

https://dspace.org/

Knowledge and lifestyle practices of hypertensive patients utilizing public and private health sectors in Umlazi Township of KwaZulu-Natal

Simamane, Mandis Jewel

2018
https://hdl.handle.net/10539/26943

Downloaded from a DSpace repository. https://dspace.org/

Knowledge and lifestyle practices of hypertensive patients utilizing public and private health sectors in Umlazi Township of KwaZulu-Natal

Mandisa Jewel Simamane,
1497887

Supervisors:

Adjunct Professor Demitri Constantinou, and
Doctor Estelle Watson

A Dissertation submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in fulfillment of the requirements of the degree of Master of Science in Medicine (Sport and Exercise Science).

Johannesburg, 2018

CONTENTS **PAGE**

DECLARATION I
DEDICATIONS II
ACKNOWLEDGEMENTS III
ABSTRACT IV
LIST OF TABLES VI
LIST OF FIGURES VII
NOMENCLATURE, DEFINITIONS OF TERMS AND ABBREVIATIONS IX

1. CHAPTER 1 – INTRODUCTORY 1
    1.1 Introduction 1
    1.2 Statement of the Problem 3
    1.3 Research Question 4
    1.4 Hypothesis 4
        1.4.1 Null Hypothesis 4
        1.4.2 Alternative Hypothesis 4
    1.5 Aim of the Study 4
    1.6 Objectives of the Study 5

2. CHAPTER 2 - LITERATURE REVIEW 6
    2.1 South African Demographics and of Umlazi Residence 6
    2.2 Non-Communicable Diseases 8
    2.3 Hypertension and Risk Factors associated with Hypertension 10
    2.4 Knowledge and Management of Hypertension (Adherence) 12
    2.5 Public and Private Health Sectors 13
    2.6 Physical Activity and Physical Inactivity 15
    2.7 Body Weight and Diet 18
    2.8 Smoking and Alcohol 20

3. CHAPTER 3 - RESEARCH METHODOLOGY 22
3.1 Study Design and Population 22
3.2 Sample Selection and Size 22
3.2.1 Inclusion Criteria 23
3.2.2 Exclusion Criteria 23
3.3 Measuring Tools and Instruments 23
3.4 Testing Procedures 25
3.4.1 Resting Blood Pressure 25
3.4.2 Body Mass 25
3.4.3 Stature 26
3.4.4 Body Mass Index 26
3.4.5 Circumference 26
3.4.5.1 Waist 26
3.4.5.2 Buttocks/Hips 27
3.4.6 Knowledge and lifestyle practices of hypertension 27
3.4.6.1 Questionnaire for Hypertensive patients 27
3.4.6.2 World Health Organization, Global Physical Activity Questionnaire 27
3.4.6.3 Diet Questionnaire 28
3.4.6.4 Smoking Questionnaire 28
3.5 Ethical and Safety Considerations 28
3.6 Data Processing and Statistical Analysis 29

4. CHAPTER 4 – RESULTS 30
4.1 Demographic Characteristics 30
4.2 Age and Anthropometric Characteristics 31
4.3 Knowledge and Management of Hypertension 34
4.4 Physical Activity 37
4.5 Diet, Smoking and Alcohol 38

5. CHAPTER 5 – DISCUSSIONS, OVERALL CONCLUDING CHAPTER WITH RECOMMENDATIONS 41

5.1 Discussion 41

5.2 Strengths and Limitations 49

5.3 Conclusions and Recommendations 50

5.4 Clinical Applications 51

6. REFERENCES 53

7. APPENDICES 65

A. Research Adverts (English and IsiZulu)
B. Participant Letter of Information
C. Participant Informed Consent Form
D. Identifying Details Sheet
E. Demographic Data Sheet
F. World Health Organization, Developing Integrated Response of Health Care Systems to Rapid Population Ageing: Questionnaire for Hypertensive patients
G. World Health Organization, Global Physical Activity Questionnaire (GPAQ)
H. Hypertensive Related Diet – Adapted From Food Frequency Questionnaire
I. Smoking Questionnaire
J. Ethical Clearance
K. KwaZulu-Natal National Department of Health Approval
L. Prince Mshiyeni Memorial Hospital Approvals
M. School's Approval
N. "Turnitin" Report

DECLARATION

I, **Mandisa Jewel Simamane,** declare that this Dissertation is my own work. It is being submitted for the Degree of **Master of Science in Medicine, Sport and Exercise Science** at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



_____

(Signature of candidate)

_____25____day of_____June_____2018_____in__Durban South Africa____

DEDICATIONS

To God be the Glory, Never would have made it without you.

To my family, thank you for the endless sacrifices and the support received for my education, even when you did not understand my career of choice but the support motivated me. I might be a handful to handle but grace carried us through.

To my daughter, Awande Lubanzi Simamane, I may have been a teenage mother when I had you but your presence in my life has taught me so much about; life, patience, selflessness, consistency, and persistency, to love another more than myself, I hope you will one day draw inspiration from this.

To my late grandmother, you may not be around with us anymore, thank you for all the life lessons you have taught me throughout your presence in my life and how much you emphasized the importance of education, this one is for you Mama.

Love always wins.

In loving memory of my grandmother
Thombi Rose Simamane
24/12/1954♥ – 15/09/2007†

Awande umusa kaNkulunkulu, uthando lwakhe Lubanzi ngokumangalisayo. Khazimula!
(May the grace of God be upon you, the depth of His love is so amazing: shine *bright!)*

ACKNOWLEDGEMENTS

I would like to acknowledge the University of the Witwatersrand for giving me the opportunity to pursue my studies in Master of Science in Medicine, Sport and Exercise Science.

I would also like to acknowledge and express my deepest appreciation to the National Research Foundation (NRF) for funding my senior years of studies, from my Bachelor of Technology (Sport and Exercise Technology), Bachelor of Science in Honours (Biokinetics) and my Master of Science in Medicine (Sport and Exercise Science), Reference Number: SFH150728132039.

I would also like to acknowledge the KwaZulu-Natal, National Department of Health and Prince Mshiyeni Memorial Hospital for granting me permission and allowing me to recruit and conduct my study in their facilities, from the staff to the patients, not forgetting the community of Umlazi Township, KwaZulu-Natal for their participation, support and spreading the word about the study.

I would also like to acknowledge my supervisors, Professor Demitri Constantinou and Doctor Estelle Watson, for their mentorship and guidance in conducting and putting my protocol and dissertation together.

ABSTRACT

Background: The South African government has taken several measures to address the evolving epidemic of non-communicable diseases (NCDs), but so far these efforts have not been effective in preventing the rising burden from these diseases. Hypertension is the most prevalent NCDs in society but unfortunately the control of this disease is suboptimal, and it is a growing health concern in all regions of the world, regardless of income. There is a substantial difference in resource availability between public and private health care sector (HCS) facilities and this result in disturbing impact on the population's health, resulting in unnecessary morbidity and mortality. Understanding the patient's knowledge, management of hypertension and its risk factors will help to identify the differences between the patients utilizing public and private health care (HC) providers in managing hypertension.

Aims: To determine patient's knowledge, management of hypertension and its risk factors between the patients utilizing public and private HC providers in managing hypertension.

Methods: A cross-sectional study design was conducted in Umlazi Townships in KwaZulu-Natal (KZN); patient's utilizing strictly public health sectors were compared to those strictly using the private health sectors. Measurements of blood pressure (BP), body mass index, waist-to-hip ratio, as well as hypertensive patients questionnaire, global physical activity question, diet and smoking questionnaire were used as measuring tools and instruments. For normally, distributed continuous data an independent two-tailed *t* test was used to determine any significant differences ($p=\leq 0.05$) and for non-normally distributed or categorical data a chi-square test was used.

Results: A total of 137 people consented to participate in this study, comparison of the demographic characteristics was made between participants' utilizing the public HCS (n=77) and private HCS (n=60). The participants average age was 65 years (±10.83) and 60 years (±9.15), for the public HCS and private HCS, respectively, the public HCS

participants were significantly older than those attending private HCS (t=2.41) (p=0.02). The average BMI for the study sample (N=137) was 30.45kg·m^2 on both the groups, classified as Obese I. No significance relationship (X^2=0.03, p=0.85) was found between the type of HC provider and having been admitted to hospital over the last year, 58.44% and 58.33% participants felt their BP was better compared to 12 months ago, in the public and private HCS, respectively. A significance relationship (X^2=3.96, p=0.05) was found between the type of HC provider the participants consulted for their hypertension and taking all prescribed medication, with public HCS (100%) participants being more likely to take their medication compared to the private HCS (95%). On average the participants global physical activity questionnaire total metabolic equivalents per week (t=0.63) (p=0.53) between the public and private HCS was 1803.12 (±4755.96) and 1385.33 (±2295.32), respectively. The public HCS (61.04% and 64.94%) had more participants that smoked regularly for ≥5 years (X^2=5.98, p=0.02) and those that drank alcohol as compared to the private HCS (38.33% and 48.33%) (X^2=3.81, p=0.05).

Conclusion: The participants of the private HCS did not tend to have better knowledge and management of hypertension and its risk factors as compared to that of the public HCS, although there were few differences between the two groups. This suggests that an intervention programme, which invests in area based specific strategies, is recommended, including healthy lifestyle and physical activity, needs to be implemented in the community of Umlazi Township in managing hypertension.

LIST OF TABLES

CHAPTER 4

Table 4.1 Demographic data characteristics for Public and Private Health Care Sector Participants 30

Table 4.2 Average of Age and Anthropometric Characteristics for Public and Private Health Care Sector 32

Table 4.3 Comparison of the Global Physical Activity Questionnaire Descriptive Data for Metabolic Equivalents level of Physical Activity between Public and Private Health Care Sector 37

LIST OF FIGURES

CHAPTER 4

Figure 4.1 Comparisons of Blood Pressure Classification Measurements between Public and Private Health Care Sector 32

Figure 4.2 Comparisons of Body Mass Index Classification Measurements between Public and Private Health Care Sector 33

Figure 4.3 Comparisons of Waist-to-Hip Ratio Classification Measurements between Public and Private Health Care Sector 34

Figure 4.4 Comparison of the Perception of Hypertension Management between Public and Private Health Care Sector 34

Figure 4.5 Comparisons of the Hypertension Complications and Hospitalizations between Public and Private Health Care Sector 35

Figure 4.6 Comparisons of Hypertension Medication and Adherence between Public and Private Health Care Sector 35

Figure 4.7 Comparisons of knowledge of Stroke's relation to Hypertension between Public and Private Health Care Sector 36

Figure 4.8 Comparisons of knowledge of Physical Activity in managing Hypertension between Public and Private Health Care Sector 36

Figure 4.9 Comparisons of Active and Inactive participants between Public and Private Health Care Sector 38

Figure 4.10 Comparison of Salt Usage while Cooking between Public and Private Health Care Sector 39

Figure 4.11 Comparison of Smoking Regularly between Public and Private Health Care Sector 39

Figure 4.12 Comparison of Alcohol Usage between Public and Private Health Care Sector 40

NOMENCLATURE, DEFINITIONS OF TERMS AND ABBREVIATIONS

BP	Blood Pressure
BMI	Body Mass Index
c	Columns
CCMDD	Central Chronic Medicines Dispensing and Distribution
CI	Confidence Interval
cm	Centimeters
Days/wk	Days per week
DBP	Diastolic Blood Pressure
GPAQ	Global Physical Activity Questionnaire
H_o	Hypothesis
HC	Health Care
HCS	Health Care Sectors
HCP	Health Care Professionals
kg	Kilogram
$kg \cdot m^2$	Kilogram-meter squared
KZN	KwaZulu-Natal
FFQ	Food Frequency Questionnaire
m	Meter
METs	Metabolic Equivalents
Mins	Minutes
Mins/wk	Minutes per week
mm	Millimeter
mmHg	Millimeter of mercury
MVPA	Moderate-to-vigorous-intensity physical activity
N	Number of total sample size
n	Number of sample size
N_0	Null Hypothesis
N_1	Alternative Hypothesis

NDoH	National Department of Health
NCDs	Non-Communicable Diseases
p - value	Probability Level
PA	Physical Activity
pa	Per annum
PHC	Primary Health Care
PR	Private
PU	Public
r	Rows
SA	South Africa
SAn	South African
SAns	South Africans
SBP	Systolic Blood Pressure
SD (±)	Standard Deviation
t	*t* test
Vs.	Versus
WHO	World Health Organization
WHR	Waist-to-Hip Ratio
X^2	Chi Square
YLL	Years of Life Lost
%	Percentage

CHAPTER 1 – INTRODUCTION

1.1 Introduction

Non-communicable diseases (NCDs) constitute the major burden of illness and disability in almost all countries of the world (Daar, et al. 2007). Non-communicable diseases are chronic medical conditions or diseases which are non-infectious; common examples include hypertension, cardiovascular disease, Type II diabetes, and cancer (Bradshaw, et al. 2008). The morbidity and mortality due to NCDs are greatest in poor populations (Schmidt, et al. 2011).These diseases are on the increase in South African (SAn) communities and they disproportionately affect poor people living in urban settings, and are driving a rise in the demand for chronic disease care (Groenewald, et al. 2008; Tollman, et al. 2008). The SAn government has taken several measures to address the evolving epidemic of NCDs (Mayosi, et al. 2009), but so far these efforts have not been effective in preventing the rising burden from these diseases (Mayosi, et al. 2009). There is insufficient multi-sectorial coordination and drive towards a concerted programme of action for NCDs in South Africa (SA) (Mayosi, et al. 2009). The SAn adult population has high levels of the risk factors associated with NCDs, and large proportions of the burden of disease can be attributed to these potentially modifiable risk factors (Medical Research Council, 2007; Norman, et al. 2007).

Hypertension is the most prevalent NCDs in society but unfortunately control of the disease is suboptimal (Saleem, et al. 2011), it is a growing health concern in all regions of the world, regardless of income level (Lackland, et al. 2015). It has disturbing impact on the population's health, resulting in unnecessary morbidity and mortality (Saleem, et al. 2011). Groenewald, et al. (2014) classified individuals as hypertensive if their average systolic blood pressure (SBP) was ≥140 mmHg or their diastolic blood pressure (DBP) ≥90 mmHg, or if they used blood pressure (BP) medication. According to Steyn, et al. (2008) the poor level of hypertension control highlights the need to identify people needing intervention for early diagnosis and cost-effective control. Hypertension is associated with consuming excess salt, high levels of stress, smoking (tobacco use), obesity, increasing consumption of unhealthy foods and low physical activity (PA) (Steyn,

et al. 2008; Daar, et al. 2007). The influence of SAn urbanization, leading to the emergence of hypertension in the black group independently of the other socio-demographic and risk factors, is reflected (Steyn, et al. 2008).

South Africa is considered a middle income country in terms of its economy, but it has health outcomes that are worse than many lower income countries (Coovadia, et al. 2009) and there is a growing burden of NCDs (Norman, et al. 2007). At the same time there is a substantial difference in resource availability between public and private health care sector (HCS) facilities (Coovadia, et al. 2009). The public HCS, comprising of government health institutions (e.g. community clinics), predominantly serves the indigent population, while the private HCS, comprising of profit organizations and individuals, serves the insured population or those who can afford care on an out-of-pocket basis (Pillay, 2009). According to Pillay (2009) the public HCS is often characterized as under resourced and overused, as well as being inefficient and ineffective in terms of meeting its mandate of accessible, affordable and appropriate health care (HC). The private HCS, on the other hand is reputed for its world-class facilities and care provision (Pillay, 2009). Most patients who utilize the public HCS in SA are from poor socio-economic groups and are generally poorly educated and may have poor knowledge and management of hypertension (Katz, et al. 2009; Steyn, et al. 2008; Seedat, et al. 2007). The socioeconomic strata imposes a massive burden on an already weak and underdeveloped public health-care delivery system that is struggling to overcome poor administrative management, low morale, lack of funding and brain drain (Chopra, et al. 2009), which also has a huge negative economic impact (Suhrcke, et al. 2006).

The SAn high unemployment rate has persisted, and income inequality has been growing and continues to be one of the highest in the world (Statistics SA, 2017). Service managers who have authority do not have insight into local needs, are geographically distant, and can be hard to reach (Mayosi, et al. 2009). The scarcity of human resources, especially at lower levels of the health system, has presented one constraint to policy implementation (Coovadia, et al. 2009). Another key constraint is that at all levels of the health system there has been inadequate stewardship, leadership, and management

(Coovadia, et al. 2009). More work is needed to refine NCD monitoring in SA, to enable the goals of the national strategic plan to be assessed and a greater focus on integrated chronic care within primary HC is needed at all levels to meet the long-term requirements for the effective management of NCDs (Groenewald, et al. 2014) and If public health is to be improved by population shifts in PA prevalence, those changes have to be affected by a change in thinking to embrace a systems approach (Kohl, et al. 2012).

Surveys provide limited geographical disaggregation and trend analysis, yet they address some monitoring gaps and are better suited to understanding the complex interplay of risk factors, demographics, equity, service availability and quality that are components of achieving universal health coverage (Groenewald, et al. 2014). An effective response to NCDs requires government leadership and coordination of all relevant sectors and stakeholders, reinforced through international cooperation (Beaglehole, et al. 2011). This will place NCDs firmly on the global development agenda, secure the commitment of Heads of State to focus governments' efforts to address the common risk factors and reverse the epidemic, mobilize the international community to take action and send a clear message to donors and funders to significantly support funding for NCDs (Bradshaw, et al. 2011).

1.2 Statement of the Problem

Hypertension is a treatable disease but its prevalence is reaching epidemic proportions in SA (Seedat, et al. 2014; Jones and Rayner, 2014). The management of hypertension may be different for patients utilizing the public HCS and private HCS (Jones and Rayner, 2014), however little research has been done in this area in SA. There are no data showing difference between the effects of services rendered in public HCS versus private HCS regarding hypertension management. Understanding the patients' social-economic status, knowledge and management of hypertension and its risk factors will help to identify the differences between the patients utilizing public and private HC providers. Furthermore, understanding these differences can assist in informing ways to strengthen the management of hypertension in the country; thus reducing the burden of disease.

Public Health Care Sectors

Defined as government-funded HC institutions (e.g. community clinics), predominantly serves the indigent population (Pillay, 2009).

Private Health Care Sectors

Defined as HC institutions that are funded by private organizations and/or individuals, comprising of profit organizations and individuals, serves the insured population or those who can afford care on an out-of-pocket basis (Pillay, 2009).

1.3 Research Question

Is there a difference between knowledge and risk factor management for hypertension between patients attending public HC and private HC facilities in SA?

1.4 Hypothesis

1.4.1 Null Hypothesis (N_0)

a) There are no significant differences between the knowledge, management, and risk factors for hypertension between participants utilizing the public and private HC facilities in SA.

1.4.2 Alternative Hypothesis (N_1)

a) There are significant differences between the knowledge, management, and risk factors for hypertension between participants utilizing the public and private HC facilities in SA.

1.5 Aim of the Study

The main aim of the study was to identify the differences in knowledge and management of hypertension, as well as risk factors for hypertension, in patients utilizing in the public HCS compared to the private HCS in Umlazi Township, KwaZulu-Natal (KZN).

1.6 Objectives of the Study

The objectives of this study were to:

a) Compare blood pressure differences between participants utilizing public HCS and private HCS.
b) Compare the knowledge and management of hypertension between participants utilizing public HCS and private HCS.
c) Compare hypertension risk factor management (body weight, level of physical activity, diet and smoking history) between participants utilizing public HCS and private HCS.

CHAPTER 2 - LITERATURE REVIEW

2.1 South African Demographics and of Umlazi Residence

Non-communicable diseases are emerging in both rural and urban areas, most prominently in poor people living in urban settings, and are resulting in increasing pressure on acute and chronic health-care services (Mayosi, et al. 2009; Tollman, et al. 2008; Groenewald, et al. 2008). The SAn constitution binds the state to work towards the progressive realization of the right to health (Coovadia, et al. 2009), and yet years after democracy, the country is still grappling with massive health inequities (Coovadia, et al. 2009). In nominal terms, public-health spending has increased from R18.7 billion in 1995/6 to over R220 billion in 2019/20, which in real 2015/16 terms is an increase from R68.0 million to R176.5 million (Mark, et al. 2017). The uninsured population (ie. population without medical aid) has also grown substantially over time (Mark, et al. 2017). Findings by National Income Dynamic Study, (2014) medical scheme coverage and access to private HC facilities for African/ Black population was 20.3% in 2015. Chopra, et al. (2009) mentioned that expansion of basic services and a massive increase in social and welfare benefits have reached nearly a quarter of the population, but health problems and social inequalities that are rooted in poverty persist (Chopra, et al. 2009). There are also substantial inequities in health between provinces and also within provinces (Coovadia, et al. 2009).

Data published by Blecher, et al. (2008) suggest that differences in public health expenditure between rich and poor health districts have substantially narrowed, with greatly increased expenditure in poor districts and SA is still struggling to establish an effective district health system (Chopra, et al. 2009). The Constitution places the responsibility on government to ensure that these services are provided to the entire population within the limits of available resources (Statistics SA, 2016). Ataguba, et al. (2011) suggest that SA represents a classic example of the inverse care law; the lowest socio-economic groups bear the largest burden of ill-health but have the lowest level of health service utilisation and derive the least benefits from service use. Ataguba, et al. (2011) further demonstrated that the burden of the major categories of ill-health and

disability is greater among lower socio-economic groups in SA. Even NCDs, which are frequently seen as disease of affluence, are increasingly being reported by lower socio-economic groups (Ataguba, et al. 2011). Research suggests that these so-called diseases of lifestyle are becoming more evenly distributed across socio-economic groups in SA (Ataguba, et al. 2011), yet the poor often cannot afford to seek care when ill (Ataguba, et al. 2011). The household survey data showed that the risk factors of hypertension and obesity increase with increasing wealth, while most of the lifestyle factors, such as light smoking, domestic exposure to ‘‘smoky’’ fuels and alcohol dependence were associated with poverty (Schneider, et al. 2009). The findings remain relevant to policy making as the mortality patterns change relatively slowly over time and it would still be expected that NCDs and lifestyle-related risk factors are prevalent among the poor (Schneider, et al. 2009).

Umlazi Township is an urban area located in southwestern Durban, which is considered part of the largest townships in SA, after Soweto (Ngubane, 2014; Mullick, et al. 2005), with an estimated population reaching nearly 2,000,000 (Mullick, et al. 2005). Umlazi Township falls under the eThekwini Metropolitan Municipalities (Statistics SA, 2016). In 2016 eThekwini Metropolitan Municipalities had a total population of 3 661 911, with 913 395 of the population living in formal main dwelling, 48 601 lived in traditional main dwelling, 149 634 lived in informal main dwelling and 7 760 fell under ‘other’ main dwelling (Statistics SA, 2016). According to KA Economic Development Consulting CC, (2013), Umlazi has a population estimated at 550 000 to over 1 million. The housing settlements consist of a mixture of formal and informal housing (Nsibande, et al. 2013), with approximately 30%- 60% of the population living in informal housing, of which Zakheleni is most prominent (Ngubane, 2014; KA Economic Development Consulting CC, 2013). Of the population, 46% are young people between the ages of 15 and 34 years, 40% are unemployed and 33% are not economically active (Ngubane, 2014). In 2013 Umlazi Township was served by a district hospital and 10 PHC facilities (Nsibande, et al. 2013), in 2016 they were served by 17 PHC clinics (Hill, et al. 2016).

In SA, typical and extensive poverty and inequalities exist in socio-economic status and in access to basic social services between population groups, provinces, and social – economic groups (Ataguba and Akazili, 2010; Coovadia, et al. 2009) and these help to exacerbate inequalities in health (Ataguba, et al. 2011). Inequalities in health, especially with reference to the burden of ill-health on the poor, have received considerable attention among health scientists and economists (Gwatken, 2000). While health systems, together with the wider social determinants of health, are relevant in seeking to improve health status and health inequalities, those that need good quality HC seldom get to it (Ataguba, et al. 2011). Studies on the burden of ill-health in SA have consistently shown that, relative to the wealthy, the poor suffer more from disease and violence (Ataguba, et al. 2011).

2.2 Non-Communicable Diseases

Non-communicable diseases disproportionately affect individuals who are poor thus increasing inequalities (World Health Organization, 2008). Most are chronic and can lead to continued expenditures that trap poor households in cycles of debt and illness, perpetuating health and economic inequalities (Beaglehole, et al. 2011). The inequality is associated with high levels of poverty (Schneider, et al. 2009). Reduced access to comprehensive services for prevention and treatment of NCDs arise because of financial reasons and weak health systems (Beaglehole, et al. 2011). Non-communicable diseases diminish household earnings and a family's ability to provide for and educate children; and expenditure on tobacco contributes to household poverty (World Health Organization, 2004). People who are poor live in settings where policies, legislation, and regulations to tackle NCDs either do not exist or are inadequate (Beaglehole, et al. 2011). The loss of productivity reduces a society's effective labour force, resulting in reductions in overall economic output (Beaglehole, et al. 2011). On the basis of this evidence, the World Economic Forum now ranks NCDs as one of the top global threats to economic development (World Economic Forum, 2011).

The NCDs have similar population attributable risks, although their relative risks (Shavelle, et al. 2008) and prevalence are somewhat different (Wen, et al. 2012). Prominent yet largely preventable behavioural risk factors associated with NCDs around

the globe – either directly or indirectly are risk factors such as increased smoking, improper diet, obesity, harmful alcohol consumption and physical inactivity (Wen, et al. 2012; Cecchini, et al. 2010; Mayosi, et al. 2009; Daar, et al. 2007). This results in a high number of cases of uncontrolled hypertension, diabetes, hyperlipidaemia, cardiovascular disease, diabetes, cancer and chronic respiratory diseases (Mayosi, et al. 2009; Puoane, et al., 2008; Steyn, et al. 2008). The combination of these diseases extends across all age-groups, nationalities and classes (Chopra, et al. 2009; Daar, et al. 2007). The SAn adult population has high levels of these risk factors, and large proportions of the burden of disease can be attributed to these potentially modifiable risk factors (Medical Research Council, 2007; Norman, et al. 2007).

The multiple risk factors for NCDs operate at different levels, from the most proximal (i.e. biological), to the most distal (i.e. structural) (Puoane, et al. 2008). These risk factors can be classified as 'modifiable' and 'non-modifiable' (Puoane, et al. 2008). Modifiable determinants include factors that can be altered, such as individual and community influences, living and working conditions and socio-cultural factors (Puoane, et al. 2008). On the other hand, non-modifiable determinants include those factors that are beyond the control of the individual, such as age, sex and hereditary factors (Puoane, et al. 2008). Treatment of chronic diseases puts much strain on the already overburdened health system, because of the additional resources required (Puoane, et al. 2008). Investment in interventions to control the modifiable risk factors and thereby reducing the burden of chronic diseases can bring economic benefit to the country in the long term (Puoane, et al. 2008).

Chronic diseases have a major economic impact on individuals, families, the health system and society at large (Puoane, et al. 2008). Some populations are susceptible to chronic disease because of inherited genes (Puoane, et al. 2008). Previously, NCDs were thought to be diseases of the affluent, but poor populations are now equally affected (Puoane, et al. 2008. The morbidity and mortality due to NCDs are in fact greatest in the poor population (Schmidt, et al. 2011). There is insufficient multi-sectorial coordination and drive towards a concerted programme of action for NCDs in SA (Mayosi, et al. 2009).

Despite increasing awareness and commitment to address chronic disease, concrete actions by global partners to plan and implement cost-effective interventions are inadequate (Alwan, et al. 2010).

South Africa has seen its government take several measures to address the evolving epidemic of NCDs (Mayosi, et al. 2009). According to Schneider, et al. (2009), NCDs are prominent over the age of 40 years, particularly in the more affluent districts. A SAn comparative risk assessment study in 2000 identified the major risk factors and causes of death among South Africans (SAns); among the top 10 diseases and conditions contributing to mortality were the following NCDs: ischaemic heart disease, stroke, hypertension and diabetes mellitus (Puoane, et al. 2008). The burden of such diseases in low-income and middle-income countries is rapidly increasing and already has major adverse social, economic, and health effects (Horton, 2007; World Health Organization, 2005). Analysis from Alwan, et al. (2010) also shows that, in high-burden countries, the capacity to effectively deal with the existing and projected burden of NCDs is inadequate. Shortage of health service inputs (staff, drugs, and equipment) often mean that appropriate care is not available (Gilson, et al. 2007). The key barriers to care are unaffordable costs to households, weak availability of inputs and services, and poor acceptability (Goudge, et al. 2009). The available information suggests that these conditions as well as risk factors are also poorly identified and inadequately treated, particularly among the poor (Schneider, et al. 2009). The indicators of the control of NCDs suggest that there is a need to improve HC for people with NCDs in all sectors of SAn society (Schneider, et al. 2009).

2.3 Hypertension and Risk Factors associated with Hypertension

The significant increase in hypertension in recent years, as well as inadequate diagnosis and control of raised BP predicts an increase in strokes and heart attacks in the years to come (Ardington, et al. 2009; FAO Food Balance Sheet, 2007). This scenario has massive impact on the population's health, resulting in unnecessary morbidity and mortality (Saleem, et al. 2011). It can be controlled with diet and PA and prescribed medication, which may need to be taken for life (Puoane, et al. 2008). The prevalence of

diabetes and hypertension is rising in parallel with that of excess weight; with these increases being associated with unfavourable changes of diet and PA (Schmidt, et al. 2011), in which less privileged ethnic and racial groups bear a disproportionately large share of the resultant burden (Schmidt, et al. 2011). The Prevalence of hypertension in KZN, in African/ Black females aged 55-64 years was 59.1% and 65+ yeas was 71.1% on the other hand African/ Black males 55-64 years was 48.2% and 65+ years was 77.5% (SA Labour and Development Unit, 2016). Ataguba, et al. (2011) found that hypertension was more concentrated among lower than higher income groups, and yet, according to Schneider, et al. (2009) hypertension and obesity show a clear gradient, with the proportions among the richer quintiles being higher than among the poorest after adjusting for age, hypertension and obesity were clearly associated with increasing wealth. Pathology consequences differ, with stroke being a feature for both the poorest and the wealthiest, but is accompanied by ischaemic heart disease for the richest and hypertensive heart disease for the poorest (Schneider, et al. 2009).

Predisposing factors such as high salt intake and increasing levels of obesity must be addressed to reduce blood pressure in the future, and improved hypertension detection and treatment are needed (Bradshaw, et al. 2011). South Africa has already intervened to reduce salt intake, a policy that has been shown to be cost-effective (Webb, et al. 2017; Watkins, et al. 2016), and is embarking on consultations regarding a tax on sugar-sweetened beverages (Day and Gray, 2017). Poor adherence to lifestyle interventions and medication-taking is problematic (Webber, et al. 2013). Within the context of hypertension management, a number of factors are targeted as influencing agents but non-adherence to treatment is still counted as one of the major contributing factors to poor management and control of hypertension (Saleem, et al. 2011).

2.4 Knowledge and Management of Hypertension (Adherence)

Knowledge of risk-factors provides a more complete picture of the epidemiologic transition as well as lessons for how the risk factors can be reduced and managed in countries at all levels of economic development, applying various preventive strategies (Ezzati and Riboli, 2012). Despite the large number of studies on patient adherence to lifestyle modification in chronic diseases such as hypertension, poor adherence to these modifications persists (Gohar, et al. 2008; Jokisalo, et al. 2002). Patient adherence should be more than just adherence to medication prescription; it should include keeping clinic appointments, participating in regular exercise and adherence to recommended dietary and other lifestyle changes (Miller, et al. 2002). Patients' main reasons for not adhering to lifestyle recommendations are unwillingness, difficulty in adhering to diets that are different from the rest of the family, the cost of prudent diets, the lack of time for exercise and the presence of other illnesses (Serour, et al. 2007). New strategies are needed in order to identify successful methods to help patients adopt and maintain healthy lifestyle practices (Munro, et al. 2007).

Diagnosis and education from a health facility is the basis for the knowledge of the presence of the condition (Ataguba, et al. 2011). In a study by Saleem, et al. (2011) in Pakistan also found that although the patients had average knowledge about hypertension, the level of adherence was poor. It is often believed that knowledge is one key factor in achieving better adherence (Saleem, et al. 2011). The awareness and control of hypertension were both associated with an increasing wealth gradient (Schneider, et al. 2009). However, even the wealthiest quintile did not reach high levels of control. For example, the control of hypertension for the wealthiest quintile ranged from 39.0% for men to 54.7% for women (Schneider, et al. 2009). The pattern of medication use for hypertension, where women with hypertension were using medication more frequently than men, women were more aware of and had better hypertension control than men (Schneider, et al. 2009).The apparent reason for the outcomes and opinions may be due to differences in the concept and definition of adherence and knowledge (Saleem, et al. 2011). Other factors such as age, gender, low socioeconomic status, prescribed drugs, posology, lack of social support, poor patient provider relationship, cost,

forgetfulness, and presence of psychological problems (especially depression) should also be kept in mind and evaluated before coming to any conclusion (Osterberg and Blaschke, 2005).

According to Saleem, et al. (2011) knowledge had inverse relationship to drug adherence, suggesting that there are other factors for the patients' non-adherence which needs to be explored. Limited interaction of the patient with the HC professional may be one reason for poor adherence (Saleem, et al. 2011). A large proportion of the patients did not have a clear understanding of the disease they were suffering from, and had little information on treatment and management of hypertension (Saleem, et al. 2011). Healthcare professionals can play a major role in informing patients of proper drug usage and a collaborative care approach should facilitate the education of patients about the benefits of medications and the importance of continuous medication use especially in the treatment and management of chronic diseases (Saleem, et al. 2011).

2.5 Public and Private Health Care Sectors

The health system has relevance to the social determinants of health and plays an important role in improving health status and addressing health inequalities (Gilson, et al. 2007). South Africa has a dual health system (Pillay, 2009). South Africa has a public and private HCS resulting in considerable inequalities in access to HC (Bradshaw, et al. 2011). In 2009, the public HCS was responsible for the well-being of 82% of the population, it accounts for only 40% of the total health expenditure in SA (Pillay, 2009), on the other hand, in 2005 the private HCS consumed 60% of the health expenditure and is responsible for less than 20% of the population (Health System Trust: Annual Health Review, 2005). The current healthcare system is born out of the country's apartheid legacy, and consequently there are systemic, and often stark, differences in healthcare outcomes by race (Coovadia, 2009; Bradshaw, 2008) and geography, e.g. by province (Statistics South Africa, 2014) or different neighbourhoods in the same city (Groenewald, et al. 2008). The private, for-profit hospital sector is well resourced and caters to a population that tends to be wealthier, urban and more likely to be formally employed (Ranchod, et al. 2017). The public-hospital sector, catering to the majority of SAns, faces

lower human-resourcing ratios, financial constraints and ageing infrastructure (Ranchod, et al. 2017). The research provides evidence of the polarization between public and private facilities: private facilities consistently scored above public facilities across a range of accreditation categories, and there was far greater variability in the scores achieved by public facilities (Ranchod, et al. 2017). The same polarised relationship was found to hold across key sub-components of the scores, such as management and leadership of hospitals in the two sectors (Ranchod, et al. 2017).

Even as diseases of lifestyle are becoming evenly distributed across socio-economic groups in SA, the poor often cannot afford to seek care when ill (Ataguba, et al. 2011). Ataguba et al. (2009) also showed that in SA the distribution of health service utilisation and of the benefits (measured in monetary terms) from using service is skewed in favour of the rich for most public facilities, especially hospitals and across all private sector services. Inequalities in health may be defined as the variations in health status across individuals in populations (Gakidou, et al. 2000). It is important to note that the measure of inequality may be sensitive to the choice of socio-economic status measure (Chuma and Molyneux, 2009). The inequities in access to HC are worsening (Harris et al. 2011) as in the past decade private hospital and specialist costs have increased to more than the consumer price index, (Council for Medical Schemes, 2009) and distribution of specific skilled human resources is skewed to the advantage of the private sector (Mayosi, et al. 2012).

It is to be expected that some of the reported problems encountered in health delivery in the public HCS are correlated with health outcomes (for example, cleanliness, drug availability and incorrect diagnosis) (Ranchod, et al. 2017). Long waiting times may also have impacted adversely on outcomes because the high time cost of a clinic visit may result in patients delaying healthcare consultations (Ranchod, et al. 2017), resulting in delays in diagnosis and treatment (Prentice, et al. 2008). Over recent years, a central chronic medicines dispensing and distribution (CCMDD) programme has been initiated in most provinces to dispense chronic medicines at external pick-up points such as community halls and private pharmacies (Mark, et al. 2017). This has the potential to

improve efficiencies by reducing the need for stable patients to visit public PHC facilities to collect chronic medicines (Mark, et al. 2017). This is important for HIV and AIDS, hypertension, diabetes and other chronic-disease patients (Mark, et al. 2017).

Work satisfaction is also an essential part of ensuring high-quality care (Pillay, 2009). Pillay, (2009) proved that work satisfaction of nurses is important, as there is sufficient empirical evidence to show that it tends to affect individual, organizational and greater health and social outcomes. The greatest differences in satisfaction levels of the nurses were with regard to safety, resources available, workload, their careers and their relationship with management, respectively (Pillay, 2009). The differences in satisfaction are related to the work context: safety, resources, workload and work schedule, management, pay and autonomy (Pillay, 2009). Excessive workload has been shown to significantly contribute to public HCS and private HCS nurses' dissatisfaction in SA (Pillay, 2009). The biggest difference in satisfaction levels was in the perceived levels of safety in the workplace–personal safety, risk of infection, risk of injury and the physical work environment (Pillay, 2009). Private sector nurses were dissatisfied only with their pay and career development opportunities (Pillay, 2009).

2.6 Physical Activity and Physical Inactivity

Physical Activity is defined as any body movement produced by the contraction of skeletal muscles that result in a substantial increase in caloric requirements over resting energy expenditure (Caspersen, et al. 1985). Warburton, et al. (2006) defined physical fitness as a physiologic state of well-being that allows one to meet the demands of daily living or that provides the basis for sport performance, or both. Health-related physical fitness involves the components of physical fitness related to health status, including cardiovascular fitness, musculoskeletal fitness, body composition and metabolism (Warburton, et al. 2006). Participating in moderate intensity, aerobic PA for a minimum of 30 minutes on 5 days a week or vigorous intensity, aerobic activity for a minimum of 20 minutes on 3 days a week (Haskell, et al. 2007). Regular PA of 150 minutes/week of moderate intensity PA reduces the risk of numerous chronic diseases, preserves health and function (both physical and mental) into old age and extends longevity (Blair and

Morris, 2009). Evidence indicating that proper levels of PA are associated with a 30% reduction in the risk of ischaemic heart disease, approximately 3.2 million deaths each year are attributable to insufficient PA (Beaglehole, et al. 2011). Increasing mechanization at work and getting about, more attractive sedentary options for leisure time and engineering of energy expenditure out of daily life combine to reduce the volume of PA and increase the amount of sitting for the majority in modern society (Blair and Morris, 2009). Evidence emerges that these conditions constitute a major threat to the health of individuals and the overall public health (Blair and Morris, 2009).

Physical Activity is a major independent, modifiable risk factor that has a protective effect for many NCDs (Armstrong and Bull, 2006); it continues to take on an increasingly important role in the prevention and treatment of multiple chronic diseases, health conditions, and their risk factors (ACSM, 2013). Kohl, et al. (2012) mentioned PAs role continues to be undervalued despite evidence of its protective effects and the cost burden posed by present levels of physical inactivity globally. Exercise has been called a miracle drug (Pimlott, 2010) and substantially extends lifespan (Wen, et al. 2011), yet socially, being inactive is perceived as normal, and in fact doctors order patients to remain on bed rest far more often than they encourage exercise (Lee, et al. 2012). Accumulation of 30 minutes of moderate intensity activity such as brisk walking, on at least 5 days a week, can provide important health benefits (Blair and Morris, 2009). There appears to be a linear relation between PA and health status, such that a further increase in PA and fitness will lead to additional improvements in health status (Warburton, et al. 2006). It is becoming clear that moderate amounts and intensities of PA also can have substantial health benefits (Blair and Morris, 2009). Evidence is beginning to emerge that exercise also enhances brain health (Lautenschlager, et al. 2008). Investigations have revealed even greater reductions in the risk of death from any cause and from cardiovascular disease (Warburton, et al. 2006). This is important because, for a long time, rest and physical inactivity had been recommended for patients with heart disease (Warburton, et al. 2006).

Physical inactivity is a global pandemic that requires global action, and causes not only morbidity and mortality, but also a major economic burden worldwide (Ding, et al. 2016; Kohl, et al. 2012). The economic burden of physical inactivity is distributed unequally across regions, and disproportionately in relation to the disease burden (Ding, et al. 2016). This is likely to be driven by differential levels of economic development, and consequentially health-care expenditure (Ding, et al. 2016). Physical inactivity has a major health effect worldwide (Lee, et al. 2012). It is the fourth leading cause of death worldwide (Kohl, et al. 2012), causing about 3 million or 8% of all deaths per year from NCDs (Beaglehole, et al. 2011). Lee, et al. (2012) presented persuasive evidence that 6–10% of all deaths from NCDs worldwide can be attributed to physical inactivity, and this percentage is even higher for specific diseases. It is also increasingly becoming prevalent in low- and middle income countries and already constitutes one of the leading causes of mortality (World Health Organization, 2009). Although physical inactivity has begun to be recognized as the fourth type of exposure that needs to be addressed for control of NCDs (World Health Organization, 2011), it is pandemic, a leading cause of death in the world, and clearly one of the top four pillars of a NCDs strategy (Kohl, et al. 2012).

Low fitness is one of the strongest predictors of mortality and also accounts for more deaths in the population than other risk predictors such as smoking, hypertension, elevated cholesterol, obesity and diabetes (Blair and Morris, 2009). Evidence presented by Lee, et al. (2012) shows that physical inactivity increases the risk of many adverse health conditions, including major NCDs such as coronary heart disease, type 2 diabetes and breast and colon cancers and shortens life expectancy. These relative risks are similar to those for hypertension, hypercholesterolemia and obesity, and they approach those associated with moderate cigarette smoking (Warburton, et al. 2006). On the other hand physical inactivity burdens society through the hidden and growing cost of medical care and loss of productivity. Getting the public to exercise is a public health priority because inactive people are contributing to a mortality burden (Wen, et al. 2012). In view of the prevalence, global reach, and health effect of physical inactivity, the issue should be appropriately described as pandemic, with far-reaching health, economic, environmental, and social consequences (Kohl, et al. 2012). If PA is not retained, the four

factors that are meant to support NCDs prevention (PA, tobacco control, diet, and alcohol) will be effectively reduced unacceptably to only three (Kohl, et al. 2012).

2.7 Body Weight and Diet

Global energy imbalances and related obesity levels are rapidly increasing (Popkin, 2006). Human diet and nutritional status have undergone a sequence of major shifts among characteristic states— defined as broad patterns of food use and corresponding nutrition-related disease (Popkin, 2006). Dietary changes appear to be shifting universally toward a diet dominated by higher intakes of animal and partially hydrogenated fats and lower intakes of fibre (Popkin, 2006). South Africans are increasingly eating a typical Western diet comprising increased calorie intake, fat (particularly saturated fat), animal protein and sugar, but a lower intake of unrefined carbohydrate and fibre (Puoane, et al. 2008; Steyn, et al. 2006). There is low intake of fruit and vegetables and salt intake has also been increasing over this period (Steyn, et al. 2006).

Obesity is a well-recognized risk factor for various chronic diseases such as cardiovascular diseases, hypertension and type 2 diabetes mellitus (Ziraba, et al. 2009). These conditions not only lead to reduced quality of life, they also lead to premature death (Ziraba, et al. 2009). Other factors that have been shown to be associated with a higher risk of overweight and obesity include genetic predisposition, metabolic disorders, gender and physical environmental factors (Kamadje, et al. 2006; Fezeu, et al. 2006).

Body weight is considered normal when the body mass index (BMI, calculated by dividing weight by height squared) is between 18 and 25 $kg \cdot m^2$ (Bradshaw, et al. 2011). A BMI between 25 and 30 is considered overweight and that of 30 or above is obese (Bradshaw, et al. 2011). Joubert, et al. (2007) found that increased body mass index (BMI) was associated with type 2 diabetes mellitus, hypertensive diseases, ischaemic stroke, cancer and osteoarthritis (Joubert, et al. 2007). Excess body weight is associated with an increased risk of diseases (Puoane, et al. 2008) and obesity is associated with diabetes, hypertension and other metabolic abnormalities that predisposes to NCDs (Bradshaw, et al. 2011). Although, Yusuf, et al. (2005) found that waist-to-hip ratios (WHR) give an

indication of central or abdominal obesity and have been shown to be better indicators of cardiovascular disease resulting from obesity than BMI. The risks of diabetes and ischaemic heart disease increase monotonically with an increase in the body-mass index, starting at a BMI in the low 20s (Ezzati and Riboli, 2016). South African women have extremely high levels of overweight and obesity (Bradshaw, et al. 2011). Obesity amongst women remains higher than that of men (Puoane, et al. 2008), although, in the past years, there has been a significant increase among men and more than 45% of those above 35 years are overweight or obese (Ardington, et al. 2009).

Poor dietary quality (in particular, high salt intake, high saturated and trans-fatty acid intake, and low fruit and vegetable consumption) and insufficient PA are key risk factors for NCDs development (Cecchini, et al. 2010) and mortality worldwide (Lim, et al. 2012). The mean salt intake in most low- and middle-income countries exceeds the recommended maximum intake (Brown, et al. 2009). A high intake of salt is a risk factor for stomach cancer and also for elevated blood pressure, which in turn increases the risk of stroke, other cardiovascular diseases, chronic kidney disease, and kidney cancer (Ezzati and Riboli, 2016). Consuming large amounts of food with high levels of saturated fat and trans fatty acids, along with foods high in cholesterol, results in an increase of cholesterol, which increases the risk of a heart attack (Steyn, 2006). An improved low calorie diet and regular PA is required to reverse this trend (Bradshaw, et al. 2011).

Nutrition is a major modifiable determinant of chronic NCDs, with scientific evidence supporting the view that alterations in diet and physical activity have effects on health throughout life (Puoane, et al. 2008). These proposed reductions could have resulted in 7400 fewer cardiovascular deaths and 4300 fewer non-fatal strokes per year in 2011 than in 2008, and cost savings of up to R300 million per year in SA (Bertram, et al. 2012). Given that the measurement of salt consumption is difficult and the crude measure of salt consumption in their study, lowering the intake of salt is nonetheless an important strategy to reduce hypertension (Sacks, et al. 2001). Healthy food should become accessible and attainable to all in order to help prevent and control chronic lifestyle diseases (Seedat, et al. 2006). Despite appropriate dietary recommendations, appropriate food remains

inaccessible and unaffordable for poor people, such as the cohort in the study by Seedat, (2007), in developing countries.

2.8 Smoking and Alcohol

The majority of the more than 1 billion smokers worldwide now live in low- and middle-income countries (Ezzati and Riboli, 2016). As the use of tobacco has increased in many low-income and middle-income countries tobacco use has fallen in many high-income countries, at least in men (Beaglehole, et al. 2011). In the older age group of 45 years and older 41% of men and 21% of women use tobacco daily (Bradshaw, et al. 2011). Tobacco smoking and exposure to second hand smoke together are responsible for about 6.3 million annual deaths worldwide and 6.3% of the global burden of disease, mostly in low and middle-income countries (Lim, et al. 2012). Poor people are at greater risk of smoking (albeit light smoking), and are at greater risk of being exposed to ‘‘smoky’’ fuels in the home (Schneider, et al. 2009). Schneider, et al. (2009) also found that heavy smoking was significantly more frequent among the wealthiest men and women. Tobacco use alone accounts for one in six of all deaths resulting from NCDs (Beaglehole, et al. 2011). Tobacco use is one of the most modifiable risk factors and preventable causes of death in the world (Puoane, et al. 2008), but it has been associated with premature mortality amongst users, with cardiovascular disease causing most deaths (Puoane, et al. 2008).

Prevention and cessation remain the only effective public health measures to reduce the harmful effects of smoking (Ezzati and Riboli, 2016). South Africa has been a global leader in adopting legislation for tobacco control, with some signs of an effect (Bradshaw, et al. 2011; Puoane, et al. 2008). The promulgation of comprehensive tobacco control legislation has resulted in the reduction in tobacco use, particularly for men above 25 years (Bradshaw, et al. 2011). South Africa has also used pricing of tobacco products as a disincentive to cigarette smoking (Puoane, et al. 2008). ‘Sin taxes’ for tobacco have increased every year as part of the policy for reducing the use of tobacco (Malan and Leaver, 2003). The Act protects children and adolescents, by banning advertising and also ensures the rights of non-smokers to a clean environment, unpolluted by tobacco

smoke (Puoane, et al. 2008). South Africa has been a global leader in developing and implementing appropriate legislation for tobacco control (Puoane, et al. 2008). . Although a review by the (Department of Health and Human Services, 2010) concluded that “five decades of evolving cigarette design had not reduced overall disease risk among smokers.”

On the other hand alcohol consumption is associated with numerous diseases and injuries (Ezzati and Riboli, 2016). Alcohol consumption is responsible for about 2.7 million annual deaths and 3.9% of the global burden of disease (Lim, et al. 2012). Moderate alcohol consumption has been inversely associated with the risk of cardiovascular diseases and diabetes, although the benefits may be greater for persons with existing cardiovascular risk factors than for those without such risk factors (Roerecke and Rehm, 2012). Epidemiologic studies that have measured both the amount and patterns of alcohol consumption have shown that heavy episodic (or binge) drinking not only substantially raises the risk of injuries but can also increase the risk of hypertension, which it can exacerbate cardiovascular disease and liver disease (Rehm, et al. 2010; Roerecke and Rehm, 2010; Mathurin and Deltenre, 2009). Since 1994, alcohol policy development has taken place in piecemeal fashion, but progress has been made in several areas including reducing allowance blood alcohol levels in drivers, requiring warning levels on alcohol containers, increasing excise taxes on alcohol products and imposing greater controls on alcohol packaging (Parry, 2010). Limited policy action (e.g. increasing excise tax on alcohol) has not yet resulted in any improvements and further actions are needed (Bradshaw, et al. 2011).

CHAPTER 3 - RESEARCH METHODOLOGY

3.1 Study Design and Population

The study used a cross-sectional study design as a method of data collection. The sample population was taken from black ethnic community, Umlazi Townships in KZN. Participants who met the inclusion criteria (as described below) and who utilized strictly public HCS or strictly private HCS to manage their hypertension were invited to participate. Umlazi Township is still facilitated by 1 primary hospital (Prince Mshiyeni Memorial Hospital) which caters for more than five other townships, in the south of Durban (Umlazi, Lamotville, Umbumbulu, Kwamakhutha, Adams Mission, etc).

3.2 Sample Selection and Size

The study used a convenience sampling of participants in a form of advertisement followed by snowball sampling of participants and word of mouth in and around the area of Umlazi Townships, KZN. The printed advertisements (Appendix A) were placed on clinics advertisement walls, the doctor's rooms and community halls, with approval by designated personnel. The advertisements had the details of the study and contact details of the researcher in order for those interested in participating in the study to reach the researcher. Participants that consented and were included in the study were also asked to recommend and tell other people in the community about the study and if they were interested to contact the researcher or the researcher contacted them. The researcher then visited participants at the requested venues of testing (e.g. hospital, clinics, home visits or community halls).

A sample size of participants was calculated based on the rough estimates of the SAn statistics, 2015 (Mortality and causes of death in SA, 2014: Findings from death notification). The ten leading underlying natural causes of death (hypertensive disease) in KZN by age (45-64 years) and sex (both genders). The confidence level of 95%, statistical power of 95% and response distribution of 50% was calculated. The estimated required sample size was 259 participants.

3.2.1 Inclusion Criteria

Inclusion criteria, included males and females;

a) Individuals diagnosed with hypertension by a medical doctor, nurse and/or healthcare professional.
b) Individuals taking antihypertensive medication prescribed by a medical doctor.
c) Individuals who utilized strictly public HCS or strictly private HCS to manage hypertension.
d) Individuals living in the areas of Umlazi Townships of KZN.

3.2.2 Exclusion Criteria

Exclusion criteria, included;

a) Individuals who utilize both public HCS and private HCS to manage hypertension.
b) Individuals who present with pre-hypertension.
c) Individuals diagnosed with hypertension, who present with physical disability or suffering and/or recovering from stroke or any other co-morbidity that may affect their physical abilities.
d) Individuals diagnosed with hypertension, but are not currently taking hypertensive medication.
e) Individuals with mental or physical disabilities that would prevent them from answering the questionnaires.

3.3 Measuring Tools and Instruments

Firstly, the participants were greeted; the researcher introduced herself to the participants and explained the purpose of the research and the proceeding of the data to be collected in the language they understand. Questions were allowed and answered accordingly, the participation was then confirmed verbally and that the participants understood the proceeding of the research and testing. Secondly, the participants were provided with information sheet (Appendix B) to read through and then the Informed Consent form (Appendix C) to sign. The information sheet and informed consent form were described and declared the researchers and participants responsibilities, as well as describe in full the purpose of the study. The researcher then took the participants identifying details

(Appendix D) on a separate sheet, and assigned the participant to a specific study number that linked to the participant's research data collection. Only the researcher had access to the participants identifying document with the details, this document was kept in a separate location from the data collection sheets and with restricted access to it (participants identifying details). Thirdly, the participants were familiarized with the measurement testing procedures, the researcher took the following measurements - BP, body mass and stature (to calculate BMI), waist circumference and hip circumference (to calculate WHR), and measurements were taken according to the testing procedure listed below. Lastly the participants answered the questionnaires after being familiarized with them by the researcher. In cases where participants did not understand the questions, the researcher explained the question in a language they understood.

The questionnaires started with the demographic data questionnaire (Appendix E) recording age, ethnicity, marital status, level of education, occupation, household income, service HC provider. The demographic data collected was used to assist in describing the socioeconomic and educational levels of the participants, but were not used as a formal objective of the study. The next questionnaire that was answered was the World Health Organization's (WHO) Developing Integrated Response of HC System to Rapid Population Ageing, Questionnaire for Hypertensive patients (Appendix F), and this questionnaire was used to measure knowledge and management of hypertension of the participants. The WHO's Global Physical Activity Questionnaire (GPAQ) (Appendix G) was used next, to measure level of PA. The last questionnaires that were answered were: Hypertensive related diet questionnaire adapted from the Food Frequency Questionnaire (FFQ) (Appendix H) and lastly history of smoking questionnaire (Appendix I).

3.4 Testing Procedures

All the information on the measurements that were used, were tested, record on demographic data sheet (Appendix E) and the norms calculated according to the American College of Sports Medicine (ACSM) guidelines; ACSM. (2013). ACSM's Guidelines for exercise testing and prescription.9th ed. Lippincott Williams & Wilkens.

Reliability: All measurements were taken by the researcher who had undergone a period of familiarisation and intra-rater reliability checking.

Validity: All measures are used routinely in studies of this nature and are valid.

3.4.1 Resting Blood Pressure

Each participant was asked to sit quietly for at least 5 min in a chair with back support, with their feet on the floor and their arms supported at heart level. Participants were asked if they smoked or drank caffeine 30 minutes prior to testing. If they answered yes to either question, they were then asked to sit for 30 minutes before the testing could proceed. A BP cuff (HI-CARE$_{INT}$) and the stethoscope (HI-CARE$_{INT,}$ KT-102) was used to measure BP, the BP cuff was wrapped firmly around upper arm at heart level (on the left side); cuff was aligned with brachial artery. The appropriate cuff size was used to ensure accurate measurement. It was ensured that the bladder within the cuff encircled at least 80% of the upper arm. At least 2 measurements were taken (minimum of 1 minute apart) and the average was recorded (mmHg).

ACSM, (2013); The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (2003) defines individuals with a SBP <120mmHg and/or DBP <80mmHg as 'Normal', 'Prehypertension' as SBP 120-139mmHg and/or DBP 80-89mmHg, 'Hypertensive stage 1' as SBP 140-159mmHg and/or DBP 90-99mmHg, 'Hypertensive stage 2' as SBP ≥160mmHg and/or DBP ≥100mmHg, and 'Hypotension' as SBP <90mmHg and/or DBP <60mmHg.

3.4.2 Body Mass

An electronic scale was used (Pure Pleasure Glass, BSG01), which was calibrated for accuracy using weights authenticated by a government department of weights and measures. The participants were asked to take off their shoes, remove any heavy clothing or anything that could add to their body mass, position their feet slightly apart, and arms by the sides and to stand with minimal movement. The final reading on the scale was recorded in kg.

3.4.3 Stature

A steel weighted tape measure was used, placed vertical against a wall. The participants were asked to take off their shoes, stand relaxed with their back against the tape measure on the wall, position feet together, and arms by the sides. The standing height was measured (m) at the maximum distance from the floor to the highest point on the head, when the subject was facing directly ahead.

3.4.4 Body Mass Index

Body mass index (BMI) is commonly the most used indicator of overweight and obesity (BMI: $kg \cdot m^2$).The height and weight as measured above were used to calculate BMI.

ACSM, (2013); Expert panel on the Identification Evaluation and Treatment of Overweight and Obesity in Adults, (1998) defines a BMI of 25.0-29.9$kg \cdot m^2$ as overweight and BMI of 30.0$kg \cdot m^2$ as obese, for most individuals obesity related health problems increase beyond a BMI of 25.0 $kg \cdot m^2$.

3.4.5 Circumference

All measurements were made with a flexible yet inelastic tape measure. The tape was placed on the skin surface without compressing the subcutaneous adipose tissue. Duplicate measures was taken at each site and retested if duplicate measurements were not within 5 mm.

3.4.5.1 *Waist*

The participants were asked to remove all clothing around the waist and/or to loosen tight clothing. With the participant standing erect, arms at the sides, feet slightly apart, attempting to distribute their weight evenly on both feet, and abdomen relaxed. A horizontal measure was taken at the narrowest part of the torso (above the umbilicus and below the xiphoid process), with the researcher standing on the side of the participant, to ensure that the tape was horizontal around the waist. The participants were asked to breathe in and out and the measurement was taken when the participants had breathed

out. This prevented any inaccurate measurement due to the participants contracting their abdominal muscles or holding their breath. The measurement was recorded to the nearest centimeter.

3.4.5.2 *Buttocks/Hips*

The preparation and procedure for hip circumference measurement was as for waist circumference, except for the fact that the participants removed clothing around the hips, and horizontal measure was taken at the maximal circumference of buttocks.

3.4.6 Knowledge and lifestyle practices of hypertension

Questionnaires (Appendix F-I) were used to record the findings from participants' diagnosis, knowledge and treatment of hypertension, level of PA and smoking history. Using the questionnaires below:

3.4.6.1 *Questionnaire for Hypertensive patients*

The questionnaire of hypertensive patients was adapted from World Health Organization, Developing Integrated Response of Health Care System to Rapid Population Ageing, a widely used questionnaire to track patient's hypertension diagnosis, management, complications, medication adherence and knowledge of self-care (Appendix F).

3.4.6.2 *World Health Organization, Global Physical Activity Questionnaire*

According to Bull, et al. (2009) the GPAQ provides reproducible data and showed a moderate-strong positive correlation with International Physical Activity Questionnaire, a previously validated and accepted measure of PA (Appendix G). Validation of GPAQ produced poor results although the magnitude was similar to the range reported in other studies (Bull, et al. 2009). Overall the results indicated that GPAQ is a suitable and acceptable instrument for monitoring PA in population health surveillance systems (Bull, et al. 2009). The GPAQ is used to quantify moderate-to-vigorous-intensity physical activity (MVPA) as Metabolic Equivalents (METs) minutes per week (METs minutes per week (mins/wk)). Time min/wk spent in each domain (work, travel and recreation) is

calculated, as well as the total PA METs mins/wk, according to the WHO STEPwise method (http://www.who.int/chp/steps/resources/GPAQ_Analysis_Guide.pdf). Metabolic Equivalents are used to calculate volume of PA by weighting each type of activity with its energy requirements. Participants were further classified as “active” (≥600 MET mins/wk) or “inactive” (<600 METs mins/wk). Energy expenditure of 600 METs mins/wk is the equivalent of reaching the recommended 150 minutes (mins) of moderate PA, 75 mins of vigorous PA or a combination of the two.

3.4.6.3 *Diet Questionnaire*

Adapted from the Food Frequency Questionnaire (Appendix H).

3.4.6.4 *Smoking Questionnaire*

Looking at the participants’ history of smoking and attempt to stop (Appendix I).

3.5 Ethical and Safety Considerations

The research design and procedures of the research study was approved by the Human Research Ethics Committee (Medical), of the University of the Witwatersrand, Clearance Certificate Number: M161034 (Appendix J). The KZN National Department of Health (NDoH) was also approached for approval, in a form of an online application, in order to recruit participants in Prince Mshiyeni Memorial Hospital and clinics associated with the hospital, as well as clinics within the hospital (Reference number: HRKM117/17 KZ_2017RP1_590). The application was approved on the 05 April 2017 by the KZN NDoH (Appendix K) and Prince Mshiyeni Memorial Hospital approved the application by 02 May 2017 (Appendix L). To ensure that appropriate safety procedures were taken regarding the well-being during testing of human participants: right to privacy or nonparticipation, right to remain anonymous, right to confidentiality, right to withdraw from the study without any negative consequences, codes were used for each participant to ensure no identifying information was revealed and right to experimenter responsibility.

3.6 Data Processing and Statistical Analysis

Data collected during the study was first coded as group 1 for the participants utilizing public HCS and group 2 for the participants utilizing private HCS, each participant was given a code number to be written on the different questionnaires so that the participant remained anonymous and their confidentiality was respected. The results were then saved in an Excel spreadsheet with all 137 participants data collected. Codes were saved on Excel spreadsheet under tested variables: BP, knowledge and management, lifestyle practices (alcohol, diet, smoking and PA), BMI and WHR.

Data analysis was conducted using IBM SPSS statistics, version 13.2 (2017) and Excel. Results were expressed as means and standard deviation (SD) for the variables that were tested. For normally, distributed continuous data (i.e. BP, body mass, height, BMI, waist and hip circumference), an independent two-tailed *t* test (*t*) was used to determine any significant differences between the two groups (group 1: public HCS and group 2: private HCS). For non-normally distributed or categorical data (knowledge questionnaire outcomes, GPAQ outcomes, FFQ outcomes, and smoking questionnaire), a Chi-Square test was used to determine any relationships between group 1 and group 2 variables. Statistical significance was set at a probability level of ≤ 0.05.

CHAPTER 4 – RESULTS

4.1 Demographic Characteristics

With the 259 calculated sample size of participants, a total of 137 people consented to participate in this study, equivalent to 52.90% of the sample were eligible according to the set inclusion criteria mentioned in the method section, 17 of the recommended participants could not be reached, 9 of the recommended did not consent to the study, and 6 participants did not meet the inclusion criteria. Comparison of the demographic characteristics was made between participants' utilizing the public and private HCS (Table 4.1). Participants were divided into two groups: group 1 (n=77) utilizing public HCS and group 2 (n=60) utilizing private HCS, in which public HCS had 51 (66.33%) female participants and 26 (33.77%) male participants and in the private HCS had 40 (66.67%) female participants and 20 (33.33%) male participants. All the participants successfully completed the demographic data questionnaire.

Table 4.1 Demographic Data Characteristics for Public and Private Health Care Sector Participants

Variables		Public Health Care Sector (n=77)	Private Health Care Sector (n=60)
Gender	Females	51 (66.23%)	40 (66.67%)
	Males	26 (33.77%)	20 (33.33%)
Marital Status	Single	9 (11.69%)	7 (11.67%)
	Widowed	21 (27.27%)	13 (21.67%)
	Married/ Cohabiting	37 (48.05%)	34 (56.67%)
	Separated/ Divorced	10 (12.99%)	6 (10.00%)
Highest level of Education	No school attended	9 (11.69%)	0 (.00%)
	Primary	17 (22.08%)	0 (.00%)
	Secondary	22 (28.57%)	5 (8.33%)
	Matric	8 (10.40%)	5 (8.33%)

	Professional/Technical training	2 (2.60%)	18 (30.00%)
	University	19 (24.68%)	32 (53.33%)
Occupation	Household	12 (15.58%)	0 (.00%)
	Skilled Manual Labor	11 (14.29%)	8 (13.33%)
	Managerial/ professional/ technical	17 (22.08%)	33 (55.00%)
	Student	0 (.00%)	0 (.00%)
	Unskilled Manual Labor	16 (20.78%)	0 (.00%)
	Clerical support, services, sales	2 (2.60)	7 (11.67%)
	Unemployed	19 (24.68%)	12 (20.00%)
Household	<R60000pa	32 (41.56%)	2 (3.33%)
Income	R60000 - R120000pa	20 (25.97%)	15 (25.00%)
	>R120000pa	25 (32.47%)	43 (71.67%)

n=number of participants, %=percentage of participants

4.2 Age and Anthropometric Characteristics

On average the participants age was 65 years (±10.83) for the public HCS and 60 years (±9.15) for the private HCS, with the public HCS participants being significantly older than those attending private HCS (t=2.41) (p=0.02). The average BP was 126/80mmHg for the public HCS and 123/79mmHg for the private HCS participants, SBP (t=0.93) (p=0.35) and DBP (t=0.73) (p=0.46) (Table 4.2), in which 38.96% of the public HCS participants had Normal BP compared to that of 33.33% private HCS (Figure 4.1). No significant difference was found between the public and private HCS participants in BP classification of Normal, Prehypertension and Hypertension. However, more participants attending private HCS were found to be hypotensive (X^2 =4.58, p=0.03).

Table 4.2 Average of Age and Anthropometric Characteristics for Public and Private Health Care Sector

Variables:	Public Health Care Sector Mean (±SD)	Private Health Care Sector Mean (±SD)	p-value
Age (years)	64.64 (±10.83)	60.43 (±9.15)	0.02*
Systolic BP (mmHg)	125.86 (±15.60)	123.30 (±16.08)	0.35
Diastolic BP (mmHg)	80.29 (±12.25)	78.75 (±12.06)	0.46
Body Mass (kg)	75.37 (±14.58)	78.67 (±15.60)	0.20
Stature (m)	1.60 (±0.06)	1.59 (±0.06)	0.64
BMI (kg·m^2)	29.81 (±6.09)	31.08 (±6.31)	0.34
Waist Circumference (cm)	100.36 (±17.00)	104.48 (±16.85)	0.16
Hip Circumference (cm)	106.00 (±15.20)	107.54 (±14.90)	0.76
Waist-to-Hip Ratio (cm)	0.95 (±0.18)	0.98 (±0.16)	0.36

*Statistically significant difference

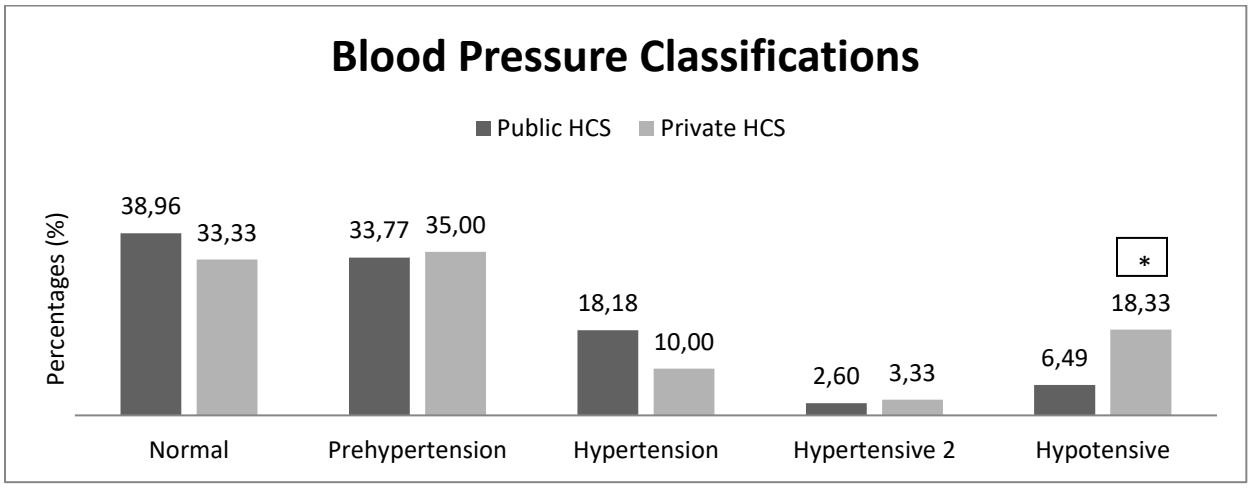


Figure 4.1 Comparisons of Blood Pressure Classification Measurements between Public and Private Health Care Sector (*X^2 =4.58, p=0.03).

The average BMI for the study sample (N=137) was 30.45kg·m^2, classified as Obese I. The average BMI between the 2 groups (*t*=-1.19) (p=0.24) was 29.81kg·m^2 (±6.09) for the public HCS participants, classified as Overweight and 31.08 kg·m^2 (±6.31) for the private HCS, classified as Obese I. The public HCS participants had 22.08% Normal BMI compared to 16.67% private HCS, 41.67% of the private HCS was classified as Obese I compared to that of 23.38% public HCS (Figure 4.2). No significant differences was found between the private and public HCS for BMI classifications, except for Obese I, where more private HCS participants were classified as Obese I compared to public HCS (*X^2=5.24, p=0.02).

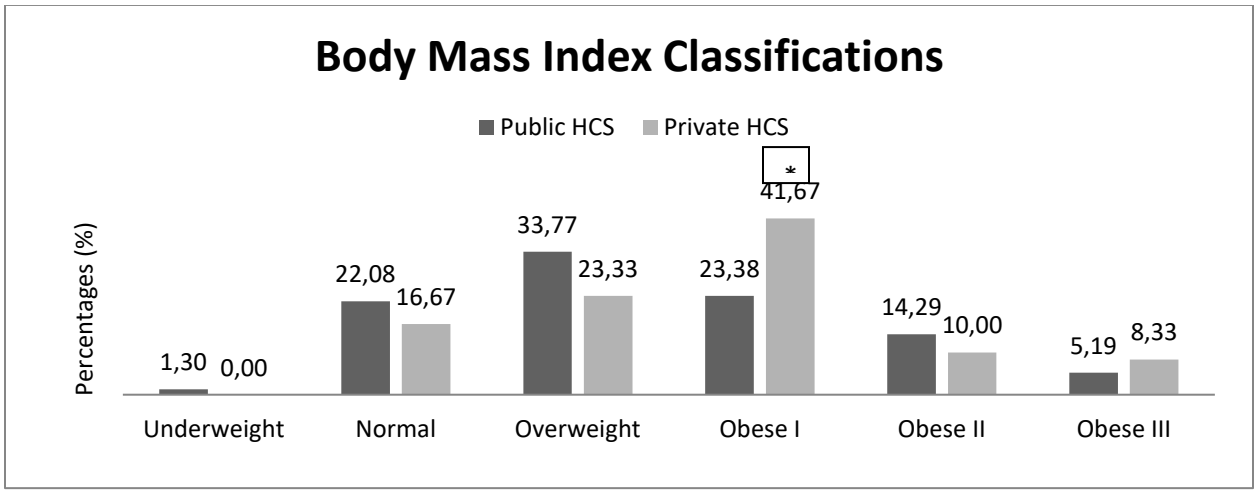


Figure 4.2 Comparisons of Body Mass Index Classification Measurements between Public and Private Health Care Sector (*X^2=5.24, p=0.02)

The WHR ratio's average (*t*=-0.90) (p=0.36) was 0.95cm (±0.18) for the public HCS participants and 0.98cm (±0.16) for the private HCS, with 63.64% public HCS participants was classified as High compared to 68.33% of the private HCS (X^2=0.33, p=0.57) (Figure 4.3). No significant relationship was found between private and public HCS participants (X^2=1.23, p=0.47) and being classified as having Low WHR (X^2=0.28, p=0.60) or Very Low WHR (X^2=1.12, p=0.29).

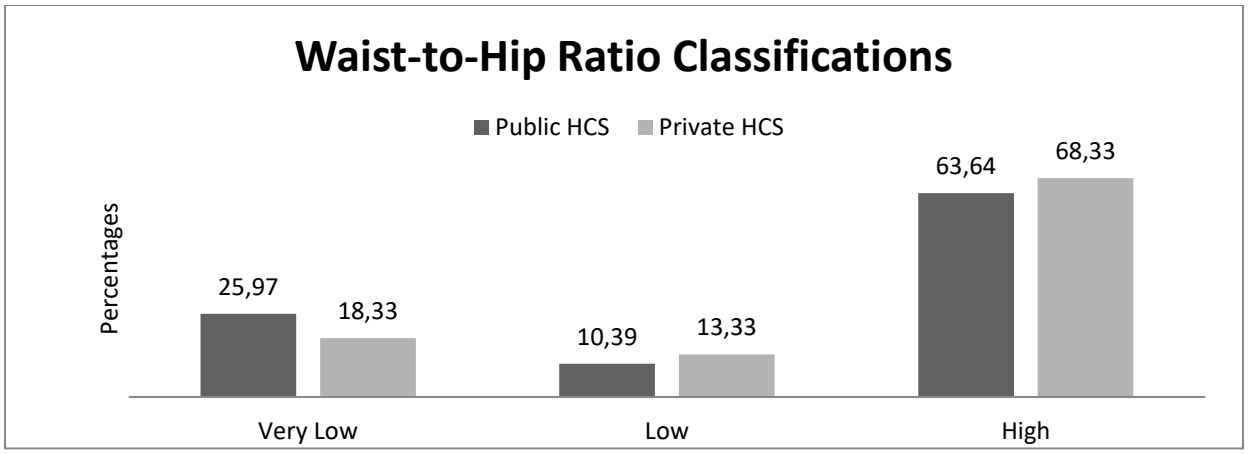


Figure 4.3 Comparisons of Waist-to-Hip Ratio Classification Measurements between Public and Private Health Care Sector (X^2=1.23, p=0.47)

4.3 Knowledge and Management of Hypertension

The majority of the participants for both the public and private HCS felt their BP was 'better' than it was compared to 12 months ago, with 58.44% compared to 58.33%, respectively (X^2=1.49, p=0.48) (Figure 4.4). The majority of the participants for both the public and private HCS groups answered 'No' to being having been admitted to hospital over the previous year, with 64.94% compared to 63.33%, respectively (Figure 4.5). No significance relationship (X^2=0.03, p=0.85) was found between the type of HC provider and having been admitted to hospital over the last year.

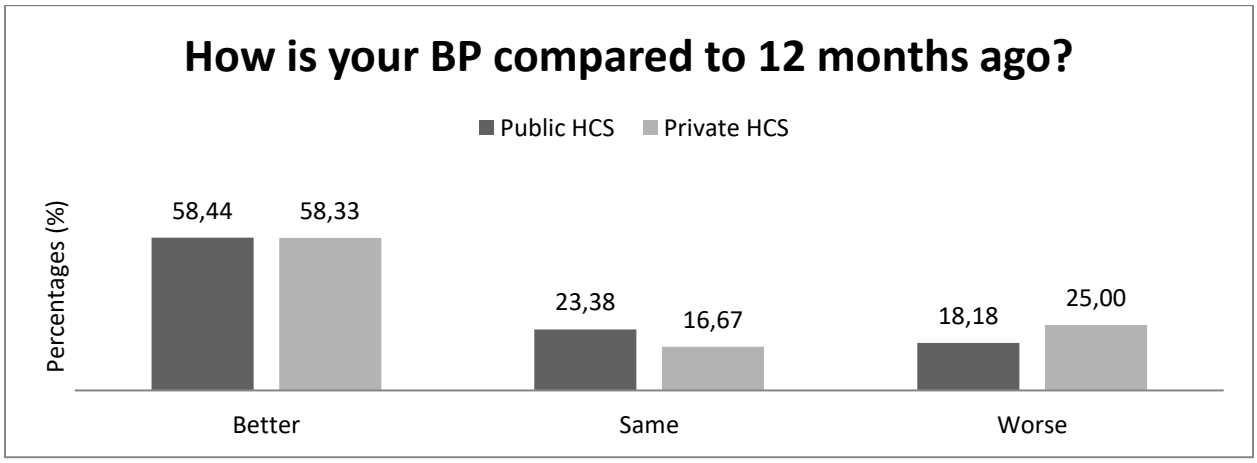


Figure 4.4 Comparison of the Perception of Hypertension Management between Public and Private Health Care Sector (X^2=1.49, p=0.48)

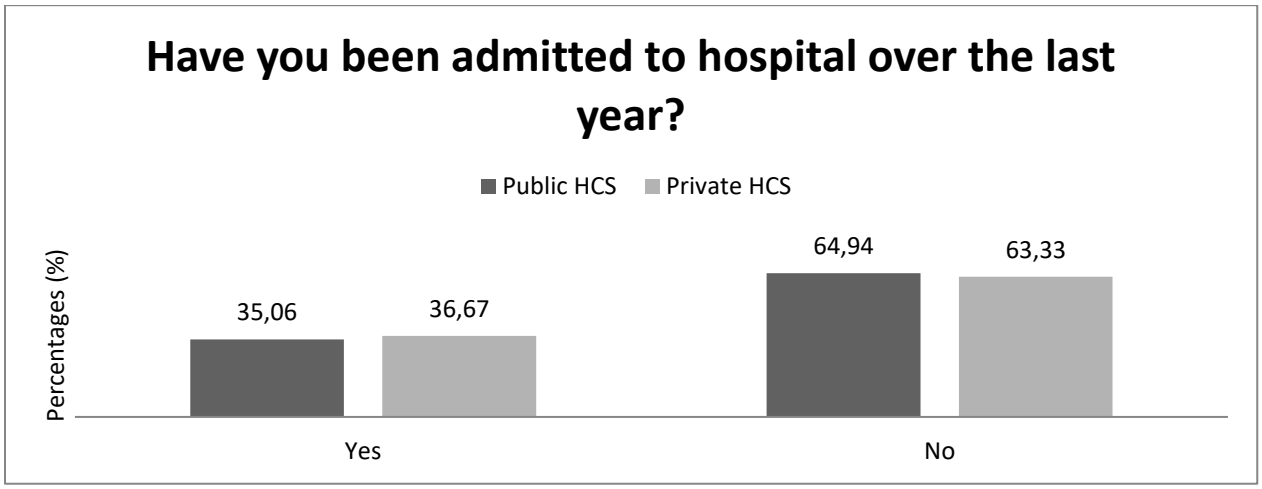


Figure 4.5 Comparisons of the Hypertension Complications and Hospitalizations between Public and Private Health Care Sector (X^2=0.03, p=0.85)

All (100%) of the public HCS participants answered 'Yes' to taking all their prescribed medication, compared to 95% of the private HCS (Figure 4.6). A significance relationship (X^2=3.96, p=0.05) was found between the type of HC provider the participants consulted for their hypertension and taking all prescribed medication, with public HCS participants being more likely to take their medication.

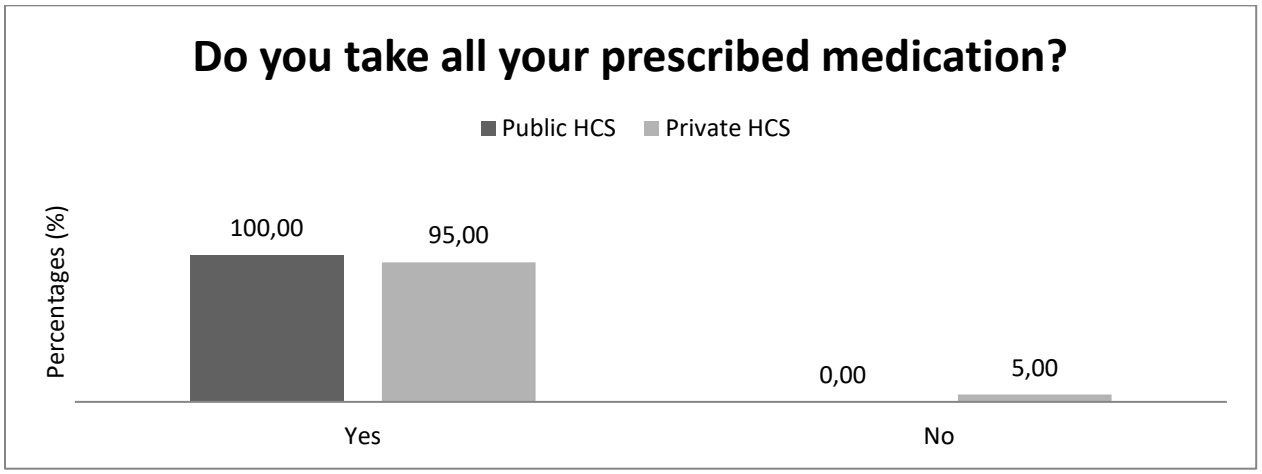


Figure 4.6 Comparisons of Hypertension Medication and Adherence between Public and Private Health Care Sector (X^2=3.96, p=0.05)

In the public HCS participants, 80.52% answered 'Yes' to being informed that stroke is related to hypertension, compared to 88.33% of the private HCS, and no significant relationship (X^2=1.53, p=0.22) being found with the type of HC provider used and knowledge of stroke's relation to hypertension (Figure 4.7). In the public HCS 74.03% participants answered 'Yes' to being informed of PA in managing hypertension, compared to 81.67% private HCS, and no significance relationship (X^2=1.12, p=0.30) was found in the type of HC provider the participants consulted and being informed that PA manages hypertension (Figure 4.8).

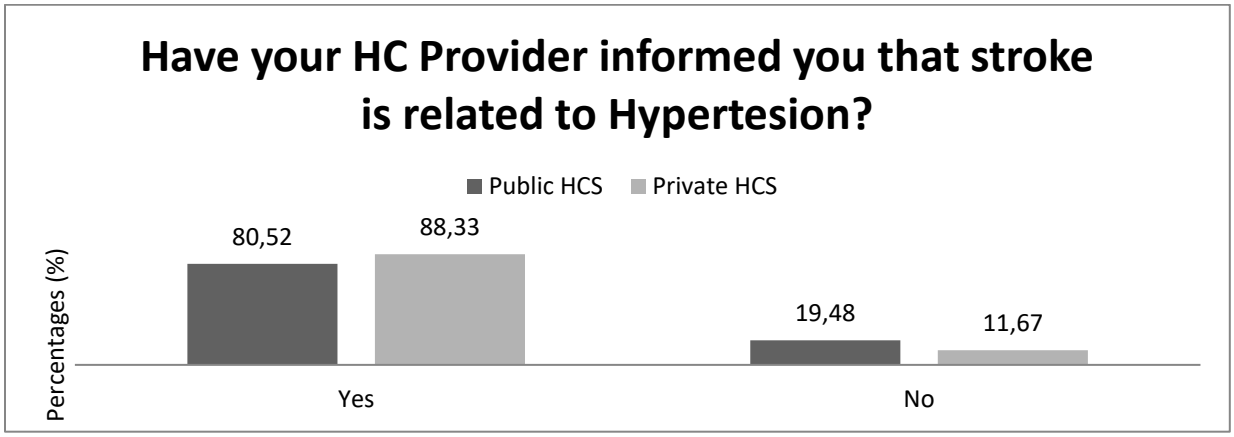


Figure 4.7 Comparisons of knowledge of Stroke's relation to Hypertension between Public and Private Health Care Sector (X^2=1.53, p=0.22)

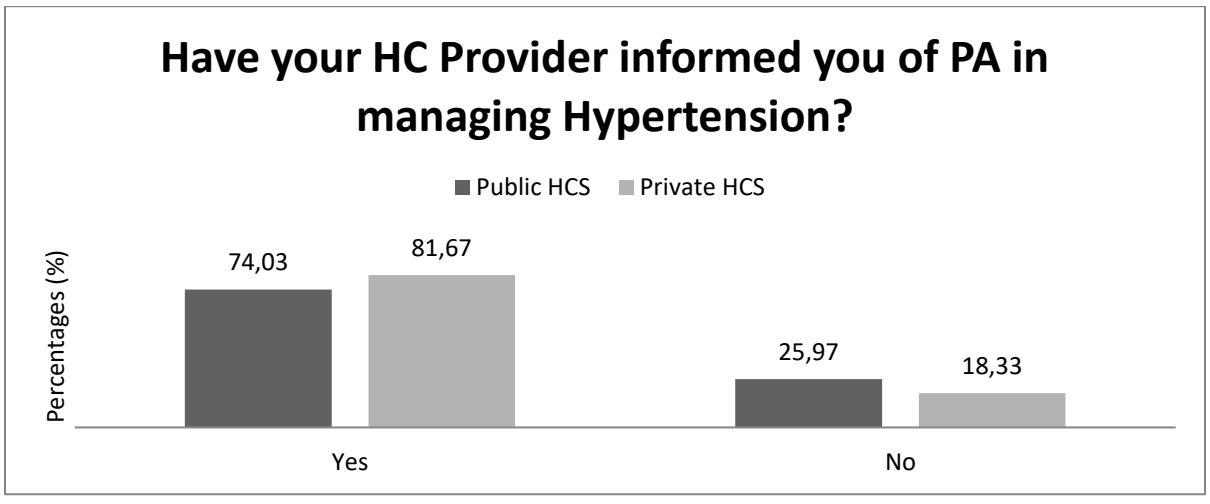


Figure 4.8 Comparisons of knowledge of Physical Activity in managing Hypertension between Public and Private Health Care Sector (X^2=1.12, p=0.30)

4.4 Physical Activity

The GPAQ total METs per week (*t*=0.63) (p=0.53) between the public and private HCS on average was 1803.12 (±4755.96) and 1385.33 (±2295.32), respectively (Table 4.3). A target volume of ≥500–1000 METs-mins/wk is recommended for most adults, this volume is approximately equal to 1000 kilocalorie per week of moderate intensity, physical activity, ~150 mins/wk of moderate intensity exercise, or pedometer counts of ≥5400–7900 steps per day (ACSM, 2013). Data from the GPAQ also provided the amount of minutes spent sedentary in a typical day, in which it reported an average of 293.83 (±125.17) for public HCS participants and 279.58 (±111.20) for private HCS participants. No significance relationship (X^2=1.78, p=0.24) was found in the type of HC provider the participants consulted and their level of PA, with 49.74% participants from the public HCS have been found to be inactive, compared to 48.33% participants from private HCS (Figure 4.9).

Table 4.3 Comparison of the Global Physical Activity Questionnaire Descriptive Data for Metabolic Equivalents level of Physical Activity between Public and Private Health Care Sector

Variables:	**Public Health Care Sector Mean (±SD)**	**Private Health Care Sector Mean (±SD)**	**p-value**
Total METs	1803.12 (±4755.96)	1385.33 (±2295.32)	0.53
Total day METs	257.59 (±679.42)	197.91(±327.90)	0.53
Minutes Sedentary	293.83 (±125.17)	279.58 (±111.20)	0.46

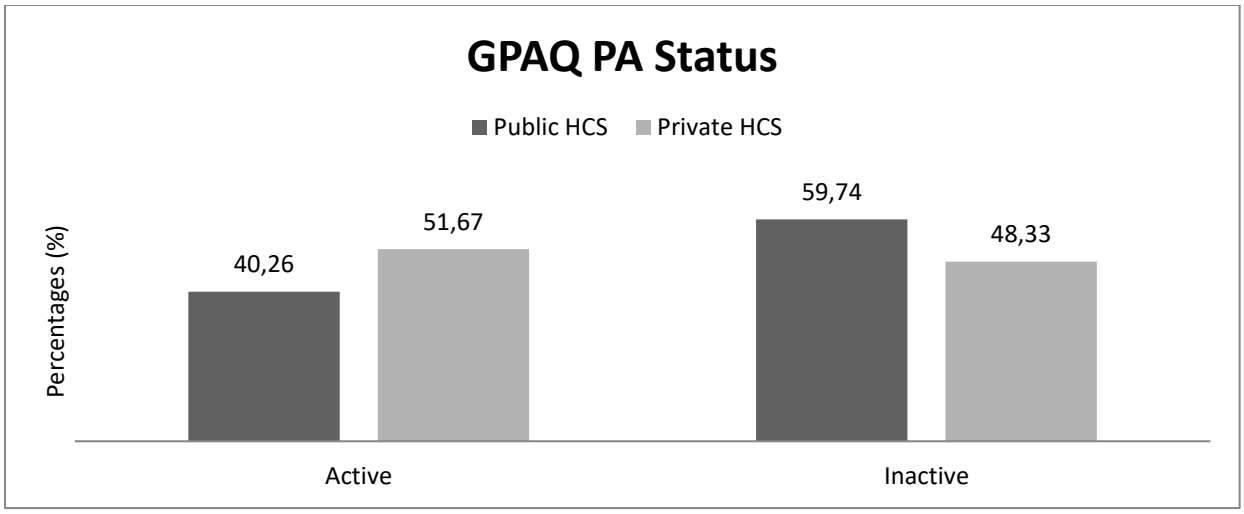


Figure 4.9 Comparisons of Active and Inactive participants between Public and Private Health Care Sector (X^2=1.78, p=0.24)

4.5 Diet, Smoking and Alcohol

Each question was analysed individually in the questionnaires related to diet and smoking that were used to record the findings. The majority of public and private HCS participants stated that they 'Always' used salt whilst cooking, 59.74% and 40.00%, respectively (Figure 4.10). No significance relationship (X^2=7.04, p=0.07) was found between the type of HC provider the participants consulted for their hypertension and the type of diet they preferred.

The public HCS 61.04% answered 'Yes' to smoking and 38.96% answered 'No', compared to 40.00% of the private HCS and 60.00% in the same categories. The public HCS had 61.04% participants that smoked regularly for ≥5 years as compared to the 38.33% private HCS (Figure 4.11). A significant relationship (X^2=5.98, p=0.02) was found between the type of HC provider the participants consulted and ever smoked, a significant relationship (X^2=6.96, p=<0.01) was found between the type of HC provider the participants consulted and smoking regularly for ≥5 years.

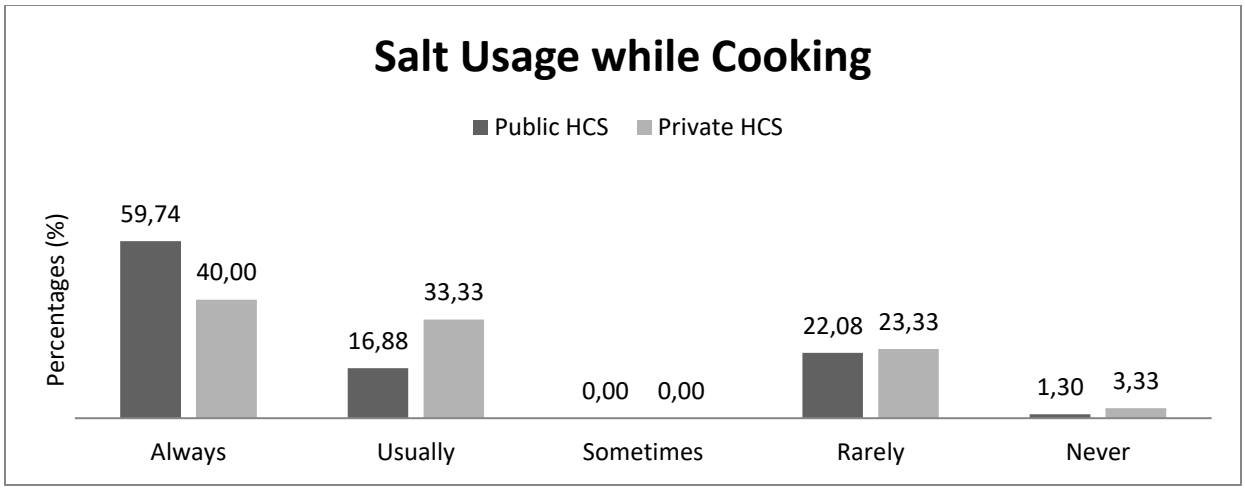


Figure 4.10 Comparison of Salt Usage while Cooking between Public and Private Health Care Sector (X^2=7.04, p=0.07)

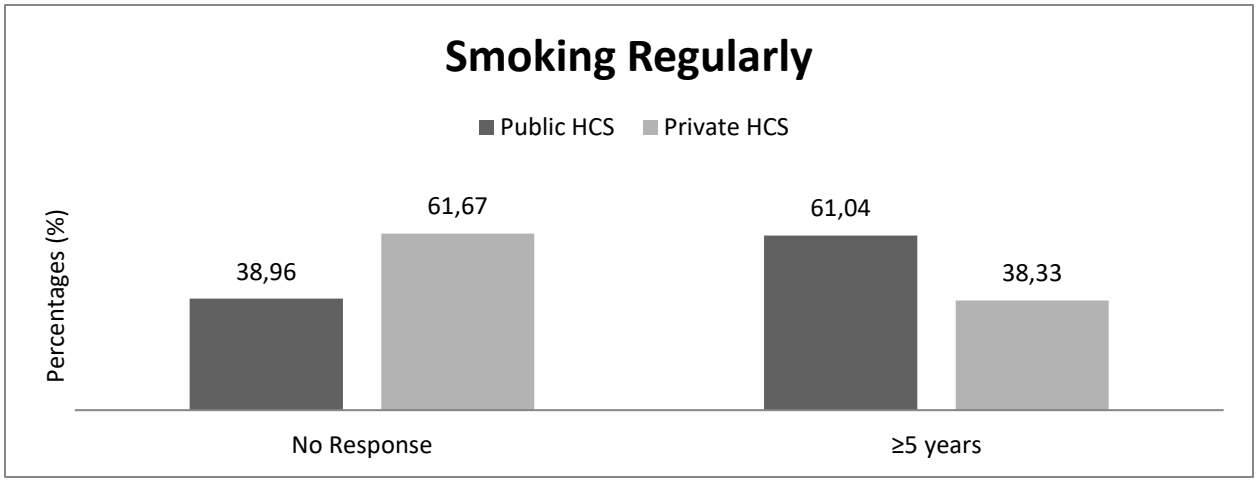


Figure 4.11 Comparison of Smoking Regularly between Public and Private Health Care Sector (X^2=5.98, p=0.02)

The public HCS had 64.94% participants that drank alcohol compared to 48.33% in the private HCS (Figure 4.12), 35.06% public HCS responded 'No' compared to 51.67% private HCS. A significance relationship (X^2=3.81, p=0.05) was found between the type of HC provider the participants consulted for their hypertension and alcohol usage, with the participants using public HCS drinking more with 64.94% participants compared to the private HCS with 48.33% participants.

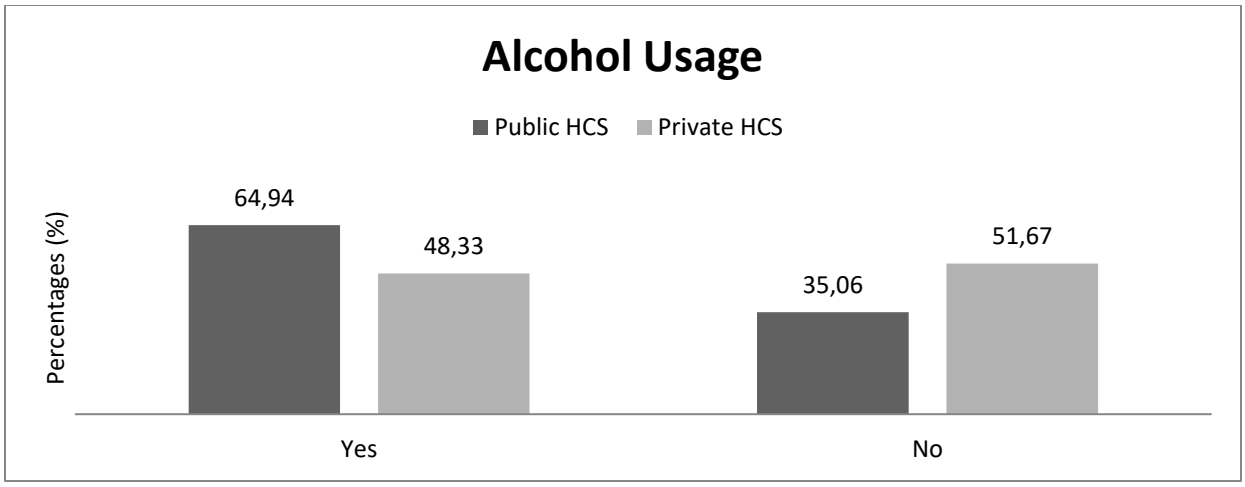


Figure 4.12 Comparison of Alcohol Usage between Public and Private Health Care Sector (X^2=3.81, p=0.05)

CHAPTER 5 - DISCUSSIONS, OVERALL CONCLUDING CHAPTER WITH RECOMMENDATIONS

5.1 Discussion

Non-communicable diseases affect both the poor and the wealthy in SA (Schneider, et al. 2009), Ranchod, et al. (2017) reported that 81.10% and 97.70% of households that attended the public HC facilities and private HC, respectively. In addition to socioeconomic differentials, the SAn population has a rich ethnic diversity that influences the distribution of lifestyle and risk factors for NCDs (Schneider, et al. 2009). Tobacco use, foods high in saturated and trans fat, salt and sugar (especially in sweetened drinks), physical inactivity and the harmful consumption of alcohol cause more than two-thirds of all new cases of NCDs and increase the risk of complications in people with NCDs (Beaglehole, et al. 2011). Very few differences are documented regarding the visibility in the distribution of the knowledge, management, risk factors associated with hypertension management between the public and private HCS.

The prevalence of hypertension among adults in Africa is the highest in the world (World Health Organization, 2014). Pooled estimates suggest that the prevalence of hypertension in Africa increased from 19.7% in 1990 to 30.8% in 2010, a trend typically attributed to increased urbanisation, population ageing and behavioural risk factors including tobacco and alcohol use, poor diet and physical inactivity (Adeloye and Basquill, 2014). Groenewald, et al. (2014) showed that the prevalence of hypertension in SA has increased since 1998, and that it increases with advancing age (both genders, all surveys), with high levels of hypertension (typically between 50.0% and 75.0%) among individuals aged ≥45 years. Estimates of awareness/diagnosis of hypertension in various studies reviewed in 2015 ranged from 19.1% to 56.4% of those with hypertension (Ataklte, et al. 2015). Rates of treatment and control also varied considerably in previous cohort studies, from 16.70% to 40.9% for treatment and 4.0% to 33.1% for control (Ataklte, et al. 2015). Analysis by Berry, et al. (2017) also revealed very high rates of unmet need for hypertension care, of the 35.1% of the adult population with hypertension, only 8.9% were treated and controlled, indicating that 91.1% of the hypertensive population had unmet

need for hypertension care (Berry, et al. 2017). There may be a gap between high BP measurement and effective diagnosis (Berry, et al. 2017), and also the type of HC provider utilized in managing hypertension can have a significant influence in the effectiveness of diagnosis and management.

This study aimed to identify the differences in knowledge and management of hypertension, as well as risk factors for hypertension, in patients utilizing in the public HCS compared to the private HCS in Umlazi Township, KZN.

Demographic Characteristics

Two-thirds of people moving into urban areas in Africa do so into poverty (Kohl et al. 2012). Third quarter 2016 data showed 27.1% unemployment, based on the official definition (Statistics SA Quarterly Labour Force Survey, 2016). This represented a 1.6% year-on-year increase (Day and Gray, 2017). Indeed, this study found the unemployment rate was unsurprisingly higher in the public HSC (24.68%) compared to private HCS (20.0%). Statistics SA, (2017), defines manager, professional and technician occupations as 'skilled' level of employment, 55.0% of those attending private HCS were in managerial/ professional/ technical positions compared to 22.08% in the public HCS. Furthermore, 41.0% of those attending public HCS earned <R60 000pa, and less than a quarter had University education. This demonstrates the difference in socioeconomics between the two groups, whereby the majority of the private HCS patients had a University qualification (53.0%) and earned >R120 000pa (71.0%). In the community such as Umlazi Township, individuals who can afford private HCS are considered to have some form of wealth, as it is not something that the majority of the community can afford and are privileged too. The majority of these individuals have the type of lifestyle that does not facilitate energy expenditure on their normal day, such as their occupation, foods. Individuals in the private HCS have occupations that are office based mostly in the city, and easy access to processed, fatty foods high in salt, but this can also mean that they have easy access to private HC institutions where they can go for their routine health screenings and/or when complications arises, or presence of other co-morbidities play a role in these findings.

Although hypertension appears to be common in both the public and private HCS, there seems to be some gender differences that exist between men and women in the management of the disease. For example, in a study by Berry et al. (2017) the age-standardised prevalence of hypertension was comparable between women and men (35.2% for men and 34.7% for women), but the likelihood of being unscreened was higher in hypertensive men than women (58.5% of men compared with 39.5% of women). In fact, women with hypertension were more likely than men with hypertension to be treated, with uncontrolled (18.5% compared with 7.9%), as well as treated and controlled (13.9% compared with 3.5%), suggesting higher overall treatment rates among women as compared with men (Berry, et al. 2017). Groenewald, et al. (2014) further reported that in general the prevalence of hypertension is higher among females in the older age categories than that of males. Indeed this study also had more females participating in both the public HCS (66.33%) and private HCS (66.67%), which may mean that women are more willing to participate in health screening and are more willing to seek treatment than men.

Hypertension Knowledge and Management

Hypertension is a major risk factor for stroke and symptomatic cardiovascular disease, and it had become the single largest contributor to premature mortality globally (Forouzanfar, et al. 2017; Lackland, et al. 2015; Poulter, et al. 2015, Schmidt, et al. 2011). The prevalence of hypertension in Africa, particularly in SA is high and on the rise (World Health Organization, 2014; Groenewald, et al. 2014) and unfortunately is often not managed well (Saleem, et al. 2011). According to Schneider, et al. (2009) the healthcare indicators show that the wealthier people had better treatment of hypertension than the poor, however, even the wealthier quintile did not reach high levels of control, the control of hypertension for the wealthiest quintile ranged from 39.0% for men to 54.7% for women. A study by Berry, et al. (2017) found that the age-standardised prevalence of normal and prehypertensive BP measurements in the sample was 26.3% and 38.6%, respectively. Whilst this study found that the average BP for its participants was classified as normal BP for both the public HCS (126/80mmHg) and the private HCS

(123/79mmHg), with 38.96% and 33.0% participants, respectively. Both the groups had an average BP classified as normal, which suggests that the majority of the participants in both groups do manage their BP according to the guidelines given to them by their HC provider. This study also showed that the private HCS (21.67%) had more individuals that were hospitalized due to hypertension compared to the public HCS (15.58%), and also the private HCS (71.67%) had more individuals who encountered complications due to their hypertension then the public HCS (70.13%) which suggests that the participants of the private HCS did not tend to have better management of hypertension as compared to that of the public HCS. Although respondents in the General Household Survery also reported higher levels of problems in public hospitals than in private hospitals, other than in the area of care being too expensive (Ranchod, et al. 2017), this was not the case in the current study's findings. The true differential in the burden of NCD between the public and private sectors is unknown, and will vary by disease due to differences in the underlying risk factors (Ranchod, et al. 2017).

Once the diagnosis of hypertension is established, patients with BP ≥160/100 mmHg should commence drug therapy and lifestyle modifications (Seedat, et al., 2014). Patients with stage 1 hypertension should receive lifestyle modification for three to six months unless they are stratified as high risk by the following criteria: three or more major risk factors, diabetes, target-organ damage or complications of hypertension (Seedat, et al., 2014). Low adherence levels have been documented in SA for several long-term treatment regimens (Berry, et al 2017). Hypertension treatment coverage was very low (35.7%), and only 36.4% of those on treatment were controlled (Groenewald, et al. 2014). Among those who reported use of BP medication, only 52.0% had controlled BP which may be due to poor adherence to antihypertensive medications or possibly ineffective medication (Berry, et al. 2017). Several factors related to access, health-seeking behaviour and health system quality may also contribute to the high rate of unmet need for hypertension care, especially among the poor, the uninsured, black Africans and rural residents (Harris, et al. 2011). This study found that in the public HCS had 58.33%, whilst the private HCS 58.44% of better BP in the last 12 months, in which 100% of the public HCS participants reported taking their prescribed medication compared to 95.0% of the

private HCS. Although the private HCS had fewer individuals admitted to hospital over the previous year compared to the public HCS, 63.33% and 64.94%, respectively, does not suggest that the private HCS had better management of hypertension then the public HCS and other co-morbidities may be contributing factors to these differentials.

Africa has a clear commitment to address social determinants that are associated with health; the challenge is to move into action (Scott, et al. 2017). Adequate planning is required to achieve efficiencies and attention should be given to management capacity and change management (Mark, et al. 2017). A systematic review on the effectiveness of the CCMDD programme should be done; although this programme appears to have helped to reduce unnecessary consultations, decongest clinics, and reduce waiting times (Mark, et al. 2017). Primary care visits declined from 129 million in 2012/13 to 126 million in 2015/16 (from 3 to 2.8 per capita uninsured), likely due to CCMDD and the ward-based outreach teams (Mark, et al. 2017). This programme may have been the reason for fewer differences and if any found in this study between the public and private HCS regarding the knowledge and management of hypertension. The number of individuals who consented to participate for both the public and private HCS might also have an effect on the differences, as the public HCS had 17 more participants which might affect the statistical findings. The type of management as was done with the CCMDD programme should work with communities and staff to plan and prioritise, thus building collective ownership (Mark, et al. 2017).

Risk Factors

Effective management of NCDs particularly focusing on the four main risk factors for NCDs, i.e. tobacco use, poor diet, lack of exercise and alcohol use, is required at primary care level (Bradshaw et al., 2011). Smoking caused 46.6% of deaths by stroke in African men, and 50.0% of deaths by ischaemic heart diseases, in the same categories in African women, smoking cased 12.6% and 12.9%, respectively (Sitas, et al. 2013). On the other hand, alcohol is the most widespread and harmful drug of abuse in SA at population level and its account for 12.0% of disability-adjusted life years in NCDs (Matzopoulous and Corrigall, 2014). The public HCS (61.04%) had more smokers than the private HCS

(40.0%), all the smokers from the public HCS smoked regularly for ≥5 years as compared to the 38.33% private HCS, this can suggest that majority of the people in the public HCS are more prone to the prevalence of stroke, with the difference of 22.71% of regular smokers for ≥5 years between the two groups. Likewise the public HCS (64.94%) had more participants who drank alcohol compared to the private HCS (48.33%), which suggests that the public HCS are more susceptible to more complications in addition to the higher rate of their smoking; alcohol and smoking combined can lead to elevation of hypertension causing resistant hypertension, which can lead to the cause of other NCDs such as cardiovascular disease. The Food-based Dietary guidelines developed in 2001, have been used for education purposes for prevention of chronic NCDs and food labeling regulations are currently being revised (Bradshaw et al., 2011). However, impact of these actions has been limited as seen from the deteriorating risk factor profile (Bradshaw et al., 2011). As it is seen in this study, the majority of public and private HCS participants stated that they always used salt whilst cooking, 59.74% and 40.0%, respectively; suggesting that both the groups are not careful of the role high salt can play in elevating their BP. The key behaviours that would reduce risk factors for NDCs are eating a healthy diet, participating in regular physical activity, not using tobacco and avoiding harmful use of alcohol (World Health Organization, 2010).

According to Lee, et al. (2012) decrease in or removal of physical inactivity could improve health substantially. We need to view the inactive population as abnormal and consider them at high risk of disease (Wen, et al. 2012). Physical activity at work, walking, and, in some populations, bicycling used to be major contributors to total energy expenditure but have declined dramatically in industrial and urban societies (Ezzati and Riboli, 2016). Indeed, this study showed high levels of sedentary behavior in both participants from both the public and private HCS (4.8 hours and 4.65 hours of sedentary time per day, respectively). The GPAQ total METs per week reported the public HCS (1803.12) being more physically active then the private HCS (1385.33) and the amount of minutes spent sedentary in a typical day, in which it reported an average of 293.83 for public HCS participants and 279.58 for private HCS participants, although both groups had high rates of sedentary hours; the public HCS reported spent more minutes sedentary in a typical

day as compared to the private HCS. The sedentary category might account for those that are home during the day, while others are at their place of work (e.g. office space), the type of work that the public HCS have might also account for the group having more physically active occupations (e.g. household or unskilled manual labour), which can play a positive role in assisting with their management of their hypertension in terms of PA. Although this study found that both the public and private HCS had very high rate of physical inactivity, 49.74% and 48.33%, respectively.

The current challenge is to develop programmes and interventions to promote PA for all in our increasingly sedentary societies (Blair and Morris, 2009). Formal academic training programmes and graduate training should be created to guide the next generation of researchers in the area of PA (Kohl, et al. 2012). The knowledge gained from the increasing research on PA is highlighting the importance of PA to health and well-being, and it underscores the need to pay serious attention to this area of public health (Blair and Morris, 2009). According to Wen, et al. (2012) governmental programmes to move people from sedentary living to meeting recommended levels of exercise are very limited; the emphasis should be placed on the harms of inactivity and not merely the benefits of exercise. Although much has been learned about how individuals can change their PA bahaviour and the determinants of those bahaviours (Bauman, et al. 2012), little progress in population-level changes has been documented (Kohl, et al. 2012). All adults aged 18–65 years should participate in moderate intensity, aerobic PA for a minimum of 30 mins on 5 days per week (days/wk) or vigorous intensity, aerobic activity for a minimum of 20 min on 3 days/wk (ACSM, 2013). Moderate intensity, aerobic activity can be accumulated to total the 30 mins minimum by performing bouts each lasting ≥10 mins (ACSM, 2013). Every adult should perform activities that maintain or increase muscular strength and endurance for a minimum of 2 days/wk (ACSM, 2013). Combinations of moderate and vigorous intensity exercise can be performed to meet this recommendation (ACSM, 2013). Understanding and application of complex systems to affect PA will allow infrastructure changes that will give individuals and populations the freedom to be more physically active and healthy (Kohl, et al. 2012). Only recently has attention been given to population-based measurement of PA in countries at all stages of urbanization and

economic development (Ezzati and Riboli, 2016). Another topic for consideration is that PA promotion is not only important for the prevention of NCDs, but it might also play a key part in efforts against global warming through the promotion of active transportation, improvement of social relationships, reduction of social inequities, and stimulation of the use of public spaces (Kohl, et al. 2012).

Studies have been consistent in showing that despite implementing lifestyle modifications, it is very difficult to reduce weight and BMI in patients with hypertension and to maintain these changes (Beasley, et al. 2009; Burke, et al. 2009; Shay, et al. 2009). This has important implications as, in addition to health programme-specific responses, it suggests a need for an overarching plan that appreciates the synergies possible in addressing the social determinants (Scott, et al. 2017). Indeed, our study added to the growing literature showing high levels of obesity in SA, with the study participates being classified as obese I (30.45kg·m^2). Interestingly, patients attending public HCS had high levels of overweight (33.77%) but also showed some prevalence of underweight (1.30%), indicating a pattern common in poorer communities where both under- and over-nutrition co-exist. On the other hand, private HCS patients had a significantly higher rate of Obese I (41.67%) versus (23.38%) of the public HCS, which may stem from their ability to afford a more westernized diet, this can also be seen where the public HCS (22.08%) higher rate of normal BMI compared to that of the private HCS (16.67%) with lower rates. The WHR ratio's also confirmed the prevalence of the private HCS's (0.98cm) ability to afford a more westernized diet compared to that of the public HCS (0.95cm), although the differences were not as much as those seen in their BMI findings, the public HCS seemed to better manage their weight compared to the private HCS. Findings by Berry et al. (2017) suggests that prevalence of hypertension increased steadily with BMI from 20.4% among the underweight to 30.7% among those with normal BMI to 34.1% among the overweight to 43.4% among the obese, although these findings show that the majority of the prevalence lied among the overweight. South African National Health and Nutrition Examination Survey (National Planning Commission, 2011), also found that 31.0% of men and 64.0% of women falls into the overweight or obese categories (Scott, et al. 2017).

In the community of Umlazi Township, there are so many other external factors that contribute to excessive increase in the risk factors associated with hypertension, for example, not many people can afford the gym membership subscription, as they have so many other bills to pay for those that are regarded as needs to them. Few recreational parks to exercise are available and safety concerns could be the other reason for the high levels of physical inactivity, as well as the majority of the community have to take public transport to get to and from places of work, by the time they get home they are tired and its dark, this is not conducive and safe for exercise after dark hours. The notion that being overweight is a sign of 'good health' still exist in the community and quick access of unhealthy fast foods (deep fried, in most case fatty and/or carbohydrate), which come at a low price is very high, as well as processed foods seem to be cheaper than fresh foods. The undisclosed true number of unemployment rate also results in majority of the individuals in the community becoming involved with drugs and excessive alcohol use, and there is easy access of these things in the community.

5.2 Strengths and Limitations

This is the first study to be conducted in Umlazi Township regarding the trends of hypertension in the community and no specific hypertension publications were found about the area. This study subjectively measured the trends of hypertension management, knowledge and its risk factors between the public and private HCS. It did not take into consideration the accuracy of the subjective nature of the questionnaires and objective observation - empirical experience would suggest that BP is not managed as well as indicated by the participants in this study, for examples, taking their medication regularly, the measurement of the actual PA, recording the amount of times the participants smoked per day and clinical records might have given more precise outcomes of the differences between the two groups. There could also be other co-morbidities and other medications taken that we did not measure or taken into consideration, which might have had an effect on the outcome of the findings of the study. This study also observed a relatively small hypertensive population of Umlazi Township and does not represent all the other townships in the country. The actual sample size

used for the study was also below the needed (calculated) sample size which may have created bias effect on the power to detect the significant differences and relationships of the study. The snowball sampling also has its own limitations with regards to the true representation of the target population.

5.3 Conclusions and Recommendations

The differences in the management of hypertension between public and private HCS in SA goes beyond the type of HC provider the participates utilize to manage their hypertension – their socioeconomic status, level of school and the type of occupation they have, just to name a few, can also have a major significance in type of HC provider they utilize. The participants of the private HCS did not tend to have better knowledge and management of hypertension and its risk factors as compared to that of the public HCS, although there were few significant relationships and/or differences that occurred in light of the type of HC provider the participants consulted between the two groups. Both the groups had moderate management of hypertension, regardless of the knowledge they had in managing the condition, which suggests that the health officials will need to conduct an in-depth area based research on how the suggestions from findings of scientific researchers can be implemented in relations to hypertension. The implementation of training individuals by the health officials in order to increase the number of people to assist in the different implementations and strategies suggested is recommended. Different individuals can be trained to deal with hypertension condition specifically. Contribution from the economic private sectors can also be approached and make a difference in assisting with the finances to fund the actual implementation of the training required. This can also help the medical staff with having more people to assist in the process of change and tackling NCDs. Creation of task teams can also help with follow up on the progress of specific areas, (i.e. PA, healthy diet, healthy environments, collaboration between public and private HCS, etc). The task teams can be area based, for more in-depth understanding of each section in Umlazi community and even other areas in the country.

An investment in building of more public hospitals, clinics that specialize on specific conditions and/or HC facilities for the public to access should also be taken into consideration. The body of other health professions should also be taken into consideration in the plan to tackle NCDs in primary HCS (e.g. Biokineticist, Physiotherapist, etc), other than the doctors and nurses. As oral medication is prescribed, so should be exercise prescription in the PHC facilities by qualified professionals, who will assess the patients and prescribe the necessary programmes accordingly and timely from baseline findings then continue from there (e.g. from baseline to 4 weeks, 6 weeks, etc.), and assess if the exercise programmes are making any differences in their lives. The emphasis of home exercise programme should be implemented as well. In the private HCS participants it's seems as though it is much easier for them to access other professions other than doctors, as the medical aid schemes can pay. Projects on building more recreational facilities managed with security is also a consideration, as majority of people can get motivation to be physically active with the necessary facilities and feeling of being safe, the community can be motivated. These recreational facilities can have all the necessary information to inform the public on benefits of good health, being physically active, well balanced diet and findings of scientific research conducted about specific NCDs, these facilities can also be used in training the task teams for specific conditions of health that affect the community of Umlazi Township.

5.4 Clinical Applications

The objectives of the study were met through the clinical application to understand the trends in knowledge of hypertension management in the community of Umlazi Township, KZN. Understanding the patients' social-economic status, knowledge and management of hypertension and its risk factors in order to help identify the differences between the patients utilizing public and private HC providers, in which the knowledge of these factors will assist in informing ways to strengthen the management of hypertension in the hypertensive community of Umlazi KZN, as well as in the country.

REFERENCES

1. ACSM guidelines; American College of Sports Medicine. (2013). ACSM's Guidelines for exercise testing and prescription. *9th edition. Lippincott Williams & Wilkens.*
2. Adeloye, D. and Basquill, C. (2014). Estimating the prevalence and awareness rates of hypertension in Africa: a systematic analysis. *Public Library of Science One*. 9, e104300.
3. Alwan, A., Maclean, D. R., Riley, L. M., et al. (2010). Monitoring and surveillance of chronic non-communicable diseases: progress and capacity in high-burden countries. *Lancet*. 376, 1861–1868.
4. Ardington, C. and Case, A. (2013). Health: analysis of the NIDS wave 1 Dataset Discussion Paper no.2.
5. Ardington, C. and Case, A. (2009). National Income Dynamics Study Health: Analysis of the NIDS Wave 1 Dataset. Discussion Paper No. 2. Cape Town: South African Labour & Development Research Unit, University of Cape Town.
6. Armstrong, T. and Bull, F. (2006). Development of the World Health Organization Global Physical Activity Questionnaire (GPAQ). *Journal of Public Health.*
7. Ataguba, J. E., Akazili, J. and McIntyre, D. (2011). Socioeconomic-related health inequality in South Africa: evidence from General Household Surveys. *International Journal for Equity in Health*.
8. Ataguba, J. E. and Akazili, J. (2010). Health care financing in South Africa: moving towards universal coverage. *Continuing Medical Education*. 28, 74-78.
9. Ataguba, J. and McIntyre, D. (2009). Financing abd benefits inicidence in the South African health system: Preliminary results. *Health economics Unit, University of Cape Town working paper*. 09-2.
10. Ataklte, F., Erqou, S., Kaptoge, S., et al. (2015). Burden of undiagnosed hypertension in sub-saharan Africa: a systematic review and metaanalysis. *Hypertension*. 65, 291–298.
11. Bauman, A. E., Reis, R. S., Sallis, J. F., et al. (2012). Correlates of physical activity: why are some people physically active and others not? *Lancet*. 380, 258–271.

12. Beaglehole, R., Bonita, R., Alleyne, G., et al. (2011). UN High- Level Meeting on Non-Communicable Diseases: addressing four questions. *Lancet*. 378, 449–455.
13. Beaglehole, R., Bonita, R., Horton, R., et al. (2011). Priority actions for the non-communicable disease crisis. *Lancet*. 377, 1438–1447.
14. Beasley, J. M., Riley, W. T., Davis, A., et al. (2009). Evaluation of a PDA-based dietary assessment and intervention programme: A randomized controlled trial. *The Journal of the American College of Nutrition.* 27 (2), 280–286.
15. Berry, K. M., Parker, W., Mchiza, Z. J., et al. (2017). Quantifying unmet need for hypertension care in South Africa through a care cascade: evidence from the SANHANES, 2011- 2012. *British Medical Journal Global Health*. 2, e000348.
16. Bertram, M. Y., Steyn, K., Wentzel-Viljoen, E., et al. (2012). Reducing the sodium content of high-salt foods: effect on cardiovascular disease in South Africa. *South African Medical Journal.* 102, 743–745.
17. Blair, S. N. and Morris, J. N. (2009). Healthy Hearts – and the Universal Benefits of Being Physically Active: Physical Activity and Health. *Elsevier Inc.*
18. Blecher, M., Davén, J., Kollipara, A., et al. (2017). Health spending at a time of low economic growth and fiscal constraint. *South African Health Review, 2017.*
19. Blecher, M., Day. C., Dove, S., et al. (2008). Primary health care financing in the public sector. In: Barron PR-RJ, ed. South African health review. *Durban: Health Systems Trust.*
20. Bradshaw, D. (2008). Determinants of health and their trends. In: Barron P, Roma-Reardon J, editors. South African Health Review 2008. *Durban: Health Systems Trust; 2008.*
21. Bradshaw, D., Steyn, K., Levitt, N., et al. (2011). Non communicable diseases: a race against time. *Cape Town: Medical Research Council South Africa.*
22. Brown, I. J., Tzoulaki, I., Candeias, V., et al. (2009). Salt intakes around the world: implications for public health. *International Journal of Epidemiology.* 38, 791–813.
23. Bull, F. C., Maslin, T. S. and Armstrong, T. (2009). Global Physical Activity Questionnaire (GPAQ): Nine Country Reliability and Validity Study. *Journal of Physical Activity and Health.* 6, 790-804.

24. Burke, L. E., Swigart, V., Turk, M. W., et al. (2009). Experiences of self-monitoring: successes and struggles during treatment for weight loss. *Qualitative Health Research.* 19 (6), 815–828.
25. Caspersen, C. J., Powell, K. E. and Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public health reports*. 100 (2), 126.
26. Cecchini, M., Sassi, F., Laver, J. J., et al. (2010). Tackling of unhealthy diets, physical inactivity, and obesity: health effects and cost-effectiveness. *Lancet*. 376, 1775-1784.
27. Central Intelligence Agency. (2017). The World Fact Book, 2017. https://www. cia. gov/ library/ publications/ the- world- factbook/ geos/ sf. html.
28. Chopra, M., Lawn, J. E., Sanders, D., et al. (2009). Achieving the health Millennium Development Goals for South Africa: challenges and priorities. *Lancet*. 374 (9694), 1023-1031.
29. Chuma, J. and Molyneux, C. (2009). Estimating inequalities in ownership of insecticide treated nets: does the choice of socio-economic status measure matter? *Health policy and planning.* 24, 83-93.
30. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: executive summary. Expert Panel on the Identification, Evaluation, and Treatment of Overweight in Adults. (1998). 64 (4). 899-917.
31. Coovadia, H., Jewkes, R., Barron, P., et al. (2009). The health and health system of South Africa: historical roots of current public health challenges. *Lancet*. 374 (9692), 817–834.
32. Council for Medical Schemes. (2016). Annual Report 2015–2016. *Pretoria: Council for Medical Schemes; 2016.*
33. Council for Medical Schemes. (2009). Annual Report, 2008–09. *Pretoria: Council for Medical Schemes, 2009.*
34. Daar, A. S., Singer, P. A., Persad, D. L., et al. (2007). Grand challenges in chronic non-communicable diseases. *Nuture*. 450, 494-496.
35. Day, C. and Gray, A. (2017). Health and Related Indicators. *South African Health Review, 2017.*

36. Department of Health and Human Services. (2010). A report of the Surgeon General: how tobacco smoke causes disease: the biology and behavioral basis for smoking attributable disease. Atlanta: National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2010. *Department of Health and Human Services publication no.* [CDC] 89-8411.
37. Ding, D., Lawson, K. D., Kolbe-Alexander, T. L., et al. for the Lancet Physical Activity Series 2 Executive Committee. (2016).The economic burden of physical inactivity: a global analysis of major non-communicable diseases. *Lancet*. 388, 1311–1324.
38. Ezzati, M. and Riboli, E. (2016). Behavioural and dietary risk factors for non-communicatble disease. *The New England Journal of Medicine*. 369 (10), 954-964.
39. Ezzati, M. and Riboli, E. (2012). Can noncommunicable diseases be prevented? Lessons from studies of populations and individuals. *Science*. 337, 1482-1487.
40. FAO Food Balance Sheets. 2007. [Online]. Available: http://www.fao.org/faostat [2011, August 1].
41. Fezeu, L., Minkoulou, E., Balkau, B., et al. (2006). Association between socioeconomic status and adiposity in urban Cameroon. *International Journal of Epidemiology*. 35 (1), 105-111.
42. Forouzanfar, M. H., Liu, P., Roth, G. A., et al. (2017). Global burden of hypertension and systolic blood pressure of at least 110 to 115 mm hg, 1990-2015. *The Journal of American Medical Association*. 317, 165–38.
43. Gakidou, E. E., Murray, C. J. L. and Frenk, J. (2000). Defining and measuring health inequality: an approach based on the distribution of health expectancy. *Bulletin of the World Health Organization.* 78, 42-54.
44. Gilson, L., Doherty, J., Loewenson, R., et al. (2007). Challenging inequity through health systems. *In Final Report of the Knowledge Network on Health Systems Geneva: World Health Organization, Commission on the social determinants of health*.
45. Gohar, F., Greenfield, S., Beevers, D. G., et al. (2008). Self-care and adherence to medication: a survey in the hypertension outpatient clinic. *BioMed Central Complementary and Alternative Medicine.* 8 (4).

46. Goudge, J., Gilson, L. Russell, S., et al. (2009). Affordability, availability and acceptability barriers to health care for the chronically ill: Longitudinal case studies from South Africa. *BioMed Central Public Health*.
47. Groenewald, P., Bradshaw, D., Daniels, J., et al. (2008). Cause of death and premature mortality in Cape Town, 2001–2006. *Cape Town: South African Medical Research Council; 2008.*
48. Groenewald, P., Laubscher, R., Chaudhry, S., et al. (2014). Monitoring of non-communicable diseases such as hypertension in South Africa: Challenges for the post-2015 global development agenda. *South African Medical Journal*. 104 (9), 680-687.
49. Harris, B., Goudge, J., Ataguba, J. E., et al. (2011). Inequities in access to health care in South Africa. *Journal of Public Health Policy*. 32 (1), S102–S123.
50. Haskell, W. L., Lee, I. M., Pate, R. R., et al. (2007). Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Circulation.* 116 (9), 1081.
51. Hill, L. M., Maman, S., Holness, D., et al. (2016). Legal knowledge, needs, and assistance seeking among HIV positive and negative women in Umlazi. *South Africa BioMed Central International Health and Human Rights*. 16, 3.
52. Horton, R. (2007). Chronic diseases: the case for urgent global action. *Lancet*. 370, 1881–82.
53. Jokisalo, E., Kumpusalo, E., Enlund, H., et al. (2002). Factors related to non-compliance with antihypertensive drug therapy. *Journal of Human Hypertension.* 16 (8), 577–583.
54. Jones, E. S. W. and Rayner, B. L. (2014). The importance of guidelines. *Cardiovascular Journal of Africa*. 25 (6), 296-297.
55. Joubert, J., Norman, R., Lambert, E. V., et al. (2007). Estimating the burden of disease attributable to physical inactivity in South Africa in 2000. *South African Medical Journal*. 97, 725-731.
56. KA Economic Development Consulting CC. Umlazi local economic development plan 2008. Available at: http://www.durban.gov.za/Documents/Invest_Durban/ Economic%20Development/5.pdf (accessed 5 June 2013).

57. Kamadje, R. M., Edwards, R., Atanga, J. S., et al. (2006). Anthropometry measures and prevalence of obesity in the urban adult population of Cameroon: an update from the Cameroon Burden of Diabetes Baseline Survey. *BioMed Central Public Health*. 6 (228), 1-8.
58. Katz, I., Schneider, H., Shezi, Z., et al. (2009). Managing type 2 diabetes in Soweto – the South African chronic disease outreach programme experience. *Primary Care Diabetes.* 3 (3), 157–164.
59. Kohl, H. W., Craig, C. L., Lambert, E. V, et al. (2012). The pandemic of physical inactivity: global action for public health. *Lancet*. 380 (9838), 294-305.
60. Lackland, D. T. and Weber, M. A. (2015). Global burden of cardiovascular disease and stroke: hypertension at the core. *The Canadian Journal of Cardiology journal*. 31, 569–571.
61. Lautenschlager, N. T., Cox, K. L., Flicker, L., et al. (2008). Effect of physical activity on cognitive function in older adults at risk for Alzheimer disease: a randomized trial. *The Journal of American Medical Association*. 300, 1027–1037.
62. Lee, I, M., Shiroma, E. J., Lobelo, F., et al. (2012). Effect physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet*. 380 (9838), 219-229.
63. Lim, S. S., Vos, T., Flaxman, A. D., et al. (2012). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*. 380, 2224-2260. Erratum, *Lancet* 2013; 381, 1276.
64. Malan, M. and Leaver, R. (2003). Political change in South Africa: new tobacco control and public health policies. In: De Beyer J, Waverley Brigden L, editors. Tobacco control policy: strategies, successes, and setbacks. *World Bank Publications*. 13(1), 59–76.
65. Mathurin, P. and Deltenre, P. (2009). Effect of binge drinking on the liver: an alarming public health issue? *Gut*. 58, 613-617.
66. Matzopoulous, R. G. and Corrigall, J. (2014). The cost of harmful alcohol use in South Africa. (2014). *The South African Medical Journal.* 104 (2), 127-132.

67. Mayosi, B. M., Flisher, A. J., Lalloo, U. G., et al. (2009). The burden of non-communicable diseases in South Africa. *Lancet*. 374 (9693), 934-947.
68. Mayosi, B. M., Lawn, K. E., van Niekerk, A., et al. (2012). Health in South Africa: changes and challenges since 2009.
69. McIntyre, D., Garshong, B., Mtei, G., et al. (2008). Beyond fragmentation and towards universal coverage: insights from Ghana, South Africa and the United Republic of Tanzania. *Bull World Health Organ*. 86 (11), 871-876.
70. Medical Research Council. (2007). South Africa Demographic and Health Survey 2003. *Pretoria: Department of Health.*
71. Miller, E. R., Erlinger, T. P., Young, D. R., et al. (2002). Results of the diet, exercise, and weight loss intervention trial (DEW-IT). *Hypertension*. 40 (5), 612–618.
72. Mullick, S., Kunene, B. and Wanjiru, M. (2005). Involving men in maternity care: health service delivery issues. *Agenda Special Focus*. 6.
73. Munro, S., Lewin, S., Swart, T. and Volmink, J. (2007). A review of health behaviour theories: how useful are these for developing interventions to promote long-term medication adherence for TB and HIV/AIDS? *BioMed Central Public Health*. 7 (104), 16 pages.
74. National High Blood Pressure Education Program. (2004). The seventh report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure.
75. National Planning Commission. (2011). National Development Plan: Vision for 2030. *Pretoria: Government of South Africa; 2011.*
76. Ng, S. W., Norton, E. C. and Popkin, B. M. (2009). Why have physical activity levels declined among Chinese adults? Findings from the 1991–2006 China Health and Nutrition Surveys. *Social Science & Medicine*. 68, 1305–1314.
77. Ngubane, C. (2014). Occupying Umlazi: Hesitant Steps Towards Political Ideology in a Durban Township. *Politikon: South African Journal of Political Studies*. 41 (3), 355-370.
78. Norman, R., Bradshaw, D., Schneider, M., et al. (2007). A Comparative risk assessment for South Africa in 2000: towards promoting health and preventing disease. *South African Medical Journal.* 97 (7), 637-641.

79. Nsibande, D., Doherty, T., Ijumba, P., et al. (2013). Assessment of the uptake of neonatal and young infant referrals by community health workers to public health facilities in an urban informal settlement, KwaZulu-Natal. *South Africa BioMed Central Health Services Research*. 13, 47.
80. Osterberg, L. and Blaschke, T. (2005). Adherence to medication. The *New England Journal of Medicine*. 353, 487-97.
81. Parry, C. D. H. (2010). Alcohol policy in South Africa: a review of policy development processes between 1994 and 2009. *Addiction*.105, 1340-1345.
82. Prentice, J. C. and Pizer, S. D. (2008). Waiting times and hospitalizations for ambulatory care sensitive conditions. *Health Services and Outcomes Research Methodology*. 8 (1), 1–18.
83. Pillay, R. (2009). Work satisfaction of professional nurses in South Africa: a comparative analysis of the public and private sector. *Biomed Central Public Health*. 7 (15), 1-10.
84. Pimlott, N. The miracle drug. (2010). *Canadian Family Physician.* 56, 407–409.
85. Popkin, B. M. (2006). Global nutrition dynamics: the world is shifting rapidly toward a diet linked with noncommunicable disease. *The American Journal Clinical Nutrition.* 84 (2), 289-298.
86. Poulter, N. R., Prabhakaran, D. and Caulfi, M. (2015). Hypertension. Lancet. 386, 801–812.
87. Puoane, T., Tsolekile, L., Sanders, D., et al. (2008). Chronic non-communicable diseases. In: Barron P, Roma-Reardon J, eds. South African Health Review. *Durban: Health Systems Trust*. 73–87.
88. Ranchod, S., Adams, C., Burger, R., et al. (2017). South Africa's hospital sector: old divisions and new developments. *South African Health Review, 2017*.
89. Rehm, J., Baliunas, D., Borges, G. L., et al. (2010). The relation between different dimensions of alcohol consumption and burden of disease: an overview. *Addiction*. 105, 817-843.
90. Roerecke, M. and Rehm, J. (2012). The cardioprotective association of average alcohol consumption and ischaemic heart disease: a systematic review and meta-analysis. *Addiction*. 107, 1246-1260.

91. Roerecke, M. and Rehm, J. (2010). Irregular heavy drinking occasions and risk of ischemic heart disease: a systematic review and meta-analysis. *American Journal of Epidemiology*. 171, 633-644.
92. Sacks, F. M., Svetkey, L. P., Vollmer, W. M., et al. (2001). Effects of blood pressure of reduced dietary sodium and the Approaches to Stop Hypertension (DASH) diet. DASH-Sodium Collaborative Research Group. *The New England Journal of Medicine*. 344, 3–10.
93. Saleem, F., Hassali, M. A., Shafie, A. A., et al. (2011). Association between Knowledge and Drug Adherence in Patients with Hypertension in Quetta, Pakistan. *Tropical Journal of Pharmaceutical Research*. 10 (2): 125-132.
94. Seedat, Y. K. (2007). Impact of poverty on hypertension and cardiovascular disease in sub- Saharan Africa. *Cardiovascular Journal of Africa*. 18 (5), 316–320.
95. Seedat, Y. K., Rayner, B. L., and Veriava, Y. (2014). South African hypertension practice guideline 2014. *Cardiovascular Journal of Africa.* 25 (6), 288-297.
96. Seedat, Y. K., Croasdale, M. A., Milne, F.J., et al. (2006). South African hypertension guideline 2006. *South African Medical Journal.* 96 (4 Pt 2), 337–362.
97. Serour, M., Alqhenaei, H., Al-Saqabi, S., et al. (2007). Cultural factors and patients' adherence to lifestyle measures. *British Journal of General Practice*. 57 (537), 291–295.
98. Schmidt, M. I., Duncan, B. B., Silva, G. A., et al. (2011). Chronic non-communicable diseases in Brazil: burden and current challenges. *Lancet*. 377 (9781), 1949-1961.
99. Schneider, M., Bradshaw, D., Steyn, K., et al. (2009). Poverty and non-communicable diseases in South Africa. *Scandinavian Journal of Public Health*.
100. Scott, V., Schaay, N., Schneider, H., et al. (2017). Addressing social determinants of health in South Africa: the journey continues. *South African Health Review, 2017.*
101. Shavelle, R. M., Paculdo, D. R., Strauss, D. J., et al. (2008). Smoking habit and mortality: a meta-analysis. *Journal of Insurance Medicine*. 40,170–178.
102. Shay, L., Seibert, D., Watts, D., et al. (2009). Adherence and weight loss outcomes associated with food-exercise diary preference in a military weight management programme. *Eating Behaviors*. 10 (4), 220–227.

103. Sitas, F. Egger, S. Bradshaw, D. et al. (2013). Differences among the coloured, white, black, and other South African populations in smoking-attributed mortality at ages 35–74 years: a case-control study of 481 640 deaths. *Lancet.* 382, 685-693.

104. Statistics South Africa. (2017). Quarterly Labour Force Survey. Statistical release P0211.

105. Statistics South Africa. (2016). General Household Survey 2015. Statistical release P0318*. Pretoria: Statistics South Africa; 2016*.

106. Statistics South Africa. (2016). Quarterly Labour Force Survey. Quarter 3: 2016. Statistical release P0211. *Pretoria: Statistics South Africa; 2016*.

107. Statistics South Africa. (2016). Mid-year population estimates 2016. *Pretoria: Statistics South Africa; 2016.*

108. Statistics South Africa. (2016). Community Survey 2016. Statistics Release P0301.

109. Statistics South Africa. (2016). Community Survery, 2016, Province at a glance, Report 03-01-03.

110. Statistics South Africa. (2015). Mortality and causes of death in South Africa, 2014: Findings from death notification. Statistical release, P0309.3.

111. Statistics South Africa. (2014). Mortality and causes of death in South Africa, 2013: Findings from death notification. Statistical release P0309.3 *Pretoria: Statistics South Africa; 2014.*

112. Statistics South Africa. (2008). Income and expenditure of households 2005/2006: analysis of results. Report No. 01-00-01. ISBN No. 978-0-621-37635-7.

113. Steyn, N. P. (2006). Nutrition and chronic diseases of lifestyle in South Africa. In: Steyn K, Fourie J, Temple N, editors. Chronic diseases of lifestyle in South Africa: 1995-2005. *Technical report, Cape Town: South African Medical Research Council*.

114. Steyn, K., Bradshaw, D., Norman, R., et al. (2008). Determinants and treatment of hypertension in South Africans: The first Demographic and Health Survey. *South African Medical Journal*. 98 (5), 376–380.

115. Steyn, N. P., Bradshaw, D., Norman, R., et al. (2006). Dietary Changes and the Health Transition in South Africa: Implications for Health Policy. *Cape Town: South African Medical Research Council*.

116. Steyn, K., Levitt N. S., Patel, M., et al. (2008). Hypertension and diabetes: Poor care for patients at community health centres. *Journal of Endocrinology, Metabolism and Diabetes of South Africa*. 13 (2), 64-70.

117. Steyn, N. P., Bradshaw, D., Norman, R., et al. (2006). Dietary Changes and the Health Transition in South Africa: Implications for Health Policy. *Cape Town: South African Medical Research Council*.

118. Suhrcke, M., Nugent, R. A., Stuckler, D., et al. (2006). Chronic Disease: An Economic Perspective (Oxford Health Alliance, London).

119. Tollman, S. M., Kahn, K., Sartorius, B., et al. (2008). Implications of mortality transition for primary health care in rural South Africa: a population-based surveillance study. *Lancet*. 372 (9642), 893–901.

120. Warburton, D. E. R., Nicol, C. W. and Bredin, S. S. D. (2006). Health benefits of physical activity: the evidence. *Canadian Medical Association Journal*. 174 (6), 801-809.

121. Watkins, D. A., Olson, Z. D., Verguet, S., et al. (2016). Cardiovascular disease and impoverishment averted due to a salt reduction policy in South Africa: an extended cost effectiveness analysis. *Health Policy Plan*. 31 (1), 75–82.

122. Webb, M., Fahimi, S., Singh, G. M., et al. (2017). Cost effectiveness of a government supported policy strategy to decrease sodium intake: global analysis across 183 nations. *British Medical Journal*. 356, i6699.

123. Webber, J., Stewart, A. and Becker, P. (2013). The effect of a reminder diary on risk factors in patients with chronic hypertension attending a clinic at a hospital in Johannesburg, South Africa. *African Journal of Primary Health Care & Family Medicine.* 5 (1), 8 pages.

124. Wen, C. P. and Wu, X. (2012). Stressing harms of physical inactivity to promote exercise. *Lancet*. 380 (9838), 192-193.

125. Wen, C. P., Wai, J. P., Tsai, M. K., et al. (2011). Minimum amount of physical activity for reduced mortality and extended life expectancy: a prospective cohort study. *Lancet*. 378 (9798), 1244–1253.

126. World Economic Forum. Global risks 2011. http://riskreport. weforum.org/ (accessed Feb 21, 2011).

127. World Health Organization. (2014). Global status report on noncommunicable diseases 2014. *World Health*. 176.

128. World Health Organization. (2010). Global status report on noncommunicable diseases 2010. *World Health*.

129. World Health Organization. (2008). Commission on the Social Determinants of health. *Geneva: World Health Organization*, 2008.

130. World Health Organization. (2005). Preventing chronic diseases: a vital investment. Geneva: World Health Organization, 2005.

131. World Health Organization (2004). Tobacco and poverty: a vicious cycle. Geneva: World Health Organization, 2004.

132. Yusuf, S., Hawken, S., Ounpuu, S., et al. (2005). Obesity and the risk of myocardial infarction in 27,000 participants from 52 countries: a case-control study (INTERHEART Study Investigators). *Lancet*. 366 (9497), 1640–1649.

133. Ziraba, A. K., Fotso, J. C. and Ochako, R. (2009). Overweight and obesity in urban Africa: A problem of the rich or the poor? *BioMed Central Public Health.* 9 (465), 1-9.

UCWANINGO OLUBANZI NGESIFO SOMFUTHO WEGAZI ELIPHEZULU (iHIGH-HIGH)!

8.8 APPENDIX I

Uphethwe isifo somfutho wegazi eliphezulu (iHIGH-HIGH)?



Uhlala elokishini laseMlazi?

UYAMENYWA UKUBA UHLANGANYELE NATHI KUCWANINGO NGESIFO SOMFUTHO WEGAZI OPHEZULU (iHIGH-HIGH):

Inhloso yocwaningo ukuba sikwazi ukuhlonza umehluko ngolwazi, nokunakekelwa kanye nobungozi obuphathelene nesifo somfutho wegazi eliphezulu (iHIGH-HIGH) kuziguli ezisebenzisa umtholampilo oxhaswe nguhulumeni kuqhathaniswe nomtholampilo ozimele kubahlali baselokishini laseMlazi. Ukuqonda lomehluko kungasiza ukwazisa indlela ekunganqinisekiswa ngayo ukunakekela isifo somfutho wegazi eliphezulu (iHIGH-HIGH) ezweni lethu.

Ucwaningo luzokwenzeka endaweni eyisicelo sakho (e.g. Ekhaya lakho), ngamunye nangasese.



Udla imithi yesifo segazi eliphezulu (iHIGH HIGH)? Noma wazi umuntu onaso isifo somfutho wegazi eliphezulu (iHIGH HIGH)?

Uneminyaka engu-45 noma ngaphezulu?

Ngemininingwane engcwele ngicela uthitane no Mandisa Simamane (ku- Whatsapp noma uthumele umyalezo ka 'Please Call Me'): *073 726 4219* or email: *SimamaneMandisa@gmail.com*

HYPERTENSION RESEARCH STUDY!

8.8 APPENDIX I

ARE YOU DIAGNOSED WITH HYPERTENSION?



DO YOU RESIDE IN UMLAZI TOWNSHIP?

YOU ARE INVITED TO PARTICIPATE IN THE RESEARCH STUDY:

The main aim of the study is to identify the differences in, knowledge and management of hypertension, as well as management of hypertension risk factors, in patients' utilizing in the public compared to the private health care sectors in Umlazi Township, KwaZulu-Natal. Understanding these differences can assist in informing ways to strengthen the management of hypertension in the country.

Study will be done at your requested venue (e.g. at your home).



ARE YOU TAKING HYPERTENSION MEDICATION? OR KNOW OF SOMEBODY WITH HYPERTENSION?

ARE YOU 45 YEARS AND OLDER?

For more information please contact Mandisa Simamane (send me Whatsapp or Please Callback message to): *073 726 4219* or *SimamaneMandisa@gmail.com*

Participant Letter of Information

Dear Sir/Madam

Good day, my name is Miss Mandisa Jewel Simamane, I am a student at the University of the Witwatersrand. I am currently doing my Master of Science in Medicine, Sport and Exercise Science. This letter intends to invites you to participate in a study aimed at identifying the differences in, knowledge and management of hypertension, as well as management of hypertension risk factors, in patients' utilizing in the public compared to the private health care sectors in Umlazi Township, KwaZulu-Natal. Participation is entirely voluntary and not accepting the invitation to participate will in no way have any negative consequences on you. The nature and the purpose of the research study and of this informed consent declaration will be explained to you in a language that you understand. Your participation will be greatly appreciated. Please ask as many questions as you like regarding the study before giving consent.

Where will the study take place? The entire testing and answering of questionnaires will take place in area requested by you, the participant (e.g. home visit).

What the study involves: The purpose of the research study involves comparing the difference in patient knowledge, lifestyle and management of hypertension risk factors in patients' utilizing in the public health sectors compared to the private health sectors in KwaZulu-Natal. The University of Witwatersrand has given ethical clearance, clearance certificate No. M161034 to this research project and you may request to see it. You participants will participate in this study by being assessed on a series of tests such as resting blood pressure, body mass, stature, circumference measurement will be taken and questionnaires to be answered, in a period of about an hour.

Who can participate?
You can participate if:

a. You are diagnosed with hypertension by a medical doctor, nurse and/or healthcare professional.
b. You are taking antihypertensive medication prescribed by a medical doctor.
c. You utilize strictly public or strictly private health sector to manage your hypertension.
d. You are between the ages of 45 years old and older.
e. You are living in the areas of Umlazi townships of KwaZulu-Natal.
f. Both Males and Females.

Who cannot participate?
You cannot participate if:

a. You utilize both public and private health sectors to manage hypertension.
b. You are presenting with pre-hypertension.
c. You are diagnosed with hypertension, who present with physical disability or suffering and/or recovering from stroke or any other co-morbidity that may affect their physical abilities.
d. You are diagnosed with hypertension, but are not currently taking hypertensive medication.

e. You are with mental or physical disabilities that would prevent them from answering the questionnaires

Freedom of consent: Your participation is entirely voluntary, should you at any stage wish to withdraw from participating further and you may do so without any negative consequences. You may be asked to withdraw from the study before it has finished if the researcher or any other appropriate person feels it is in your best interest to do so or if the given instructions are not followed accordingly.

Reimbursements: You will not be compensated for participating in the study.

Risks/ Benefits: There will be no risks associated with the study to the participants. There are no direct benefits to the participants, but the research will allow us to have a better understanding of the differences in patient knowledge and management of risk factors of hypertension in patients utilizing in the public health sectors compared to the private health sectors in South Africa.

What is your responsibility? You are responsible for fully disclosing information to the researcher that might be of importance to the study.

Conclusion: The researcher intends to publish the research results in the form of an article. However, confidentiality and anonymity of records will be maintained and that your name and identity will not be revealed to anyone who has not been involved in the conduct of the research.
You will receive verbal feedback regarding the results obtained during the study.
Any further questions that you might have concerning the study or your participation will be answered by Miss Mandisa Jewel Simamane at 073 726 4219 or email at simamanemandisa@gmail.com

Your participation would be greatly appreciated.

Kind Regards,

Miss Mandisa Jewel Simamane
Biokineticist
Student, Master of Science in Medicine (Biokinetics)
Tel: +27 (0) 73 726 4219
Email: simamanemandisa@gmail.com

Participant Informed Consent Form

I, ……., do hereby give consent to participate in the study entitled: Knowledge and lifestyle practices of hypertensive patients utilizing public and private health sectors in Umlazi township of KwaZulu-Natal. I have read the letter of information and confirm that the information has been explained to me in a language that I understand and I am aware of this document's contents. I have asked all questions that I wished to ask and these have been answered to my satisfaction. I fully understand what is expected of me during the study.

By signing this informed consent declaration I am not waiving any legal claims rights or remedies that I may have.

An original copy of this informed consent declaration will be kept on record by the researcher.

I have not been pressurized in any way to participate in the study. By signing below, I voluntarily agree to participate in the above mentioned study.

……	……
Participants Signature	Date
……	……
Witness's Signature	Date

PARTICIPANTS IDENTIFYING DETAILS

Study Number	Name	Surname	Gender	Physical Address

DEMOGRAPHIC DATA SHEET									
Study Number									
Service Provider	**Public Health Sector**								
	Private Health Sector								
Participants Details:									
Date	**DD/MM/YY**	Age							
Body Mass		Statue							
Race/Ethnicity		Black		White					
		Asian		Other					
Do you drink alcohol?								**Y**	**N**
If yes, on average, how many units of alcohol do you have per week?									
Resting Blood Pressure								**SBP**	**DBP**
Body Mass Index									
Waist Circumference									
Hip Circumference									
Waist-to-Hip Circumference									
Marital Status: (tick one)									
Single		Widowed		Married/Cohabiting		Separated/Divorced			
Education:									
Total number of years of formal education									
Highest level of education attended:									
No school attended		Primary		Secondary		Matric			
Professional/Technical training		University							
Occupation:									
Which one of the following best describes your occupational status:									
Housework		Skilled manual labor		Managerial/professional/technical					
Student		Unskilled manual work		Clerical support, services, sales					
Other									
Household income (per annum)									
<R60 000		R60 000-120 000		>120 000					

World Health Organization
Developing Integrated Response of Health Care Systems to Rapid Population Ageing

PATIENT QUESTIONNAIRE
Questionnaire for **Hypertensive patients**

DIAGNOSIS OF HYPERTENSION: Q 1-4, 6,7

Study number	
1. How did you come to know about your hypertension?	1. in a routine medical control 2. screening programme 3. emergency service 4. other (specify:_____) 5. I do not know
2. When were you diagnosed?	1. First time 2. < 5 years 3. > 5 years
3. Where were you first diagnosed as having hypertension?	1. This primary health centre 2. Other primary care clinic/physician 3. Secondary care hospital* 4. Tertiary care hospital* 5. at a pharmacy/drugstore 6. other (specify) 7. I do not know * manual explains what it is meant
4. Was the clinic or hospital where you were first diagnosed run by the government, a charitable organization or was it privately run? *(Please mark only one option)*	1. Public 2. Private 3. Non-governmental Organization/Charity organization
6. Where do you regularly go for routine follow up to check your blood pressure?	1. Diagnosis on this visit 2. This health centre 3. Nearby primary health care clinic 4. Nearby hospital (secondary facility) 5. Tertiary hospital 6. I do not do any routine follow up Why? _____
7. Do you have to pay fees for consultation and/or drugs at the facility that you regularly go to for the treatment of your hypertension ? *(Please mark only one option)*	1. Paid nothing 2. Paid part 3. Paid fully 4. Paid (I do not know if part or fully) 5. I do not know

Management. Q 5, 8, 9, 11

5. Have you been told by a doctor or nurse or someone by this health centre to control your blood pressure?	1. Yes 2. No
8. When do you go for your routine blood pressure check?	1. Diagnosis on this visit 2. As advised by the doctor 3. When I do not feel well 4. Both 5. Other (specify)_____
9. Beside a primary health centre, how else do you get your blood pressure measured (checked)?	1. Secondary care hospital* 2. Tertiary care hospital* 3. Neighbour/family member 4. Myself 5. Check in a nearby pharmacy/ market place 6. Other (specify) _____ 7. I only check my blood pressure in the primary health centre
11. Compared to 12 months ago, is your blood pressure:	1. better 2. same 3. worse 4. I do not know 5. I didn't get my blood pressure measurement 12 months ago

COMPLICATIONS AND HOSPITALIZATION: Q 12-15; 20

10. Do you have blood relatives with history of hypertension?	1. Yes 2. No 3. I do not know
12. Over the last year have you been admitted to the hospital?	1. Yes 2. No **Go to Q16**
13. Do you know why?	1. No 2. Yes (specify) _____ _____ _____
14. Was it related to hypertension?	1. Yes 2. No 3. I do not know
15. Was your blood pressure controlled at your admission to the hospital?	4. Yes 5. No 6. I do not know
20. Have you had any complications from your hypertension?	1. No 2. renal disease 3. stroke 4. retinopathy 5. cardiovascular 6. other_____ 7. I do not know

MEDICATIONS AND ADHRENCE: Q16-19

16. Have you been prescribed any medication to lower your blood pressure?	1. Yes 2. No 3. I do not know
17. Do you take all your prescribed medications?	1. Yes 2. No
18. How many different medicines a day are you taking (approximate number)?	[ ] [ ]
19. If you don't take your medication regularly, why don't you take them as directed?	1. I cannot afford the cost 2. medication are not easily available 3. I do not like to take medications 4. I only take them when I feel that I need them. 5. I do not like the side effects of the medication. 6. I prefer alternative medicine 7. I forget 8. I do not know 9. Other_____

KNOWLEDGE AND SELF CARE: Q 21,22,23

21. Are you aware of any complication of hypertension?	8.
22. If you are aware, have you been informed by the doctor or nurses or someone by the health centre about these complications?	1. Yes 2. No □ **Go to Q23**
23. Have been told that stroke is related to hypertension?	1. Yes 2. No

KNOWLEDGE OF RISK FACTORS: Q 25 - 26

1. Have you been informed by your doctor or nurse or someone by the health centre about the rule of any of diet in managing your hypertension?	1. Yes 2. No (specify) _____ _____ _____
2. Have you been informed by your doctor or nurse or someone by the health centre about the rule of any of alcohol in managing your hypertension?	1. Yes 2. No (specify) _____ _____ _____
3. Have you been informed by your doctor or nurse or someone by the health centre about the rule of any of smoking in managing your hypertension?	1. Yes 2. No (specify) _____ _____ _____
4. Have you been informed by your doctor or nurse or someone by the health centre about the rule of any of physical activity in managing your hypertension?	1. Yes 2. No (specify) _____ _____ _____

World Health Organization, Global Physical Activity Questionnaire (GPAQ).

Study Number:

Physical Activity			
Next I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person. Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, fishing or hunting for food, seeking employment. *[Insert other examples if needed].* In answering the following questions 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.			
Questions		**Response**	**Code**
Activity at work			
1	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like *[carrying or lifting heavy loads, digging or construction work*] for at least 10 minutes continuously? *[INSERT EXAMPLES] (USE SHOWCARD)*	Yes 1 No 2 *If No, go to P 4*	P1
2	In a typical week, on how many days do you do vigorous-intensity activities as part of your work?	Number of days ⌊__⌋	P2
3	How much time do you spend doing vigorous-intensity activities at work on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋ hrs mins	P3 (a-b)
4	Does your work involve moderate-intensity activity that causes small increases in breathing or heart rate such as brisk walking *[or carrying light loads*] for at least 10 minutes continuously? *[INSERT EXAMPLES] (USE SHOWCARD)*	Yes 1 No 2 *If No, go to P 7*	P4
5	In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Number of days ⌊__⌋	P5
6	How much time do you spend doing moderate-intensity activities at work on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋ hrs mins	P6 (a-b)
Travel to and from places			
The next questions exclude the physical activities at work that you have already mentioned. Now I would like to ask you about the usual way you travel to and from places. For example to work, for shopping, to market, to place of worship. [insert other examples if needed]			
7	Do you walk or use a bicycle (*pedal cycle*) for at least 10 minutes continuously to get to and from places?	Yes 1 No 2 *If No, go to P 10*	P7
8	In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?	Number of days ⌊__⌋	P8
9	How much time do you spend walking or bicycling for travel on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋ hrs mins	P9 (a-b)
Recreational activities			
The next questions exclude the work and transport activities that you have already mentioned. Now I would like to ask you about sports, fitness and recreational activities (leisure), [insert relevant terms].			
10	Do you do any vigorous-intensity sports, fitness or recreational (*leisure*) activities that cause large increases in breathing or heart rate like [*running or football,]* for at least 10 minutes continuously? *[INSERT EXAMPLES] (USE SHOWCARD)*	Yes 1 No 2 *If No, go to P 13*	P10
11	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (*leisure*) activities?	Number of days ⌊__⌋	P11
12	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋ hrs mins	P12 (a-b)

Physical Activity (recreational activities) contd.			
Questions		**Response**	**Code**
13	Do you do any moderate-intensity sports, fitness or recreational (*leisure*) activities that causes a small increase in breathing or heart rate such as brisk walking.(*cycling, swimming, volleyball*)for at least 10 minutes continuously? *[INSERT EXAMPLES] (USE SHOWCARD)*	Yes 1 No 2 *If No, go to P16*	P13
14	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (*leisure*) activities?	Number of days ⌊__⌋	P14
15	How much time do you spend doing moderate-intensity sports, fitness or recreational (*leisure*) activities on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋ hrs mins	P15 (a-b)
Sedentary behaviour			
The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent [sitting at a desk, sitting with friends, travelling in car, bus, train, reading, playing cards or watching television], but do not include time spent sleeping. *[INSERT EXAMPLES] (USE SHOWCARD)*			
16	How much time do you usually spend sitting or reclining on a typical day?	Hours : minutes ⌊__⌋⌊__⌋ : ⌊__⌋⌊__⌋ hrs min s	P16 (a-b)

HYPERTENSIVE RELATED DIET – ADAPTED FROM FOOD FREQUENCY QUESTIONNAIRE

Study Number:

13. How often did you add salt to food while cooking?

Always ☐ Rarely ☐
Usually ☐ Never ☐
Sometimes ☐

14. How often did you add salt to any food at the table?

Always ☐ Rarely ☐
Usually ☐ Never ☐
Sometimes ☐

15. Did you regularly use a salt substitute (eg LoSalt)? Yes ☐ No ☐

If yes, which brand? _____

16. During the course of last year, on average, how many times a week did you eat the following foods?

Food type	Times/week	Portion size
Vegetables (not including potatoes)	☐☐	medium serving
Salads	☐☐	medium serving
Fruit and fruit products (not including fruit juice)	☐☐	medium serving or 1 fruit
Fish and fish products	☐☐	medium serving
Meat, meat products and meat dishes (including bacon, ham and chicken)	☐☐	medium serving

Study Number:

SMOKING QUESTIONNAIRE

Please answer each of the following items as they apply to you. Answer as honestly as you can. Thank you so much.

Questions

1. Have you ever smoked? ("√" one answer)
   [1] Yes
   [2] No

2. If yes, on average, how many cigarettes per day do you currently smoke?
   [1] Less than 10 cigarettes
   [2] 10–19 cigarettes
   [3] 20 or more cigarettes

3. How long have you smoked regularly?
   [1] Less than 2 years
   [2] 2-3 years
   [3] 4-5 years
   [4] 5 or more years

4. Do you want to quit smoking?
   [1] Don't want to quit
   [2] Want to attempt to quit smoking
   [3] Strong desire to quit smoking

5. Have you ever made an attempt to stop smoking?
   [1] Yes
   [2] No

6. On your most recent quit attempt, how long were you able to stop smoking? ("√" one answer)
   [1] 1–3 months
   [2] 3–5 months
   [3] 6 or more months

R14/49 Miss Mandisa Jewel Simamane

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M161034

NAME: (Principal Investigator)	Miss Mandisa Jewel Simamane
DEPARTMENT:	Centre for Exercise Science and Sport Medicine Umlazi, KwaZulu-Natal
PROJECT TITLE:	Knowledge and Lifestyle Practices of Hypertensive Patients Utilizing Public and Private Health Sectors in Umlazi Township of Kwazulu-Natal
DATE CONSIDERED:	28/10/2016
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Prof Demitri Constantinou and Mrs Estelle Watson
APPROVED BY:	Prof A Woodiwiss, Co- Chairperson, HREC (Medical)
DATE OF APPROVAL:	12/12/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 301, Third floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in October and will therefore be due in the month of October each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

Date 30/01/17

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

DIRECTORATE:
Health Research & Knowledge Management (HKRM)

330 Langalibalele street,
Private Bag X9051 PMB, 3200
Tel: 033 395 2805/3189/3123 Fax: 033 394 3782
Email: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

Reference: HRKM117/17
KZ_2017RP1_590

05 April 2017

Dear Ms M J Simamane
(University of Witwatersrand)

Subject: Approval of a Research Proposal

1. The research proposal titled **'Knowledge and lifestyle practices of hypertensive patients utilizing public and private health sectors in Umlazi township of KwaZulu-Natal'** was reviewed by the KwaZulu-Natal Department of Health (KZN-DoH).

   The proposal is hereby **approved** for research to be undertaken at Prince Mshiyeni Memorial Hospital.

2. You are requested to take note of the following:
   a. Make the necessary arrangement with the identified facility before commencing with your research project.
   b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.

3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Ms G Khumalo on 033-395 3189.

Yours Sincerely

Dr E Lutge
Chairperson, Health Research Committee
Date: 05/04/17.

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Mrs Sandra Benn
E-mail: sandra.benn@wits.ac.za

06 January 2017
Person No: 1497887
PAG

Miss MJ Simamane
Bb1001
Umlazi
4031
South Africa

Dear Miss Simamane

Master of Science in Medicine: Approval of Title

We have pleasure in advising that your proposal entitled *Knowledge and lifestyle practices of hypertensive patients utilizing public and private health sectors in Umlazi township of KwaZulu-Natal* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

DIRECTORATE: Senior Medical Manager

Mangosuthu Highway, Private Bag X 07
MOBENI
Tel: 031 907 8317/8304 Fax: 031 906 1044 Email:myint.aung@kznhealth.gov.za
www.kznhealth.gov.za

Prince Mshiyeni Memorial Hospital

Enquiry: Dr M AUNG
Ref No: 12/RESH/2017
Date: 02/05/2017

TO: Ms Mandisa Simamane

RE: LETTER OF APPROVAL TO CONDUCT RESEARCH AT PMMH

Dear Researcher;

I have pleasure to inform you that PMMH has granted to conduct research on **"Knowledge and lifestyle practices of hypertensive patients utilizing public and private health sectors in Umlazi township of KwaZulu-Natal"** in our institution.

Please note the following:

1. Please ensure this office is informed before you commence your research.
2. The institution will not provide any resources for this research.
3. You will be expected to provide feedback on you finding to the institution.

With kind regard



_____

DR MYINT AUNG
Senior Medical Manager & specialist in Family Medicine
MBBS, DO(SA), PGDip in HIV (Natal), M.Med.Fam.Med (natal), PhD
Tel: 031 9078317
Fax: 031 906 1044
myint.aung@kznhealth.gov.za

1497887:4.Dissertation_for_Turnitin_Report.docx

by Mandisa Simamane

Submission date: 22-Mar-2018 05:26PM (UTC+0200)
Submission ID: 934464765
File name: f-47da-8198-f91eaaea6338_4.Dissertation_for_Turnitin_Report.docx (7.6M)
Word count: 15943
Character count: 89546

ABSTRACT

Background: The South African government has taken several measures to address the evolving epidemic of non-communicable diseases (NCDs), but so far these efforts have not been effective in preventing the rising burden from these diseases. Hypertension is the most prevalent NCDs in society but unfortunately the control of this disease is suboptimal, and it is a growing health concern in all regions of the world, regardless of income). There is a substantial difference in resource availability between public and private health care sector (HCS) facilities and this result in disturbing impact on the population's health, resulting in unnecessary morbidity and mortality. Understanding the patient's knowledge, management of hypertension and its risk factors will help to identify the differences between the patients utilizing public and private health care (HC) providers in managing hypertension.

Aims: To determine patient's knowledge, management of hypertension and its risk factors between the patients utilizing public and private HC providers in managing hypertension.

Methods: A cross-sectional study design was conducted in Umlazi Townships in KwaZulu-Natal (KZN); patient's utilizing strictly public health sectors were compared to those strictly using the private health sectors. Measurements of blood pressure, body mass index, waist-to-hip ratio, as well as hypertensive patients questionnaire, global physical activity question, diet and smoking questionnaire were used as measuring tools and instruments. For normally, distributed continuous data an independent two-tailed *t* test was used to determine any significant differences ($p=\leq 0.05$) and for non-normally distributed or categorical data a chi-square test was used.

Results: A total of 137 people consented to participate in this study, comparison of the demographic characteristics was made between participants' utilizing the public HCS (n=77) and private HCS (n=60). The participants average age was 65 years (±10.83) and 60 years (±9.15), for the public HCS and private HCS, respectively, the public HCS

participants were significantly older than those attending private HCS (t=2.41) (p=0.02). The average BMI for the study sample (N=137) was 30.45kg·m^2 on both the groups, classified as Obese I. No significance relationship (X^2=0.03, p=0.85) was found between the type of HC provider and having been admitted to hospital over the last year, 58.44% and 58.33% participants felt their blood pressure was better compared to 12 months ago, in the public and private HCS, respectively. A significance relationship (X^2=3.96, p=0.05) was found between the type of HC provider the participants consulted for their hypertension and taking all prescribed medication, with public HCS (100%) participants being more likely to take their medication compared to the private HCS (95%). On average the participants global physical activity questionnaire total metabolic equivalents per week (t=0.63) (p=0.53) between the public and private HCS was 1803.12 (±4755.96) and 1385.33 (±2295.32), respectively. The public HCS (61.04% and 64.94%) had more participants that smoked regularly for ≥5 years (X^2=5.98, p=0.02) and those that drank alcohol as compared to the private HCS (38.33% and 48.33%) (X^2=3.81, p=0.05).

Conclusion: The participants of the private HCS did not tend to have better knowledge and management of hypertension and its risk factors as compared to that of the public HCS, although there were few significant differences between the two groups. This suggests that an intervention programme, which invests in area based specific strategies, is recommended, including healthy lifestyle and physical activity, needs to be implemented in the community of Umlazi Township in managing hypertension.

LIST OF TABLES

CHAPTER 4

Table 4.1 Demographic data characteristics for Public and Private Health Care Sector Participants

Table 4.2 Average of Age and Anthropometric Characteristics for Public and Private Health Care Sector

Table 4.3 Comparison of the Global Physical Activity Questionnaire Descriptive Data for Metabolic Equivalents level of Physical Activity between Public and Private Health Care Sector

LIST OF FIGURES

CHAPTER 4

Figure 4.1 Comparisons of Blood Pressure Classification Measurements between Public and Private Health Care Sector

Figure 4.2 Comparisons of Body Mass Index Classification Measurements between Public and Private Health Care Sector

Figure 4.3 Comparisons of Waist-to-Hip Ratio Classification Measurements between Public and Private Health Care Sector

Figure 4.4 Comparison of the Perception of Hypertension Management between Public and Private Health Care Sector

Figure 4.5 Comparisons of the Hypertension Complications and Hospitalizations between Public and Private Health Care Sector

Figure 4.6 Comparisons of Hypertension Medication and Adherence between Public and Private Health Care Sector

Figure 4.7 Comparisons of knowledge of Stroke's relation to Hypertension between Public and Private Health Care Sector (X^2=1.53, p=0.22)

Figure 4.8 Comparisons of knowledge of Physical Activity in managing Hypertension between Public and Private Health Care Sector (X^2=1.12, p=0.30)

Figure 4.9 Comparisons of Active and Inactive participants between Public and Private Health Care Sector

Figure 4.10 Comparison of Salt Usage while Cooking between Public and Private Health Care Sector

Figure 4.11 Comparison of Smoking Regularly between Public and Private Health Care Sector

Figure 4.12 Comparison of Alcohol Usage between Public and Private Health Care Sector

CHAPTER 1 – INTRODUCTION

1.1 Introduction

Non-communicable diseases (NCDs) constitute the major burden of illness and disability in almost all countries of the world (Daar, et al. 2007). Non-communicable diseases are chronic medical conditions or diseases which are non-infectious; common examples include hypertension, cardiovascular disease, Type II diabetes, and cancer (Bradshaw, et al. 2008). The morbidity and mortality due to NCDs are greatest in poor populations (Schmidt, et al. 2011).These diseases are on the increase in South African (SAn) communities and they disproportionately affect poor people living in urban settings, and are driving a rise in the demand for chronic disease care (Groenewald, et al. 2008; Tollman, et al. 2008). The SAn government has taken several measures to address the evolving epidemic of NCDs (Mayosi, et al. 2009), but so far these efforts have not been effective in preventing the rising burden from these diseases (Mayosi, et al. 2009). There is insufficient multi-sectorial coordination and drive towards a concerted programme of action for NCDs in South Africa (SA) (Mayosi, et al. 2009). The SAn adult population has high levels of the risk factors associated with NCDs, and large proportions of the burden of disease can be attributed to these potentially modifiable risk factors (Medical Research Council, 2007; Norman, et al. 2007).

Hypertension is the most prevalent NCDs in society but unfortunately control of the disease is suboptimal (Saleem, et al. 2011), it is a growing health concern in all regions of the world, regardless of income level (Lackland, et al. 2015). It has disturbing impact on the population's health, resulting in unnecessary morbidity and mortality (Saleem, et al. 2011). Groenewald, et al. (2014) classified individuals as hypertensive if their average systolic blood pressure (SBP) was ≥140 mmHg or their diastolic blood pressure (DBP) ≥90 mmHg, or if they used blood pressure (BP) medication. According to Steyn, et al. (2008) the poor level of hypertension control highlights the need to identify people needing intervention for early diagnosis and cost-effective control. Hypertension is associated with consuming excess salt, high levels of stress, smoking (tobacco use), obesity, increasing consumption of unhealthy foods and low physical activity (PA)

(Steyn, et al. 2008; Daar, et al. 2007). The influence of SAn urbanization, leading to the emergence of hypertension in the black group independently of the other socio-demographic and risk factors, is reflected (Steyn, et al. 2008).

South Africa is considered a middle income country in terms of its economy, but it has health outcomes that are worse than many lower income countries (Coovadia, et al. 2009) and there is a growing burden of NCDs (Norman, et al. 2007). At the same time there is a substantial difference in resource availability between public and private health care sector (HCS) facilities (Coovadia, et al. 2009). The public HCS, comprising of government health institutions (e.g. community clinics), predominantly serves the indigent population, while the private HCS, comprising of profit organizations and individuals, serves the insured population or those who can afford care on an out-of-pocket basis (Pillay, 2009). According to Pillay (2009) the public HCS is often characterized as under resourced and overused, as well as being inefficient and ineffective in terms of meeting its mandate of accessible, affordable and appropriate health care (HC). The private HCS, on the other hand is reputed for its world-class facilities and care provision (Pillay, 2009). Most patients who utilize the public HCS in SA are from poor socio-economic groups and are generally poorly educated and may have poor knowledge and management of hypertension (Katz, et al. 2009; Steyn, et al. 2008; Seedat, et al. 2007). The socioeconomic strata imposes a massive burden on an already weak and underdeveloped public health-care delivery system that is struggling to overcome poor administrative management, low morale, lack of funding and brain drain (Chopra, et al. 2009), which also has a huge negative economic impact (Suhrcke, et al. 2006).

The SAn high unemployment rate has persisted, and income inequality has been growing and continues to be one of the highest in the world (Statistics SA, 2017). Service managers who have authority do not have insight into local needs, are geographically distant, and can be hard to reach (Mayosi, et al. 2009). The scarcity of human resources, especially at lower levels of the health system, has presented one constraint to policy implementation (Coovadia, et al. 2009). Another key constraint is

that at all levels of the health system there has been inadequate stewardship, leadership, and management (Coovadia, et al. 2009). In many places, clinic committees and hospital boards have yet to be set up and where they have, are often under-resourced and dysfunctional (Coovadia, et al. 2009). The widespread practice of restricting clinical expertise (mainly doctors) to hospitals needlessly undermines the efforts of local health workers to provide quality community-based care; it also imposes heavy costs on patients (Mayosi, et al. 2009), with the poorest people inevitably being lost to follow-up (McIntyre, et al. 2008).

Clinicians and nurses working at primary care clinics often do not have the skills to deal comprehensively with NCDs (Steyn, et al. 2008) or they have the capacity to manage only a subset of such diseases (Mayosi, et al. 2009). Chronic diseases and risk factors are infrequently diagnosed and inadequately treated (Puoane, et al. 2008; Steyn, et al. 2008), and thus opportunities to provide comprehensive services and to identify other NCDs that their patients might have, are missed (Mayosi, et al. 2009). On the other hand, problems with the private HCS include questions about the quality of clinical care provided by the private practitioners (Coovadia, et al. 2009). Some aspects of private medical care are excellent and yet in other areas severe deficiencies have been highlighted (Coovadia, et al. 2009). This results in a high number of cases of uncontrolled hypertension, diabetes, hyperlipidemia, and chronic respiratory diseases, even in some private HCS settings (Puoane, et al. 2008; Steyn, et al. 2008).

1.2 Statement of the Problem

Hypertension is a treatable disease but its prevalence is reaching epidemic proportions in SA (Seedat, et al. 2014; Jones and Rayner, 2014). The management of hypertension may be different for patients utilizing the public HCS and private HCS (Jones and Rayner, 2014), however little research has been done in this area in SA. There are no data showing difference between the effects of services rendered in public HCS versus private HCS regarding hypertension management. Understanding the patients' social-economic status, knowledge and management of hypertension and its risk factors will help to identify the differences between the patients utilizing public and private HC

providers. Furthermore, understanding these differences can assist in informing ways to strengthen the management of hypertension in the country; thus reducing the burden of disease.

Public Health Care Sectors

Defined as government-funded HC institutions (e.g. community clinics), predominantly serves the indigent population (Pillay, 2009).

Private Health Care Sectors

Defined as HC institutions that are funded by private organizations and/or individuals, comprising of profit organizations and individuals, serves the insured population or those who can afford care on an out-of-pocket basis (Pillay, 2009).

1.3 Research Question

Is there a difference between knowledge and risk factor management for hypertension between patients attending public HC and private HC facilities in SA?

1.4 Hypothesis

1.4.1 Null Hypothesis (N_0)

a) There are no significant differences between the knowledge, management, and risk factors for hypertension between participants utilizing the public and private HC facilities in SA.

1.4.2 Alternative Hypothesis (N_1)

a) There are significant differences between the knowledge, management, and risk factors for hypertension between participants utilizing the public and private HC facilities in SA.

1.5 Aim of the Study

The main aim of the study was to identify the differences in knowledge and management of hypertension, as well as risk factors for hypertension, in patients

utilizing in the public HCS compared to the private HCS in Umlazi Township, KwaZulu-Natal (KZN).

1.6 Objectives of the Study

The objectives of this study were to:

a) Compare blood pressure differences between participants utilizing public HCS and private HCS.
b) Compare the knowledge and management of hypertension between participants utilizing public HCS and private HCS.
c) Compare hypertension risk factor management (body weight, level of physical activity, diet and smoking history) between participants utilizing public HCS and private HCS.

CHAPTER 2 - LITERATURE REVIEW

2.1 South African Demographics and of Umlazi Residence

Non-communicable diseases are emerging in both rural and urban areas, most prominently in poor people living in urban settings, and are resulting in increasing pressure on acute and chronic health-care services (Mayosi, et al. 2009; Tollman, et al. 2008; Groenewald, et al. 2008). The SAn constitution binds the state to work towards the progressive realization of the right to health (Coovadia, et al. 2009), and yet years after democracy, the country is still grappling with massive health inequities (Coovadia, et al. 2009). In nominal terms, public-health spending has increased from R18.7 billion in 1995/6 to over R220 billion in 2019/20, which in real 2015/16 terms is an increase from R68.0 million to R176.5 million (Mark, et al. 2017). The uninsured population (ie. population without medical aid) has also grown substantially over time (Mark, et al. 2017). Findings by National Income Dynamic Study, (2014) medical scheme coverage and access to private HC facilities for African/ Black population was 20.3% in 2015. Chopra, et al. (2009) mentioned that expansion of basic services and a massive increase in social and welfare benefits have reached nearly a quarter of the population, but health problems and social inequalities that are rooted in poverty persist (Chopra, et al. 2009). There are also substantial inequities in health between provinces and also within provinces (Coovadia, et al. 2009).

Data published by Blecher, et al. (2008) suggest that differences in public health expenditure between rich and poor health districts have substantially narrowed, with greatly increased expenditure in poor districts and SA is still struggling to establish an effective district health system (Chopra, et al. 2009). The Constitution places the responsibility on government to ensure that these services are provided to the entire population within the limits of available resources (Statistics SA, 2016). Ataguba, et al. (2011) suggest that SA represents a classic example of the inverse care law; the lowest socio-economic groups bear the largest burden of ill-health but have the lowest level of health service utilisation and derive the least benefits from service use. Ataguba, et al. (2011) further demonstrated that the burden of the major categories of ill-health and

disability is greater among lower socio-economic groups in SA. Even NCDs, which are frequently seen as disease of affluence, are increasingly being reported by lower socio-economic groups (Ataguba, et al. 2011). Research suggests that these so-called diseases of lifestyle are becoming more evenly distributed across socio-economic groups in SA (Ataguba, et al. 2011), yet the poor often cannot afford to seek care when ill (Ataguba, et al. 2011). The household survey data showed that the risk factors of hypertension and obesity increase with increasing wealth, while most of the lifestyle factors, such as light smoking, domestic exposure to "smoky" fuels and alcohol dependence were associated with poverty (Schneider, et al. 2009). The findings remain relevant to policy making as the mortality patterns change relatively slowly over time and it would still be expected that NCDs and lifestyle-related risk factors are prevalent among the poor (Schneider, et al. 2009).

Umlazi Township is an urban area located in southwestern Durban, which is considered part of the largest townships in SA, after Soweto (Ngubane, 2014; Mullick, et al. 2005), with an estimated population reaching nearly 2,000,000 (Mullick, et al. 2005). Umlazi Township falls under the eThekwini Metropolitan Municipalities (Statistics SA, 2016). In 2016 eThekwini Metropolitan Municipalities had a total population of 3 661 911, with 913 395 of the population living in formal main dwelling, 48 601 lived in traditional main dwelling, 149 634 lived in informal main dwelling and 7 760 fell under 'other' main dwelling (Statistics SA, 2016). According to KA Economic Development Consulting CC, (2013), Umlazi has a population estimated at 550 000 to over 1 million. The housing settlements consist of a mixture of formal and informal housing (Nsibande, et al. 2013), with approximately 30%- 60% of the population living in informal housing, of which Zakheleni is most prominent (Ngubane, 2014; KA Economic Development Consulting CC, 2013). Of the population, 46% are young people between the ages of 15 and 34 years, 40% are unemployed and 33% are not economically active (Ngubane, 2014). In 2013 Umlazi Township was served by a district hospital and 10 PHC facilities (Nsibande, et al. 2013), in 2016 they were served by 17 PHC clinics (Hill, et al. 2016).

In SA, typical and extensive poverty and inequalities exist in socio-economic status and in access to basic social services between population groups, provinces, and social – economic groups (Ataguba and Akazili, 2010; Coovadia, et al. 2009) and these help to exacerbate inequalities in health (Ataguba, et al. 2011). Inequalities in health, especially with reference to the burden of ill-health on the poor, have received considerable attention among health scientists and economists (Gwatken, 2000). While health systems, together with the wider social determinants of health, are relevant in seeking to improve health status and health inequalities, those that need good quality HC seldom get to it (Ataguba, et al. 2011). Studies on the burden of ill-health in SA have consistently shown that, relative to the wealthy, the poor suffer more from disease and violence (Ataguba, et al. 2011).

2.2 Non-Communicable Diseases

Non-communicable diseases disproportionately affect individuals who are poor thus increasing inequalities (World Health Organization, 2008). Most are chronic and can lead to continued expenditures that trap poor households in cycles of debt and illness, perpetuating health and economic inequalities (Beaglehole, et al. 2011). The inequality is associated with high levels of poverty (Schneider, et al. 2009). Reduced access to comprehensive services for prevention and treatment of NCDs arise because of financial reasons and weak health systems (Beaglehole, et al. 2011). Non-communicable diseases diminish household earnings and a family's ability to provide for and educate children; and expenditure on tobacco contributes to household poverty (World Health Organization, 2004). People who are poor live in settings where policies, legislation, and regulations to tackle NCDs either do not exist or are inadequate (Beaglehole, et al. 2011). The loss of productivity reduces a society's effective labour force, resulting in reductions in overall economic output (Beaglehole, et al. 2011). On the basis of this evidence, the World Economic Forum now ranks NCDs as one of the top global threats to economic development (World Economic Forum, 2011).

The NCDs have similar population attributable risks, although their relative risks (Shavelle, et al. 2008) and prevalence are somewhat different (Wen, et al. 2012).

Prominent yet largely preventable behavioural risk factors associated with NCDs around the globe – either directly or indirectly are risk factors such as increased smoking, improper diet, obesity, harmful alcohol consumption and physical inactivity (Wen, et al. 2012; Cecchini, et al. 2010; Mayosi, et al. 2009; Daar, et al. 2007). This results in a high number of cases of uncontrolled hypertension, diabetes, hyperlipidaemia, cardiovascular disease, diabetes, cancer and chronic respiratory diseases (Mayosi, et al. 2009; Puoane, et al., 2008; Steyn, et al. 2008). The combination of these diseases extends across all age-groups, nationalities and classes (Chopra, et al. 2009; Daar, et al. 2007). The SAn adult population has high levels of these risk factors, and large proportions of the burden of disease can be attributed to these potentially modifiable risk factors (Medical Research Council, 2007; Norman, et al. 2007).

The multiple risk factors for NCDs operate at different levels, from the most proximal (i.e. biological), to the most distal (i.e. structural) (Puoane, et al. 2008). These risk factors can be classified as 'modifiable' and 'non-modifiable' (Puoane, et al. 2008). Modifiable determinants include factors that can be altered, such as individual and community influences, living and working conditions and socio-cultural factors (Puoane, et al. 2008). On the other hand, non-modifiable determinants include those factors that are beyond the control of the individual, such as age, sex and hereditary factors (Puoane, et al. 2008). Treatment of chronic diseases puts much strain on the already overburdened health system, because of the additional resources required (Puoane, et al. 2008). Investment in interventions to control the modifiable risk factors and thereby reducing the burden of chronic diseases can bring economic benefit to the country in the long term (Puoane, et al. 2008).

Chronic diseases have a major economic impact on individuals, families, the health system and society at large (Puoane, et al. 2008). Some populations are susceptible to chronic disease because of inherited genes (Puoane, et al. 2008). Previously, NCDs were thought to be diseases of the affluent, but poor populations are now equally affected (Puoane, et al. 2008. The morbidity and mortality due to NCDs are in fact greatest in the poor population (Schmidt, et al. 2011). There is insufficient multi-sectorial

coordination and drive towards a concerted programme of action for NCDs in SA (Mayosi, et al. 2009). Despite increasing awareness and commitment to address chronic disease, concrete actions by global partners to plan and implement cost-effective interventions are inadequate (Alwan, et al. 2010).

South Africa has seen its government take several measures to address the evolving epidemic of NCDs (Mayosi, et al. 2009). According to Schneider, et al. (2009), NCDs are prominent over the age of 40 years, particularly in the more affluent districts. A SAn comparative risk assessment study in 2000 identified the major risk factors and causes of death among South Africans (SAns); among the top 10 diseases and conditions contributing to mortality were the following NCDs: ischaemic heart disease, stroke, hypertension and diabetes mellitus (Puoane, et al. 2008). The burden of such diseases in low-income and middle-income countries is rapidly increasing and already has major adverse social, economic, and health effects (Horton, 2007; World Health Organization, 2005). Analysis from Alwan, et al. (2010) also shows that, in high-burden countries, the capacity to effectively deal with the existing and projected burden of NCDs is inadequate. Shortage of health service inputs (staff, drugs, and equipment) often mean that appropriate care is not available (Gilson, et al. 2007). The key barriers to care are unaffordable costs to households, weak availability of inputs and services, and poor acceptability (Goudge, et al. 2009). The available information suggests that these conditions as well as risk factors are also poorly identified and inadequately treated, particularly among the poor (Schneider, et al. 2009). The indicators of the control of NCDs suggest that there is a need to improve HC for people with NCDs in all sectors of SAn society (Schneider, et al. 2009).

2.3 Hypertension and Risk Factors associated with Hypertension

The significant increase in hypertension in recent years, as well as inadequate diagnosis and control of raised BP predicts an increase in strokes and heart attacks in the years to come (Ardington, et al. 2009; FAO Food Balance Sheet, 2007). This scenario has massive impact on the population's health, resulting in unnecessary morbidity and mortality (Saleem, et al. 2011). It can be controlled with diet and PA and

prescribed medication, which may need to be taken for life (Puoane, et al. 2008). The prevalence of diabetes and hypertension is rising in parallel with that of excess weight; with these increases being associated with unfavourable changes of diet and PA (Schmidt, et al. 2011), in which less privileged ethnic and racial groups bear a disproportionately large share of the resultant burden (Schmidt, et al. 2011). The Prevalence of hypertension in KZN, in African/ Black females aged 55-64 years was 59.1% and 65+ yeas was 71.1% on the other hand African/ Black males 55-64 years was 48.2% and 65+ years was 77.5% (SA Labour and Development Unit, 2016). Ataguba, et al. (2011) found that hypertension was more concentrated among lower than higher income groups, and yet, according to Schneider, et al. (2009) hypertension and obesity show a clear gradient, with the proportions among the richer quintiles being higher than among the poorest after adjusting for age, hypertension and obesity were clearly associated with increasing wealth. Pathology consequences differ, with stroke being a feature for both the poorest and the wealthiest, but is accompanied by ischaemic heart disease for the richest and hypertensive heart disease for the poorest (Schneider, et al. 2009).

Predisposing factors such as high salt intake and increasing levels of obesity must be addressed to reduce blood pressure in the future, and improved hypertension detection and treatment are needed (Bradshaw, et al. 2011). South Africa has already intervened to reduce salt intake, a policy that has been shown to be cost-effective (Webb, et al. 2017; Watkins, et al. 2016), and is embarking on consultations regarding a tax on sugar-sweetened beverages (Day and Gray, 2017). Poor adherence to lifestyle interventions and medication-taking is problematic (Webber, et al. 2013). Within the context of hypertension management, a number of factors are targeted as influencing agents but non-adherence to treatment is still counted as one of the major contributing factors to poor management and control of hypertension (Saleem, et al. 2011).

2.4 Knowledge and Management of Hypertension (Adherence)

Knowledge of risk-factors provides a more complete picture of the epidemiologic transition as well as lessons for how the risk factors can be reduced and managed in countries at all levels of economic development, applying various preventive strategies (Ezzati and Riboli, 2012). Despite the large number of studies on patient adherence to lifestyle modification in chronic diseases such as hypertension, poor adherence to these modifications persists (Gohar, et al. 2008; Jokisalo, et al. 2002). Patient adherence should be more than just adherence to medication prescription; it should include keeping clinic appointments, participating in regular exercise and adherence to recommended dietary and other lifestyle changes (Miller, et al. 2002). Patients' main reasons for not adhering to lifestyle recommendations are unwillingness, difficulty in adhering to diets that are different from the rest of the family, the cost of prudent diets, the lack of time for exercise and the presence of other illnesses (Serour, et al. 2007). New strategies are needed in order to identify successful methods to help patients adopt and maintain healthy lifestyle practices (Munro, et al. 2007).

Diagnosis and education from a health facility is the basis for the knowledge of the presence of the condition (Ataguba, et al. 2011). In a study by Saleem, et al. (2011) in Pakistan also found that although the patients had average knowledge about hypertension, the level of adherence was poor. It is often believed that knowledge is one key factor in achieving better adherence (Saleem, et al. 2011). The awareness and control of hypertension were both associated with an increasing wealth gradient (Schneider, et al. 2009). However, even the wealthiest quintile did not reach high levels of control. For example, the control of hypertension for the wealthiest quintile ranged from 39.0% for men to 54.7% for women (Schneider, et al. 2009). The pattern of medication use for hypertension, where women with hypertension were using medication more frequently than men, women were more aware of and had better hypertension control than men (Schneider, et al. 2009).The apparent reason for the outcomes and opinions may be due to differences in the concept and definition of adherence and knowledge (Saleem, et al. 2011). Other factors such as age, gender, low socioeconomic status, prescribed drugs, posology, lack of social support, poor

patient provider relationship, cost, forgetfulness, and presence of psychological problems (especially depression) should also be kept in mind and evaluated before coming to any conclusion (Osterberg and Blaschke, 2005).

According to Saleem, et al. (2011) knowledge had inverse relationship to drug adherence, suggesting that there are other factors for the patients' non-adherence which needs to be explored. Limited interaction of the patient with the HC professional may be one reason for poor adherence (Saleem, et al. 2011). A large proportion of the patients did not have a clear understanding of the disease they were suffering from, and had little information on treatment and management of hypertension (Saleem, et al. 2011). Healthcare professionals can play a major role in informing patients of proper drug usage and a collaborative care approach should facilitate the education of patients about the benefits of medications and the importance of continuous medication use especially in the treatment and management of chronic diseases (Saleem, et al. 2011).

2.5 Public and Private Health Care Sectors

The health system has relevance to the social determinants of health and plays an important role in improving health status and addressing health inequalities (Gilson, et al. 2007). South Africa has a dual health system (Pillay, 2009). South Africa has a public and private HCS resulting in considerable inequalities in access to HC (Bradshaw, et al. 2011). In 2009, the public HCS was responsible for the well-being of 82% of the population, it accounts for only 40% of the total health expenditure in SA (Pillay, 2009), on the other hand, in 2005 the private HCS consumed 60% of the health expenditure and is responsible for less than 20% of the population (Health System Trust: Annual Health Review, 2005). The current healthcare system is born out of the country's apartheid legacy, and consequently there are systemic, and often stark, differences in healthcare outcomes by race (Coovadia, 2009; Bradshaw, 2008) and geography, e.g. by province (Statistics South Africa, 2014) or different neighbourhoods in the same city (Groenewald, et al. 2008). The private, for-profit hospital sector is well resourced and caters to a population that tends to be wealthier, urban and more likely to be formally employed (Ranchod, et al. 2017). The public-hospital sector, catering to the majority of

SAns, faces lower human-resourcing ratios, financial constraints and ageing infrastructure (Ranchod, et al. 2017). The research provides evidence of the polarization between public and private facilities: private facilities consistently scored above public facilities across a range of accreditation categories, and there was far greater variability in the scores achieved by public facilities (Ranchod, et al. 2017). The same polarised relationship was found to hold across key sub-components of the scores, such as management and leadership of hospitals in the two sectors (Ranchod, et al. 2017).

Even as diseases of lifestyle are becoming evenly distributed across socio-economic groups in SA, the poor often cannot afford to seek care when ill (Ataguba, et al. 2011). Ataguba et al. (2009) also showed that in SA the distribution of health service utilisation and of the benefits (measured in monetary terms) from using service is skewed in favour of the rich for most public facilities, especially hospitals and across all private sector services. Inequalities in health may be defined as the variations in health status across individuals in populations (Gakidou, et al. 2000). It is important to note that the measure of inequality may be sensitive to the choice of socio-economic status measure (Chuma and Molyneux, 2009). The inequities in access to HC are worsening (Harris et al. 2011) as in the past decade private hospital and specialist costs have increased to more than the consumer price index, (Council for Medical Schemes, 2009) and distribution of specific skilled human resources is skewed to the advantage of the private sector (Mayosi, et al. 2012).

It is to be expected that some of the reported problems encountered in health delivery in the public HCS are correlated with health outcomes (for example, cleanliness, drug availability and incorrect diagnosis) (Ranchod, et al. 2017). Long waiting times may also have impacted adversely on outcomes because the high time cost of a clinic visit may result in patients delaying healthcare consultations (Ranchod, et al. 2017), resulting in delays in diagnosis and treatment (Prentice, et al. 2008). Over recent years, a central chronic medicines dispensing and distribution (CCMDD) programme has been initiated in most provinces to dispense chronic medicines at external pick-up points such as community halls and private pharmacies (Mark, et al. 2017). This has the potential to

improve efficiencies by reducing the need for stable patients to visit public PHC facilities to collect chronic medicines (Mark, et al. 2017). This is important for HIV and AIDS, hypertension, diabetes and other chronic-disease patients (Mark, et al. 2017).

Work satisfaction is also an essential part of ensuring high-quality care (Pillay, 2009). Pillay, (2009) proved that work satisfaction of nurses is important, as there is sufficient empirical evidence to show that it tends to affect individual, organizational and greater health and social outcomes. The greatest differences in satisfaction levels of the nurses were with regard to safety, resources available, workload, their careers and their relationship with management, respectively (Pillay, 2009). The differences in satisfaction are related to the work context: safety, resources, workload and work schedule, management, pay and autonomy (Pillay, 2009). Excessive workload has been shown to significantly contribute to public HCS and private HCS nurses' dissatisfaction in SA (Pillay, 2009). The biggest difference in satisfaction levels was in the perceived levels of safety in the workplace–personal safety, risk of infection, risk of injury and the physical work environment (Pillay, 2009). Private sector nurses were dissatisfied only with their pay and career development opportunities (Pillay, 2009).

2.6 Physical Activity and Physical Inactivity

Physical Activity is defined as any body movement produced by the contraction of skeletal muscles that result in a substantial increase in caloric requirements over resting energy expenditure (Caspersen, et al. 1985). Warburton, et al. (2006) defined physical fitness as a physiologic state of well-being that allows one to meet the demands of daily living or that provides the basis for sport performance, or both. Health-related physical fitness involves the components of physical fitness related to health status, including cardiovascular fitness, musculoskeletal fitness, body composition and metabolism (Warburton, et al. 2006). Participating in moderate intensity, aerobic PA for a minimum of 30 minutes on 5 days a week or vigorous intensity, aerobic activity for a minimum of 20 minutes on 3 days a week (Haskell, et al. 2007). Regular PA of 150 minutes/week of moderate intensity PA reduces the risk of numerous chronic diseases, preserves health and function (both physical and mental) into old age and extends longevity (Blair and

Morris, 2009). Evidence indicating that proper levels of PA are associated with a 30% reduction in the risk of ischaemic heart disease, approximately 3.2 million deaths each year are attributable to insufficient PA (Beaglehole, et al. 2011). Increasing mechanization at work and getting about, more attractive sedentary options for leisure time and engineering of energy expenditure out of daily life combine to reduce the volume of PA and increase the amount of sitting for the majority in modern society (Blair and Morris, 2009). Evidence emerges that these conditions constitute a major threat to the health of individuals and the overall public health (Blair and Morris, 2009).

Physical Activity is a major independent, modifiable risk factor that has a protective effect for many NCDs (Armstrong and Bull, 2006); it continues to take on an increasingly important role in the prevention and treatment of multiple chronic diseases, health conditions, and their risk factors (ACSM, 2013). Kohl, et al. (2012) mentioned PAs role continues to be undervalued despite evidence of its protective effects and the cost burden posed by present levels of physical inactivity globally. Exercise has been called a miracle drug (Pimlott, 2010) and substantially extends lifespan (Wen, et al. 2011), yet socially, being inactive is perceived as normal, and in fact doctors order patients to remain on bed rest far more often than they encourage exercise (Lee, et al. 2012). Accumulation of 30 minutes of moderate intensity activity such as brisk walking, on at least 5 days a week, can provide important health benefits (Blair and Morris, 2009). There appears to be a linear relation between PA and health status, such that a further increase in PA and fitness will lead to additional improvements in health status (Warburton, et al. 2006). It is becoming clear that moderate amounts and intensities of PA also can have substantial health benefits (Blair and Morris, 2009). Evidence is beginning to emerge that exercise also enhances brain health (Lautenschlager, et al. 2008). Investigations have revealed even greater reductions in the risk of death from any cause and from cardiovascular disease (Warburton, et al. 2006). This is important because, for a long time, rest and physical inactivity had been recommended for patients with heart disease (Warburton, et al. 2006).

Physical inactivity is a global pandemic that requires global action, and causes not only morbidity and mortality, but also a major economic burden worldwide (Ding, et al. 2016; Kohl, et al. 2012). The economic burden of physical inactivity is distributed unequally across regions, and disproportionately in relation to the disease burden (Ding, et al. 2016). This is likely to be driven by differential levels of economic development, and consequentially health-care expenditure (Ding, et al. 2016). Physical inactivity has a major health effect worldwide (Lee, et al. 2012). It is the fourth leading cause of death worldwide (Kohl, et al. 2012), causing about 3 million or 8% of all deaths per year from NCDs (Beaglehole, et al. 2011). Lee, et al. (2012) presented persuasive evidence that 6–10% of all deaths from NCDs worldwide can be attributed to physical inactivity, and this percentage is even higher for specific diseases. It is also increasingly becoming prevalent in low- and middle income countries and already constitutes one of the leading causes of mortality (World Health Organization, 2009). Although physical inactivity has begun to be recognized as the fourth type of exposure that needs to be addressed for control of NCDs (World Health Organization, 2011), it is pandemic, a leading cause of death in the world, and clearly one of the top four pillars of a NCDs strategy (Kohl, et al. 2012).

Low fitness is one of the strongest predictors of mortality and also accounts for more deaths in the population than other risk predictors such as smoking, hypertension, elevated cholesterol, obesity and diabetes (Blair and Morris, 2009). Evidence presented by Lee, et al. (2012) shows that physical inactivity increases the risk of many adverse health conditions, including major NCDs such as coronary heart disease, type 2 diabetes and breast and colon cancers and shortens life expectancy. These relative risks are similar to those for hypertension, hypercholesterolemia and obesity, and they approach those associated with moderate cigarette smoking (Warburton, et al. 2006). On the other hand physical inactivity burdens society through the hidden and growing cost of medical care and loss of productivity. Getting the public to exercise is a public health priority because inactive people are contributing to a mortality burden (Wen, et al. 2012). In view of the prevalence, global reach, and health effect of physical inactivity, the issue should be appropriately described as pandemic, with far-reaching health,

economic, environmental, and social consequences (Kohl, et al. 2012). If PA is not retained, the four factors that are meant to support NCDs prevention (PA, tobacco control, diet, and alcohol) will be effectively reduced unacceptably to only three (Kohl, et al. 2012).

2.7 Body Weight and Diet

Global energy imbalances and related obesity levels are rapidly increasing (Popkin, 2006). Human diet and nutritional status have undergone a sequence of major shifts among characteristic states— defined as broad patterns of food use and corresponding nutrition-related disease (Popkin, 2006). Dietary changes appear to be shifting universally toward a diet dominated by higher intakes of animal and partially hydrogenated fats and lower intakes of fibre (Popkin, 2006). South Africans are increasingly eating a typical Western diet comprising increased calorie intake, fat (particularly saturated fat), animal protein and sugar, but a lower intake of unrefined carbohydrate and fibre (Puoane, et al. 2008; Steyn, et al. 2006). There is low intake of fruit and vegetables and salt intake has also been increasing over this period (Steyn, et al. 2006).

Obesity is a well-recognized risk factor for various chronic diseases such as cardiovascular diseases, hypertension and type 2 diabetes mellitus (Ziraba, et al. 2009). These conditions not only lead to reduced quality of life, they also lead to premature death (Ziraba, et al. 2009). Other factors that have been shown to be associated with a higher risk of overweight and obesity include genetic predisposition, metabolic disorders, gender and physical environmental factors (Kamadje, et al. 2006; Fezeu, et al. 2006).

Body weight is considered normal when the body mass index (BMI, calculated by dividing weight by height squared) is between 18 and 25 $kg \cdot m^2$ (Bradshaw, et al. 2011). A BMI between 25 and 30 is considered overweight and that of 30 or above is obese (Bradshaw, et al. 2011). Joubert, et al. (2007) found that increased body mass index (BMI) was associated with type 2 diabetes mellitus, hypertensive diseases, ischaemic

stroke, cancer and osteoarthritis (Joubert, et al. 2007). Excess body weight is associated with an increased risk of diseases (Puoane, et al. 2008) and obesity is associated with diabetes, hypertension and other metabolic abnormalities that predisposes to NCDs (Bradshaw, et al. 2011). Although, Yusuf, et al. (2005) found that waist-to-hip ratios (WHR) give an indication of central or abdominal obesity and have been shown to be better indicators of cardiovascular disease resulting from obesity than BMI. The risks of diabetes and ischaemic heart disease increase monotonically with an increase in the body-mass index, starting at a BMI in the low 20s (Ezzati and Riboli, 2016). South African women have extremely high levels of overweight and obesity (Bradshaw, et al. 2011). Obesity amongst women remains higher than that of men (Puoane, et al. 2008), although, in the past years, there has been a significant increase among men and more than 45% of those above 35 years are overweight or obese (Ardington, et al. 2009).

Poor dietary quality (in particular, high salt intake, high saturated and trans-fatty acid intake, and low fruit and vegetable consumption) and insufficient PA are key risk factors for NCDs development (Cecchini, et al. 2010) and mortality worldwide (Lim, et al. 2012). The mean salt intake in most low- and middle-income countries exceeds the recommended maximum intake (Brown, et al. 2009). A high intake of salt is a risk factor for stomach cancer and also for elevated blood pressure, which in turn increases the risk of stroke, other cardiovascular diseases, chronic kidney disease, and kidney cancer (Ezzati and Riboli, 2016). Consuming large amounts of food with high levels of saturated fat and trans fatty acids, along with foods high in cholesterol, results in an increase of cholesterol, which increases the risk of a heart attack (Steyn, 2006). An improved low calorie diet and regular PA is required to reverse this trend (Bradshaw, et al. 2011).

Nutrition is a major modifiable determinant of chronic NCDs, with scientific evidence supporting the view that alterations in diet and physical activity have effects on health throughout life (Puoane, et al. 2008). These proposed reductions could have resulted in 7400 fewer cardiovascular deaths and 4300 fewer non-fatal strokes per year in 2011

than in 2008, and cost savings of up to R300 million per year in SA (Bertram, et al. 2012). Given that the measurement of salt consumption is difficult and the crude measure of salt consumption in their study, lowering the intake of salt is nonetheless an important strategy to reduce hypertension (Sacks, et al. 2001). Healthy food should become accessible and attainable to all in order to help prevent and control chronic lifestyle diseases (Seedat, et al. 2006). Despite appropriate dietary recommendations, appropriate food remains inaccessible and unaffordable for poor people, such as the cohort in the study by Seedat, (2007), in developing countries.

2.8 Smoking and Alcohol

The majority of the more than 1 billion smokers worldwide now live in low- and middle-income countries (Ezzati and Riboli, 2016). As the use of tobacco has increased in many low-income and middle-income countries tobacco use has fallen in many high-income countries, at least in men (Beaglehole, et al. 2011). In the older age group of 45 years and older 41% of men and 21% of women use tobacco daily (Bradshaw, et al. 2011). Tobacco smoking and exposure to second hand smoke together are responsible for about 6.3 million annual deaths worldwide and 6.3% of the global burden of disease, mostly in low and middle-income countries (Lim, et al. 2012). Poor people are at greater risk of smoking (albeit light smoking), and are at greater risk of being exposed to "smoky" fuels in the home (Schneider, et al. 2009). Schneider, et al. (2009) also found that heavy smoking was significantly more frequent among the wealthiest men and women. Tobacco use alone accounts for one in six of all deaths resulting from NCDs (Beaglehole, et al. 2011). Tobacco use is one of the most modifiable risk factors and preventable causes of death in the world (Puoane, et al. 2008), but it has been associated with premature mortality amongst users, with cardiovascular disease causing most deaths (Puoane, et al. 2008).

Prevention and cessation remain the only effective public health measures to reduce the harmful effects of smoking (Ezzati and Riboli, 2016). South Africa has been a global leader in adopting legislation for tobacco control, with some signs of an effect (Bradshaw, et al. 2011; Puoane, et al. 2008). The promulgation of comprehensive

tobacco control legislation has resulted in the reduction in tobacco use, particularly for men above 25 years (Bradshaw, et al. 2011). South Africa has also used pricing of tobacco products as a disincentive to cigarette smoking (Puoane, et al. 2008). 'Sin taxes' for tobacco have increased every year as part of the policy for reducing the use of tobacco (Malan and Leaver, 2003). The Act protects children and adolescents, by banning advertising and also ensures the rights of non-smokers to a clean environment, unpolluted by tobacco smoke (Puoane, et al. 2008). South Africa has been a global leader in developing and implementing appropriate legislation for tobacco control (Puoane, et al. 2008). . Although a review by the (Department of Health and Human Services, 2010) concluded that "five decades of evolving cigarette design had not reduced overall disease risk among smokers."

On the other hand alcohol consumption is associated with numerous diseases and injuries (Ezzati and Riboli, 2016). Alcohol consumption is responsible for about 2.7 million annual deaths and 3.9% of the global burden of disease (Lim, et al. 2012). Moderate alcohol consumption has been inversely associated with the risk of cardiovascular diseases and diabetes, although the benefits may be greater for persons with existing cardiovascular risk factors than for those without such risk factors (Roerecke and Rehm, 2012). Epidemiologic studies that have measured both the amount and patterns of alcohol consumption have shown that heavy episodic (or binge) drinking not only substantially raises the risk of injuries but can also increase the risk of hypertension, which it can exacerbate cardiovascular disease and liver disease (Rehm, et al. 2010; Roerecke and Rehm, 2010; Mathurin and Deltenre, 2009). Since 1994, alcohol policy development has taken place in piecemeal fashion, but progress has been made in several areas including reducing allowance blood alcohol levels in drivers, requiring warning levels on alcohol containers, increasing excise taxes on alcohol products and imposing greater controls on alcohol packaging (Parry, 2010). Limited policy action (e.g. increasing excise tax on alcohol) has not yet resulted in any improvements and further actions are needed (Bradshaw, et al. 2011).

CHAPTER 3 - RESEARCH METHODOLOGY

3.1 Study Design and Population

The study used a cross-sectional study design as a method of data collection. The sample population was taken from black ethnic community, Umlazi Townships in KZN. Participants who met the inclusion criteria (as described below) and who utilized strictly public HCS or strictly private HCS to manage their hypertension were invited to participate. Umlazi Township is still facilitated by 1 primary hospital (Prince Mshiyeni Memorial Hospital) which caters for more than five other townships, in the south of Durban (Umlazi, Lamotville, Umbumbulu, Kwamakhutha, Adams Mission, etc).

3.2 Sample Selection and Size

The study used a convenience sampling of participants in a form of advertisement followed by snowball sampling of participants and word of mouth in and around the area of Umlazi Townships, KZN. The printed advertisements (Appendix A) were placed on clinics advertisement walls, the doctor's rooms and community halls, with approval by designated personnel. The advertisements had the details of the study and contact details of the researcher in order for those interested in participating in the study to reach the researcher. Participants that consented and were included in the study were also asked to recommend and tell other people in the community about the study and if they were interested to contact the researcher or the researcher contacted them. The researcher then visited participants at the requested venues of testing (e.g. hospital, clinics, home visits or community halls).

A sample size of participants was calculated based on the rough estimates of the SAn statistics, 2015 (Mortality and causes of death in SA, 2014: Findings from death notification). The ten leading underlying natural causes of death (hypertensive disease) in KZN by age (45-64 years) and sex (both genders). The confidence level of 95%, statistical power of 95% and response distribution of 50% was calculated. The estimated required sample size was 259 participants.

3.2.1 Inclusion Criteria

Inclusion criteria, included males and females;

a) Individuals diagnosed with hypertension by a medical doctor, nurse and/or healthcare professional.
b) Individuals taking antihypertensive medication prescribed by a medical doctor.
c) Individuals who utilized strictly public HCS or strictly private HCS to manage hypertension.
d) Individuals living in the areas of Umlazi Townships of KZN.

3.2.2 Exclusion Criteria

Exclusion criteria, included;

a) Individuals who utilize both public HCS and private HCS to manage hypertension.
b) Individuals who present with pre-hypertension.
c) Individuals diagnosed with hypertension, who present with physical disability or suffering and/or recovering from stroke or any other co-morbidity that may affect their physical abilities.
d) Individuals diagnosed with hypertension, but are not currently taking hypertensive medication.
e) Individuals with mental or physical disabilities that would prevent them from answering the questionnaires.

3.3 Measuring Tools and Instruments

Firstly, the participants were greeted; the researcher introduced herself to the participants and explained the purpose of the research and the proceeding of the data to be collected in the language they understand. Questions were allowed and answered accordingly, the participation was then confirmed verbally and that the participants understood the proceeding of the research and testing. Secondly, the participants were provided with information sheet (Appendix B) to read through and then the Informed Consent form (Appendix C) to sign. The information sheet and informed consent form were described and declared the researchers and participants responsibilities, as well as describe in full the purpose of the study. The researcher then took the participants

identifying details (Appendix D) on a separate sheet, and assigned the participant to a specific study number that linked to the participant's research data collection. Only the researcher had access to the participants identifying document with the details, this document was kept in a separate location from the data collection sheets and with restricted access to it (participants identifying details). Thirdly, the participants were familiarized with the measurement testing procedures, the researcher took the following measurements - BP, body mass and stature (to calculate BMI), waist circumference and hip circumference (to calculate WHR), and measurements were taken according to the testing procedure listed below. Lastly the participants answered the questionnaires after being familiarized with them by the researcher. In cases where participants did not understand the questions, the researcher explained the question in a language they understood.

The questionnaires started with the demographic data questionnaire (Appendix E) recording age, ethnicity, marital status, level of education, occupation, household income, service HC provider. The demographic data collected was used to assist in describing the socioeconomic and educational levels of the participants, but were not used as a formal objective of the study. The next questionnaire that was answered was the World Health Organization's (WHO) Developing Integrated Response of HC System to Rapid Population Ageing, Questionnaire for Hypertensive patients (Appendix F), and this questionnaire was used to measure knowledge and management of hypertension of the participants. The WHO's Global Physical Activity Questionnaire (GPAQ) (Appendix G) was used next, to measure level of PA. The last questionnaires that were answered were: Hypertensive related diet questionnaire adapted from the Food Frequency Questionnaire (FFQ) (Appendix H) and lastly history of smoking questionnaire (Appendix I).

3.4 Testing Procedures

All the information on the measurements that were used, were tested, record on demographic data sheet (Appendix E) and the norms calculated according to the

American College of Sports Medicine (ACSM) guidelines; ACSM. (2013). ACSM's Guidelines for exercise testing and prescription.9th ed. Lippincott Williams & Wilkens.

Reliability: All measurements were taken by the researcher who had undergone a period of familiarisation and intra-rater reliability checking.

Validity: All measures are used routinely in studies of this nature and are valid.

3.4.1 Resting Blood Pressure

Each participant was asked to sit quietly for at least 5 min in a chair with back support, with their feet on the floor and their arms supported at heart level. Participants were asked if they smoked or drank caffeine 30 minutes prior to testing. If they answered yes to either question, they were then asked to sit for 30 minutes before the testing could proceed. A BP cuff (HI-CAREINT) and the stethoscope (HI-CAREINT, KT-102) was used to measure BP, the BP cuff was wrapped firmly around upper arm at heart level (on the left side); cuff was aligned with brachial artery. The appropriate cuff size was used to ensure accurate measurement. It was ensured that the bladder within the cuff encircled at least 80% of the upper arm. At least 2 measurements were taken (minimum of 1 minute apart) and the average was recorded (mmHg).

ACSM, (2013); The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (2003) defines individuals with a SBP <120mmHg and/or DBP <80mmHg as 'Normal', 'Prehypertension' as SBP 120-139mmHg and/or DBP 80-89mmHg, 'Hypertensive stage 1' as SBP 140-159mmHg and/or DBP 90-99mmHg, 'Hypertensive stage 2' as SBP ≥160mmHg and/or DBP ≥100mmHg, and 'Hypotension' as SBP <90mmHg and/or DBP <60mmHg.

3.4.2 Body Mass

An electronic scale was used (Pure Pleasure Glass, BSG01), which was calibrated for accuracy using weights authenticated by a government department of weights and measures. The participants were asked to take off their shoes, remove any heavy

clothing or anything that could add to their body mass, position their feet slightly apart, and arms by the sides and to stand with minimal movement. The final reading on the scale was recorded in kg.

3.4.3 Stature

A steel weighted tape measure was used, placed vertical against a wall. The participants were asked to take off their shoes, stand relaxed with their back against the tape measure on the wall, position feet together, and arms by the sides. The standing height was measured (m) at the maximum distance from the floor to the highest point on the head, when the subject was facing directly ahead.

3.4.4 Body Mass Index

Body mass index (BMI) is commonly the most used indicator of overweight and obesity (BMI: $kg \cdot m^2$).The height and weight as measured above were used to calculate BMI.

ACSM, (2013); Expert panel on the Identification Evaluation and Treatment of Overweight and Obesity in Adults, (1998) defines a BMI of 25.0-29.9$kg \cdot m^2$ as overweight and BMI of 30.0$kg \cdot m^2$ as obese, for most individuals obesity related health problems increase beyond a BMI of 25.0 $kg \cdot m^2$.

3.4.5 Circumference

All measurements were made with a flexible yet inelastic tape measure. The tape was placed on the skin surface without compressing the subcutaneous adipose tissue. Duplicate measures was taken at each site and retested if duplicate measurements were not within 5 mm.

3.4.5.1 *Waist*

The participants were asked to remove all clothing around the waist and/or to loosen tight clothing. With the participant standing erect, arms at the sides, feet slightly apart, attempting to distribute their weight evenly on both feet, and abdomen relaxed. A horizontal measure was taken at the narrowest part of the torso (above the umbilicus

and below the xiphoid process), with the researcher standing on the side of the participant, to ensure that the tape was horizontal around the waist. The participants were asked to breathe in and out and the measurement was taken when the participants had breathed out. This prevented any inaccurate measurement due to the participants contracting their abdominal muscles or holding their breath. The measurement was recorded to the nearest centimeter.

3.4.5.2 *Buttocks/Hips*

The preparation and procedure for hip circumference measurement was as for waist circumference, except for the fact that the participants removed clothing around the hips, and horizontal measure was taken at the maximal circumference of buttocks.

3.4.6 Knowledge and lifestyle practices of hypertension

Questionnaires (Appendix F-I) were used to record the findings from participants' diagnosis, knowledge and treatment of hypertension, level of PA and smoking history. Using the questionnaires below:

3.4.6.1 *Questionnaire for Hypertensive patients*

The questionnaire of hypertensive patients was adapted from World Health Organization, Developing Integrated Response of Health Care System to Rapid Population Ageing, a widely used questionnaire to track patient's hypertension diagnosis, management, complications, medication adherence and knowledge of self-care (Appendix F).

3.4.6.2 *World Health Organization, Global Physical Activity Questionnaire*

According to Bull, et al. (2009) the GPAQ provides reproducible data and showed a moderate-strong positive correlation with International Physical Activity Questionnaire, a previously validated and accepted measure of PA (Appendix G). Validation of GPAQ produced poor results although the magnitude was similar to the range reported in other studies (Bull, et al. 2009). Overall the results indicated that GPAQ is a suitable and

acceptable instrument for monitoring PA in population health surveillance systems (Bull, et al. 2009). The GPAQ is used to quantify moderate-to-vigorous-intensity physical activity (MVPA) as Metabolic Equivalents (METs) minutes per week (METs minutes per week (mins/wk)). Time min/wk spent in each domain (work, travel and recreation) is calculated, as well as the total PA METs mins/wk, according to the WHO STEPwise method (http://www.who.int/chp/steps/resources/GPAQ_Analysis_Guide.pdf). Metabolic Equivalents are used to calculate volume of PA by weighting each type of activity with its energy requirements. Participants were further classified as "active" (≥600 MET mins/wk) or "inactive" (<600 METs mins/wk). Energy expenditure of 600 METs mins/wk is the equivalent of reaching the recommended 150 minutes (mins) of moderate PA, 75 mins of vigorous PA or a combination of the two.

3.4.6.3 *Diet Questionnaire*

Adapted from the Food Frequency Questionnaire (Appendix H).

3.4.6.4 *Smoking Questionnaire*

Looking at the participants' history of smoking and attempt to stop (Appendix I).

3.5 Ethical and Safety Considerations

The research design and procedures of the research study was approved by the Human Research Ethics Committee (Medical), of the University of the Witwatersrand, Clearance Certificate No. M161034 (Appendix J). The KZN National Department of Health (NDoH) was also approached for approval, in a form of an online application, in order to recruit participants in Prince Mshiyeni Memorial Hospital and clinics associated with the hospital, as well as clinics within the hospital (Reference number: HRKM117/17 KZ_2017RP1_590). The application was approved on the 05 April 2017 by the KZN NDoH (Appendix K) and Prince Mshiyeni Memorial Hospital approved the application by 02 May 2017 (Appendix L). To ensure that appropriate safety procedures were taken regarding the well-being during testing of human participants: right to privacy or nonparticipation, right to remain anonymous, right to confidentiality, right to withdraw from the study without any negative consequences, codes were used for each

participant to ensure no identifying information was revealed and right to experimenter responsibility.

3.6 Data Processing and Statistical Analysis

Data collected during the study was first coded as group 1 for the participants utilizing public HCS and group 2 for the participants utilizing private HCS, each participant was given a code number to be written on the different questionnaires so that the participant remained anonymous and their confidentiality was respected. The results were then saved in an Excel spreadsheet with all 137 participants data collected. Codes were saved on Excel spreadsheet under tested variables: BP, knowledge and management, lifestyle practices (alcohol, diet, smoking and PA), BMI and WHR.

Data analysis was conducted using IBM SPSS statistics, version 13.2 (2017) and Excel. Results were expressed as means and standard deviation (SD) for the variables that were tested. For normally, distributed continuous data (i.e. BP, body mass, height, BMI, waist and hip circumference), an independent two-tailed *t* test (*t*) was used to determine any significant differences between the two groups (group 1: public HCS and group 2: private HCS). For non-normally distributed or categorical data (knowledge questionnaire outcomes, GPAQ outcomes, FFQ outcomes, and smoking questionnaire), a Chi-Square test was used to determine any relationships between group 1 and group 2 variables. Statistical significance was set at a probability level of ≤ 0.05.

CHAPTER 4 – RESULTS

4.1 Demographic Characteristics

With the 259 calculated sample size of participants, a total of 137 people consented to participate in this study, equivalent to 52.90% of the sample were eligible according to the set inclusion criteria mentioned in the method section, 17 of the recommended participants could not be reached, 9 of the recommended did not consent to the study, and 6 participants did not meet the inclusion criteria. Comparison of the demographic characteristics was made between participants' utilizing the public and private HCS (Table 4.1). Participants were divided into two groups: group 1 (n=77) utilizing public HCS and group 2 (n=60) utilizing private HCS, in which public HCS had 51 (66.33%) female participants and 26 (33.77%) male participants and in the private HCS had 40 (66.67%) female participants and 20 (33.33%) male participants. All the participants successfully completed the demographic data questionnaire.

Table 4.1 Demographic Data Characteristics for Public and Private Health Care Sector Participants

Variables		Public Health Care Sector (n=77)	Private Health Care Sector (n=60)
Gender	Females	51 (66.23%)	40 (66.67%)
	Males	26 (33.77%)	20 (33.33%)
Marital Status	Single	9 (11.69%)	7 (11.67%)
	Widowed	21 (27.27%)	13 (21.67%)
	Married/ Cohabiting	37 (48.05%)	34 (56.67%)
	Separated/ Divorced	10 (12.99%)	6 (10.00%)
Highest level of Education	No school attended	9 (11.69%)	0 (.00%)
	Primary	17 (22.08%)	0 (.00%)
	Secondary	22 (28.57%)	5 (8.33%)
	Matric	8 (10.40%)	5 (8.33%)
	Professional/Technical	2 (2.60%)	18 (30.00%)

	training		
	University	19 (24.68%)	32 (53.33%)
Occupation	Household	12 (15.58%)	0 (.00%)
	Skilled Manual Labor	11 (14.29%)	8 (13.33%)
	Managerial/ professional/ technical	17 (22.08%)	33 (55.00%)
	Student	0 (.00%)	0 (.00%)
	Unskilled Manual Labor	16 (20.78%)	0 (.00%)
	Clerical support, services, sales	2 (2.60)	7 (11.67%)
	Unemployed	19 (24.68%)	12 (20.00%)
Household	<R60000pa	32 (41.56%)	2 (3.33%)
Income	R60000 - R120000pa	20 (25.97%)	15 (25.00%)
	>R120000pa	25 (32.47%)	43 (71.67%)

n=number of participants, %=percentage of participants

4.2 Age and Anthropometric Characteristics

On average the participants age was 65 years (±10.83) for the public HCS and 60 years (±9.15) for the private HCS, with the public HCS participants being significantly older than those attending private HCS (t=2.41) (p=0.02). The average BP was 126/80mmHg for the public HCS and 123/79mmHg for the private HCS participants, SBP (t=0.93) (p=0.35) and DBP (t=0.73) (p=0.46) (Table 4.2), in which 38.96% of the public HCS participants had Normal BP compared to that of 33.33% private HCS (Figure 4.1). No significant difference was found between the public and private HCS participants in BP classification of Normal, Prehypertension and Hypertension. However, more participants attending private HCS were found to be hypotensive (X^2 =4.58, p=0.03).

Table 4.2 Average of Age and Anthropometric Characteristics for Public and Private Health Care Sector

Variables:	Public Health Care Sector Mean (±SD)	Private Health Care Sector Mean (±SD)	p-value
Age (years)	64.64 (±10.83)	60.43 (±9.15)	0.02*
Systolic BP (mmHg)	125.86 (±15.60)	123.30 (±16.08)	0.35
Diastolic BP (mmHg)	80.29 (±12.25)	78.75 (±12.06)	0.46
Body Mass (kg)	75.37 (±14.58)	78.67 (±15.60)	0.20
Stature (m)	1.60 (±0.06)	1.59 (±0.06)	0.64
BMI ($kg \cdot m^2$)	29.81 (±6.09)	31.08 (±6.31)	0.34
Waist Circumference (cm)	100.36 (±17.00)	104.48 (±16.85)	0.16
Hip Circumference (cm)	106.00 (±15.20)	107.54 (±14.90)	0.76
Waist-to-Hip Ratio (cm)	0.95 (±0.18)	0.98 (±0.16)	0.36

*Statistically significant difference

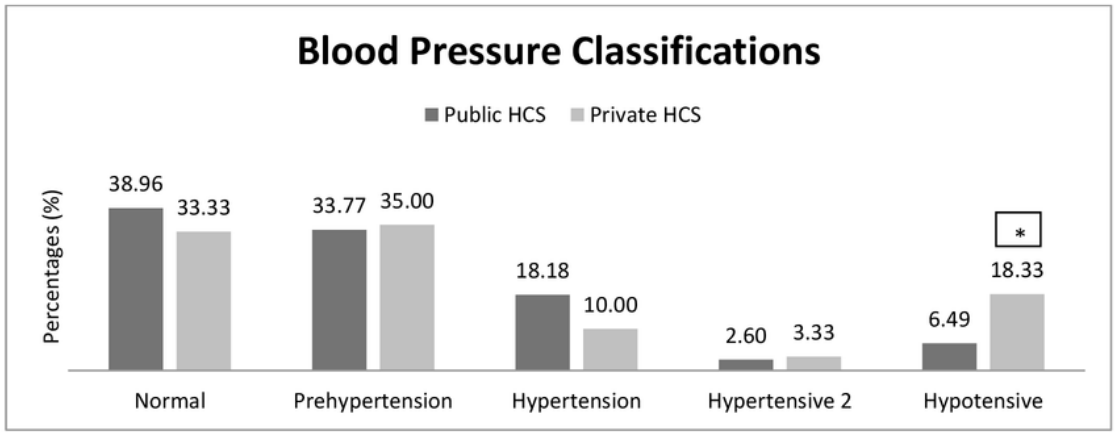


Figure 4.1 Comparisons of Blood Pressure Classification Measurements between Public and Private Health Care Sector (*X^2 =4.58, p=0.03).

The average BMI for the study sample (N=137) was 30.45kg·m^2, classified as Obese I. The average BMI between the 2 groups (t=-1.19) (p=0.24) was 29.81kg·m^2 (±6.09) for the public HCS participants, classified as Overweight and 31.08 kg·m^2 (±6.31) for the private HCS, classified as Obese I. The public HCS participants had 22.08% Normal BMI compared to 16.67% private HCS, 41.67% of the private HCS was classified as Obese I compared to that of 23.38% public HCS (Figure 4.2). No significant differences was found between the private and public HCS for BMI classifications, except for Obese I, where more private HCS participants were classified as Obese I compared to public HCS (*X^2=5.24, p=0.02).

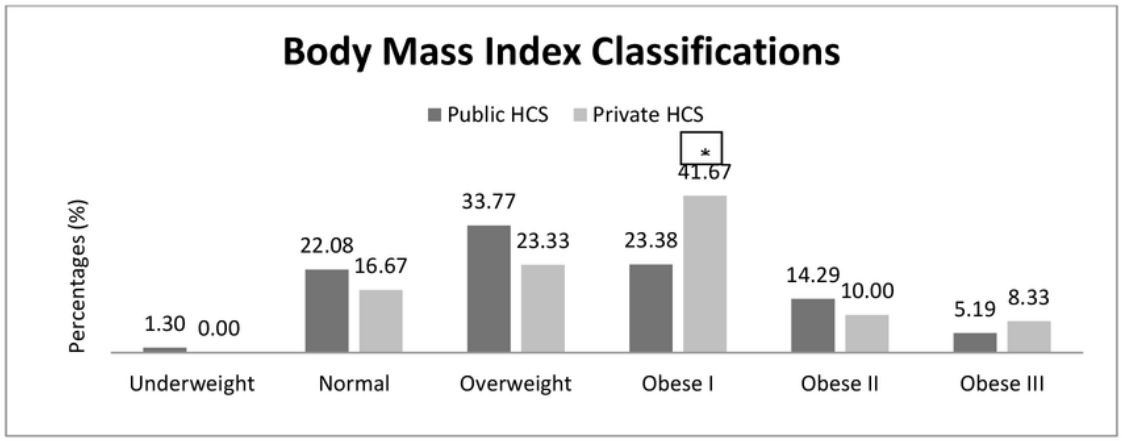


Figure 4.2 Comparisons of Body Mass Index Classification Measurements between Public and Private Health Care Sector (*X^2=5.24, p=0.02)

The WHR ratio's average (t=-0.90) (p=0.36) was 0.95cm (±0.18) for the public HCS participants and 0.98cm (±0.16) for the private HCS, with 63.64% public HCS participants was classified as High compared to 68.33% of the private HCS (X^2=0.33, p=0.57) (Figure 4.3). No significant relationship was found between private and public HCS participants (X^2=1.23, p=0.47) and being classified as having Low WHR (X^2=0.28, p=0.60) or Very Low WHR (X^2=1.12, p=0.29).

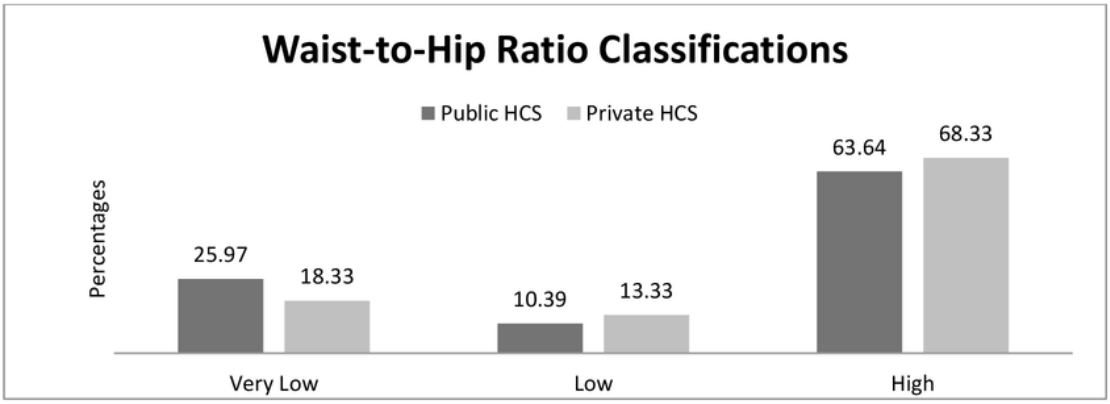


Figure 4.3 Comparisons of Waist-to-Hip Ratio Classification Measurements between Public and Private Health Care Sector (X^2=1.23, p=0.47)

4.3 Knowledge and Management of Hypertension

The majority of the participants for both the public and private HCS felt their BP was 'better' than it was compared to 12 months ago, with 58.44% compared to 58.33%, respectively (X^2=1.49, p=0.48) (Figure 4.4). The majority of the participants for both the public and private HCS groups answered 'No' to being having been admitted to hospital over the previous year, with 64.94% compared to 63.33%, respectively (Figure 4.5). No significance relationship (X^2=0.03, p=0.85) was found between the type of HC provider and having been admitted to hospital over the last year.

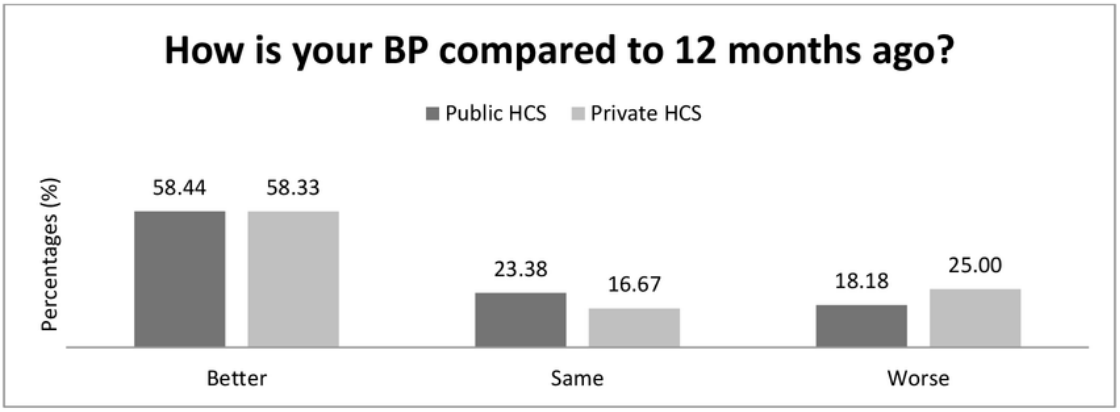


Figure 4.4 Comparison of the Perception of Hypertension Management between Public and Private Health Care Sector (X^2=1.49, p=0.48)

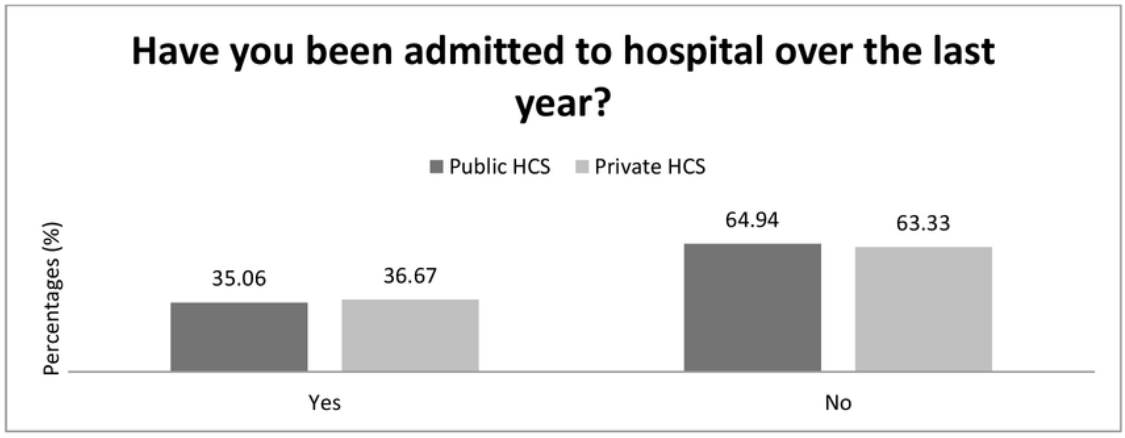


Figure 4.5 Comparisons of the Hypertension Complications and Hospitalizations between Public and Private Health Care Sector (X^2=0.03, p=0.85)

All (100%) of the public HCS participants answered 'Yes' to taking all their prescribed medication, compared to 95% of the private HCS (Figure 4.6). A significance relationship (X^2=3.96, p=0.05) was found between the type of HC provider the participants consulted for their hypertension and taking all prescribed medication, with public HCS participants being more likely to take their medication.

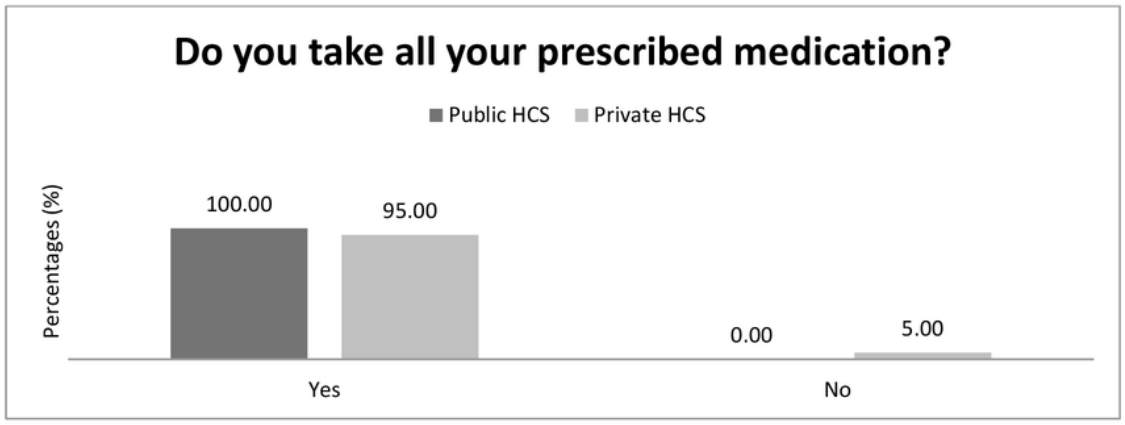


Figure 4.6 Comparisons of Hypertension Medication and Adherence between Public and Private Health Care Sector (X^2=3.96, p=0.05)

In the public HCS participants, 80.52% answered 'Yes' to being informed that stroke is related to hypertension, compared to 88.33% of the private HCS, and no significant relationship (X^2=1.53, p=0.22) being found with the type of HC provider used and knowledge of stroke's relation to hypertension (Figure 4.7). In the public HCS 74.03% participants answered 'Yes' to being informed of PA in managing hypertension, compared to 81.67% private HCS, and no significance relationship (X^2=1.12, p=0.30) was found in the type of HC provider the participants consulted and being informed that PA manages hypertension (Figure 4.8).

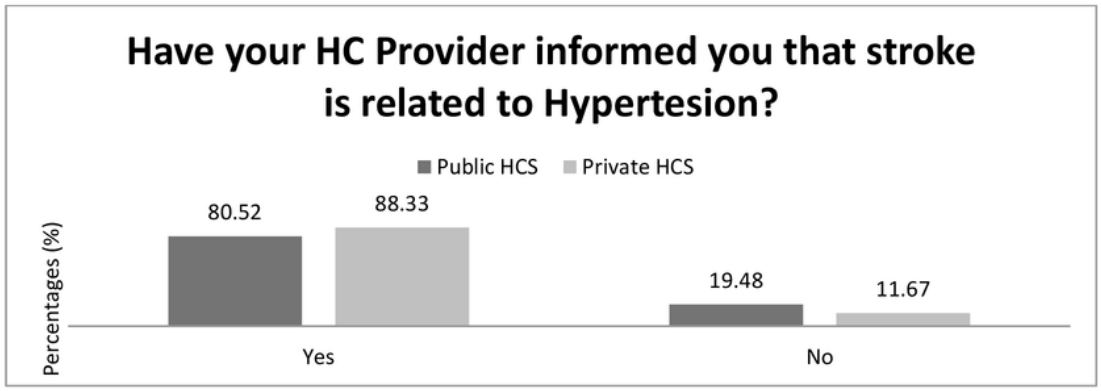


Figure 4.7 Comparisons of knowledge of Stroke's relation to Hypertension between Public and Private Health Care Sector (X^2=1.53, p=0.22)

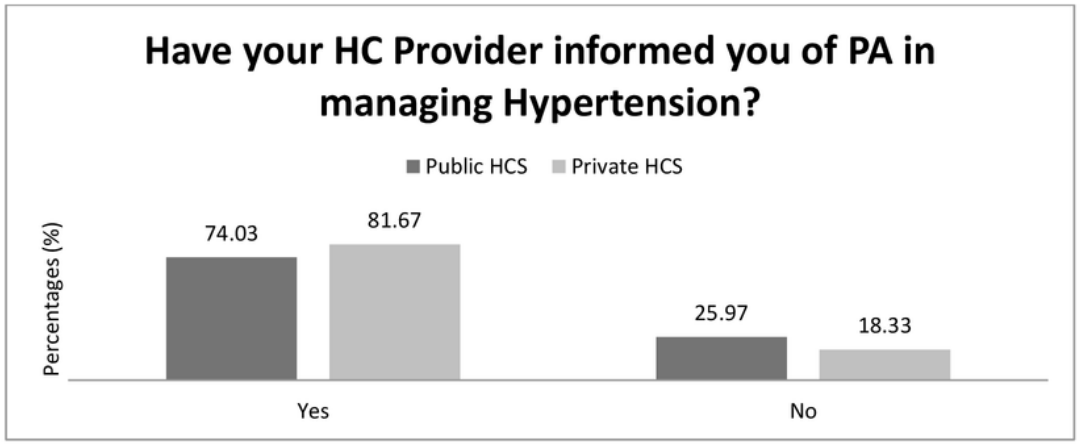


Figure 4.8 Comparisons of knowledge of Physical Activity in managing Hypertension between Public and Private Health Care Sector (X^2=1.12, p=0.30)

4.4 Physical Activity

The GPAQ total METs per week (t=0.63) (p=0.53) between the public and private HCS on average was 1803.12 (±4755.96) and 1385.33 (±2295.32), respectively (Table 4.3). A target volume of ≥500–1000 METs-mins/wk is recommended for most adults, this volume is approximately equal to 1000 kilocalorie per week of moderate intensity, physical activity, ~150 mins/wk of moderate intensity exercise, or pedometer counts of ≥5400–7900 steps per day (ACSM, 2013). Data from the GPAQ also provided the amount of minutes spent sedentary in a typical day, in which it reported an average of 293.83 (±125.17) for public HCS participants and 279.58 (±111.20) for private HCS participants. No significance relationship (X^2=1.78, p=0.24) was found in the type of HC provider the participants consulted and their level of PA, with 49.74% participants from the public HCS have been found to be inactive, compared to 48.33% participants from private HCS (Figure 4.9).

Table 4.3 Comparison of the Global Physical Activity Questionnaire Descriptive Data for Metabolic Equivalents level of Physical Activity between Public and Private Health Care Sector

Variables:	**Public Health Care Sector Mean (±SD)**	**Private Health Care Sector Mean (±SD)**	**p-value**
Total METs	1803.12 (±4755.96)	1385.33 (±2295.32)	0.53
Total day METs	257.59 (±679.42)	197.91(±327.90)	0.53
Minutes Sedentary	293.83 (±125.17)	279.58 (±111.20)	0.46

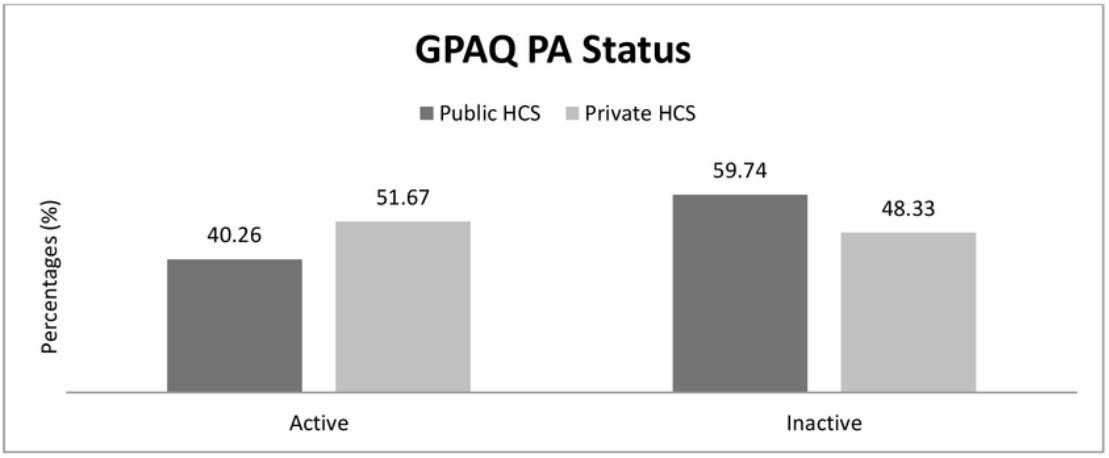


Figure 4.9 Comparisons of Active and Inactive participants between Public and Private Health Care Sector (X^2=1.78, p=0.24)

4.5 Diet, Smoking and Alcohol

Each question was analysed individually in the questionnaires related to diet and smoking that were used to record the findings. The majority of public and private HCS participants stated that they 'Always' used salt whilst cooking, 59.74% and 40.00%, respectively (Figure 4.10). No significance relationship (X^2=7.04, p=0.07) was found between the type of HC provider the participants consulted for their hypertension and the type of diet they preferred.

The public HCS 61.04% answered 'Yes' to smoking and 38.96% answered 'No', compared to 40.00% of the private HCS and 60.00% in the same categories. The public HCS had 61.04% participants that smoked regularly for ≥5 years as compared to the 38.33% private HCS (Figure 4.11). A significant relationship (X^2=5.98, p=0.02) was found between the type of HC provider the participants consulted and ever smoked, a significant relationship (X^2=6.96, p=<0.01) was found between the type of HC provider the participants consulted and smoking regularly for ≥5 years.

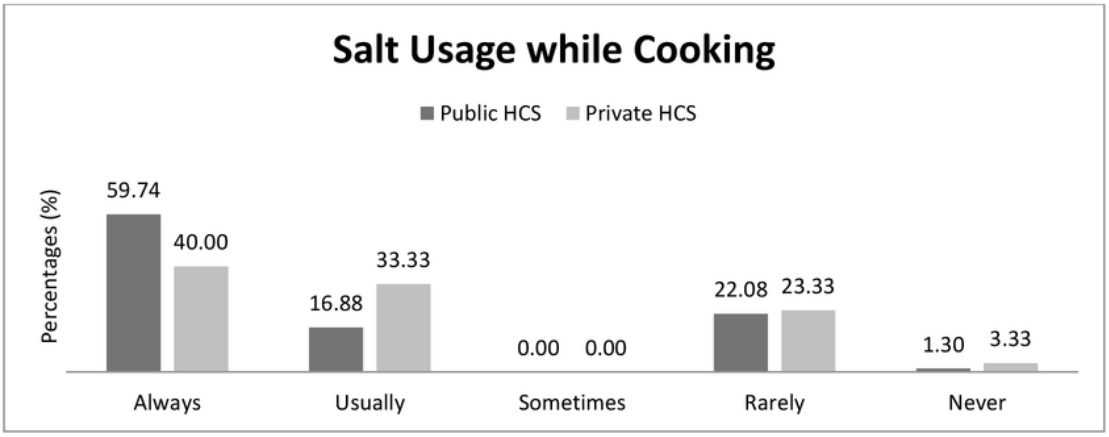


Figure 4.10 Comparison of Salt Usage while Cooking between Public and Private Health Care Sector (X^2=7.04, p=0.07)

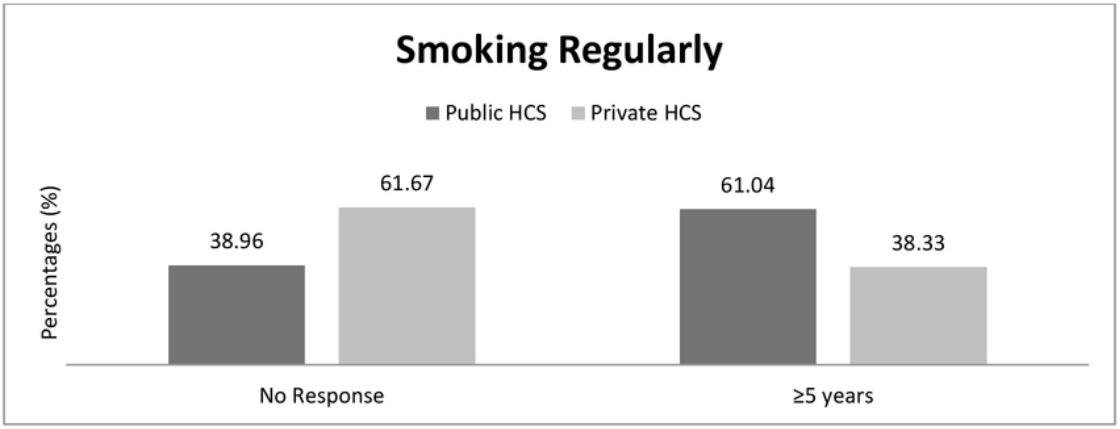


Figure 4.11 Comparison of Smoking Regularly between Public and Private Health Care Sector (X^2=5.98, p=0.02)

The public HCS had 64.94% participants that drank alcohol compared to 48.33% in the private HCS (Figure 4.12), 35.06% public HCS responded 'No' compared to 51.67% private HCS. A significance relationship (X^2=3.81, p=0.05) was found between the type of HC provider the participants consulted for their hypertension and alcohol usage, with the participants using public HCS drinking more with 64.94% participants compared to the private HCS with 48.33% participants.

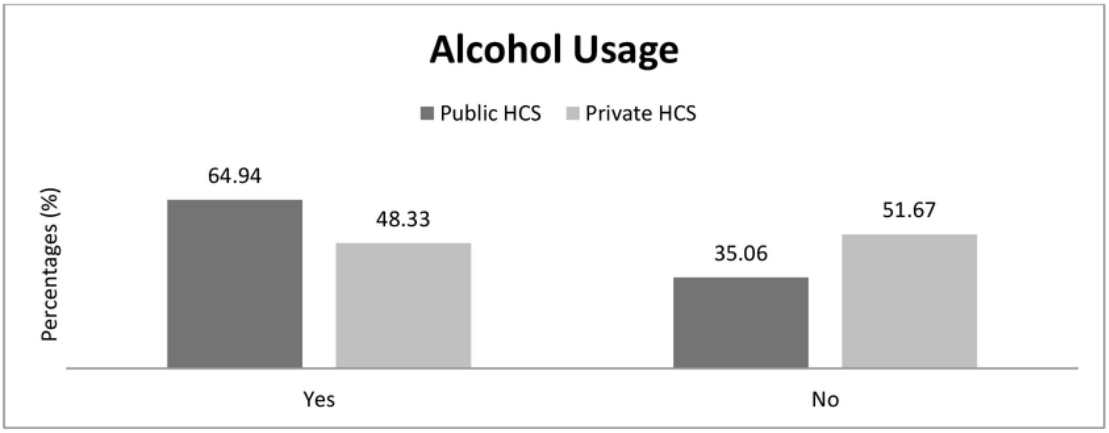


Figure 4.12 Comparison of Alcohol Usage between Public and Private Health Care Sector (X^2=3.81, p=0.05)

CHAPTER 5 - DISCUSSIONS, OVERALL CONCLUDING CHAPTER WITH RECOMMENDATIONS

5.1 Discussion

Non-communicable diseases affect both the poor and the wealthy in SA (Schneider, et al. 2009), Ranchod, et al. (2017) reported that 81.10% and 97.70% of households that attended the public HC facilities or private HC, respectively. In addition to socioeconomic differentials, the SAn population has a rich ethnic diversity that influences the distribution of lifestyle and risk factors for NCDs (Schneider, et al. 2009). Tobacco use, foods high in saturated and trans fat, salt and sugar (especially in sweetened drinks), physical inactivity and the harmful consumption of alcohol cause more than two-thirds of all new cases of NCDs and increase the risk of complications in people with NCDs (Beaglehole, et al. 2011).

The prevalence of hypertension among adults in Africa is the highest in the world (World Health Organization, 2014). Pooled estimates suggest that the prevalence of hypertension in Africa increased from 19.70% in 1990 to 30.80% in 2010, a trend typically attributed to increased urbanisation, population ageing and behavioural risk factors including tobacco and alcohol use, poor diet and physical inactivity (Adeloye and Basquill, 2014). Groenewald, et al. (2014) showed that the prevalence of hypertension in SA has increased since 1998, and that it increases with advancing age (both genders, all surveys), with high levels of hypertension (typically between 50.0% and 75.0%) among individuals aged ≥45 years. Estimates of awareness/diagnosis of hypertension in various studies reviewed in 2015 ranged from 19.10% to 56.40% of those with hypertension (Ataklte, et al. 2015). Rates of treatment and control also varied considerably in previous cohort studies, from 16.70% to 40.90% for treatment and 4.0% to 33.10% for control (Ataklte, et al. 2015). Analysis by Berry, et al. (2017) also revealed very high rates of unmet need for hypertension care, of the 35.10% of the adult population with hypertension, only 8.90% were treated and controlled, indicating that 91.10% of the hypertensive population had unmet need for hypertension care (Berry, et al. 2017). There may be a gap between high BP measurement and effective diagnosis

(Berry, et al. 2017), and also the type of HC provider utilized in managing hypertension can have a significant influence in the effectiveness of diagnosis and management.

This study aimed to identify the differences in knowledge and management of hypertension, as well as risk factors for hypertension, in patients utilizing in the public HCS compared to the private HCS in Umlazi Township, KZN.

Demographic Characteristics

Two-thirds of people moving into urban areas in Africa do so into poverty (Kohl et al. 2012). Third quarter 2016 data showed 27.10% unemployment, based on the official definition (Statistics SA Quarterly Labour Force Survey, 2016). This represented a 1.6% year-on-year increase (Day and Gray, 2017). Indeed, this study found the unemployment rate was unsurprisingly higher in the public HSC (24.68%) compared to private HCS (20.0%). Statistics SA, (2017), defines manager, professional and technician occupations as 'skilled' level of employment, 55.0% of those attending private HCS were in managerial/ professional/ technical positions compared to 22.08% in the public HCS. Furthermore, 41.0% of those attending public HCS earned <R60 000pa, and less than a quarter had University education. This demonstrates the difference in socioeconomics between the two groups, whereby the majority of the private HCS patients had a University qualification (53.0%) and earned >R120 000pa (71.0%). In the community such as Umlazi Township, individuals who can afford private HCS are considered to have some form of wealth, as it is not something that the majority of the community can afford and are privileged too. The majority of these individuals have the type of lifestyle that does not facilitate energy expenditure on their normal day, such as their occupation, foods. Individuals in the private HCS have occupations that are office based mostly in the city, and easy access to processed, fatty foods high in salt, but this can also mean that they have easy access to private HC institutions where they can go for their routine health screenings and/or when complications arises, or presence of other co-morbidities play a role in these findings.

Although hypertension appears to be common in both the public and private HCS, there seems to be some gender differences that exist between men and women in the management of the disease. For example, in a study by Berry et al. (2017) the age-standardised prevalence of hypertension was comparable between women and men (35.2% for men and 34.7% for women), but the likelihood of being unscreened was higher in hypertensive men than women (58.5% of men compared with 39.5% of women). In fact, women with hypertension were more likely than men with hypertension to be treated, with uncontrolled (18.5% compared with 7.9%), as well as treated and controlled (13.9% compared with 3.5%), suggesting higher overall treatment rates among women as compared with men (Berry, et al. 2017). Groenewald, et al. (2014) further reported that in general the prevalence of hypertension is higher among females in the older age categories than that of males. Indeed this study also had more females participating in both the public HCS (66.33%) and private HCS (66.67%), which may mean that women are more willing to participate in health screening and are more willing to seek treatment than men.

Hypertension Knowledge and Management

Hypertension is a major risk factor for stroke and symptomatic cardiovascular disease, and it had become the single largest contributor to premature mortality globally (Forouzanfar, et al. 2017; Lackland, et al. 2015; Poulter, et al. 2015, Schmidt, et al. 2011). The prevalence of hypertension in Africa, particularly in SA is high and on the rise (World Health Organization, 2014; Groenewald, et al. 2014) and unfortunately is often not managed well (Saleem, et al. 2011). According to Schneider, et al. (2009) the healthcare indicators show that the wealthier people had better treatment of hypertension than the poor, however, even the wealthier quintile did not reach high levels of control, the control of hypertension for the wealthiest quintile ranged from 39.0% for men to 54.7% for women. A study by Berry, et al. (2017) found that the age-standardised prevalence of normal and prehypertensive BP measurements in the sample was 26.3% and 38.6%, respectively. Whilst this study found that the average BP for its participants was classified as normal BP for both the public HCS (126/80 mmHg) and the private HCS (123/79 mmHg), with 38.96% and 33.0% participants classified as

having normal BP, respectively. Both groups had an average BP classified as normal, which suggests that the majority of the participants in both groups do manage their BP according to the guidelines given to them by their HC provider. This study also showed that the private HCS (21.67%) had more individuals that were hospitalized due to hypertension compared to the public HCS (15.58%), and also the private HCS (71.67%) had more individuals who encountered complications due to their hypertension then the public HCS (70.13%) which suggests that the participants of the private HCS did not tend to have better management of hypertension as compared to that of the public HCS. Although respondents in the General Household Survery also reported higher levels of problems in public hospitals than in private hospitals, other than in the area of care being too expensive (Ranchod, et al. 2017), this was not the case in the current study's findings. The true differential in the burden of NCD between the public and private sectors is unknown, and will vary by disease due to differences in the underlying risk factors (Ranchod, et al. 2017).

Once the diagnosis of hypertension is established, patients with BP ≥160/100 mmHg should commence drug therapy and lifestyle modifications (Seedat, et al., 2014). Patients with stage 1 hypertension should receive lifestyle modification for three to six months unless they are stratified as high risk by the following criteria: three or more major risk factors, diabetes, target-organ damage or complications of hypertension (Seedat, et al., 2014). Low adherence levels have been documented in SA for several long-term treatment regimens (Berry, et al 2017). Hypertension treatment coverage was very low (35.7%), and only 36.4% of those on treatment were controlled (Groenewald, et al. 2014). Among those who reported use of BP medication, only 52.0% had controlled BP which may be due to poor adherence to antihypertensive medications or possibly ineffective medication (Berry, et al. 2017). Several factors related to access, health-seeking behaviour and health system quality may also contribute to the high rate of unmet need for hypertension care, especially among the poor, the uninsured, black Africans and rural residents (Harris, et al. 2011). This study found that in the public HCS had 58.33%, whilst the private HCS 58.44% of better BP in the last 12 months, in which 100.0% of the public HCS participants took their prescribed medication compared to

95.0% of the private HCS. Although the private HCS had fewer individuals admitted to hospital over the previous year compared to the public HCS, 63.33% and 64.94%, respectively, does not suggest that the private HCS had better management of hypertension then the public HCS and other co-morbidities may be contributing factors to these differentials.

Africa has a clear commitment to address social determinants that are associated with health; the challenge is to move into action (Scott, et al. 2017). Adequate planning is required to achieve efficiencies and attention should be given to management capacity and change management (Mark, et al. 2017). A systematic review on the effectiveness of the CCMDD programme should be done; although this programme appears to have helped to reduce unnecessary consultations, decongest clinics, and reduce waiting times (Mark, et al. 2017). Primary care visits declined from 129 million in 2012/13 to 126 million in 2015/16 (from 3 to 2.8 per capita uninsured), likely due to CCMDD and the ward-based outreach teams (Mark, et al. 2017). This programme may have been the reason for fewer differences and if any found in this study between the public and private HCS regarding the knowledge and management of hypertension. The number of individuals who consented to participate for both the public and private HCS might also have an effect on the differences, as the public HCS had 17 more participants which might affect the statistical findings. The type of management as was done with the CCMDD programme should work with communities and staff to plan and prioritise, thus building collective ownership (Mark, et al. 2017).

Risk Factors

Effective management of NCDs particularly focusing on the four main risk factors for NCDs, i.e. tobacco use, poor diet, lack of exercise and alcohol use, is required at primary care level (Bradshaw et al., 2011). Smoking caused 46.6% of deaths by stroke in African men, and 50.00% of deaths by ischaemic heart diseases, in the same categories in African women, smoking cased 12.60% and 12.90%, respectively (Sitas, et al. 2013). On the other hand, alcohol is the most widespread and harmful drug of abuse in SA at population level and its account for 12.0% of disability-adjusted life years

in NCDs (Matzopoulous and Corrigall, 2014). The public HCS (61.04%) had more smokers than the private HCS (40.0%), all the smokers from the public HCS smoked regularly for ≥5 years as compared to the 38.33% private HCS, this can suggest that majority of the people in the public HCS are more prone to the prevalence of stroke, with the difference of 22.71% of regular smokers for ≥5 years between the two groups. Likewise the public HCS (64.94%) had patients who drank alcohol compared to the private HCS (48.33%), which suggests that the public HCS are more susceptible to more complications in addition to the higher rate of their smoking; alcohol and smoking combined can lead to elevation of hypertension causing resistant hypertension, which can lead to the cause of other NCDs such as cardiovascular disease. The Food-based Dietary guidelines developed in 2001, have been used for education purposes for prevention of chronic NCDs and food labeling regulations are currently being revised (Bradshaw et al., 2011). However, impact of these actions has been limited as seen from the deteriorating risk factor profile (Bradshaw et al., 2011). As it is seen in this study, the majority of public and private HCS group stated that they always used salt whilst cooking, 59.74% and 40.00%, respectively; suggesting that both the groups are not careful of the role high salt can play in elevating their BP. They key behaviours that would reduce risk factors for NDCs are eating a healthy diet, participating in regular physical activity, not using tobacco and avoiding harmful use of alcohol (World Health Organization, 2010).

According to Lee, et al. (2012) decrease in or removal of physical inactivity could improve health substantially. We need to view the inactive population as abnormal and consider them at high risk of disease (Wen, et al. 2012). Physical activity at work, walking, and, in some populations, bicycling used to be major contributors to total energy expenditure but have declined dramatically in industrial and urban societies (Ezzati and Riboli, 2016). Indeed, this study showed high levels of sedentary behavior in both participants from both the public and private sectors (4.8 hours and 4.65 hours of sedentary time per day, respectively). The GPAQ total METs per week reported the public HCS (1803.12) being more physically active then the private HCS (1385.33) and the amount of minutes spent sedentary in a typical day, in which it reported an average

of 293.83 for public HCS participants and 279.58 for private HCS participants, although both groups had high rates of sedentary hours; the public HCS reported spent more minutes sedentary in a typical day as compared to the private HCS. The sedentary category might account for those that are home during the day, while others are at their place of work (e.g. office space), the type of work that the public HCS have might also account for the group having more physically active occupations (e.g. household or unskilled manual labour), which can play a positive role in assisting with their management of their hypertension. Although this study found that both the public and private HCS had very high rate of physical inactivity, 49.74% and 48.33%, respectively.

The current challenge is to develop programmes and interventions to promote physical activity for all in our increasingly sedentary societies (Blair and Morris, 2009). Formal academic training programmes and graduate training should be created to guide the next generation of researchers in the area of PA (Kohl, et al. 2012). The knowledge gained from the increasing research on PA is highlighting the importance of PA to health and well-being, and it underscores the need to pay serious attention to this area of public health (Blair and Morris, 2009). According to Wen, et al. (2012) governmental programmes to move people from sedentary living to meeting recommended levels of exercise are very limited; the emphasis should be placed on the harms of inactivity and not merely the benefits of exercise. Although much has been learned about how individuals can change their PA bahaviour and the determinants of those bahaviours (Bauman, et al. 2012), little progress in population-level changes has been documented (Kohl, et al. 2012). All adults aged 18–65 years should participate in moderate intensity, aerobic physical activity for a minimum of 30 mins on 5 days per week (days/wk) or vigorous intensity, aerobic activity for a minimum of 20 min on 3 days/wk (ACSM, 2013). Moderate intensity, aerobic activity can be accumulated to total the 30 mins minimum by performing bouts each lasting ≥10 mins (ACSM, 2013). Every adult should perform activities that maintain or increase muscular strength and endurance for a minimum of 2 days/wk. Combinations of moderate and vigorous intensity exercise can be performed to meet this recommendation (ACSM, 2013). Understanding and application of complex systems to affect PA will allow infrastructure changes that will give individuals and

populations the freedom to be more physically active and healthy (Kohl, et al. 2012). Only recently has attention been given to population-based measurement of PA in countries at all stages of urbanization and economic development (Ezzati and Riboli, 2016). Another topic for consideration is that physical activity promotion is not only important for the prevention of NCDs, but it might also play a key part in efforts against global warming through the promotion of active transportation, improvement of social relationships, reduction of social inequities, and stimulation of the use of public spaces (Kohl, et al. 2012).

Studies have been consistent in showing that despite implementing lifestyle modifications, it is very difficult to reduce weight and BMI in patients with hypertension and to maintain these changes (Beasley, et al. 2009; Burke, et al. 2009; Shay, et al. 2009). This has important implications as, in addition to health programme-specific responses, it suggests a need for an overarching plan that appreciates the synergies possible in addressing the social determinants (Scott, et al. 2017). Indeed, our study added to the growing literature showing high levels of obesity in SA, with the study participates being classified as obese I (30.45kg·m^2). Interestingly, patients attending public HCS had high levels of overweight (33.77%) but also showed some prevalence of underweight (1.30%), indicating a pattern common in poorer communities where both under- and over-nutrition co-exist. On the other hand, private HCS patients had a significantly higher rate of Obese I (41.67%) versus (23.38%) of the public HCS, which may stem from their ability to afford a more westernized diet, this can also be seen where the public HCS (22.08%) higher rate of normal BMI compared to that of the private HCS (16.67%) with lower rates. The WHR ratio's also confirmed the prevalence of the private HCS's (0.98cm) ability to afford a more westernized diet compared to that of the public HCS (0.95cm), although the differences were not as much as those seen in their BMI findings, the public HCS seemed to better manage of their weight compared to the private HCS. Findings by Berry et al. (2017) suggests that prevalence of hypertension increased steadily with BMI from 20.4% among the underweight to 30.7% among those with normal BMI to 34.1% among the overweight to 43.4% among the obese, although these findings show that the majority of the prevalence lied among the

overweight. South African National Health and Nutrition Examination Survey (National Planning Commission, 2011), also found that 31.0% of men and 64.0% of women falls into the overweight or obese categories (Scott, et al. 2017).

In the community of Umlazi Township, there are so many other external factors that contribute to excessive increase in the risk factors associated with hypertension, for example, not many people can afford the gym membership subscription, as they have so many other bills to pay for those that are regarded as needs to them. Few recreational parks to exercise and safety concerns could be the other reason for the high levels of physical inactivity, as well as the majority of the community have to take public transport to get to and from places of work, by the time they get home they are tired and its dark, this is not conducive and safe for exercise after dark hours. The notion that being overweight is a sign of 'good health' still exist in the community and quick access of unhealthy fast foods (deep fried, in most case fatty and/or carbohydrate), which come at a low price is very high, as well as processed foods seem to be cheaper than fresh foods. The undisclosed true number of unemployment rate also results in majority of the individuals in the community become involved with drugs and excessive alcohol use, and there is easy access these things in the community.

5.2 Strengths and Limitations

This is the first study to be conducted in Umlazi Township regarding the trends of hypertension in the community and no specific hypertension publications were found about the area. This study subjectively measured the trends of hypertension management, knowledge and its risk factors between the public and private HCS. It did not take into consideration the accuracy of the subjective nature of the questionnaires and objective observation - empirical experience would suggest that BP is not managed as well as indicated by the participants in this study, for examples, taking their medication regularly, the measurement of the actual PA, recording the amount of times the participants smoked per day and clinical records might have given more precise outcomes of the differences between the two groups. There could also be other co-morbidities and other medications taken that we did not measure or taken into

consideration, which might have had an effect on the outcome of the findings of the study. This study also observed a relatively small hypertensive population of Umlazi Township and does not represent all the other townships in the country. The actual sample size used for the study was also below the needed (calculated) sample size which may have created bias effect on the power to detect the significant differences and relationships of the study.

5.3 Conclusions and Recommendations

The differences in the management of hypertension between public and private HCS in SA goes beyond the type of health care provider the participates utilize to manage their hypertension – their socioeconomic status, level of school and the type of occupation they have, just to name a few, can also have a major significance in type of HC provider they utilize. The participants of the private HCS did not tend to have better knowledge and management of hypertension and its risk factors as compared to that of the public HCS, although there were few differences between the two groups. Both the groups had moderate management of hypertension, regardless of the knowledge they had in managing the condition, which suggests that the health officials will need to conduct an in-depth area based research on how the suggestions from findings of scientific researchers can be implemented in relations to hypertension. The implementation of training individuals by the health officials in order to increase the number of people to assist in the different implementations and strategies suggested is recommended. Different individuals can be trained to deal with hypertension condition specifically. Contribution from the economic private sectors can also be approached and make a difference in assisting with the finances to fund the actual implementation of the training required. This can also help the medical stuff with having more people to assist in the process of change and tackling NCDs. Creation of task teams can also help with follow up on the progress of specific areas, (i.e. PA, healthy diet, healthy environments, collaboration between public and private sectors, etc). The task teams can be area based, for more in-depth understanding of each section in Umlazi community.

An investment in building of more public hospitals, clinics that specialize on specific conditions and/or HC facilities for the public to access should also be taken into consideration. The body of other health professions should also be taken into consideration in the plan to tackle NCDs in primary HCS (e.g. Biokineticist, Physiotherapist, etc), other than the doctors and nurses. As oral medication is prescribed, so should be exercise prescription in the PHC facilities by qualified professionals, who will assess the patients and prescribe the necessary programmes accordingly and timely form baseline findings then continue from there (e.g. 4 weeks, 6 weeks, etc.), and assess if the exercise programmes are making any differences in their lives. The emphasis of home exercise programme should be implemented as well. The private HCS participants it's seems much easier for them to access other professions other than doctors, as the medical aid schemes can pay. Projects on building more recreational facilities managed with security is also a consideration, as majority of people can get motivation to be physically active with the necessary facilities and feeling of being safe, the community can be motivated. These recreational facilities can have all the necessary information to inform the public on benefits of good health, being physically active, well balanced diet and findings of scientific research conducted, these facilities can also be used in training the task teams for specific conditions of health that affect the community of Umlazi Township.

5.4 Clinical Applications

The objectives of the study were met through the clinical application to understand the trends in knowledge of hypertension management in the community of Umlazi Township, KZN. Understanding the patients' social-economic status, knowledge and management of hypertension and its risk factors in order to help identify the differences between the patients utilizing public and private HC providers, in which the knowledge of these factors will assist in informing ways to strengthen the management of hypertension in the hypertensive community of Umlazi KZN, as well as in the country.

1497887:4.Dissertation_for_Turnitin_Report.docx

ORIGINALITY REPORT

18%	19%	17%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.hst.org.za Internet Source	2%
2	Kaitlyn M Berry, Whadi-ah Parker, Zandile J Mchiza, Ronel Sewpaul, Demetre Labadarios, Sydney Rosen, Andrew Stokes. "Quantifying unmet need for hypertension care in South Africa through a care cascade: evidence from the SANHANES, 2011-2012", BMJ Global Health, 2017 Publication	2%
3	www.phcfm.org Internet Source	2%
4	www.scribd.com Internet Source	2%
5	www.mrc.ac.za Internet Source	2%
6	sjp.sagepub.com Internet Source	2%
7	www.equityhealthj.com	

Internet Source

2%

8 www.tjpr.org
Internet Source

2%

9 www.nejm.org
Internet Source

2%

Exclude quotes	On	Exclude matches	< 2%
Exclude bibliography	On		

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

FACULTY OF HEALTH SCIENCES

PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I MANDISA JEWEL SIMAMANE (Student number: 1497857) am a student registered for the degree of MSC (Med) BIOKINETICS. in the academic year 2018.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature: _____ Date: 26/06/2018