

**FACTORS ASSOCIATED WITH PARTICIPATION IN PHYSICAL  
ACTIVITY AMONG ADULTS WITH HYPERTENSION IN  
KIGALI, RWANDA**

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**A thesis submitted in partial fulfillment of the requirements of degree of  
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**May 2011**

## ABSTRACT

Hypertension is one of the most common non-communicable diseases, and it is the leading cause of cardiovascular diseases, death and disability worldwide, especially in developing countries. Physical activity has been regarded as a commonly accepted modality for preventing and treating hypertension. However, despite its known benefits, this modality of treatment and prevention of hypertension continues to be underused. The present study aimed to determine the demographic, social and health-related factors that are associated with levels of physical activity participation among adults with hypertension in Kigali, Rwanda. This cross-sectional study was conducted with 252 adults with hypertension and 87 healthcare professionals through the Godin Leisure-Time Exercise Questionnaire (GLTEQ) and Physical Activity Exit Interview (PAEI). Two thirds of the participants (69.44%) were classified as sedentary. The following factors were found to be significantly ( $P < 0.05$ ) associated with the levels of physical activity: age, marital status, and level of education, residence, tobacco; past and current users, alcohol; current user, diabetes mellitus, BMI, perceived health status, self-efficacy, and blood pressure. None of the healthcare professionals were considered good physical activity counsellor. The findings of the present study highlight the need for the implementation of health promotion strategies aimed at promoting physical activity lifestyle among individuals with hypertension in Rwanda. Efforts should be made in educating people with hypertension on the benefits of integrating regular physical activity in their daily lives. Furthermore, healthcare professionals should be educated concerning how to promote physical activity to all patients especially those with hypertension.

## KEYWORDS

Physical activity

Exercise

Hypertension

High blood pressure

Cardiovascular diseases

Non-communicable diseases

Lifestyle

Sedentary

Obesity

Rwanda



## DECLARATION

I hereby declare that “**Factors associated with participation in physical activity among adults with hypertension in Kigali, Rwanda**” is my own work, that it has not been submitted, or part of it, for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

**Bernardin Umuvandimwe**



Signature.....

**May 2011**

Witness: .....

**Prof. Julie Phillips**

## DEDICATION

This thesis is dedicated to the Lord God Almighty. I also dedicate this work to my loving deceased parents and the rest of my family for the love and parental care that made me whom I am. I also dedicate this thesis to my beloved fiancée Benegusenga, C., for the love, patience and support that you have shown me.



## ACKNOWLEDGEMENTS

I wish to give all honour and praise to my Creator, Almighty God, for having given me life, strength, courage and mental ability to go through my studies.

I highly recognize and appreciate the contributions extended to me by:

- The Government of Rwanda, through the Ministry of Education for granting me a scholarship for further studies, and Rwamagana Hospital.
- The National Ethical Committee of the Ministry of Health, Rwanda, thank you so much for permitting me to conduct this study.
- My sincere gratitude to my supervisor, Prof. Julie Phillips for her encouragement, constructive criticism, sacrifice and guidance. I cannot find the words to express my appreciation for always availing yourself in every phase of this thesis.
- Special thanks to the lecturers and staff of physiotherapy department, UWC, for their help in so many ways during my studies.
- My sincere appreciation to Prof. Richard Madsen for the assistance in statistical work during data analysis process.
- My heartfelt thanks to my classmates who shared the happiness and stressful times during our stay at UWC.
- Much thanks to all participants who voluntarily participated in this study.
- To all my friends who supported me in all (Morally, Spiritually, and financially), my heartfelt appreciation.
- My deepest thanks to my aunts and uncle, and the rest of the family for their love, support and encouragement.

***May God bless you!***

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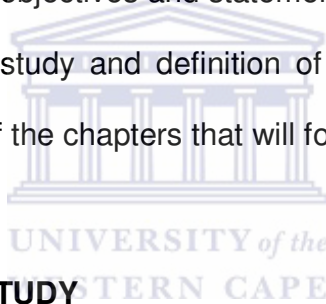
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## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 INTRODUCTION**

In this chapter, the background of the study is given to highlight the importance of physical activity in addressing the increasing and alarming burden of chronic diseases of lifestyle, with emphasis on hypertension. The chapter also reflects on the levels of physical activity that are recommended for the prevention as well as the management of hypertension. The aim, specific objectives and statement of the problem are highlighted. Lastly, the significance of the study and definition of key terms are also given. The chapter ends with a summary of the chapters that will follow in this study.



#### **1.2 BACKGROUND OF THE STUDY**

Non-communicable diseases (NCDs) which include cardiovascular disease, diabetes, cancer and chronic respiratory diseases, are the leading causes of death and disability worldwide. Furthermore, NCDs are responsible for 60% of all deaths globally and 80% of deaths in low-income and middle-income countries (World Health Organization, 2002a). In a study done by Sobngwi, Mbanya, Unwin, Aspray and Albert (2001), it is approximated that by 2020, chronic diseases of lifestyle in sub-Saharan Africa will constitute almost 50% of the burden of disease. These major underlying diseases share key risk factors, mainly the lack of physical activity, unhealthy diet, tobacco and alcohol use (Yach, Hawkes, Gould & Hofman, 2004). Physical inactivity is recognised as the

result of the urbanisation leading to an increase in consumption of energy rich foods and a decrease in energy expenditure (through less physical activity) in developing countries (Yusuf, Reddy, Ounpuu & Anand, 2001).

Joshi, Jan, Wu and MacMahon (2008) stated the disease burden, economic burden, treatment gaps and lack of investment as the main problems of cardiovascular disease in low-and middle-income countries. Hypertension or high blood pressure is the major risk factor of cardiovascular disease worldwide (WHO, 2002b). Recent analyses show that in the year 2000, adults with hypertension were estimated to be 26.4% of the world's population. Furthermore, between 2000 and 2001, 27.2% of Chinese adults were reported to have hypertension (Hou, 2008). The number of individuals with hypertension in developing countries was higher than in developed ones (Chockalingam, Campbell & Fodor, 2006). Various researchers have shown that hypertension in Sub-Saharan Africa is in high prevalence (Addo, Smeeth & Leon, 2007; Opie & Seedat, 2005). Prevention and control interventions by African nations are thus urgently needed.

Addo et al. (2007) reported that hypertension is becoming an important medical and public health problem worldwide. They further documented that hypertension was estimated to be responsible for 7.6 million premature deaths and caused 92 million disability-adjusted life years worldwide in 2001. Hypertension contributes to higher rates morbidity (Seedat, 2000). It is stated that hypertension is at higher risk of CVD, ischemic heart disease, cardiac and renal failure. Furthermore, hypertension must be adequately



well prevented and managed by all nations. In order to reduce the incidence of hypertension worldwide, the World Health Organization and the International Society of Hypertension in 2003 have established a statement on management of hypertension through a variety of lifestyle modifications such as weight loss and physical activity (Kaplan, Mendis, Poulter & Whitworth, 2003).

Hypertension is a considerable risk factor for CVD morbidity and mortality. By the year 2030, CVD is predicted to account for 41% of all deaths in working-age individuals in developing countries (Frost & Topp, 2006). CVD has a large impact on individuals, households, and countries (Joshi et al., 2008). A study in Peruvian cities, conducted by Goldstein, Jacoby, Aguila and Lopez (2005) have found that low socioeconomic status is associated with a high prevalence of NCD or chronic diseases of lifestyle such as CVD. Frost and Topp (2006) said that hypertension is a major health problem that affects individuals of all ethnicities and socioeconomic levels. Most deaths and disability caused by hypertension-related diseases are seen in lower income countries (Perkovic, Huxley, Wu, Prabhakaran & MacMahon, 2007). Future health interventions must also focus on the poverty reduction (Goldstein et al., 2005).

Kaplan et al. (2003) reported further that hypertension is associated with contributing factors such as obesity, physical inactivity and an unhealthy diet. It was shown that regular physical activity ameliorates quality of life for the general public and adults with hypertension in particular (Bassuk & Manson, 2005). Moreover, regular physical activity can help the regulation of body weight and reduction of blood pressure (Harsha & Bray,

2008). There is evidence that regular physical activity lowers blood pressure and other chronic diseases of lifestyle (Bassuk & Manson, 2005; Bronas & Leon, 2009; Mora, Cook, Buring, Ridker & Lee, 2007). Physical activity or exercising strongly reduces the risk of CVD (Eriksson, Westborg & Eliasson, 2006) such as hypertension (Mora et al., 2007).

Thus, it is necessary for adults with hypertension to reduce the incidence of hypertension and blood pressure levels through lifestyle modifications like exercise and dietary habits (Bronas & Leon, 2009). The high prevalence of hypertension in urban societies in Africa imposes a considerable public health problem, and therefore, hypertension is becoming not only common in developed countries but also in developing countries. The rapid urbanization with the adoption of western lifestyle in Africa is considered to play a key role in the rise of hypertension (Sobngwi et al., 2002). Hypertension is an important risk factor for CVD and stroke (Cakir & Pinar, 2006). Epidemiological studies have shown that physical inactivity is associated with hypertension. Healthy lifestyles have been strongly associated with the prevention of non-communicable diseases in general and hypertension in particular (Bronas & Leon, 2009).

Recent findings indicate that engaging in physical activity is an important approach in the prevention and management of hypertension (Bassuk & Manson, 2005; Manfredini et al., 2009; Mora et al., 2007). A meta-analysis of randomized controlled trials has demonstrated a reduction of blood pressure by aerobic exercise in both hypertensive

and normotensive individuals. Furthermore, high aerobic physical activity should be regarded as a major frame of lifestyle modification for preventing and treating high blood pressure (Whelton, Chin, Xin & He, 2002b). There is good evidence that regular physical activity brings enormous results in reducing risk of having hypertension and greatly benefits those who are suffering from hypertension (Hu et al., 2004; Mora et al., 2007; Whelton et al., 2002b). Similarly, according to Manfredini et al. (2009) physical activity can be considered as a cornerstone discipline for the prevention, treatment, and control of hypertension.

Adults with hypertension should be recommended to exercise on most, preferably all, days of the week, with moderate intensity for at least 30 minutes of continuous or accumulated physical activity per day, consisting primarily of endurance training but supplemented by resistance training (Cornelissen & Fagard, 2007). According to a study done by Lee and Laffrey (2006), regular physical activity is considered as a drug-free approach, which greatly benefits those who are suffering from hypertension. Hu et al. (2004) stated that regular physical activity can help control blood lipid abnormalities, diabetes and obesity. They further stated that regular physical activity can prevent or delay the development of high blood pressure, and reduces blood pressure in persons with hypertension.

A prospective study conducted in Finland reported that regular physical activity can reduce the risk of hypertension in both sexes' adults (Hu et al., 2004). Research shows that regular physical activity has several benefits to the individuals with hypertension

which may include a decrease of body fat mass, improvement functioning of nervous, renal, and cardiovascular systems (Frost & Topp, 2006). The authors further reported that during the initial assessment, the clinician should consider the individual's capacity to perform the recommended level of physical activity. Furthermore, they proposed a physical activity programme of warm-up, aerobic resistance, and cool-down exercises which can be used by clinicians according to the goals and capabilities for every individual with hypertension. Manfredini et al. (2009) added that it needs motivation by both individuals with hypertension and health practitioners. Clinicians must also make adjustments to the progressive goals for intensity, duration, frequency, and/or mode of training according to medical conditions of their clients (Frost & Topp, 2006).

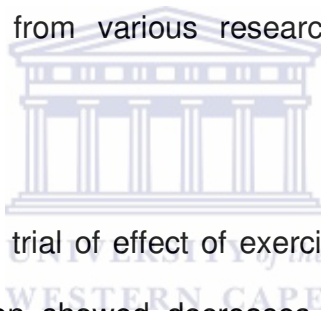
In order to reduce the impact of hypertension worldwide, the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure seventh report in 2003 have recommended five therapeutic lifestyle changes. These therapeutic lifestyle changes focus on loss of excess weight, increasing exercise/physical, reducing alcohol consumption, following a heart-healthy diet and reducing daily sodium intake (Chobanian et al., 2003). In addition, there is an important effect of lifestyle modifications for the prevention and management of elevated blood pressure levels (Bronas & Leon, 2009). Carlson, Maynard, Fulton, Hootman and Yoon (2009) added that health-care professionals should assess patient's activities and provide physical activity advice. Insufficient attention to health education for hypertension preventive counseling services continues to handicap progress. Furthermore, effective education of health care professionals and the general public is needed for the implementation of

strategies aiming at reducing the impact of hypertension through lifestyle changes (Whelton et al., 2002a). Health-care providers should offer physical activity counseling to all individuals with hypertension at every consultation (Carlson et al., 2009). Moreover, health-care providers have to offer physical activity counseling for better managing hypertension.

Research has shown that a weekly increase of 30 to 60 minutes of physical activity in adults with hypertension is associated with blood pressure reduction. This reduction means, that for every 10 kg body weight loss for individual with hypertension over 25 kg/m<sup>2</sup> body mass index (BMI), blood pressure can be reduced between 5 to 20 mmHg. Additionally, regular physical activity of moderate intensity, performed on most days (such as brisk walking 30min/day), can reduce blood pressure by 4 to 9 mmHg (Frost & Topp, 2006). Furthermore, regular physical activity is an important approach in the prevention of hypertension in normal weight and overweight or obese individuals (Hu et al., 2004). According to Frost and Topp (2006), regular physical activity is a very effective means of therapy to prevent and manage hypertension.

Lifestyle modifications including increased physical activity help to reduce blood pressure (Manfredini et al., 2009). Around the world, between 60% and 80% of adults are physically inactive therefore failing to benefit their health (WHO, 2002a). Choudhury and Lip (2005) reported that there is high prevalence of sedentary lifestyle in most societies. According to Lee and Laffrey (2006), physical activity is influenced by personal, interpersonal, and environmental factors. Seefeldt, Malina and Clark (2002)

divided those factors into invariable (age, gender, race, ethnicity) and modifiable (behavioural and personality characteristics, environmental circumstances and community settings). The authors further reported that barriers such as unaffordable facilities and unavailable childcare, high crime rates fear for personal safety and culturally inappropriate activities, have been noted to influence low physical activity in some ethnic minorities. Research by Nugent (2008) reported the high impact of change taking place in workplace technology (more mechanization, less manual labour) and behaviour within the home (more television viewing, greater use of automobiles) to lower levels of physical activity. Implementation of recommendations relative to appropriate physical activities from various researchers should take high priority (Choudhury & Lip, 2005).



A recent randomized controlled trial of effect of exercise training on blood pressure in older persons with hypertension showed decreases in systolic blood pressure and diastolic blood pressure of 5.3 and 3.7 mmHg, respectively (Stewart et al., 2005). A meta-analysis of 54 clinical trials demonstrated that aerobic exercise has an important reduction in lowering systolic and diastolic blood pressures of 3.84 and 2.58 mmHg, respectively, in adults with hypertension, independent of weight loss (Whelton et al., 2002b). Literature revealed that moderate-intensity resistance training is considered as a complement to aerobic exercise programmes in the prevention, treatment, and control of hypertension (Braith & Stewart, 2006; Manfredini et al., 2009). Endurance training is also effective, and resistance training can be combined with it (Manfredini et al., 2009). In addition, Whelton et al. (2002a) reported that endurance training is considered

effective in lowering the resting blood pressure in patients with mild to severe hypertension. Therefore, participation in physical activity or fitness plays an important role in both prevention and management of hypertension. In addition, regular physical activity is associated with lower blood pressure in both men and women (Hu et al., 2004).

Mora et al. (2007) reported the beneficial effect of physical activity with an important reduction of 30% to 50% in CVD risk. In individuals with hypertension, the pharmacological therapy carries high costs, sometimes with lower efficacy. Physical activity, alone or combined with other lifestyle interventions, can decrease blood pressure and avoid or reduce the need for pharmacologic therapy in individuals with hypertension. Furthermore, exercise programmes might require a preliminary medical evaluation or exercise tolerance assessment to be safe, effective, and able to meet the patient's necessities and capabilities. Physical activity can reduce health care cost and it also prevents disabilities thus improving the overall quality of life (Manfredini et al., 2009).

There is an increasing high prevalence of hypertension and related diseases in Africa. It was commented that the prevalence of hypertension in sub-Saharan Africa (SSA) is higher in urban than rural areas. Moreover, rapid urbanisation with global influences on lifestyles in Africa and other developing countries lead to a decrease physical activity (Addo et al., 2007). The urbanization is associated with societal and environmental changes (Yusuf et al., 2001). It was stated that socioeconomic stress, lack of access to

facilities, and poor diet for lower-income groups and obesity, dietary excess, alcohol consumption, and lack of exercise for higher-income groups are the major causes of developing hypertension in SSA populations. The reason that being at proper treatment and appropriate national policies need to be highly considered (Opie & Seedat, 2005).

Evidence from literature reported that urbanization seems to be associated with high changes in dietary habits, psychological stress, subsistence means and physical activity. Furthermore, urban growth rate in Africa is estimated at 4.3% compared to 0.5% in Europe. Obesity, diabetes and hypertension prevalence is higher in urban compared to rural dwellers in populations studied. Physical activity is significantly lower and differs in pattern in urban subjects compared to rural. Inactivity was associated with higher body mass index, blood pressure and fasting blood glucose levels, observed in men than women (Sobngwi et al., 2002). Clinicians and policymakers must determine how best to promote regular physical activity to their clients and the general public, respectively (Bassuk & Manson, 2005).

Between 1991 and 2000, the urban population increased from 235 664 to 600 000 in Kigali city, Rwanda due to natural population growth, rural exodus, and return of refugees who lived in foreign countries after the war of 1994 (Rwandan Ministry of Finance, 2001). The picture of physical inactivity in developed countries is mirrored in developing countries such as Rwanda. Kagwiza, Phillips and Struthers (2005) found that the majority of women working in different institutions in Kigali, the capital city in Rwanda, were sedentary. In the study done by Banyangiriki (2009) to measure the



levels of physical activity among university employees in Kigali city, almost one third of these employees were considered sedentary. The author also found a significant association between hypertension and other chronic diseases of lifestyle and physical inactivity.

Despite the benefits of physical activity, this modality of treatment and prevention of chronic diseases of lifestyle such as hypertension continues to be underused. Limited literature is available on the prevalence of hypertension in Rwanda. However, there is no information about the factors associated with physical activity participation among adults with hypertension. Considering the increasing prevalence of hypertension in developing countries such as Rwanda, the researcher felt the need to assess the following; levels of physical activity among adults with hypertension, and factors associated with it. The current study will thus attempt to address this gap in the literature. This information may be a useful tool in the implementation of promotion strategies aiming at the prevention and appropriate management of people with hypertension and those at risk of developing hypertension.

### **1.3 STATEMENT OF THE PROBLEM**

Physical activity may be of benefit to people suffering from hypertension. The prevalence of hypertension in Rwanda is on the increase (Ministry of Health Rwanda, 2006). However, no literature is available on the factors associated with physical activity participation among adults with hypertension. Therefore, there is a need to know to

what extent physical activity is performed among adults with hypertension and understand the factors related to it.

#### **1.4 RESEARCH QUESTION**

What are the factors that are associated with participation in physical activity among adults with hypertension in Kigali, Rwanda?

#### **1.5 AIM OF THE STUDY**

The aim of the study is to determine the factors that are associated with participation in physical activity among adults with hypertension in Kigali, Rwanda.

#### **1.6 OBJECTIVES OF THE STUDY**

1. To establish the levels of physical activity participation among adults with hypertension in Kigali, Rwanda.
- 2 To determine the socio-demographic and health-related factors associated with physical activity participation among adults with hypertension in Kigali, Rwanda.
- 3 To identify barriers and facilitators of physical activity participation among adults with hypertension in Kigali, Rwanda.
- 4 To determine the extent to which healthcare professionals encourage physical activity for individuals with hypertension.

## 1.7 SIGNIFICANCE OF THE STUDY

The results of the study and the recommendations will definitely help in managing hypertension in adults. The medical team will work hand in hand for a better management of hypertension through the implementation of appropriate physical activities and exercise programmes. Therefore, there is a need to determine the levels of physical activity participation among adults with hypertension and understand their association with demographic, social and health-related factors.

## 1.8. DEFINITION OF KEY TERMS

**Physical Activity:** is defined as any bodily movement produced by skeletal muscles that require energy expenditure (WHO, 2002c).

**Exercise:** is defined as a physical activity that is planned, structured, repetitive, with the objective of improving the general physical fitness through increased strength, endurance and flexibility (Durstine & Moore, 2003).

**Hypertension or High blood pressure:** A sustained elevation of optimal or normal blood pressure levels that equals or exceeds 140 mmHg systolic and 90 mmHg diastolic. It is considered a syndrome with multiple phenomena in which arterial pressure stays high for an extended period of time (McPhee, Lingappa, Ganong, & Lange, 2003).

**Cardiovascular diseases:** These are diseases which are caused by disorders of the heart and blood vessels, and include coronary heart (heart attacks), cerebrovascular disease (stroke), raised blood pressure (hypertension), peripheral artery disease,

rheumatic heart disease, congenital heart disease and heart failure. The major causes of cardiovascular diseases are tobacco use, physical inactivity, and unhealthy diet (WHO, 2008a).

**Non-communicable diseases:** These are diseases or conditions that occur in, or are known to affect individuals over an extensive period of time and for which there are no known causative agents that are transmitted from one affected individual to another. NCDs include diseases such as cancer, diabetes mellitus, hypertension, and cardiovascular diseases (Daar et al., 2007).

**Lifestyle:** the way a person or a group of people live(s) (Hornby, 2000).

**Sedentary:** The original meaning of the word “sedentary” is related to the higher propensity to be sitting down without performing any physical activity that requires energy expenditure (Varo et al., 2003).

**Obesity:** It is defined as abnormal or excessive fat accumulation that presents a risk to health. A measure of obesity is the Body Mass Index (weight in kilograms divided by the square of his height in meters). A person with a BMI of 30 or more is generally considered obese, while BMI equal to or more than 25 classify the person as overweight (WHO, 2006).

**Rwanda:** Rwanda is a landlocked country situated in eastern-central Africa, bordered by Uganda to the north, Tanzania to the east, Burundi to the south and the Democratic Republic of Congo to the west. It covers an area of 26338 square kilometers with a total population of 10.2 million people (Rwandan Ministry of Local Government, 2010).

## 1.9 ABBREVIATIONS USED IN STUDY

**BMI:** Body Mass Index

**BP:** Blood pressure

**CVDs:** Cardiovascular diseases

**DASH:** Dietary Approaches To Stop Hypertension

**DF:** Degrees of freedom

**GLTEQ:** Godin Leisure-Time Exercise Questionnaire

**HIV/AIDS:** Human Immuno-Deficiency Virus/Acquired Immune-Deficiency Syndrome

**MET:** Metabolic Equivalent of Task

**NCDs:** Non-Communicable Diseases

**PA:** Physical activity

**PAEI:** Physical Activity Exit Interview

**SD:** Standard Deviation

**SSA:** Sub-Saharan Africa

**UWC:** University of the Western Cape

**WHO:** World Health Organisation

**$\chi^2$ :** Chi-square test

**%:** Percentage



## **1.10 OUTLINE OF CHAPTERS**

Chapter one describes the background of the study, in which a general picture of non-communicable diseases in general and hypertension in particular is described. The benefits of physical activity both in the prevention and the management of hypertension, as well as the recommended levels for adults with hypertension are highlighted. The statement of the problem, the aim, objectives and significance of the study are given. The chapter ends with the definition of key terms used in the study and the outline of chapters.

Chapter two presents a literature review pertaining to the global burden of non-communicable diseases, particularly hypertension. This is followed by a description of the management approach of hypertension, and the role of physical activity both in the prevention and management of hypertension. The barriers and facilitators as well as the role of health professionals' counselling to physical activity participation among adults with hypertension are also emphasized. A description of various physical activity health promotion programmes and strategies concludes the chapter.

Chapter three describes the methodology used for this study. The research setting, study design, study population and sample are described. Moreover, the validity and reliability of the instrument used is explained. The chapter also describes the procedures used to collect data, as well as the methods used in their analysis. Finally, the issues of ethical considerations are highlighted.

Chapter four presents the results of the study. In this chapter, both descriptive and inferential statistic results of the study are well described and presented by use of tables, figures and pie charts.

Chapter five interprets and discusses the findings of the study and the implications of the results. The chapter compares and contrasts the study results with previous similar studies. Limitations that were encountered during the study are also highlighted.

Chapter six gives the summary of the study. The important findings of the study are highlighted in the conclusion, and relevant recommendations related to it are proposed.

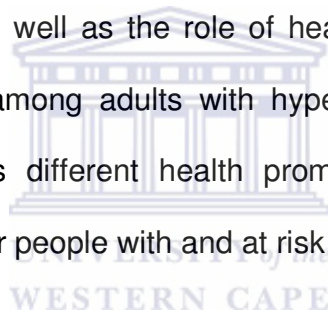


## **CHAPTER TWO**

### **REVIEW OF THE LITERATURE**

#### **2.1 INTRODUCTION**

This chapter is a review of the relevant literature pertaining to hypertension and physical activity among individuals with hypertension. It gives a clear picture of the global burden of non-communicable diseases, with emphasis on hypertension. Furthermore, this chapter describes the management strategies for hypertension and emphasis is given on the role of physical activity both in the prevention and management of hypertension. The barriers and facilitators as well as the role of health professionals' counseling to physical activity participation among adults with hypertension are also emphasized. Finally, this chapter describes different health promotion strategies aiming at the promotion of physical activity for people with and at risk of developing hypertension.



#### **2.2 GLOBAL BURDEN OF NON-COMMUNICABLE DISEASES AND HYPERTENSION**

##### **2.2.1 Non-communicable diseases**

NCDs continue to be important public health problems in the world. These NCDs which include cardiovascular disease, diabetes, cancer and chronic respiratory disease, cause 60% of all deaths globally and 80% of these are in low- and middle-income countries (McClaughlyn, 2008). The researcher further reported that the global figure for deaths as a result of NCD will increase by 17% over the next 10 years and the greatest increase will be seen in the African region (27%) and the Eastern Mediterranean region



(25%). The effects of deaths from these diseases is double the effects of deaths resulting from a combination of infectious diseases (including HIV/AIDS, tuberculosis and malaria), maternal and perinatal conditions, and nutritional deficiencies. Moreover, without intervention, at least 388 million of people will die from NCDs by 2017 (Daar et al., 2007). By 2020, it is predicted that these diseases will be causing seven out of every ten deaths in developing countries (Boutayeb & Boutayeb, 2005). The burden of mortality, morbidity and disability resulting from NCDs continue to grow in the developing countries (Narayan, Ali & Koplan, 2010). The projected increase in the burden of these diseases in low and middle income countries is largely driven by the underlying determinants of urbanisation, globalisation and rapid population ageing (Worley, 2006). Recently, the WHO reported six risk factors associated with non-communicable diseases as the leading risk factors for death worldwide such as high blood pressure, tobacco use, high blood glucose levels, physical inactivity, overweight or obesity, and high cholesterol levels (WHO, 2009). Risk factors, such as alcohol use, improper nutrition and sedentary behaviour contribute substantially to the development of NCDs (Beaglehole & Yach, 2003). Those risk factors are no more a specificity of industrialized countries; they are becoming more prevalent in developing nations (Boutayeb & Boutayeb, 2005).

In order to manage the NCDs epidemic in South Asia, major obstacles have been found to impede the progress. These obstacles include sedentary lifestyles, extreme poverty, and inadequate health systems (Ghaffar, Reddy & Singhi, 2004). In sub-Saharan Africa, it is reported that there are inadequate resources to respond the NCDs burden. In

addition, health is a necessary determinant of development as well as the economic growth (Boutayeb & Boutayeb, 2005). Non-communicable diseases attack also the prime productive years of youth and middle age together with long term costs of treatment, these facts cause the negative effects on productivity (Ghaffar et al., 2004; Narayan et al., 2010). The WHO's World health statistics 2008, estimates 100 million people every year is paying health care (WHO, 2008b). The NCDs represent a primordial challenge to economic growth (Narayan et al., 2010). The focus on health and relief of poverty, as a development issue, urgently demand attention and action (Ghaffar et al., 2004).

The greatest potential in treatment of NCDs is in influencing the risk-factors distribution in the population through general lifestyle changes, notably in diet and physical activity (WHO, 2002c). This would support the overall goal of NCDs prevention and control, which is to delay mortality from these diseases to older age groups and to promote healthy ageing of the global population (Strong, Mathers, Leeder & Beaglehole, 2005). Developing-countries' health systems often cannot provide good opportunities for diagnosing and treating the NCDs while the disabilities resulting from these chronic diseases demand longer-term care and services than these health systems are structured to provide (Worley, 2006). The author further stated that management of these countries' health systems needs to pay attention to the management of these chronic diseases of lifestyle.

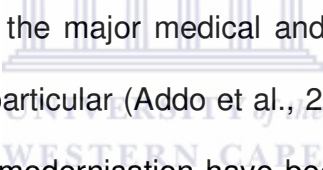
## 2.2.2 Hypertension

Hypertension is one of the primary risk factors for heart disease and stroke, responsible for approximately seven million deaths worldwide. It is identified as the third ranked factor for disability-adjusted life years (WHO, 2002a). According to Ong, Cheung, Man, Lau, and Lam (2007), hypertension is a public health problem affecting more than 65 million adults in the United States and it is an important risk factor for myocardial infarction, stroke, and heart failure. The authors further reported that in 1999-2002, 28.6% of adult Americans were diagnosed with hypertension. Recent analyses have shown that as of the year 2000, there were 972 million people living with hypertension worldwide, and it is estimated that this number will escalate to more than 1.56 billion by the year 2025 (Chockalingam et al., 2006). Table 2.1 illustrated the worldwide prevalence of high blood pressure in 2000 as well as its predicted prevalence for 2025 as reported by Perkovic et al. (2007).

**Table 2.1 Estimated number of individuals age >20 years with blood pressure >140/90 mm Hg in 2000 and predicted number of affected individuals in 2025 (Perkovic et al., 2007)**

Region	Prevalence 2000, Millions	Predicted Prevalence 2025, Millions	Increase, Millions
Established market economies	239.5	309.7	70.2
Latin America and the Caribbean	114.3	200.6	86.3
Former socialist economies	93.1	103.7	10.6
Middle East crescent	73.8	152.6	78.8
China	181.6	299.2	117.6
India	118.2	213.5	95.3
Other Asia and islands	71.4	129.4	58.0
Sub-Saharan Africa	79.8	150.7	70.9
Total	971.7	1559.4	587.7

Nearly two-thirds of individuals with hypertension live in low- and middle-income countries, resulting in a huge economic burden. In these poor regions, CVD, which include raised blood pressure, appears at youth in comparison to high-income nations (Chockalingam et al., 2006). Thus, this results in a life of poor health as well as low economic productivity (Joshi et al., 2008). This creates problems for most individuals and households who have to pay for the utilisation of services and treatment in sub-Saharan Africa (SSA) where resources for healthcare are usually limited (Addo et al., 2007). These studies have shown that the prevalence of hypertension increased with age. Thus, awareness, prevention, treatment and control of hypertension must receive a priority for public health (Chockalingam et al., 2006).



Hypertension is categorised as the major medical and public health problem globally, and in developing countries in particular (Addo et al., 2007). Choudhury and Lip (2005) reported how urbanisation and modernisation have been linked to chronic diseases of lifestyle, such as hypertension. There is a high prevalence of hypertension in urban areas compared with rural areas in SSA and other lower income regions. The high prevalence of hypertension in urban societies compared with rural societies mainly indicates differences in lifestyle. Furthermore, those urban individuals engage in jobs with minimal physical activity and consume high salt and fat intake resulting in high prevalence of obesity (Addo et al., 2007). In addition, it has proven that there is association between increased obesity and increased high blood pressure (Opie & Seedat, 2005). Lifestyle changes especially physical activity relationships to hypertension may need greater attention (Choudhury & Lip, 2005).

There is a high prevalence of hypertension in developing countries including sub-Saharan Africa (Opier & Seedat, 2005). The WHO (2002a) estimates more than 30 million people in Africa suffer from hypertension. The WHO further predicts that by 2020, three quarters of all deaths in Africa will be attributed to hypertension if nothing is done about the current situation (WHO, 2002b). According to the Ministry of Health in Rwanda (2006), 9816 cases of hypertension were consulted at different hospitals and clinics in Kigali city. There is an urgent need to develop strategies to prevent, detect, treat, and control hypertension effectively in the African region (Addo et al., 2007). According to Chockalingam et al. (2006), awareness, prevention, treatment and control of hypertension is a significant public health measure.

## **2.3 MANAGEMENT OF HYPERTENSION**

### **2.3.1 Drug therapy**

There is a wide variety of different types of medications that can be prescribed to manage hypertension with great variability in patients' responsiveness to different types of medications. Frequently, multiple anti-hypertensive drugs are required in combination for control of hypertension and to achieve an optimal blood pressure-reducing effect which can cause dose-dependent side effects (Bronas & Leon, 2009). The different type of antihypertensive drugs include thiazide and potassium-sparing diuretics,  $\beta$ -blockers,  $\alpha$ -blockers, angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor (AR) blockers, calcium channel blockers, centrally acting drugs, and direct-acting vasodilators with the effect to reduce exercise capacity for some medications (Chobanian et al., 2003). People with hypertension may also develop the independent

risk factors for CVD like diabetes or chronic kidney disease. The treatment of these diseases requires the use of other antihypertensive drug classes, considering that blood pressure control is more important (Franco, Oparil & Carretero, 2004).

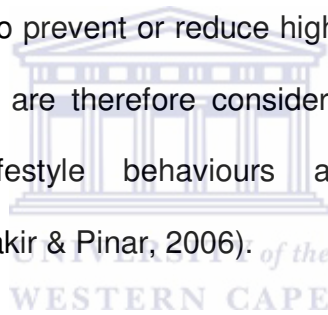
### **2.3.2 Self-efficacy for hypertension**

Self-efficacy is defined as a judgment of one's capability to accomplish a certain level of performance (Rosenstock, Strecher, & Becker, 1988). The theory of self-efficacy proposes that behaviour change and maintenance functions are expectations about the result of one engaging in a behaviour, and outcome expectations about one's ability to engage in or perform the behaviour (Bandura, 2001).

Hypertension is a chronic disease which requires a daily and complete involvement of those affected in its management through adequate regular physical activity. Regular physical activity can prevent the development of hypertension or can help manage normal blood pressure levels for those who are already hypertensive (Chintanadilok & Lewenthal, 2002). Martin et al. (2004) reported that self-efficacy has received more attention for its role in physical activity. Bopp et al. (2006) found that high physical activity self-efficacy correlates with physical activity behaviours in both men and women, and a significant proportion of hypertensives surveyed actually had low self-efficacy regarding physical activity. Therefore, people with hypertension must understand the importance of regular physical activity to control their high blood pressure, and health promotion professionals may help to address the specific barriers that inhibit the adoption and maintenance of physical activity (Stith, 2006).

### **2.3.3 Lifestyle modifications**

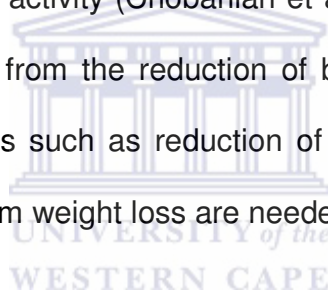
Recent studies have shown that lifestyle modifications lower blood pressure. Furthermore, the lifestyle modification can reduce cardiac risk and enhance the effects of antihypertensive medications. Those lifestyle interventions include regular physical exercise, dietary modification and weight loss, stress management and smoking cessation (Derman et al., 2009). Public health approaches including lowering sodium content or caloric density in the food supply, and providing attractive, safe, and convenient opportunities for exercise are the best ones for reduction of average blood pressure in the community. In addition, a moderation of alcohol consumption is also considered the best approach to prevent or reduce high blood pressure (Whelton et al., 2002a). Lifestyle modifications are therefore considered an important therapy in the development of healthy lifestyle behaviours among of hypertensive and nonhypertensive individuals (Cakir & Pinar, 2006).



It has shown that participation in physical activity helps to reduce risk of all-cause morbidity and mortality (Bassuk & Manson, 2005; Eriksson et al., 2006). Regular, moderate-intensity aerobic exercise training for 30 to 60 minutes, 3 to 5 times per week, can reduce systolic and diastolic BP levels, much more in individuals with hypertension than to those with normal BP levels (Bronas & Leon, 2009). Research shows that exercise training reduces visceral abdominal fat which potentiates blood pressure reduction (Jakicic et al., 2001). A study by Whelton et al. (2002a) has shown that one of lifestyle modifications for primary prevention of hypertension include; to engage in regular aerobic physical activity such as brisk walking. Thus, there is importance of

therapeutic lifestyle changes in the prevention and treatment of hypertension such as increasing exercise or physical activity (Chobanian et al., 2003).

Blumenthal et al., (2000) reported that physical activity combined with weight loss strongly reduces blood pressure levels in patients with hypertension. Various studies have found that there is an association between obesity and hypertension (Appel et al., 2006; Blumenthal et al., 2000; Kaplan, 2004). Various researchers reported recommendations for weight reduction, which is the attainment of a BMI <25 kg/m<sup>2</sup>, as the appropriate approach to prevent and treat hypertension (Appel et al., 2006). Weight loss strategies include physical activity (Chobanian et al., 2003) and dietary (Harsha & Bray, 2008) behaviours. Apart from the reduction of blood pressure, weight loss can lead to other additional benefits such as reduction of risk for CVD and stroke. Thus, strategies for achieving long-term weight loss are needed (Harsha & Bray, 2008).



Both exercise and diet modifications have blood pressure-lowering effects (Roberts & Barnard, 2005). Research by Nugent (2008) reported that currently people consume more fats, animal-based products, sugar, as well as processed foods and less fibre which can lead to overweight and obesity, responsible for chronic diseases. The primary goal with respect to effective diet to manage an individual with hypertension, is to adopt the DASH (Dietary Approaches To Stop Hypertension) eating plan and moderation in alcohol consumption. General recommendations for DASH diet, encourage the consumption of a low saturated fat, cholesterol and total fat intake and emphasise the consumption of fruits, vegetables and fat-free dairy products, including whole grain products, fish, poultry and nuts. Furthermore, the DASH diet is also reduced in lean red



meats, sweets and added sugars, and it focuses on increasing intake of foods in nutrients that are expected to reduce blood pressure, primarily minerals (such as potassium, calcium and magnesium), protein and fibre (Nugent, 2008).

Various studies have found an association between alcohol intake and blood pressure (Renaud et al., 2004; Xin et al., 2001). Nugent (2008) reported that the alcohol-hypertension relationship extends into the light drinking range ( $\leq 2$  drinks per day), the range in which alcohol may lower coronary heart disease risk. Clinical trials reported that decreased consumption of alcohol may lower systolic and diastolic BP by 3.3 and 2.0 mmHg, respectively (Xin et al., 2001). As an effective approach to lower BP, a moderation of alcohol intake should be limited to  $\leq 2$  alcohol drinks per day in most men and  $\leq 1$  alcoholic drink per day in women and lighter-weight persons. Furthermore, 1 drink is defined as 12 oz of regular beer, 5 oz of wine (12% alcohol), and 1.5 oz of 80-proof distilled spirits (Nugent, 2008).

Lifestyle interventions to reduce blood pressure include stress management. Stress reduction increases parasympathetic/vagal control of the heart and reduces sympathetic activation. Moreover, stress management therapies in the management of elevated blood pressure levels, enhance the feeling of well-being, reduce muscular tension, and improve sleep, which indirectly can reduce sympathetic stimulation (Bronas & Leon, 2009). Recent clinical trials reported mean reductions of 0.8 to 5.0 mmHg and +2.4 to -2.8 mmHg in systolic and diastolic blood pressure levels, respectively (Rainforth et al., 2007). Derman et al. (2009) have recommended stress management as initial treatment for mild hypertension.

Lifestyle interventions to reduce blood pressure also include smoking cessation. Smoking causes higher rates of systolic and diastolic blood pressure in both male and female smokers (Al-Safi, 2005). Halperin, Gaziano and Sesso (2008) have reported a risk of developing hypertension for former and current smokers compared to nonsmokers. Rhee, Na, Kim, Lee and Kim (2007) reported that smoking is related to arterial stiffness amongst hypertensive males. The smoking habit increases both cardiovascular and non-cardiovascular morbidity and mortality. Furthermore, healthcare professionals have a critical role to play in advising and assisting smokers to stop smoking (Derman et al., 2009).

## **2.4 PHYSICAL ACTIVITY AND HYPERTENSION**

### **2.4.1 Physical activity in the prevention of hypertension**

Booth, Bauman and Owen (2002) reported that physical activity reduces the risk of cardiovascular diseases. Being physically active improves endothelial function (Baster & Brooks, 2005) in which the endothelium lining of blood vessel walls maintains normal vasomotor tone, enhances fluidity of blood, and regulates vascular growth (Sherman, 2000). Its dysfunction contributes to many diseases such as hypertension (Baster & Brooks, 2005). Endurance exercise is considered to be cornerstone in the prevention and management of hypertension (Pescatello, 2005). An inactive lifestyle and obesity increase the chance of having hypertension. Furthermore, physical activity is recommended as a component of weight management for the primary treatment of obesity (Donnelly et al., 2009). Walking programmes for older adults which are included in their daily routines, may prevent cardiovascular health problems such as

hypertension (Lee, Arthur & Avis, 2007). Therefore, an active lifestyle of physical activity has an important preventive effect and it reduces the risk of developing hypertension (Baster & Brooks, 2005).

Exercise is a lower cost option and also has other significant health benefits than antihypertensive medications. Recent findings indicate that engaging in physical activity is an important approach in the prevention of hypertension. An active lifestyle of physical activity has an important preventive effect as well as reducing the risk of developing hypertension. Regular physical activity such as walking, jogging or cycling can prevent or delay the development of high blood pressure. Aerobic activity is the preferred type of activity to lower blood pressure (Baster & Brooks, 2005). As recommended by the WHO (2002c) and Diehl et al. (2001), participation in physical activity can improve cardiovascular fitness, prevent or delay the development of high blood pressure and reduce symptoms of chronic depression.

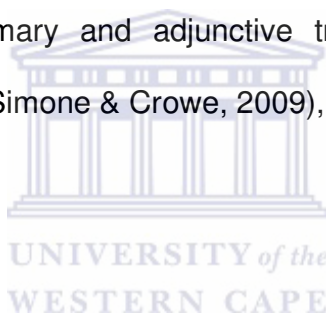
A lack of physical activity is an important risk factor for chronic diseases, and overall is estimated to cause 1.9 million deaths globally (WHO, 2004). Physical inactivity is one of the lifestyles related to the most common metabolic and cardiovascular conditions, namely obesity, type 2 diabetes, metabolic syndrome, hypertension, coronary heart disease, stroke and peripheral arterial disease (Vuori, 2007). Physically active individuals have a lower risk of hypertension associated with weight gain compared with their physically inactive counterparts (Davy & Hall, 2004). Usually, as physical activity increases, body fat mass decreases, which improves the functioning of the nervous,

renal, and cardiovascular systems, and blood pressure is maintained within a normal range (Frost & Topp, 2006). Regular aerobic and resistance exercise reduce systolic and diastolic blood pressure (Whelton et al., 2002b). Individuals should be advised to increase levels of physical activity gradually to minimise risks of developing elevated blood pressure (Kaplan, Gidding, Pickering & Wright, 2005).

#### **2.4.2 Physical activity in the management of hypertension**

Lifestyle modification such as physical activity is the initial step in the management of hypertension. Among older adults with hypertension, a walking intervention was effective in reducing systolic blood pressure (Lee et al., 2007). It has been established by Kelley, Kelley and Vu Tran (2001) that aerobic exercises reduce both systolic and diastolic blood pressure. The authors further reported that lifestyle modification such as regular physical activity should be indicated to all patients with hypertension, regardless of drug therapy, because it may reduce or even abolish the need for antihypertensive drugs. Rhythmical and aerobic exercise such as walking, running, cycling and swimming are considered greatly beneficial for individuals with hypertension (Baster & Brooks, 2005). However, given the many benefits of physical activity as one of the cornerstones of hypertension management, it remains by far the most underused (Marcus et al., 2006). Health care providers should prescribe exercise for individuals with hypertension with the same consideration as prescribing any other effective treatment (Baster & Brooks, 2005). In addition, interventions should be designed effectively to promote the adoption and maintenance of active lifestyle (Marcus et al., 2006).

An isolated exercise session reduces blood pressure by an average of 5-7 mmHg. In addition, exercise may reduce the need for antihypertensive drugs (Baster & Brooks, 2005; Pescatello, 2005). According to Baster and Brooks (2005) the benefits of exercise seems to be equal to the effects of drug treatment and should be vigorously encouraged. They further reported that individuals with hypertension have to participate in physical activity as it has other important health benefits relevant to their CVD risk factors. Physical activity can lower anxiety, decrease tension, relieve stress and influence sleep (Hong & Dimsdale, 2003). It is also able to control adverse lipid profiles, overweight and obesity, and insulin resistance (Briffa et al., 2006). Hence, it is recommended as both a primary and adjunctive treatment option for successful lowering of blood pressure (DeSimone & Crowe, 2009), and for controlling other existing risk factors (Briffa et al., 2006).



The aerobic exercise training (walking, jogging, stationary bicycling, or any combination of these activities) is not the only form of exercise with blood pressure reduction effects (Manfredini et al., 2009). Endurance training is considered effective in lowering the resting BP of 10.5/ 7.6 mmHg for systolic blood pressure and diastolic blood pressure, respectively in average (Kokkinos, Narayan & Papademetriou, 2001). Resistance training showed a systolic blood pressure reduction in women with normotensive and borderline hypertension (Fisher, 2001). However, resistance training needs careful evaluation particularly in some populations with cardiovascular or low aerobic fitness despite its increased mass, safety and effectiveness (Cornelissen & Fagard, 2005).

Resistance training is considered as a complement to aerobic exercises and used to reduce blood pressure (Pescatello et al., 2004).

It is widely accepted that physical inactivity is a risk factor for high blood pressure. Increasing physical activity has been repeatedly associated with a decrease in blood pressure. A systolic blood pressure reduction of 3 mmHg in average populations have been estimated to reduce cardiac morbidity by 5% to 9%, stroke by 8% to 14% and all-cause mortality by 4% (Whelton et al., 2002b). A meta-analysis of randomized controlled trials have shown that the use of resistance training in combination with aerobic exercise in older adults with hypertension shows mean decreasing in systolic and diastolic blood pressure of 5.3 and 3.7 mmHg, respectively (Stewart et al., 2005). However, the indication for exercise must depend on the patient's necessities and capabilities (Kahn et al., 2002). In addition, patients should be advised on exercise-related warning symptoms, such as chest pain or discomfort, abnormal dyspnoea, dizziness or malaise, which would necessitate medical supervision or evaluation (Fagard & Cornelissen, 2007). Adherence to the exercise intervention programme is an essential element for success in achieving and maintaining the maximum benefit of exercise on blood pressure (Whelton et al., 2002b).

## **2.5 BARRIERS TO PHYSICAL ACTIVITY PARTICIPATION IN ADULTS WITH HYPERTENSION**

Non-communicable diseases (NCDs) associated with physical inactivity are of primary importance for public health problems in most countries around the world (WHO, 2010). Literature has revealed possible reasons for the low levels of physical activity such as gender, age, level of education and marital status (Cunha, Peixoto, Jardim & Alexandre, 2008). Globally, most people live in a technologically advanced society, making them more physically inactive (Biddle & Mutrie, 2001).

The WHO (2003) listed the following potential barriers to the general population in physical activity; lack of awareness about benefits, lack of national health, sport, educational and related policies. However, other potential barriers to the population include the following: perception of the value of sport in the society, prevailing local culture, economic and other competing pressures, time constraint, personal motivation, lack of support from family and friends, lack of access to sport facilities and past experiences, and the lack of availability of local physical programmes (WHO, 2003). The WHO (2010) recommends the implementation of the effective public health measures to ameliorate physical activity behaviours in all populations.

Self-efficacy is of greater importance for its role in physical activity (Martin, Dutton, & Brantley, 2004). The theory of self-efficacy proposes that behaviour change and maintenance functions are expectations about the result from one engaging in a behaviour, and outcome expectations about one's ability to engage in or perform the

behaviour (Bandura, 2001). Social environment such as social support from family members is another major element for being physically active (Stahl, Rutten, Nutbeam, & Kanna, 2002). The lack of time for the continuity of physical activity is related to health awareness and health behaviour (Hyman & Pavlik, 2001). Self-efficacy, social environment and time commitment must receive more attention to increase physical activity participation.

Research has found various facilitators and barriers to physical activity to the general population. Health professionals or health care providers have been identified as possible barriers to physical activity participation among patients (Sanchez et al., (2007). Therefore, health care providers' advice and encouragement are essential when dealing with patients or adults with various disease patterns. The present study will aim to identify if barriers experienced by adults within the general population is also experienced by adults with hypertension in Rwanda.

## **2.6 ROLE OF HEALTHCARE PROFESSIONAL'S ENCOURAGING PHYSICAL ACTIVITY**

Prevalence of receiving physical activity advice among persons diagnosed with hypertension seems to be very low. It is reported that healthcare professionals should work with patients to evaluate their needs (Carlson et al., 2009). They further state that healthcare professionals should promote physical activity to all patients with hypertension, especially those who are not physically active. However, the habit of prescribing and regular monitoring are greatly important in maintaining adherence with a



programme of regular physical activity among hypertensive patients (Alsairafi, Alshamali & Al-rashed, 2010). Healthcare providers have to offer all patients suitable counseling (Carlson et al., 2009) or refer some of them if necessary to community physical activity programmes with fitness facilities and health plans for more intensive counselling and participation in appropriate physical activities (Woolf, 2008).

Any prescription physical activity programme should be designed based on inclusion criteria specific to the target patient group. Three primary health objectives can be individualized for hypertensive patients: 1) maintaining blood pressure within a normal range; 2) decreasing body weight to a normal range; and 3) enhancing functional ability. Once a hypertensive individual is deemed eligible for engaging in regular physical activity, individual goals and objectives should be developed to ensure that the patient and clinician understand and are in agreement with the purpose of the programme (Frost & Topp, 2006). However, there are some barriers encountered by healthcare professionals such as time, reimbursement, and perceived ineffectiveness of counselling (Carlson et al., 2009). Moreover, some healthcare professionals mention lack of knowledge about how to advise for physical activity (Ainsworth & Youmans, 2002). Additional education of healthcare professionals and the general public concerning of how to promote physical activity as one of lifestyles, is essential for any national programme aimed at prevention of hypertension (Whelton et al., 2002a). Moreover, exercise for treating hypertension requires endurance training and should be performed at moderate intensity for a minimum of 30 minutes of continuous or accumulated physical activity per day (Pescatello et al., 2004). Baster and Brooks

(2005) have reported guidelines from the American College of Sports Medicine which recommended increased physical activity as a first line intervention for preventing and treating patients with prehypertension (systolic BP 120-139 mmHg and/or diastolic BP 80-89 mmHg). The authors further stated that these guidelines also recommend exercise as a treatment strategy for patients with grade 1 (140-159/80-90 mmHg), or grade 2 (160-179/100-109 mmHg) hypertension as it is described in Table 2.2. During weight training, patients should be instructed that holding their breaths should be avoided because it can result in large fluctuations in blood pressure and increase the potential of passing out or, in some individuals, possibly result in abnormal heart rhythms (Frost & Topp, 2006).



**Table 2.2 How to prescribe exercise to hypertensive patients based on health status and age (Baster & Brooks, 2005)**

Patient category	Column A	Column B	Column C
	.Prehypertensives with no suspected CVD <50 years .Grade 1 hypertensives <50 years	.Prehypertensives with suspected CVD .Prehypertensives >50 years with no suspected CVD .Grade 2 hypertensives with no suspected CVD <50 years	.Hypertensives with no suspected CVD >50 years .Hypertensives with suspected CVD
Exercise testing and monitoring	Not necessary	Recommended	Recommended
Exercise type	Aerobic activities: walking, jogging, cycling, swimming Resistance training for retaining muscle mass  Monitoring not necessary, but suggest they seek advice from a clinical exercise physiologist for a conditioning and aerobic based training programme	Walking, cycling until medically evaluated Send to clinical exercise physiologist for conditioning and aerobic training advice Monitoring probably not necessary unless patient has been sedentary for a number of years and feels uncomfortable about exercise Resistance training for muscle maintenance	Low impact activities such as walking, cycling, swimming Resistance training for muscle maintenance Send to clinical exercise physiologist for monitored conditioning programme Follow aerobic training programme designed by a clinical exercise physiologist. Periodic monitoring may be necessary
Frequency	6-7days/week	5-7days/week	5-7days/week
Intensity	Start with 20-30 minutes continuous aerobic activity at comfortable pace (50-65%) of maximum heart rate for 3-4 weeks for general conditioning Then exercise at up to 85% of maximum heart rate Maintain an endurance based resistance training for muscle maintenance	Work at light-moderate intensity until evaluated and conditioned Then undertake a maintenance aerobic programme at up to 85% of maximum heart rate Maintain an endurance based resistance training for muscle maintenance	Light-moderate. Lower intensity can start with 20-30 mins/day of continuous activity then build to 45-60 mins/day Maintain an endurance based resistance training for muscle maintenance
Duration	Aim for 30-60 mins/day (minimum 150 mins/week of aerobic activity)	Start with 20-30 mins/day of continuous activity. Build to 30-60 mins/day	Start with 20-30 mins/day of continuous activity. Build to 30-60 mins/day (minimum 150 mins/day)
Weight problems	For patients who are overweight, emphasise weight reduction through diet modification. Goal is 60 mins/day of aerobic exercise. Suggest alternating aerobic activity type to avoid injuries. Emphasise endurance resistance training of 3 sets of 12-15 repetitions. Do not make resistance training main exercise. It is important not to hold breath while lifting weights		

## **2.7 PHYSICAL ACTIVITY HEALTH PROMOTION PROGRAMMES**

Physical activity is a major healthy lifestyle modification to adopt for people with raised blood pressure (Chobanian et al., 2003). However, any lifestyle intervention is difficult to adopt as it necessitates time, effort, and persistence from the patient. Furthermore, encouragement from family, friends, and healthcare providers is helpful (Franco et al., 2004). General practitioners should particularly be aware of the benefits of exercise and should assist their patients by motivating them to start and continue an exercise programme (Derman et al., 2009). The challenge to clinicians and policymakers in determining how best to promote appropriate levels of regular physical activity to their clients and the general public, respectively is greatly needed (Bassuk & Manson, 2005).

Apart from reducing blood pressure, being active regularly reduces left ventricular hypertrophy, improves exercise capacity and quality of life (Choudhury & Lip, 2005). Inactive individuals have a 30-50% greater risk than their more physically active counterparts for developing high BP as they age. Some individuals require a cardiac evaluation before commencing exercise. For individuals with hypertension, exercise seems to be quite safe but caution is required for those with suspected CVD. Patients over 50 years of age require to be placed under medical supervision in dedicated rehabilitation centres where they can receive education about exercise, and physiological reactions to exercise. However, dedicated rehabilitation centres are not always available everywhere in many countries unless in major cities (Baster & Brooks, 2005). Exercise programmes might require a preliminary medical evaluation or exercise

tolerance assessment to be safe, effective, and able to meet the patient's necessities and capabilities (Casillas, Gremeaux, Damak, Feki & Pérennou, (2007).

Adherence to physical activity is a major element to achieve and maintain the maximum benefit of exercise. Older people with chronic health problems may be limited in the type and level of physical activity and must be aware of less demanding forms of exercise. It is essential to consider the psychological components, such as confidence, perceived exercise enjoyment and satisfaction in development of physical activity programmes designed for older people (Lee, Arthur & Avis, 2008). Moreover, knowing the physical activity guidelines and its benefits has a positive effect on the increase of adherence to the physical activity (Ferney, Moorhead, Bauman & Brown, 2009). Health promotion can be described as a process of assisting people to increase control over, and to improve their health in order to enhance it (WHO, 1986). Health practitioners: doctors, nurses and other health professionals are key to disease prevention and health promotive actions, and must be won over and actively engaged in actions for health promotion (WHO, 1991). Older adults might encounter a number of psychological factors in adopting and maintaining regular physical activity. Addressing attitudes and beliefs, accessing information of how to commence or perform physical activities safely and effectively may maximise effectiveness of physical activity programmes (Lee et al., 2008).

## **2.8 SUMMARY OF THE CHAPTER**

As the literature review indicates, hypertension is one of the most common NCDs, and is the leading cause of cardiovascular diseases worldwide. There is evidence of the rising incidence and prevalence of NCDs in developing countries. Physical activity plays an important role in both prevention and management of hypertension and it has been regarded as a commonly accepted modality for treating hypertension. However, despite its known benefits, this modality of treatment and prevention of hypertension continues to be under utilised. Being physically inactive is increasing rapidly amongst populations globally. As literature indicates, rapid urbanisation with changes in lifestyle in Africa and other developing countries, increases this risk behaviour. This highlights the urgent need for the implementation of strategies aiming at reducing the impact of hypertension through lifestyle changes in Rwanda. The present study whose aim is to establish the levels of physical activity and factors associated with it among adults with hypertension, hopes to provide useful information that would help in the implementation of such strategies. The medical team has to work hand in hand for a better management of hypertension through the implementation of appropriate physical activities and exercise programmes.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 INTRODUCTION**

This chapter details the methods used in conducting the present study. A clear description of the research setting, as well as the study design, the study population and the sampling technique is given. The chapter also describes the pilot study, the data collection procedures, and the methods used in the data analysis. Finally, the issues of ethical considerations regarding the study are also reported.

#### **3.2 RESEARCH SETTING**

Rwanda is a landlocked country situated in eastern-central Africa, bordered by Uganda to the north, Tanzania to the east, Burundi to the south and the Democratic Republic of Congo to the west. It covers an area of 26338 square kilometers with a total population of 10.2 million people (Rwandan Ministry of Local Government, 2010). The study was conducted at the two biggest health care facilities in Kigali, the capital city of the Republic of Rwanda namely “Polyclinic La Médicale” and “Polyclinic du Carrefour”. These clinics provide 24-hour care for all kinds of diseases but are the only facilities with specialists available for the management of individuals with hypertension. Furthermore, patients with hypertension are provided with preventive, treatment and rehabilitation care. A team comprised of cardiologists in collaboration with nurses, general practitioners and laboratory analyst work together to ensure the care of people

with hypertension. In addition the clinics receive the biggest number of hypertension patients for treatment and follow up care from both urban and rural areas of the country.

### 3.3 STUDY DESIGN

A descriptive quantitative, cross-sectional study was conducted to describe the levels of physical activity and its association with socio-demographic and health related factors among adults with hypertension in Rwanda. According to Babbie (2004), a cross-sectional study attempts to involve observations of a sample, of a population or phenomenon that are made at one point in time.

### 3.4 STUDY POPULATION AND SAMPLE

The population of the study included all adult hypertension patients aged 18 years and above who receive treatment and follow up care at clinics mentioned above. Both males and females who voluntarily agreed to participate in the study were eligible. Approximately 750 adults aged 18 years and above attended the two clinics on a monthly basis. Approximately 400 adults with hypertension attended Polyclinic La Medicale and 350 adults with hypertension attended Polyclinic du Carrefour. To determine the sample size, the formula suggested by Yamane (Israel, 1992) was used:

$$n = \frac{N}{1 + N(e)^2}$$

where **n** is the sample, **N** the population and **e** is a constant, equal to 0.05.

By using the above formula, 260 participants should be included in the study.



Patients with uncontrolled blood pressure and those with physical impairments or any other impairment that may represent limitations to perform a physical activity such as severe vision, mental impairments were excluded from the study.

A systematic random sampling technique was used to ensure the equal chance of selection among participants. Participants were randomly selected by considering every 2nd patient who was coming for treatment or follow up care at the two clinics. Of the 260 participants, eight were excluded because of they were unable to perform physical activity due to physical impairments and a final number of 252 adults with hypertension of which 142 (56.3) were female and 110 (43.7) were male, voluntarily agreed to participate in the study.

Furthermore, all health professionals such as cardiologists, general practitioners and nurses who were directly involved with the management of people with hypertension were approached to participate in the study. Polyclinic La Médicale had 3 cardiologists, 16 general practitioners and 28 nurses while Polyclinic du Carrefour had 2 cardiologists, 14 general practitioners and 24 nurses dealing with hypertensive individuals. The total number of health professionals was 87, and all participated in the study.

### **3.5 DATA COLLECTION**

#### **3.5.1 Instruments**

To meet the first 3 objectives of the study, data collection comprised of a self-administered questionnaire with a number of closed-ended questions. The questionnaire comprised four sections (Appendix O).

**Section A:** This section assessed the socio-demographic and health-related characteristics of participants and was composed of 13 items. These items include age, gender, marital status, level of education, residential area, history of tobacco and alcohol use and diabetes, height and weight measurements, BMI, and perceived health status. In this section, the blood pressure readings were also included. These were the readings recorded by the trained nursing practitioner prior to administration of the questionnaire. Participants' perception of their health status was measured by a single item: "How would you rate your overall health at the present time?" To this question, the respondents were asked to rate their health as poor, fair, good or as very good.

**Section B:** This section measured the participants' self-efficacy for hypertension. Subscales from the Chronic Disease Self-efficacy Scales (Lorig et al., 1996) were used. This section aimed at identifying how confident respondents were in dealing with hypertension in their daily activities. This section consisted of 23 questions which participants were requested to score. The scores ranged from 1 (as not confident at all) to 10 (as totally confident).

**Section C:** The section measured the levels of physical activity participation by use of the Godin Leisure-Time Exercise Questionnaire (Godin & Shephard, 1985). This section consisted of 1 question by which participants were requested to respond. Participants were asked to respond to, how many times on average per week, they participated in some form of exercises, for more than 15 minutes. Those exercises included strenuous, moderate and mild exercises.

**Section D:** The section assessed the barriers and facilitators of physical activity participation. This section consisted of 32 possible barriers and 23 possible facilitators. Participants were asked to select responses that most closely reflected their perceptions of what decreases (barriers) and increases (facilitators) their willingness to engage in physical activity.

To address the 4<sup>th</sup> objective of the study, a self-administered questionnaire (Appendix P) was administered to the health professionals dealing with hypertensive individuals at the two clinics. The Physical Activity Exit Interview (PAEI) instrument consisted of 12 yes/no questions covering the main content that health care providers may discuss pertaining to physical activity (Sciamanna, Goldstein, Marcus, Lawrence & Pinto, 2004). The questionnaire is a yes/no response format, with the scores ranging from 0 to 12 where a score of 0 to 4 reflected a poor quality of physical activity counselling content, 5 to 8 a moderate quality content and 9 to 12 a high quality content of physical activity counselling.

### **3.5.2 Validity and reliability**

The items included in the above questionnaires have been used in prior research and have demonstrated good reliability and validity. Perceptions of health status were measured with a single item: "How would you rate your overall health at the present time?" This item's reliability and validity has been supported by Idler and Benyamini (1997). The self-efficacy for hypertension was established by using items from the Chronic Disease Self-efficacy Scales. Each of the sub-scales included has been

developed and tested for reliability. Test-retest reliability of these sub-scales has been established and range from 0.77 to 0.91 (Lorig et al., 1996). The test-retest reliability of the Godin Leisure-Time Exercise Questionnaire (GLTEQ) which was used to measure participants' current levels of physical activity, has been established and range from 0.50 to 0.95 (Godin & Shephard, 1985). The Barriers and Motivators Questionnaire which was used to assess the barriers and motivators of physical activity participation was reported by Goodman and Ballou (2004) to show high internal reliability (barriers:  $\alpha = .88$ ; motivators:  $\alpha = .90$ ). The Physical Activity Exit Interview (PAEI) was tested for validity as a scale for establishing the content of physical activity counselling. This was done among 43 medical practitioners and their test supports the validity of the PAEI as a measure of the content of physical activity counselling practice in a hospital setting (Sciamanna et al., 2004). Blood pressure readings were taken after the participants had been seated for at least 15 minutes. A qualified registered nurse was involved and used a sphygmomanometer and stethoscope to measure the blood pressure of the participants. Two measurements of blood pressure were taken with the mean of these two measurements recorded.

One common language, Kinyarwanda, is used by the majority of Rwandan people as the national language. The questionnaire for adults with hypertension was therefore translated from English to Kinyarwanda (Appendix R) by a professional translator. To ensure the validity of the instrument, the Kinyarwanda questionnaire was then retranslated into English by an independent translator to see if that version was similar to the original English version of the questionnaire. The questionnaire for health

professionals was retranslated from English to French (Appendix S), the language used by healthcare professionals. The second version has shown to be similar to the original English version of the questionnaires.

A pilot study was conducted at two clinics on 18 individuals with hypertension and 5 health professionals who were not included in the study. During the pilot study, questionnaires were distributed to the participants individually and explanations regarding how to fill them in were provided. Participants were allowed to contact the researcher to clarify any questions and were told to take their time while filling the questionnaire. The aim of this pilot study was to test the understanding and clarity of the questionnaires and to determine how long it would take to complete them. The result of the pilot study indicated that the questionnaires were clear and understandable. Health professionals reported that it took approximately 4 minutes to complete the questionnaire while people with hypertension reported that it took approximately 45 minutes to complete the questionnaire, including the time taken to complete measurements of height, weight, body mass index and blood pressure.

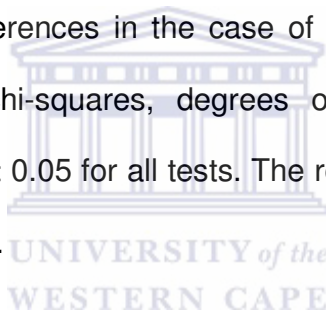
### **3.5.3. Procedure**

Permission and ethical clearance were first requested and obtained from the Senate Research Grant and Study Leave committee at the University of the Western Cape (UWC). Permission was also obtained from the National Ethics Committee of the Ministry of Health, Rwanda. Furthermore, authorization to conduct the study at Polyclinic La Médicale and Polyclinic du Carrefour was sought from directors of those

two clinics. Prior to data collection, a meeting was organized with the medical team to discuss the purpose of the study, the sampling techniques to be used as well as the inclusion and exclusion criteria to be taken into consideration. The purpose of the meeting was to get a clear and common understanding of the data collection process. A registered nursing practitioner was trained as a research assistant. The purpose of this training was to explain her role in the study, the aim of the study, and its ethical issues. Hypertensive patients were randomly selected. Every second patient who came for treatment or follow-up care at the two clinics was approached to participate in the study. The information letter as well as the consent letter was then given to both patients and health professionals prior to the distribution of the questionnaires, and participants were requested to return the signed consent form. In addition, measurements of blood pressure, height and weight of the patients were taken by the trained nursing practitioner before the patients completed the questionnaire. Blood pressure readings were taken after the participants had been seated for 15 minutes, the mean of two readings obtained were then recorded. A sphygmomanometer and stethoscope were used to measure the blood pressure of the participants. A tape measure was used to measure height to the nearest 0.1 cm. The hypertensive patients were requested to stand on a paper while the shoes were out in a straight position close to the wall and the line at the level of the head was selected for measurements. A digital scale was used to measure weight in light clothes to the nearest 0.05 kg. The Body Mass Index (BMI) was calculated from height and weight measurements. Data collection was done over a period of six weeks.

### **3.6. DATA ANALYSIS**

Statistical Package for Social Sciences (SPSS) version 19.0 was used to analyze the data. Descriptive statistics were employed to summarize the levels of physical activity participation and the socio-demographic characteristics as well as the health related factors. Categorical data was expressed as frequencies and percentages, means and standard deviations were used for continuous data. Furthermore, cross-tabulations were used to determine the association between socio-demographic, health-related factors and physical activity levels among adults with hypertension. For categorical data, Chi-square tests were carried out to test for any significant differences. Student t-tests were used to test for significant differences in the case of continuous variables. Inferential statistics were reported as chi-squares, degrees of freedom and P-values. The significance level was set at  $p < 0.05$  for all tests. The results were presented by means of tables, pie charts and graphs.



### **3.7. ETHICAL CONSIDERATIONS**

Permission to conduct this study was obtained from the Senate Research Grants and Leave Committee at the University of the Western Cape (Appendix A), the National Ethics Committee of Ministry of Health in Rwanda (Appendix B), the Director of Polyclinic La Médicale (Appendix C), and the Director of Polyclinic du Carrefour (Appendix D). The researcher included a clear explanation of the study and its objectives in the permission letters (Appendix E, F & G). Prior to the completion of the questionnaires, written information sheets [in Kinyarwanda (Appendix J) for adults with hypertension and in French (Appendix K) for health professionals] on the study and its

aim as well as a consent letter was given to each participant. Those who were willing to participate in the study were asked to mark their approval by signing and returning a consent form [in Kinyarwanda (Appendix M) for adults with hypertension, and in French (Appendix N) for health professionals] to the researcher. Participation was voluntary and any member of the group was at liberty to withdraw from the study at any time. Participants were assured of strict confidentiality of information provided, and individual anonymity was assured by completing questionnaires without names. The researcher will make the research findings available to the participants, staff of the clinics as well as the Ministry of Health.

### **3.8 SUMMARY**

In this chapter, the method used in the study, sampling procedures and explanation of the instruments used were outlined. A brief explanation of the data analysis procedure was given. The results of the analysis were tabulated and are presented in Chapter four.



## CHAPTER FOUR

### RESULTS

#### 4.1 INTRODUCTION

In this chapter the results are divided into **Section A**, describing results from adults with hypertension, and **Section B**, describing results from health professionals. The chapter contains the results of the statistical analysis that attempts to answer the objectives and overall aim of this study stated in chapter one.

#### 4.2 Section A: ADULTS WITH HYPERTENSION

##### 4.2.1 DESCRIPTION OF THE STUDY SAMPLE

Out of 260 participants with hypertension approached to participate in the study, 96.9% (n=252) agreed to participate in the study. The participants' age ranges from 18 to 80 years, with the mean age of the study being 49.75 years (SD=13.66) as illustrated in the table 4.1.

**Table 4.1 Mean age, height and weight of the study sample (n=252)**

<b>Variable</b>	<b>Mean</b>	<b>SD</b>
Age	49.75 years	13.66
Height	1.71 meter	0.08
Weight	77.29 kilograms	2.73
BMI	26.14 kg/m <sup>2</sup>	3.50

Furthermore, of the 252 respondents, 43.7% (n=110) were males and 56.3% (n=142) were females. The study samples' demographic characteristics are outlined in the table 4.2.

**Table 4.2 Socio-demographic and health-related characteristics of participants (n=252)**

<b>Variable</b>	<b>Characteristics</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Gender</b>	Male	110	43.7
	Female	142	56.3
<b>Marital status:</b>	Single	41	16.3
	Widowed	48	19.0
	Divorced	7	2.8
	Separated	6	2.4
	Married	150	59.5
<b>Education levels:</b>	Never went to school	22	8.7
	Primary school	74	29.4
	Secondary (1-3)	63	25.0
	Secondary (4-6)	39	15.5
	Tertiary education	54	21.4
<b>Residence:</b>	Urban	244	96.8
	Rural	8	3.2
<b>Tobacco use:</b>	Never used	207	82.2
	Past user	28	11.1
	Current user	17	6.7
<b>Alcohol use:</b>	Never used	100	39.7
	Past user	90	35.7
	Current user	62	24.6
<b>Diabetes mellitus:</b>	Yes	57	22.6
	No	195	77.4

The body Mass Index (BMI) was calculated from measured height and weight for the participants in the study. The sample was divided into four categories according to their BMI, i.e. underweight (<18.5), normal (18.5-24.9), overweight (25-29.9) and obese (>30). The mean BMI for the study sample was 26.14 kg/m<sup>2</sup> (SD=3.5) as is illustrated in

table 4.1. The majority of males (55.45%, n=61) had a normal weight, whereas the majority of females were either overweight or obese (69.1%, n=98) as illustrated in table 4.3. Furthermore, the BMI has shown to have a significant association with the gender ( $\chi^2= 25.983$ ,  $DF=3$ ,  $p=0.000<0.01$ ).

**Table 4.3 BMI categories and blood pressure in relation to gender**

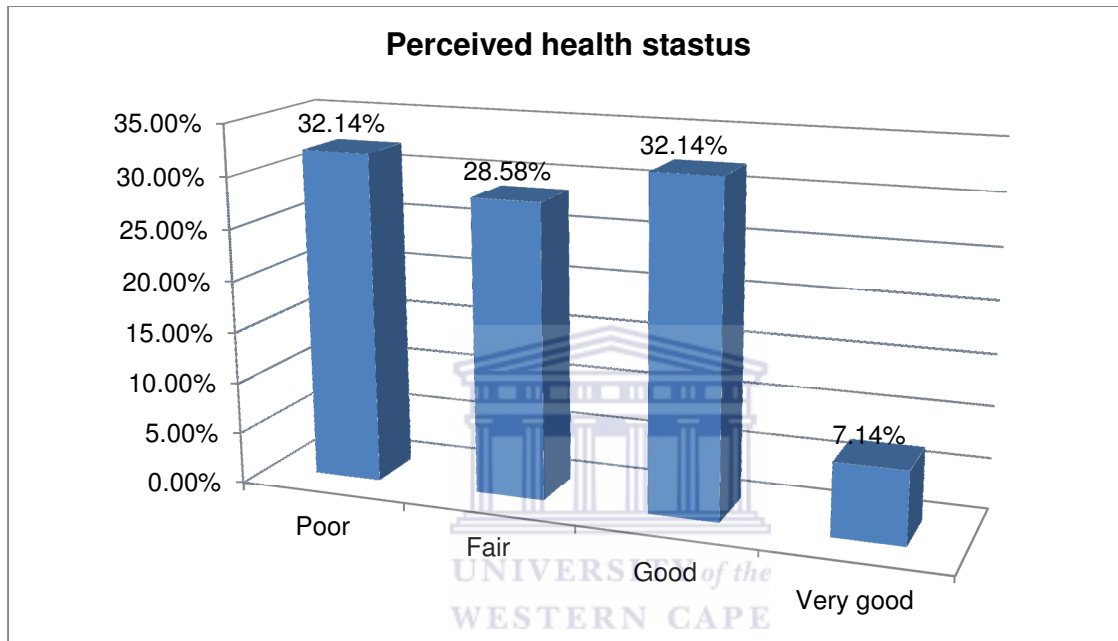
<b>Variable</b>	<b>Male Frequency, (%)</b>	<b>Female Frequency, (%)</b>	<b>Total Frequency,(%)</b>
<b>BMI categories*</b>			
Underweight	5 (4.55)	7 (4.93)	12 (4.76)
Normal weight	61 (55.45)	37 (26.06)	98 (38.89)
Overweight	31 (28.18)	53 (37.32)	84 (33.33)
Obese	13 (11.82)	45 (31.69)	58 (23.02)
<b>Total</b>	<b>110 (100)</b>	<b>142 (100)</b>	<b>252 (100)</b>
<b>Blood pressure (BP)</b>			
Systolic BP	137.31 (10.20)	134.95 (10.31)	135.98 (10.30)
Diastolic BP	86.55 (8.83)	84.65 (9.04)	85.47 (8.98)

\***Significant ( $p < 0.01$ )** based on the chi-square test ( $\chi^2$ ).

The mean blood pressure for the study sample was 135.98 mmHg (SD= 10.30) for systolic and 85.47 mmHg (SD= 8.98) for diastolic blood pressure as illustrated in table 4.3. Table 4.3 illustrates also the mean blood pressure in relation to males and females. Student's t test was conducted to analyse the association of the blood pressure in relation to gender. Gender was not related to systolic and diastolic blood pressures with p-values of  $p = 0.071$  and  $p = 0.095$ , respectively.

#### 4.2.2 PERCEIVED HEALTH STATUS OF STUDY SAMPLE

Participants were asked to rate their health as being poor, fair, good or very good. They reported to have a poor (32.14%, n=81), a fair (28.58%, n=72), a good (32.14%, n=81) and very good health status (7.14%, n=18) as illustrated in the figure 4.1.



**Figure 4.1 Participants' perceived health status (n=252)**

#### 4.2.3 PARTICIPANTS' SELF- EFFICACY FOR HYPERTENSION

Participants were requested to score their level of confidence in dealing with various activities of daily living with regard to hypertension. The scores range from 1 (as not confident at all) to 10 (as totally confident). Table 4.4 illustrates the participants' mean scores of self-efficacy for hypertension.

**Table 4.4 Mean scores of self-efficacy for hypertension (n=252).**

<b>Sub-scales</b>	<b>No of items</b>	<b>Mean</b>	<b>SD</b>
Get information on disease	1	4.51	1.30
Obtain help from community, family, friends	4	4.57	1.02
Communication with physician	3	4.43	1.03
Manage disease in general	5	4.57	0.97
Do chores	3	4.54	1.15
Do social/recreational activity	2	4.46	1.08
Manage symptoms	4	4.59	1.03

#### 4.2.4 LEVELS OF PARTICIPATION IN PHYSICAL ACTIVITY

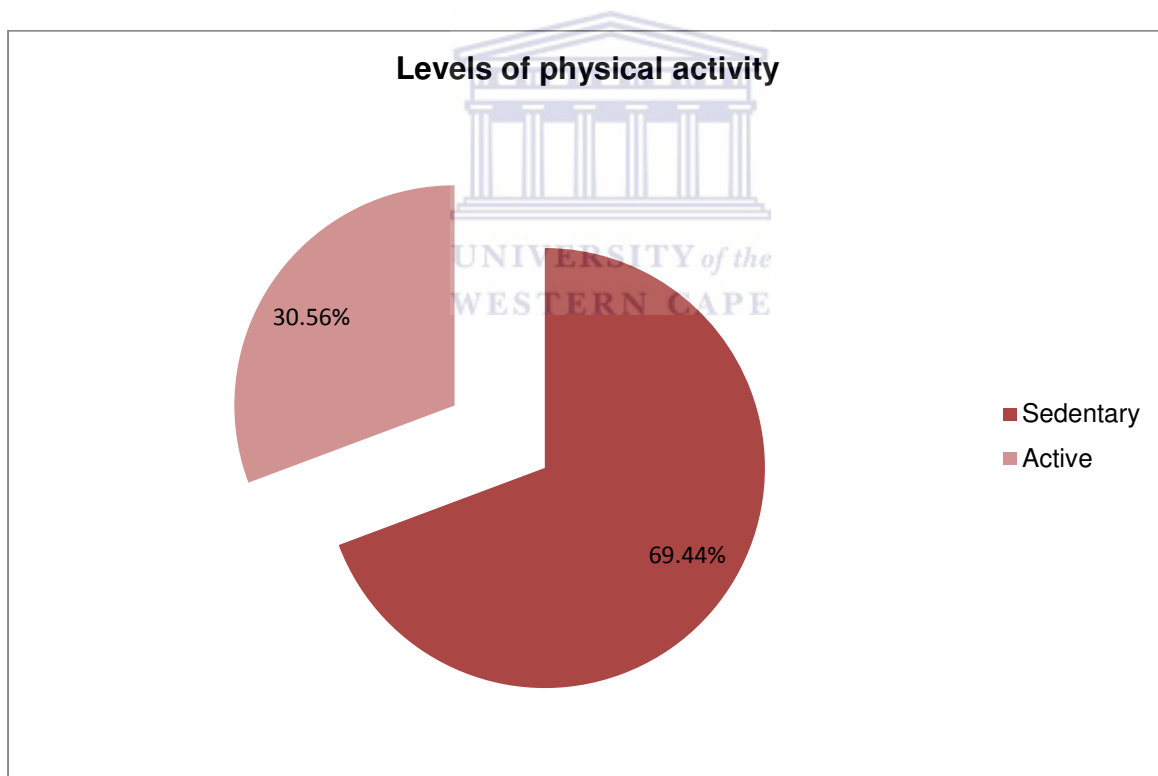
Leisure-time exercise was assessed using the question from Godin Leisure-Time Exercise Questionnaire (GLTEQ). The question assessed the frequency of periods of strenuous, moderate, and light exercise more than 15 minutes over a 7-day period, and an overall total physical activity MET-minutes per week score were calculated. Weekly frequencies of strenuous, moderate, and mild activities are multiplied by nine, five, and three METs, respectively (Godin & Shephard, 1985). Table 4.6 indicates mean MET-minutes per week in physical activity categories such as strenuous, moderate and light physical activity.

**Table 4.5 Mean MET-minutes per week (n=252)**

<b>Variable</b>	<b>Mean</b>	<b>SD</b>
<b>Physical activity (PA) categories</b>		
Strenuous PA	4.89	8.16
Moderate PA	11.31	8.83
Light PA	10.94	8.91
<b>Total PA score</b>	<b>27.14</b>	<b>14.81</b>
<b>Gender</b>		
Male	27.45	14.82
Female	26.92	14.85

The total mean score in MET-minutes per week was highest for males than females, and the MET accumulated in a week was 27.14 (SD=14.81) as illustrated in table 4.5.

Participants were categorized into sufficiently active or sedentary based on accumulated METs per week. Males had to accumulate at least 38 METs per week or females at least 35 METs per week (Elos'a et al., 2000; Jacobs, Ainsworth, Hartman & Leon, 1993; Paffenbarger, Wing & Hyde, 1978). Based on the above criteria, (69.44%, n=175) and (30.56%, N=77) of the total sample was categorized as sedentary and active respectively, as illustrated in figure 4.2.



**Figure 4.2 Physical activity levels of the study sample (n=252)**

## 4.2.5 FACTORS ASSOCIATED WITH PARTICIPATION IN PHYSICAL ACTIVITY

The association between different socio-demographic, health-related factors and the levels of physical activity are summarized in tables 4.6, 4.7 and 4.8.

### 4.2.5.1 Socio-demographic characteristics factors

Cross tabulation was done and the test statistic Chi-square ( $\chi^2$ ) and Student's t were done between the socio-demographic characteristics and the level of physical activities.

Table 4.6 indicates the socio-demographic factors with levels of physical activity.

**Table 4.6 Socio-demographic factors with levels of physical activity (n= 252)**

Variable	Characteristics	Sedentary Frequency, (%)	Active Frequency, (%)
Mean age**		52.73	42.99
Gender	Male	83 (47.43)	27 (35.06)
	Female	92 (52.57)	50 (64.94)
Marital status*	Not married	60 (34.29)	42 (54.55)
	Married	115 (65.71)	35 (45.45)
Education levels*	Never went to school	10 (5.72)	12 (15.58)
	Primary school	43 (24.57)	31 (40.26)
	Secondary school	77 (44.00)	25 (32.47)
	Tertiary education	45 (25.71)	9 (11.69)
Residence*	Urban	171 (97.71)	68 (88.31)
	Rural	4 (2.29)	9 (11.69)

\*Significant ( $p < 0.01$ ) based on the chi-square test.

\*\*Significant ( $p < 0.01$ ) based on the Student's t test.

Most of the socio-demographic characteristics were significantly associated with the levels of physical activity. However, gender was not related to levels of physical activity:

#### **4.2.5.1.1 Age**

The association between participants' mean age and the patterns of physical activity indicated that participants categorized as active had a statistically significant lower mean age (42.99 years) than those categorized as inactive (52.73 years), ( $p=0.000<0.01$ ) according to results of the Student's t test.

#### **4.2.5.1.2 Gender**

A higher prevalence of females (64.94%,  $n=50$ ) than males (35.06%,  $n=27$ ) were considered to be physically active. The association between gender and physical activity levels was not significant ( $p=0.068>0.05$ ).

#### **4.2.5.1.3 Marital status**

A significantly higher prevalence of participants that were not married (54.55%,  $n=42$ ) were considered physically active than those that were married (45.45%,  $n=35$ ), and the marital status was significantly associated with levels of physical activity ( $\chi^2=9.110$ ,  $DF=1$ ,  $p=0.003<0.01$ ).

#### **4.2.5.1.4 Level of education**

The level of education was significantly associated with the levels of physical activity ( $\chi^2= 19.592$ ,  $DF=4$ ,  $p=0.001<0.01$ ). A significantly higher prevalence of participants with primary school level of education were found to be active (40.26%,  $n=31$ ), in comparison to those who reached the tertiary level of education (11.69%,  $n=9$ ).

#### **4.2.5.1.5 Residence**

A higher prevalence of participants from urban (88.31%,  $n=68$ ) than participants from rural (11.69%,  $n=9$ ) were considered to be physically active. The association between residence and physical activity levels was significant ( $\chi^2=3.973$ ,  $DF=1$ ,  $p=0.002<0.01$ ).



#### 4.2.5.2 Health-related factors

Cross tabulation was done and the test statistic Chi-Square ( $\chi^2$ ), Student's t and Wilcoxon Rank Sum were done between the health-related factors and the level of physical activities. Tables 4.7 and 4.8 indicate the health-related factors with levels of physical activity.

**Table 4.7 Health-related factors with levels of physical activity (n= 252)**

Variable	Characteristics	Sedentary Frequency, (%)	Active Frequency, (%)
<b>Tobacco use</b>			
	Past user*		
	Yes	27 (15.43)	1 (1.30)
	No	148 (84.57)	76 (98.70)
	Current user*		
	Yes	17 (9.71)	0 (0.00)
	No	158 (90.29)	77 (100)
<b>Alcohol use</b>			
	Past user		
	Yes	68 (38.86)	22 (28.57)
	No	107 (61.14)	55 (71.43)
	Current user*		
	Yes	51 (29.14)	11 (14.29)
	No	124 (70.86)	66 (85.71)
<b>Diabetes mellitus*</b>			
	Yes	53 (30.29)	4 (5.19)
	No	122 (69.71)	73 (94.81)
<b>BMI categories*</b>			
	Underweight	4 (2.29)	8 (10.39)
	Normal weight	48 (27.43)	50 (64.93)
	Overweight or obese	123 (70.28)	19 (24.68)
<b>Perceived health status*</b>			
	Poor	80 (45.71)	1 (1.30)
	Fair	67 (38.29)	5 (6.49)
	Good or very good	28 (16.00)	71 (92.21)

\*Significant ( $p < 0.01$ ) based on the chi-square test.

\*Significant ( $p < 0.05$ ) based on the chi-square test.

**Table 4.8 Self-efficacy, blood pressure with levels of physical activity (n= 252)**

<b>Variable</b>	<b>Sedentary Mean, (SD)</b>	<b>Active Mean, (SD)</b>
<b>Self-efficacy</b>		
Get information on disease***	4.19 (1.23)	5.23 (1.17)
Obtain help from community, family, friends***	4.28 (0.84)	5.22 (1.11)
Communication with physician***	4.27 (0.95)	4.80 (1.12)
Manage disease in general***	4.36 (0.89)	5.03 (0.99)
Do chores***	4.28 (1.06)	5.13 (1.14)
Do social/recreational activities***	4.29 (1.01)	4.86 (1.14)
Manage symptoms***	4.35 (0.94)	5.13 (1.01)
<b>Blood pressure (BP)</b>		
Systolic BP**	138.41 (10.26)	130.45 (8.08)
Diastolic BP**	87.53 (8.91)	80.82 (7.27)

\*\*\*Significant ( $p < 0.01$ ) based on the Wilcoxon Rank Sum test

\*\*Significant ( $p < 0.01$ ) based on the Student's t test.

Most of health-related factors were significantly associated with the levels of physical activity:

#### **4.2.5.2.1 Tobacco use**

A high prevalence of participants who were either non past users (98.70%, n=76) or non current users (100%, n=77), were found to be active than those reported to be smokers. The association of past and current users with levels of physical activity ( $\chi^2 = 10.809$ ,  $DF=1$ ,  $p=0.001 < 0.01$ ) and ( $\chi^2 = 8.021$ ,  $DF=1$ ,  $p=0.004 < 0.01$ ) respectively, was significant.

#### **4.2.5.2.2 Alcohol use**

A high prevalence of participants who were either non past users (71.43%, n=55) or non current users (85.71%, n=66), were found to be active than those reported to be drinkers. Only the association of current users with levels of physical activity ( $\chi^2 = 6.362$ ,  $DF=1$ ,  $p=0.011 < 0.05$ ) was significant. The past users were not related to physical activity levels ( $\chi^2 = 2.464$ ,  $DF=1$ ,  $p=0.116 > 0.05$ ).

#### **4.2.5.2.3 Diabetes mellitus**

The diabetes mellitus was significantly associated with the levels of physical activity ( $\chi^2= 19.233$ ,  $DF=1$ ,  $p=0.000<0.01$ ). A significantly higher prevalence of participants who were never diagnosed with diabetes mellitus were found to be active (94.81%,  $n=73$ ), in comparison to those who were diagnosed with diabetes mellitus (5.19%,  $n=4$ ).

#### **4.2.5.2.4 Body Mass Index (BMI)**

A higher prevalence of participants who were classified as normal weight (64.93%,  $n=50$ ) were considered physically active than those classified as overweight or obese (24.68%,  $n=19$ ). The association between physical activity levels and BMI was statistically significant ( $\chi^2= 46.458$ ,  $DF=2$ ,  $p=0.000<0.01$ ).

#### **4.2.5.2.5 Perceived health status**

A higher prevalence of participants who reported their health status as being good or very good (92.21%,  $n=71$ ) were classified more active than those who perceived their health as poor (1.30%,  $n=1$ ) or fair (6.49%,  $n=5$ ). There is statistic association of the participants' perceived health status and the levels of physical activity ( $\chi^2= 136.138$ ,  $DF=3$ ,  $p=0.000<0.01$ ).

#### **4.2.5.2.6 Self-efficacy for hypertension**

The entire self-efficacy domains and the levels of physical activity indicated that participants categorized as active had a statistically significant greater mean than those categorized sedentary. Based on the Wilcoxon Rank Sum test, there is a statistically significant difference between the entire self-efficacy domain scores and levels of physical activity ( $p=0.000<0.01$ ).

#### **4.2.5.2.7 Blood pressure**

The association between participants' mean blood pressure and the patterns of physical activity indicated that participants categorized as active had a statistically significant lower mean blood pressure of systolic and diastolic of 130.45 and 80.82 mmHg respectively, than those categorized as inactive with 138.41 and 87.53 mmHg respectively, ( $p=0.000<0.01$ ) according to results of the Student's t test.

### **4.2.6 BARRIERS AND FACILITATORS TO PHYSICAL ACTIVITY PARTICIPATION**

#### **4.2.6.1 Barriers to physical activity participation.**

Barriers to physical activity participation were examined for the study sample. The important barrier reported by more than half of the participants (55.6%) was "lack of motivation" (Table 4.9). Other major barriers identified were "health conditions" (47.2%) and "lack of knowledge of the benefits of exercise" (33.3%). Adults with hypertension also reported that "lack of time" (28.6%), "self-conscious about appearance while exercising" (19.4%), and "limited financial resources" (16.3%) decreased their willingness to engage in physical activity. The least identified barriers were "no place to sit down while exercising outside" (0.0%) "kidney disease" (0.0)

#### **4.2.6.2 Facilitators to physical activity participation.**

Facilitators to physical activity participation were examined for the study sample. Table 4.10 illustrates an equal percentage of participants reported: "wanting to feel better" (46.0%) and "wanting to manage weight" (46.0%). The health benefits such as "feeling healthy" (17.9%), "wanting enhanced physical mobility" (13.5%), and "wanting increase strength" (12.7%) were also selected as facilitators by individuals with hypertension.

“Encouragement from healthcare providers” (1.2%), “having financial resources” (1.2%), and “high expectations from healthcare providers” (0.4%) were the least reported facilitators to physical activity.

<b>Table 4.9 Barriers to PA participation (n=252)</b>		<b>Table 4.10 Facilitators to PA participation (n=252)</b>	
<b>Barriers</b>	<b>%</b>	<b>Facilitators</b>	<b>%</b>
Lack of motivation	55.6	Wanting to feel better	46.0
Health conditions	47.2	Wanting to manage weight	46.0
Lack of knowledge of benefits of exercise	33.3	Feeling healthy	17.9
Lack of time	28.6	Wanting enhanced physical mobility	13.5
Self-conscious about appearance	19.4	Wanting increase strength	12.7
Limited financial resource	16.3	Wanting to decrease pain	11.5
Preferring to spend time doing other things	16.3	Belief in one’s ability to be physically active	10.5
Being too fatigued	8.3	Wanting to improve health	9.9
Doctors advice not to exercise	8.3	Having less pain	7.1
Low expectations by self to exercise	8.3	Wanting increased energy	5.6
Not wanting to become more fatigued	8.3	Wanting to decrease anxiety	5.6
Lack of interest	7.9	Encouragement from family or friends	4.8
Fear of increase of pain	7.1	Exercising with others	4.8
Lack of encouragement to exercise	7.1	High expectations from family or friends	4.8
Shortness of breath	5.6	Enjoying how exercise feels	4.0
Low expectations from healthcare providers	3.2	Wanting to decrease pain	4.0
Anxiety	2.8	Wanting to decrease depression	4.0
Poor sidewalks	2.8	Having a supportive exercise leader	3.2
Fear of falling	2.4	Knowing the value of increased exercise	3.2
Fear of injury	2.4	Attending exercise classes	2.8
Physically demanding job	2.4	Encouragement from healthcare providers	1.2
Concerns exercise will make you too thirsty	2.0	Having financial resources	1.2
Low expectations from family or friends	2.0	High expectations from healthcare providers	0.4
Fear of crime during outside activity	1.6		
Lack of support from family and friends	1.6		
Not having access to exercise facilities	1.6		
Fear of making health worse	1.2		
Bad weather	1.2		
Depression	1.2		
Unpleasant sensation associated with activity	1.2		
Kidney disease	0.0		
No place to sit down while exercising outside	0.0		

### 4.3 Section B: HEALTHCARE PROFESSIONALS

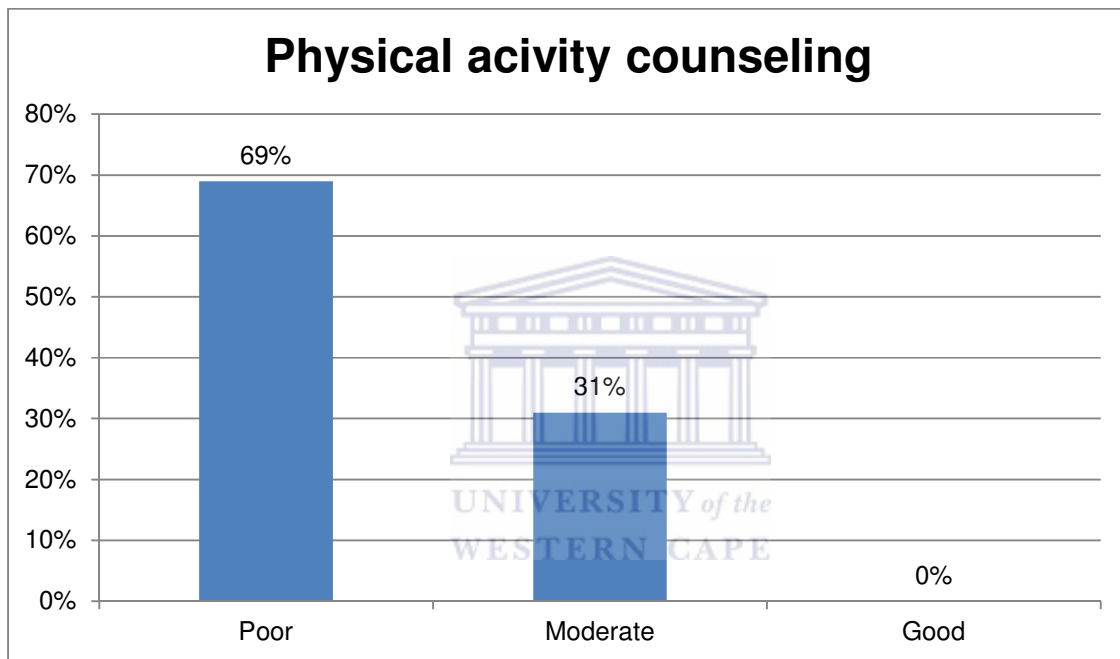
All healthcare professionals completed the Physical Activity Exit Interview (PAEI) which measured their quality of physical activity counselling content to patients with hypertension. Table 4.11 summarises the frequency of items used by healthcare professionals.

**Table 4.11 Frequency of items used by healthcare professionals (n=87)**

Item	Frequency	%
Do you discuss the topic of physical activity with your patient?	64	73.6
Do you advise your patients to become more physically active?	56	64.4
Do you discuss the benefits of physical activity with your patients?	47	54.0
Do you discuss with your patients on their past experiences with physical activity?	36	41.4
Do you discuss the difficult situations patients might encounter or problems they might have in trying to become more physically active?	36	41.4
Do you inform your patients on how FREQUENTLY they should exercise?	34	39.1
Do you inform your patients on how LONG they should exercise?	33	37.9
Do you inform your patients on how HARD they should exercise?	25	28.7
Do you inform your patients on the TYPES of exercise they should do?	14	16.1
Do you and your patient put the plan to become more physically active in writing?	3	3.4
Do you give any written materials about PA or exercise during each day's clinic visit?	0	0.0
Do you state to the patients that you are planning to discuss their PA on a future visit?	0	0.0

Table 4.11 illustrated that physical activity as a topic was discussed by 73.6% of all healthcare professionals. Furthermore, reasons to become active (64.4%) and advice to become active (54.0%) were also included. Recommended frequency, type and intensity were included by less than half of all healthcare professionals (41.4%, 41.4% & 39.1%), respectively.

Based on the healthcare professionals' content of physical activity counselling, they were categorised as poor, moderate and good "physical activity counsellors". None of the healthcare professionals were considered good physical activity counsellor and most (69%) were considered poor physical activity counsellors as illustrated in figure 4.3.



**Figure 4.3 Healthcare professionals' physical activity counseling (n=87)**

#### **4.4 SUMMARY**

The current study aimed to establish the levels of physical activity and factors associated with it among adults with hypertension in Kigali, Rwanda. A significant number of individuals with hypertension were found to be physically sedentary. Various factors that are associated with physical activity were highlighted. Due to the importance

of physical activity in the management of hypertension, attention should be given to the factors influencing it. The next chapter will present an integrated discussion of the data outlined in this chapter.





## **CHAPTER FIVE**

### **DISCUSSION**

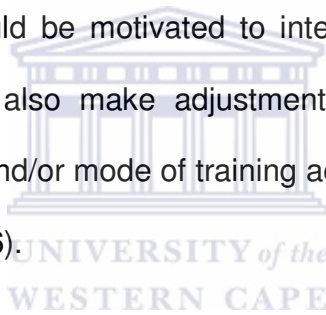
#### **5.1 INTRODUCTION**

The aim of the study is to determine the factors that are associated with physical activity participation among adults with hypertension in Kigali, Rwanda. This chapter therefore discusses the results of the study in the context of the aim, and objectives of the study. Participants indicated a willingness and high interest in participating in the study and completing the questionnaires. This is a positive element which gives hope for the success of future interventions aiming at increasing and encouraging the participation in physical activity among adults with hypertension in Rwanda. Furthermore, the findings are analyzed and discussed in relation to previous similar studies or contextual data to give inferences. The chapter concludes by highlighting the limitations and strengths of the study.

#### **5.2 PARTICIPATION IN PHYSICAL ACTIVITY**

Several studies have pointed out that although physical activity is considered to be a cornerstone in the management of hypertension, it remains by far the most underused (Jackson-Elmoore, 2007; Marcus et al., 2006). The findings of the current study support this in that more than two thirds of all the participants (69.44%) were categorized as inactive or sedentary. The findings of this study therefore concur with a cross-sectional study with 310 adults with hypertension conducted in Brazil to assess the physical activity levels, in which 80% of participants have presented low or moderate levels of

physical activity (Martins, Guedes, Teixeira, de Oliveira & de Araujo, 2009). Moreover, Churilla and Ford (2009) also indicated that adults with hypertension were found to be less active compared with nonhypertensive adults when comparing physical activity patterns of hypertensive and nonhypertensive adults in United States. A possible reason for this inactivity could be explained by Franco et al. (2004) who stated that patients with chronic illnesses in general and hypertension in particular often avoid physical activity for fear of making their condition worse because it requires time, effort and persistence. This highlights the need for appropriate education of individuals with hypertension of the health benefits of physical activity in management of their condition. People with hypertension should be motivated to integrate physical activities in their daily routine. Clinicians must also make adjustments to the progressive goals for intensity, duration, frequency, and/or mode of training according to medical conditions of their clients (Frost & Topp, 2006).



## **5.3 FACTORS ASSOCIATED WITH PARTICIPATION IN PHYSICAL ACTIVITY**

### **5.3.1 Socio-demographic factors**

Various researchers have reported a decline in physical activity with advancing age (Amanda, 2010; Brawley, Rejeski & King, 2003). The findings of the current study showed that more than half of participants were categorised as inactive and had a significantly higher mean age of 52.73 years, compared to those active, whose mean age was 42.99 years. This could be explained by the fact that young people are more likely to engage in physical activity compared to older ones, even in the general population. A study by Buman, Yasova and Giacobbi (2010) revealed that the overall

participation in physical activity significantly decreases with increasing age. Furthermore, Chobanian et al. (2003) also indicated in their study that inactivity was most commonly seen in older patients with hypertension and was often associated with poor health conditions. Age was identified as one of the factors which induce adults to initiate and maintain regular physical activity, therefore, healthcare programmes should be focused on older adult patients. The increasing age is often associated with a greater predisposition to morbidities and complications related to hypertension as a consequence of ageing, and poor adherence to healthy lifestyles.

Scientific evidence shows that men have higher rates of participation in physical activities than women (Eyler et al., 2002; Williams, 2008). However, females were also found to be more physically active than males in the study done by Kritz-Silvestein, Barrett-Connor and Corbeau (2001). The present study found that females were more physically active compared to males. Culturally, Rwandese women were always considered to be the ones responsible for all household duties and caregiving activities. Moreover, an increasing number of females are currently full-time or part-time workers. Meeting the double responsibility of household duties and daily work load could possibly explain how females are more active than males. In addition, Rwandese women from rural areas face the triple responsibility of family agriculture, household activities and children's caregiving. Women also recognise the need to stay healthy to support their families more than men as reported by Addo et al. (2007). Therefore, their high engagement in physical activities might be attributed to the knowledge of the health benefits of physical activity, compared to men. This could explain the reason for the

higher percentage of active women, than men in the current study. The difference in the levels of physical activity observed between the present study and other studies might also be explained by the difference in the type of study and the methodology employed in the respective studies and more importantly the characteristics of the participants and the investigation tool used. Despite the existing differences, the participation of women in physical activities should be enhanced and men should be educated and encouraged to participate in physical activities.

Marital status is an important determinant for physical activity participation (Petree et al., 2006). Eyler et al. (2002) has shown that being married was negatively related to physical activity or exercise in a group of women. This is in accordance with the findings of the present study which revealed that the majority of participants who were active were not married (54.55%). This is not surprising as unmarried individuals with hypertension face less life responsibilities, family expenses and constraints, compared to those who are married. However, these findings are contrary to those of Petree et al. (2006) which indicated that compared to those unmarried counterparts, married men and women reported higher levels of physical activity. Despite the differences of life responsibilities between unmarried and married people, married individuals in general, and particularly those with hypertension, should be encouraged and motivated to participate in physical activities. In addition, precautions like serious health education and increasing physical activity are needed.

Recent studies have reported that higher levels of education and income are related to lower levels of physical activity (Sávio, Da Costa, Schmitz & Da Silva, 2008; Orsini,

Belloco, Bottai, Pagaro & Wolk, 2007). This is in accordance with the findings of the current study which indicated that the most participants who were classified as active had either a primary or a secondary school level of education. In contrast, those who reached the tertiary level of education were found to be mainly inactive. These findings suggest that the level of education is inversely proportional to the levels of physical activity. This could be explained that people with low levels of education are more likely to have heavier or more physically demanding jobs in contrary to those with higher levels of education that tend to have lighter or more sedentary jobs. Therefore, given the fact that individuals with higher levels of education (tertiary level) were found to be mainly sedentary, they may be considered as an at-risk group for complications and morbidities-related to hypertension. Therefore, there is an urgent need for implementing awareness education programmes on the benefits of regular physical activity and exercise for individuals with hypertension, particularly, those with higher education levels as they are the most likely to adopt a sedentary lifestyle.

Engaging in jobs with minimal physical activity is the main reason for high hypertension in urban populations compared with rural populations (Addo et al., 2007). A Cameroonian study was conducted by Sobngwi et al. (2002), to evaluate and compare physical activity and its relationship with obesity, hypertension and diabetes in urban and rural areas. The study found that urban participants were physically inactive with light occupation, high prevalence of multiple occupations, and reduced walking and cycling time compared to rural participants. This would explain why a higher prevalence of participants from urban (97.71%) than participants from rural (2.29%) were considered

to be physically inactive in the current study. This can be explained that most of the families in the rural areas in Rwanda hire the services of people from rural areas for their house-keeping duties such as cooking, babysitting, house cleaning or gardening as most family members are workers. In addition, those who did not attend school rely on agriculture, farming and house-keeping activities for their living. Moreover, rural dwellers do their physical activities through long-distance walking often performed at a brisk pace as the main means of transportation (Sobngwi et al., 2002).

### **5.3.2 Health-related factors**

Smoking reduces the capacity of the circulatory system, which diminishes exercise duration, increases blood pressure, and elevates heart rate (Papathanasiou et al., 2007). Thus, smokers tend to be less physically active (Kaczynski, Manske, Mannell & Grewal, 2008). Moreover, DeRuijter, Faulkner, Cairney and Veldhuizen (2008) also conducted a study to establish the prevalence of physical activity among smokers. They found that only 22.6% of participants were physically active. This would explain why a high prevalence of participants who were either non past users (98.70%) or non current users (100%), were found to be active than those reported to be smokers. Therefore, health promotion campaigns are necessary to reduce or stop smoking among people in general and especially those suffering from hypertension, by integrating physical activity into their daily routine to reduce elevated high blood pressure, and to have other benefits such as, mental and physical well-being. Moreover, smoking cessation reduces cardiovascular risk such as elevated blood pressure compared with smokers (Huang, Duggan & Harman, 2008).

Many studies have found that there is an association between alcohol intake and blood pressure (Renaud et al, 2004; Xin et al., 2001). Regular physical activity can help manage normal blood pressure levels for those who are already hypertensive (Chintanadilok & Lowenthal, 2002). However, lifestyle factors such as alcohol use greatly influence a person's level of physical activity (Nelson et al., 2010; Stith, 2006). This association has been observed among adults with hypertension where a high prevalence of participants who were either non past users (71.43%) or non current users (85.71%), were found to be active than those reported to be drinkers. Therefore, reduction in alcohol consumption by increasing physical activity in daily routine is recommended in management of hypertension. Health-care professionals need to identify and address the risk of cardiovascular diseases caused by the alcohol use. All adults with hypertension must also pay attention to their behavioural risk factors such as high alcohol consumption for hypertension and cardiovascular diseases (Nelson et al., 2010).

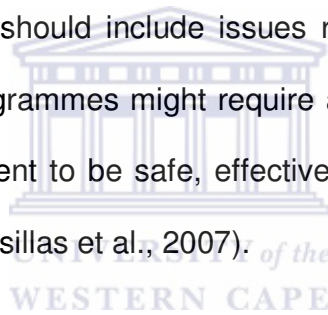
Sobngwi et al. (2002) have shown that diabetes was associated with physical inactivity. Diabetes was also found to be one of predictors of low physical activity level (Martins et al., 2009). This is in accordance with the findings of the current study which indicates that a significantly higher prevalence of participants who never diagnosed with diabetes mellitus were found to be active (94.81%) in comparison to those who are suffering from diabetes mellitus (5.19%). Furthermore, physical inactivity has been shown to be associated with hypertension and diabetes mellitus in epidemiological studies (Tuomilehto et al., 2001). Adults with hypertension in general and those who are

diagnosed with diabetes in particular, should be encouraged to integrate physical activities in their daily lives. Effective intervention to prevention of the rising of NCDs such as hypertension and diabetes is much needed. Benefits of regular physical activity include reduced risk of mortality of all causes such as from hypertension and diabetes (Franco et al., 2004).

Wamala et al. (2009) stated that most people with high blood pressure are in most cases overweight or obese. Physical activity is recommended as a component of weight management as the primary treatment for obesity (Donnelly et al., 2009). However, in the study by Sobngwi et al. (2002), high BMI was associated with physical inactivity. This concurs with the results of this study which observed the relationship between BMI and physical activity and 70.28% of overweight or obese participants were sedentary. Therefore, this population should be informed to reduce weight as it is believed that weight reduction is an important intervention for primary prevention of hypertension. Weight loss strategies include physical activity (Chobanian et al., 2003) and dietary (Harsha & Bray, 2008) behaviours. Behaviour therapy initiated in early life of individuals is the foundation of obesity treatment (Harris & George, 2008). These findings imply that having a normal weight, or losing weight among those who are overweight or obese, would reduce the chances of developing hypertension. Therefore, more emphasis should be placed on prevention of weight gain in the general population, particularly in people with hypertension. Physical activity has a positive effect on weight loss, and therefore on risk reduction of hypertension (Rankinen, Church, Rice, Bouchard & Blair, 2007).



According to the study by Sobngwi et al. (2002), good health-related status was associated with the increasing physical activity levels. This is highlighted in the current study which found that a higher prevalence of participants who reported their health status as being good or very good (92.21%) were classified more active than those who perceived their health as poor (1.30%) or fair (6.49%). Kolt and Snyder-Mackler (2003) stated that patients with chronic illnesses such as hypertension often avoid physical activity for fear of making their condition worse. Healthcare professionals should work with patients to evaluate their needs (Carlson et al., 2009). Appropriate counselling gives by healthcare professionals should occur with all patients, particularly, those with hypertension. This counseling should include issues relating to health conditions like chronic illnesses. Exercise programmes might require a preliminary medical evaluation or exercise tolerance assessment to be safe, effective, and able to meet the patient's necessities and capabilities (Casillas et al., 2007).



The theory of self-efficacy proposes that behaviour change and maintenance functions are expectations about the result of one engaging in a behaviour, and outcome expectations about one's ability to engage in or perform the behaviour (Bandura, 2001). Martin et al. (2004) reported that self-efficacy has received more attention for its role in physical activity. In the current study, the self efficacy for hypertension involved the confidence and ability of participants with hypertension in dealing with various aspect of their everyday life. These included the following; to get information about disease, obtain help from community, family and friends, communicate with physician, manage disease in general, do chores, social/recreational activities and manage symptoms. The

findings of the present study indicated that participants who showed good self-efficacy for hypertension were classified more active. Education is therefore crucial to motivate people to actively cope with their condition, enhancing the likelihood of successful management, and thus reducing healthcare costs incurred by treating hypertension complications. Efforts should be made to encourage individuals with hypertension to raise their awareness concerning the importance of dealing efficiently with hypertension in their daily lives.

It is widely accepted that physical activity is considered to be cornerstone in the management of hypertension (Chobanian et al., 2003; Baster & Brooks, 2005; Marcus et al., 2006; Whelton et al., 2002b). Various researchers have shown the reduction of elevated blood pressure resulting from physical activity (Lee et al., 2007; Manfredini et al., 2009). This concurs with the results of the present study which observed a statistically significant reduction of the systolic and diastolic blood pressure among the participants who were physically active. Therefore, people with hypertension should be encouraged to engage in physical activity in order to control their raised blood pressure and other existing risk factors, such as adverse lipid profiles, overweight and obesity, insulin resistance, depression and social isolation (Briffa et al., 2006). Physical activity has proven itself as one of the strategies to be used in the management of elevated blood pressure, therefore the general population and particularly people with hypertension, should be encouraged and motivated to participate in physical activity.

In the study by Sobngwi et al. (2002), the physical inactivity was related to high levels of blood pressure. Physical activity is recommended as both a primary and adjunctive treatment option for successful lowering of blood pressure (DeSimone & Crowe, 2009). This was supported by the study conducted by Frost and Topp (2006) which found that regular physical activity of moderate intensity, performed on most days (such as brisk walking 30min/day) lowers systolic and diastolic blood pressure by 4 to 9 mmHg. Physical activity should be included in everyday routine because it is widely recognised as an important health behaviour, ameliorating quality of life by providing benefits for both physical and psychological well-being (Bassuk & Manson, 2005; Hong & Dimsdale, 2003). Regular, moderate to vigorous physical activity can provide adults with important physical, chronic diseases of lifestyle, mental and social benefits. However, it is more valuable to have clarity on how physical activity is as important as pharmacologic intervention for many medical conditions. Health care providers should prescribe exercise for individuals with hypertension with the same consideration as prescribing any other effective treatment (Baster & Brooks, 2005).

#### **5.4 BARRIERS AND FACILITATORS TO PHYSICAL ACTIVITY PARTICIPATION**

Physical activity is an important modality in the management of hypertension, through its reduction of morbidity and complications and improvement of hypertensive individuals' quality of life. Tumusiime and Frantz (2006) highlighted the fact that a person's perceived barriers to physical activity are an important determinant that influences his or her participation in physical activity. The findings of the present study indicated that the common barriers encountered by the participants were: lack of

motivation (55.6%), health conditions (47.2%) and the lack of knowledge of the benefits of exercise (33.3%). Similar findings have been reported in a study done in Kuwait by Alsairafi et al. (2010) to demonstrate the effect of physical activity on controlling blood pressure among hypertensive patients, where the main barriers in practicing physical activity were 'cannot spare time' (51.1%), 'lack of desire' (19.6%) and 'not convinced of the benefits' (12%). The lack of motivation and health conditions are shown to be the common barriers encountered by individuals with hypertension. This highlights the great need for continuous support and encouragement of individuals with hypertension for the integration of physical activity in their daily routine, therefore increasing their motivation. Furthermore, the health conditions of individuals with hypertension is strongly related to the self-efficacy for hypertension, as hypertension is a chronic condition which requires daily adjustments and an individual's commitment in the fulfillment of these recommendations. This emphasises once again the role of education both in promoting physical activity and equipping individuals with hypertension with skills and knowledge for better self-care and adherence to management recommendations. The least endorsed barriers to physical activity were kidney disease and no place to sit down while exercising outside. As the result, the researcher believes that the majority of participants were not aware of control or situation of their kidney status. These findings therefore emphasise the great role of clinicians to focus on patient control or detection of kidney disease for people with hypertension.

Furthermore, the findings of the current study indicated that the common facilitators encountered by the participants were: wanting to feel better (46.0%), wanting to

manage weight (46.0%) and the health benefits such as feeling healthy (17.9%), wanting enhanced physical mobility (13.5%), and wanting increase strength (12.7%). “Encouragement from healthcare providers” (1.2%), “having financial resources” (1.2%), and “high expectations from healthcare providers” (0.4%) were the least reported facilitators to physical activity. Thus, healthcare professionals must focus on patient education regarding the benefits of physical activity. Health professionals’ advice and encouragement are also essential elements of physical activity programmes (Sanchez et al., 2007).

## **5.5 ROLE OF HEALTHCARE PROFESSIONAL’S ENCOURAGING PHYSICAL ACTIVITY**

Physical activity is necessary to maintain independent living and a happy and healthy life (Amanda, 2010). The findings of a study done in Kuwait by Alsairafi et al. (2010) showed that of about 80% of hypertensive patients who received advice from their physician to practice physical activity, only 34.5% reported to practice it.

The findings of the present study indicated that the majority of participants (73.6%) reported that they discuss physical activity as a topic with their patients, followed by the reasons to become active (64.4%) and advice to become active (54.0%). However, the least used counselling activities was to formulate a written plan (0.0%), giving written materials plan made (0.0%), and making a plan to discuss physical activity during a future visit (3.4%). This concurs with the findings of a study by Carlson et al. (2009), which indicated that prevalence of receiving physical activity advice among persons

diagnosed with hypertension seems to be very low. However, healthcare providers have to provide all patients with appropriate counselling (Carlson et al., 2009). In their study, Weidinger et al. (2008) reported that when health care providers encourage patients to be more physically active, and discuss an exercise plan with them, patients are more likely to initiate and maintain physical activity. Similarly, Amanda, (2010) indicated that practitioners who offer a few minutes of their time per office visit, to encourage patients to be physically active, help to increase their patients' activity level.

Furthermore, the findings of the current study indicated that none of the healthcare professionals were considered good physical activity counsellors (0.0%), and most (69%) were considered poor physical activity counsellors, followed by moderate physical activity counsellors (31%). Reports recommend that healthcare professionals often miss counselling opportunities for lifestyle change (Franklin & Vanhecke, 2008). However, in a recent study by Marke et al. (2006) in which patients were counselled by their physician to increase activity, half of the study participants changed their behaviour. In addition, Amanda, (2010) reported that healthcare professionals are the most suitable people to give advice. This highlights the need of the confidence and motivation in promoting daily physical activities of the patients in general and people with hypertension in particular. Additional education of healthcare professionals of the health benefits of physical activity in management of hypertension is thus urgently needed. Healthcare professionals should particularly be aware of the benefits of exercise and should assist their patients by motivating them to start and continue an exercise programme (Derman et al., 2009).

## 5.6 LIMITATIONS AND STRENGTH OF THE STUDY

The results of this study are interpreted in the light of the following limitations:

- All data was self-reported, thus vulnerable to misrepresentation in simplifying or exaggerating them. Recall bias may also represent sources of error.
- Cross-sectional data may consistently describe levels of association but not causality. A patient not participating in physical activity will not necessarily continue to do so. Thus, caution should be employed when interpreting the results of a cross-sectional study when longitudinal data is not present.
- The questionnaires consisted of close-ended responses. This limited the study to gain deeper information on the factors associated with participation in physical activity. A triangulated study design could possibly have produced better results.

Despite the limitations, this study has the following strengths:

- The study used questionnaires which were adapted from validated and reliable studies, to adequately measure the levels of physical activity and determine the factors associated with those levels with respect to the validity and reliability issues.
- Systematic random sampling was used in the selection of participants, thus giving an equal chance to all participants and limiting bias. In addition, the analysis closely considered the association between the numerous variables and the levels of physical activity.

## **5.7 SUMMARY**

The levels of physical activity and their association with various socio-demographic characteristics are thoroughly discussed in relation to previous similar studies. The barriers to participation in physical activity are also discussed. Through the discussion, the important role of education for the promotion of physical activity is highlighted.





## CHAPTER SIX

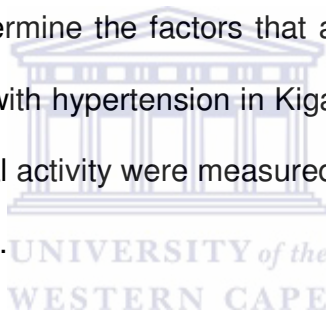
### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 6.4 INTRODUCTION

This chapter provides a summary and conclusion of the study. The fundamental findings are highlighted and finally, recommendations made from the study are provided at the end of this chapter

#### 6.5 SUMMARY AND CONCLUSION

The aim of this study is to determine the factors that are associated with the levels of physical activity among adults with hypertension in Kigali, Rwanda. To achieve this, the levels of participation in physical activity were measured, and various factors associated with those levels were identified.



Literature has emphasised the increasing prevalence of hypertension both in developed and developing countries. Moreover, it has indicated that prevalence rates are significantly rising among young and productive populations in developing countries. The rapid urbanisation with the adoption of western lifestyle in Africa in general, and Rwanda in particular, is considered to play a key role in the rise of hypertension. Physical activity is considered a cornerstone in the management of hypertension, for its benefits. However, literature has demonstrated that physical activity remains the least used modality in the daily lives of people with hypertension. The motivation for this study was to assess the levels of physical activity among adults with hypertension and

to identify the factors associated with it and the possible barriers and facilitators to physical activity, as well as healthcare professionals' quality of physical activity counseling. It is hoped that the information collected would provide a useful tool in the implementation of physical activity promotion strategies. These strategies assist in appropriately managing people with hypertension, but also assist with those at risk of developing hypertension.

The two clinics namely “Polyclinic La Medicale” and “Polyclinic du Carrefour” based in Kigali, the capital city of the Republic of Rwanda were chosen as research settings. A descriptive quantitative study was then carried out to describe the levels of physical activity participation and their association with the socio-demographic and health related factors among adults with hypertension. A cross sectional study was then used to collect information during a six week period. Two hundred and fifty two (252) people with hypertension were randomly selected considering the exclusion criteria, and all 87 healthcare professionals dealing with people with hypertension were willing to participate in the study. Self-administered questionnaires consisting of close-ended questions were used to collect the desired information. The questionnaires were adapted from three valid and reliable questionnaires and a pilot study was conducted to further ensure its validity and reliability. Data was then analysed by use of both descriptive and inferential statistics. Descriptive statistics was used to summarise the levels of physical activity as well as the socio-demographic and health-related factors, while inferential statistics was used to test the association between these factors and the levels of physical activity.

Participants' age ranged from 18 to 80 years, with the mean age for both males and females being 49.75 years. The females constituted slightly more than half of the participants (56.3%). With regards to the marital status and the level of education, the majority of participants (56.3%) were married and had a primary school level of education (29.4%). The participants' BMI was then calculated after recording their weights and heights, and the findings of the study revealed that more than half (56.3%) of the participants were either overweight or obese. Almost an equal number of participants perceived their health as poor, fair and good (32.1%, 28.6%, and 32.1% respectively). The self-efficacy for hypertension was rated by the participants and all of them showed a moderate mean scored for different activities.

The Godin Leisure-Time Exercise Questionnaire was used to assess the levels of PA. The results of the study showed that the majority of participants (69.44%) were categorised as inactive or sedentary.

The following factors were found to be significantly associated with the levels of PA: age, marital status, level of education, residence, tobacco use, alcohol past user, diabetes mellitus, BMI, perceived health status, self-efficacy for hypertension and blood pressure.

Common barriers to PA as reported by the participants were the lack of motivation (55.6%), health conditions (47.2%) and lack of knowledge of benefits of exercise

(33.3%) while common facilitators endorsed by the participants, were wanting to feel better (46.0% and wanting to manage weight (46.0%).

The Physical Activity Exit Interview was used to measure the quality of physical activity counselling of healthcare professionals. The most used counselling activities were; discussed activity (73.6%), reasons to become active (64.4%) and advice to become active (54.0%). Based on the healthcare professionals' content of physical activity counselling, none of the healthcare professionals were considered good physical activity counsellors and most (69%) were considered poor physical activity counsellors.

The aim and objectives of this study were achieved and the findings indicated that most participants were inactive. These findings are in accordance with similar studies done in various countries. The participants' spontaneous willingness to participate in the study gives hope for the future success of an intervention programme to raise hypertensive individuals' level of awareness on the benefits on PA, and increase their physical activity levels. In addition, the numerous questions asked by the participants in relation to the recommended types, intensity and frequency of PA for their health benefits are also indicative of their curiosity and willingness to improve their physical activity levels and health. The results of this study would undoubtedly inform the management of the two clinics that physical activity policies are needed for their clients in general and with those who are suffering from hypertension in particular. This gives much hope for a successful intervention programme to promote physical activity among adults with hypertension in clinics or hospitals in Rwanda.

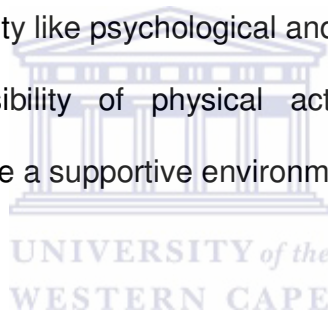
## 6.6 RECOMMENDATIONS

- The role of physiotherapists in promoting the health of people with hypertension through the advocacy of physical activity should be emphasised to the physiotherapists and to other members of the medical team. A physiotherapy department should be of great importance to the clinics, not only for rehabilitation after complications, but also for advice on the type, intensity and frequency of PA required by individuals with hypertension, with regards to their individual needs, and health conditions. This will increase other medical staff members' awareness on the benefits of referring patients diagnosed with hypertension for advices on physical activity, but also those at risk including some with obesity. Therefore, professionals such as physiotherapists should be involved in designing programmes for physical activity promotion.
- The media, for example, radio is considered as the most popular means of information, therefore, radio transmissions concerning hypertension would be beneficial for the prevention of hypertension for those at risk and for increasing hypertensive people's awareness on the importance of integrating physical activity in their daily routine.
- Educational pamphlets and videos should be provided in public places such as workplaces, schools, hospitals and clinics, and other public places, in order to increase awareness of the benefits, motivation of physical activity, change the way people perceive barriers to physical activity and acquire knowledge about

physical activity and its benefits and the related health risk of a sedentary lifestyle.

- Peer motivation specifically by family members and friends who share the same challenges in dealing with hypertension would be a major factor in promoting healthy lifestyles through the promotion of physical activity, diet, and other key factors. Therefore, support groups within the communities would be of great benefit for people with hypertension; organising physical activities among themselves, and also sharing and discussing the challenges that they are facing and the means of overcoming them.
- Healthy lifestyles have been strongly associated with the prevention of noncommunicable diseases in general and hypertension in particular. It is therefore important that health education programmes be implemented in schools from primary to tertiary education so as to promote the benefits of adopting healthy lifestyles at a young age. The Ministry of Education should establish a policy that would promote healthy behaviours and physical activity in schools and higher institutions. In addition, the Ministry of Health should emphasise the need for healthy behaviours among the general population as a preventive measure for non-communicable diseases in general and hypertension in particular. It should advocate for the need to integrate programmes of physical activity in work, school and various common settings. This should be encouraged and supported with accessibility to programme facilities and equipment. The

Ministry of Health should initiate physical activity programmes for healthcare professionals. These programmes should include; education on guiding or counselling patients in general and those with hypertension on how to find out the quality of exercises needed for health benefits, satisfy the need for healthcare professionals to be familiar with existing physical activity research, and always consider physical activity as a tool in the prevention and management of hypertension, since it can reduce health care cost and it is safer than pharmacological treatment. The Ministry of Health also needs to increase the awareness of risks of physical inactivity, motivate patients with important health benefits of physical activity like psychological and physiological benefits, increase availability and accessibility of physical activity facilities to people with hypertension, and provide a supportive environment.



### **Further studies**

- The two clinics are situated in Kigali (the capital city of Rwanda). Consequently, the majority of participants lived in the city. More research can be conducted to find out factors associated with participation in physical activity among adults with hypertension who mainly live in rural area settings.
- Further study can be done to investigate why health-care professionals miss opportunities to have a better understanding and counselling of the benefits of physical activity by practicing and maintaining the regular physical activity for their patients.

- Another study, which combines both quantitative and qualitative study designs (triangulation), could be conducted for deeper insights into the factors associated and levels of physical activity among adults with hypertension.





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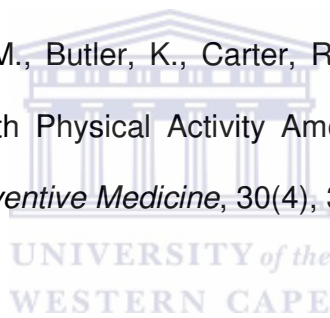
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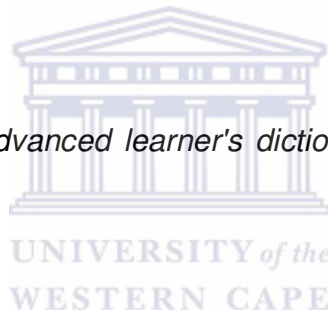
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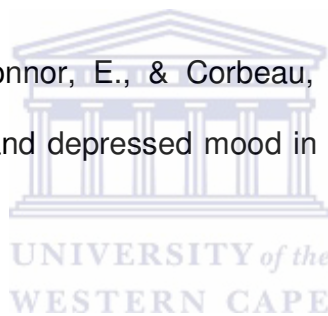
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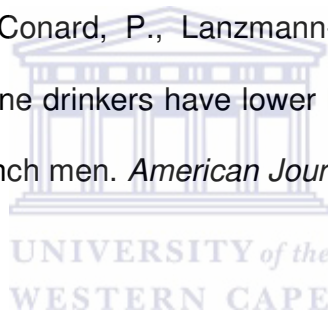
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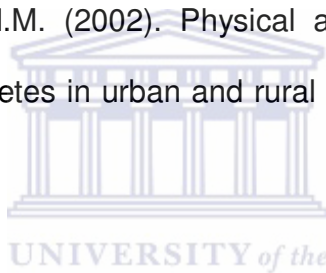
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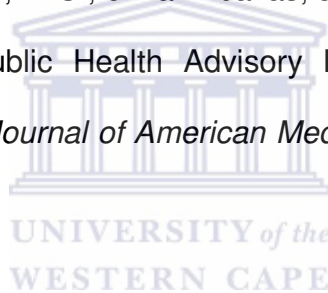
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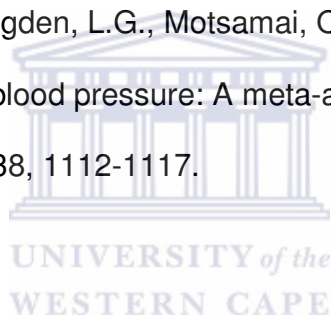
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## APPENDICES



UNIVERSITY *of the*  
WESTERN CAPE

## APPENDIX A

OFFICE OF THE DEAN  
DEPARTMENT OF RESEARCH  
DEVELOPMENT

Private Bag X17, Bellville 7535  
South Africa  
Telegraph: UNIBEL1  
Telephone: +27 21 959 2948/2949  
Fax: +27 21 959 3170  
Website: www.uwc.ac.za

5 October 2010

To Whom It May Concern

I hereby certify that the Senate Research Committee of the University of the Western Cape has approved the methodology and the ethics of the following research project by:  
Mr. B Umuvandimwe (Physiotherapy)

Research Project:

Factors associated with participation in physical  
activity among adults with hypertension in Kigali,  
Rwanda

Registration no:

10/8/16

UNIVERSITY of the  
WESTERN CAPE



*Peter Syster*  
Manager: Research Development Office  
University of the Western Cape



UNIVERSITY of the  
WESTERN CAPE

A place of quality, a place to grow, from hope to action through knowledge

APPENDIX B

REPUBLIC OF RWANDA/REPUBLIQUE DU RWANDA



NATIONAL ETHICS COMMITTEE / COMITE NATIONAL D'ETHIQUE

Telephone: (250) 55 10 78 84

E-mail: [r nec@moh.gov.rw](mailto:r nec@moh.gov.rw)

Web site: [www.r nec.moh.gov.rw](http://www.r nec.moh.gov.rw)

Ministry of Health  
P.O. Box. 84  
Kigali, Rwanda.

FWA Assurance No. 00001973  
IRB 00001497 of IORG0001100

November 23, 2010  
No. 313/ RNEC /2010

Bernadin UMUVANDIMWE  
Principal Investigator



Your Project title: **Factors associated with participation in physical activity among adults with hypertension in Kigali, Rwanda;** has been evaluated by the Rwanda National Ethics Committee.

Name	Institute	Involve in the decision		
		Yes	No ( Reason)	
			Absent	Withdrawn from the proceeding
Dr. Justin Wane	King Faisal Hospital, Kigali HOD Laboratory	X		
Prof. Emmanuel Bajyana	Immunologist, faculty of sciences (NUR)	X		
Dr.Emmanuel Nkeramihigo	Senior Lecturer, National University of Rwanda. Faculty of Medicine	X		
Dr. Dariya Mukamusoni	Director of Nyamata Hospital	X		
Dr Juliet Mbabazi	King Faisal Hospital, Kigali Ag. Chief Executive Officer	X		

Prof.Alexandre Lyambabaje	National University of Rwanda		X	
Mrs.Françoise Uwingabiye	Lawyer Musanze	X		
Dr. Eugène Rutembesa	National University of Rwanda	X		
Sr.Domitilla Mukantabana	Kabgayi Nursing and Midwife school		X	

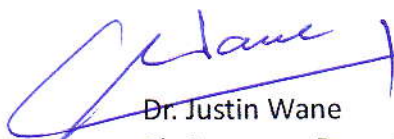
After reviewing your protocol during the RNEC meeting of 13 November 2010, where the quorum was met, and revisions made on the advice of the RNEC submitted on 22 November 2010, **we hereby provide approval for the above mentioned protocol.**

Please note that approval of the protocol and consent form is valid for **12 months.**

You are responsible for fulfilling the following requirements:

1. Changes, amendments, and addenda to the protocol or consent form must be submitted to the committee for review and approval, prior to activation of the changes.
2. Only approved consent forms are to be used in the enrollment of participants
3. All consent forms signed by subjects should be retained on file. The RNEC may conduct audits of all study records, and consent documentation may be part of such audits.
4. A continuing review application must be submitted to the RNEC in a timely fashion and before expiry of this approval.
5. Failure to submit a continuing review application will result in termination of the study.

Sincerely,



Dr. Justin Wane  
Chairperson, Rwanda National Ethics Committee.



Date of Approval: November 23, 2010

Expiration date: November 22, 2011

**C.C.**

- Hon. Minister of Health.
- The Permanent Secretary, Ministry of Health

APPENDIX C

REPUBLIC OF RWANDA

POLYCLINIC LA MEDICALE

P.O. BOX: 4296

TEL. /FAX: (250)570077/ 570076

KIGALI

November 23, 2010

Bernardin UMUVANDIMWE

C/o University of the Western Cape

Physiotherapy department

Dear Sir,



**Re: REPLY TO CONDUCT A RESEARCH STUDY**

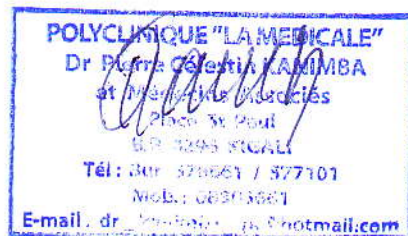
Referring to your letter dated October 22, 2010 requesting to conduct a research study entitled **Factors associated with participation in physical activity among adults with hypertension in Kigali, Rwanda**: I have the honor to inform you that permission has been granted.

We hereby facilitate you to carry your study in our clinic.

Yours faithfully,

**Dr KANIMBA Pierre Célestin**

**Director**



**APPENDIX D**

REPUBLIC OF RWANDA

POLYCLINIC DU CARREFOUR

PO BOX: 1659

TEL. (+250) 571362

CELL: (+250) 0788300751

KIGALI

23 November, 2010

**Bernardin UMUVANDIMWE**

Masters student at University of the Western Cape

Department of Physiotherapy

Dear Sir,



**RE: REPLY TO YOUR REQUEST TO CONDUCT A RESEARCH STUDY IN OUR CLINIC**

Referring to your letter dated 3 November 2010 requesting me to allow you to carry out a research study at Polyclinic du Carrefour; I have no hesitation to inform you that you are permitted to do your research study in our clinic.

We are ready to give you our possible facilitations needed to do this research.

Yours faithfully,

**Dr GATSINGA Jean Dieudonné**

Director

*J. Gatsinga*  
Dr GATSINGA Jean Dieudonné  
Gynécologue Obstétricien  
Andrologue Echographiste  
O.M. 0334



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DEPARTMENT OF PHYSIOTHERAPY

Chairperson: Rwanda National Ethics committee

October 4, 2010

Ministry of Health, Kigali – Rwanda

Dear Sir/ Madam,

**Re: Request to conduct a research study at Polyclinic La Medicale and Polyclinic du Carrefour**

I am a postgraduate student doing a masters degree program in physiotherapy at the University of the Western Cape in South Africa. I am expected to conduct a research project as part of the requirements for a master's degree in physiotherapy. The title of my research thesis is **"Factors associated with participation in physical activity among adults with hypertension in Kigali, Rwanda."**

I hereby request permission to carry out the above mentioned study at Polyclinic La Medicale and Polyclinic du Carrefour. It is hoped that the results of this study will be helpful in raising hypertensive people's awareness on the importance of integrating physical activity in their daily routine in Rwanda in order to improve their overall quality of life. It may also be used to inform policy makers, health professionals and people with hypertension about the importance of engaging in physical activities. Please find attached letter of acceptance of my research proposal by the authorities of the University of the Western Cape.

I would be very grateful if you would allow me to conduct the study during November and December, 2010. Ethical issues will be taken into consideration, participation in this study will be anonymous and voluntary and the information gathered will be treated with respect and confidentiality.

Looking forward to your positive response.

Sincerely,

.....  
.....

Mr. Bernardin Umuvandimwe

Student Researcher

.....  
.....

Prof. Julie Phillips

Research Supervisor





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DEPARTMENT OF PHYSIOTHERAPY

The Republic of Rwanda

Director: Polyclinic La Medicale

October 22, 2010

Kigali - Rwanda

Dear Sir / Madam,

**Re: Request to conduct a research study at Polyclinic La Medicale.**

My name is Bernardin UMUVANDIMWE. I am currently doing a masters degree programme in Physiotherapy at the University of the Western Cape in South Africa. I am expected to conduct a research project as a partial fulfillment of the requirements for master science (M.Sc.) Physiotherapy. The title of my research is: **"Factors associated with participation in physical activity among adults with hypertension in Kigali, Rwanda."**

I kindly request permission to carry out the above-mentioned research study in your clinic, among adults with hypertension, and health professionals who are dealing with hypertensive individuals. **It is hoped that the results of the study would be helpful in raising hypertensive people's awareness on the importance of integrating physical activity in their routine lives in Rwanda.**

It would be very grateful if you would allow me to conduct out the research study during November and December, 2010.

The participation in this study will be anonymous and voluntary, the information gathered will be treated with confidentiality and the feedback of the results will be provided to stakeholders.

Hoping for your positive response.

Yours faithfully,

.....  
.....

Mr. Bernardin Umuvandimwe

Student Researcher

.....  
.....

Prof. Julie Phillips

Research Supervisor



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Website: www.uwc.ac.za

DEPARTMENT OF PHYSIOTHERAPY

The Republic of Rwanda

Director: Polyclinic du Carrefour  
Kigali - Rwanda

November 3, 2010

Dear Madam/Sir.

**Re: Request to conduct a research study at Polyclinic du Carrefour.**

My name is Bernardin UМУVANDIMWE. I am currently doing a masters degree programme in Physiotherapy at the University of the Western Cape in South Africa. I am expected to conduct a research project as a partial fulfillment of the requirements for master science (M.Sc.) Physiotherapy. The title of my research is: **"Factors associated with participation in physical activity among adults with hypertension in Kigali, Rwanda."**

I kindly request permission to carry out the above-mentioned research study in your clinic, among adults with hypertension, and health professionals who are dealing with hypertensive individuals. **It is hoped that the results of the study would be helpful in raising hypertensive people's awareness on the importance of integrating physical activity in their routine lives in Rwanda.**

It would be very grateful if you would allow me to conduct the research study during November and December, 2010.

The participation in this study will be anonymous and voluntary, the information gathered will be treated with confidentiality and the feedback of the results will be provided to stakeholders.

Hoping for your positive response.

Yours faithfully,

.....  
.....

Mr. Bernardin Umuvandimwe

Student Researcher

.....  
.....

Prof. Julie Phillips

Research Supervisor



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E-mail: [mwarner@uwc.ac.za](mailto:mwarner@uwc.ac.za)

## **APPENDIX H** **INFORMATION SHEET: ADULTS WITH HYPERTENSION**

**Project Title:** Factors associated with participation in physical activity among adults with hypertension in Kigali, Rwanda.

### **What is this study about?**

This is a research project being conducted by Bernardin UMUVANDIMWE at the University of the Western Cape. We are inviting you to participate in this research project because you have been diagnosed with hypertension. The purpose of this research project is to determine the factors that are associated with participation in physical activity among adults with hypertension in Kigali, Rwanda.

### **What will I be asked to do if I agree to participate?**

You will be asked to fill in the questionnaire that you will be given. This will help me to answer my research objective and at the same time it will help me to make recommendations regarding physical activity participation among adults with hypertension to increase their awareness of the importance of integrating physical activity in their routine lives. The questionnaire will be issued to you and you will be given ample time to fill it and then it will be collected by the researcher at the agreed time. In addition your blood pressure will be measured by a nurse practitioner, and your height and weight will also be recorded.

### **Would my participation in this study be kept confidential?**

We will do our best to keep your personal information confidential. To help protect your confidentiality, no individual names will be used in the questionnaire. There will be no information that may personally identify you.

### **What are the risks of this research?**

There are no known risks associated with participating in this research project.

### **What are the benefits of this research?**

This research is not designed to help you personally, but the results will help the policy makers and researcher to learn more about factors that are associated with participation in physical activity among adults with hypertension in Kigali, Rwanda. We hope that, in the future, other people might benefit from this study through improved understanding of the importance of physical activity in management and prevention of hypertension.

### **Do I have to be in this research and may I stop participating at any time?**

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.



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## **What if I have questions?**

This research is being conducted by Bernardin UMUVANDIMWE, a registered student at the Department of Physiotherapy, University of the Western Cape. If you have any questions about the research study itself, please contact (Bernardin UMUVANDIMWE on telephone number 0782413906, e-mail: [bubernum@gmail.com](mailto:bubernum@gmail.com)).

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Head of Department: Prof Julie Phillips

Dean of the Faculty of Community and Health Sciences: Prof Ratie Mpofo

University of the Western Cape

Private Bag X17

Bellville 7535

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee.





# UNIVERSITY OF THE WESTERN CAPE

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## APPENDIX I

### INFORMATION SHEET: HEALTH PROFESSIONALS

**Project Title:** Factors associated with participation in physical activity among adults with hypertension in Kigali, Rwanda.

#### **What is this study about?**

This is a research project being conducted by Bernardin UMUVANDIMWE at the University of the Western Cape. We are inviting you to participate in this research project because you are a health professional dealing with hypertensive individuals. The purpose of this research project is to determine the factors that are associated with participation in physical activity among adults with hypertension in Kigali, Rwanda.

#### **What will I be asked to do if I agree to participate?**

You will be asked to fill in the questionnaire that you will be given. This will help me to answer my research objective and at the same time it will help me to make recommendations regarding physical activity participation among adults with hypertension to increase their awareness of the importance of integrating physical activity in their routine lives. The questionnaire will be issued to you and you will be given ample time to fill it and then it will be collected by the researcher at the agreed time.

#### **Would my participation in this study be kept confidential?**

We will do our best to keep your personal information confidential. To help protect your confidentiality, no individual names will be used in the questionnaire. There will be no information that may personally identify you.

#### **What are the risks of this research?**

There are no known risks associated with participating in this research project.

#### **What are the benefits of this research?**

This research is not designed to help you personally, but the results will help the policy makers and researcher to learn more about factors that are associated with participation in physical activity among adults with hypertension in Kigali, Rwanda. We hope that, in the future, other people might benefit from this study through improved understanding of the importance of physical activity in management and prevention of hypertension.

#### **Do I have to be in this research and may I stop participating at any time?**

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.



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## **What if I have questions?**

This research is being conducted by Bernardin UMUVANDIMWE, a registered student at the Department of Physiotherapy, University of the Western Cape. If you have any questions about the research study itself, please contact (Bernardin UMUVANDIMWE on telephone number 0782413906, e-mail: [bubernum@gmail.com](mailto:bubernum@gmail.com)).

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Head of Department: Prof Julie Phillips

Dean of the Faculty of Community and Health Sciences: Prof Ratie Mpofo

University of the Western Cape

Private Bag X17

Bellville 7535

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee.





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## **APPENDIX J**

### **IBISOBANURIRWA UBAZWA:**

**Ubushakashatsi:** IBIJYANYE NO GUKORA IMIRIMO NTAKAZANGUFU HAGATI Y'ABANTU BAKURU BAFITE UMUVUDUKO UKABIJE W'AMARASO MURI KIGALI, RWANDA.

#### **Ubu bushakashatsi bugamije iki?**

Ubu bushakashatsi bukozwe na Bernardin UMUVANDIMWE, wiga muri Kaminuza ya Western Cape muri Africa y'epfo. Wahamagajwe muri ubu bushakashatsi kubera ko ufite umuvuduko ukabije w'amaraso. Intego y'ubu bushakashatsi ni ukumenya uburyo imyitozo ikorwa hagati y'abantu bakuru bafite umuvuduko ukabije w'amaraso muri Kigali, Rwanda.

#### **Nzasabwa gukora iki, igihe nemeye kubazwa?**

Urasabwa kuzuza ibibazo uri buze guhabwa. Ibi bizafasha gusubiza intego z'ubushakashatsi bwanjye kandi bikazamfasha na none gushyira ahagaragara ibikenewe birebana no kwitabira imirimo ntakazangufu mu bantu bakuru bafite umuvuduko ukabije w'amaraso mu kongera ubumenyi bwabo ku kamaro ko kwimika imirimo ntakazangufu mu buzima bwabo bwa buri munsu. Uraza guhabwa ibyo bibazo ubisubize mu mwanya ukwiriye, nyuma byongere bifatwe n'umushakashatsi ku gihe mwumvikanyeho. Na none umuvuduko w'amaraso yawe uraza gupimwa n'umuforomo, uburebure kimwe n'ibiro byawe nabyo biraza gupimwa.

#### **Ese ibisubizo ndibutange bizagirirwa ibanga ki?**

Ibisubizo byose utanga bizagirirwa ibanga. Kugira ngo bishoboke, nturi busabwe kwandika amazina yawe ku rutonde rw'ibibazo. Aho hose kandi nta makuru yerekana uwo wowe bwite uriwe.

#### **Nta ngaruka se nagira mbye muri ubu bushakashatsi?**

Nta ngaruka nimwe izwi ijyanye n'ubu bushakashatsi.

#### **Ni izihe nyungu se ziri muri ubu bushakashatsi?**

Ubu bushakashatsi ntibwagennye gufasha wowe gusa, ibisubizo by'ubu bushakashatsi bizafasha abagenabikorwa hamwe n'umushakashatsi kwiga birushijeho ibyerekeye n'ibijyanye no gukora imirimo ntakazangufu hagati y'abantu bakuru bafite umuvuduko ukabije w'amaraso muri Kigali, Rwanda. Turizera kandi ko mugihe gitaha abandi bantu bazagira inyungu zivuye kuri ubu bushakashatsi binyuriye ku myumvire iteye imbere ku kamaro k'imirimo ntakazangufu mu kuvura no kwirinda umuvuduko ukabije w'amaraso.

#### **Ese nemeye kubazwa muri ubu bushakashatsi nshobora kwivanamo igihe cyose mbishakiye?**

Kwemera kujya muri ubu bushakashatsi ni ubushake bwawe busesuye. Ushobora kwemera cyangwa kutemera kubazwa. Wemerewe kwivana muri ubu bushakashatsi igihe cyose nta nkurikizi, ntuzabihanirwa cyangwa ngo utakaze inyungu iyo ariyo yose wakagombye kubona muri ubu bushakashatsi.



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## **Ndamutse se nshatse kugira icyo nasobanuzwa nyuma y'ubu bushakashatsi nakwiyambaza nde?**

Ubu bushakashatsi burimo gukorwa na Bernardin UMUVANDIMWE, wiga muri Kaminuza ya Western Cape muri Africa y'epfo. Hagize ikibazo wakwifuzwa kubaza kirebana n'ubu bushakashatsi, wakwiyambaza (Bernardin UMUVANDIMWE, ku numero 0782413906, e-mail: [bubernum@gmail.com](mailto:bubernum@gmail.com)).

Ugize ikibazo kirebana n'ubu bushakashatsi ni uburenganzira bwawe nk'ubazwa, cyangwa ushatse kumenyekanisha ibibazo wagize birebana n'ubu bushakashatsi, wabimenyesha:

Uhagarariye ishami rya Physiotherapy: Professor Julie Phillips

Umuyobozi wa Faculty of Community and Health Sciences: Professor Ratie Mpofu

Kaminuza ya Western Cape

Private Bag X17

Bellville 7535

Ubu bushakashatsi bwemejwe na Kaminuza ya Western Cape's Senate Research Committee and Ethics Committee.







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## APPENDIX K FORMULAIRE D'INFORMATION

**Titre du projet :** Facteurs associés à la participation aux activités physiques parmi les adultes hypertensifs à Kigali, Rwanda.

### **En quoi consiste cette étude?**

Ce projet de recherche est mené par Bernardin UМУVANDIMWE étudiant à l'Université du Western Cape. Nous vous invitons à participer dans ce projet de recherche car, vous êtes des professionnels concernés par des individus ayant l'hypertension. L'objectif de ce projet de recherche vise à déterminer les facteurs associés à la participation aux activités physiques parmi les adultes vivant avec l'hypertension à Kigali, Rwanda.

### **Qu'est-ce qui m'est demandé une fois accepté de participer ?**

Vous serez demandé de répondre au questionnaire qui vous sera livré. Ceci m'aidera à répondre ma recherche objective et en même temps, à faire des recommandations concernant la participation aux activités physiques chez les adultes vivant avec l'hypertension dans le cadre d'accroître les connaissances de l'importance d'intégrer les activités physiques dans leur vie quotidienne. Le questionnaire vous sera livré et vous aurez assez de temps pour le compléter afin d'être collecté par le chercheur au temps convenu.

### **Ma participation à cette étude sera-t-elle gardée confidentielle?**

Nous ferons tout possible pour garder très soigneusement ton information personnelle comme confidentielle. Pour garantir ta confidentialité, aucun nom individuel ne sera publié dans le questionnaire. Pour cela, aucune information personnelle ne t'identifiera.

### **Quels sont les risques de cette recherche ?**

Aucun risque associé n'est connu à la participation de ce projet de recherche.

### **Quels sont les intérêts de cette recherche?**

Cette recherche n'entre pas seulement dans le cadre de vous aider personnellement, mais aussi ses résultats aideront les planificateurs et le chercheur à beaucoup apprendre des facteurs associés à la participation aux activités physiques parmi les adultes vivant avec l'hypertension à Kigali, Rwanda. Nous espérons que, dans le futur, beaucoup de gens bénéficieront de cette étude à travers la compréhension de l'importance des activités physique dans la gestion et prévention de l'hypertension.



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## **Une fois m'impliqué dans cette recherche puis-je m'arrêter n'importe quand?**

Ta participation dans cette recherche est totalement volontaire. Tu peux ne participer nulle part du tout. Si tu décides de participer dans cette recherche, tu auras aussi le droit de t'arrêter à n'importe quel moment. Si tu décides de ne pas participer dans cette étude ou tu t'arrêtes d'y participer n'importe quand, tu n'en sera pas pénalisé et ne perdras rien de toute sorte d'intérêt.

## **Que faire en cas de questions?**

Comme nous l'avons signalé au début, cette recherche est menée par Bernardin UMUVANDAIMWE, étudiant inscrit au Département de Physiothérapie de l'Université du Western Cape. Si tu as des questions à l'étude de recherche en soit, tu es prié de lui contacter (Bernardin UMUVANDIMWE, Téléphone mobile 0782413906, adresse e-mail: [bubernum@gmail.com](mailto:bubernum@gmail.com)).

Tu peux aussi avoir des questions concernant cette étude, c'est ton droit en tant que participant dans la recherche, ou même si tu souhaites relever des problèmes relatifs à l'étude, tu peux dans ce cas contacter le Chef de Département : Professeur Julie Phillips, ou Doyen de la Faculté des Sciences Communautaires et Sanitaires : Professeur Ratie Mpofo  
Université du Western Cape  
Private Bag X17  
Bellville 7535

Cette recherche a été approuvée par le Comité du Sénat de Recherche et Comité Ethique de l'Université du Western Cape.



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## APPENDIX L

### CONSENT FORM

**Title of Research Project: Factors associated with participation in physical activity among adults with hypertension in Kigali, Rwanda.**

The study has been described to me in a language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

Participant's name.....

Participant's signature.....

Date.....

Witness' name.....

Witness' signature.....

Date.....



Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact:

**Chairperson of Rwanda National Ethics Committee: Dr Wane Justin at 0788500499**

**Secretary of Rwanda National Ethics Committee: Dr. Emmanuel Nkeramihigo at 0788557273**

**Study Coordinator: Prof Julie Phillips**

**University of the Western Cape**

**Private Bag X17, Belville 7535**

**Cell: (021) 959 2542; Fax: (021) 959 1217**

**Email: jphillips@uwc.ac.za**



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## APPENDIX M

### KWEMERA KUGIRA URUHARE

**Ubushakashatsi: Ibijyanye no gukora imirimo ntakazangufu hagati y’abantu bafite umuvuduko ukabije w’amaraso muri Kigali-Rwanda.**

Nyuma yo gusobanukirwa iby’ubu bushakashatsi n’ibijyanye nabwo mu rurimi numva, nemeye ku bushake bwanjye kugira uruhare muri ubu bushakashatsi. Ibibazo mfite kuri ubu bushakashatsi byasubijwe. Ndumva neza ko bazangirira ibanga no kuba nemerewe kwivana muri ubu bushakashatsi igihe cyose mbishatse kandi ko nta nkurikizi byangiraho.

**Amazina y’ugira uruhare mu bushakashatsi.....**

**Umukono/Igikumwe cy’ugira uruhare mu bushakashatsi.....**

**Italiki.....**

**Amazina y’umutangabuhamya.....**

**Umukono/Igikumwe cy’umutangabuhamya.....**

**Italiki.....**

Ugize ikibazo kirebana n’ubu bushakashatsi cyangwa ushatse kumenyekanisha ibibazo wagize birebana n’ubu bushakashatsi, wabimenyesha:

**Uwukuriye ishami ry’igihugu rishinzwe ubushakashatsi: Dr Wane Justin kuri 0788500499**

**Umunyamabanga w’ishami ry’igihugu rishinzwe ubushakashatsi: Dr. Emmanuel Nkeramihigo kuri 0788557273**

**Umuhuzabikorwa w’ubushakashatsi: Professor Julie Phillips**

**Kaminuza ya Western Cape, Private Bag X17, Belville 7535**

**Cell: (021) 959 2542 / Fax: (021) 959 1217, Email: jphillips@uwc.ac.za**



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## APPENDIX N

### FORMULAIRE D'APPROBATION

**Titre du Projet de Recherche : Facteurs associés à la participation aux activités physiques parmi les adultes hypertensifs à Kigali, Rwanda.**

L'étude m'a été décrite dans la langue que je comprend, j'accepte librement et volontairement de participer. Mes questions sur l'étude ont été répondues. J'ai compris que mon identité ne sera pas dévoilée et que je peux retirer ma participation à l'étude n'importe quand sans donner des raisons, et ceci n'aura aucun effet négatif sur moi en tout cas.

Noms du participant.....

Signature du participant.....

Date.....

Noms du témoin.....

Signature du témoin.....

Date.....

Si tu aurais quelques questions concernant cette étude ou souhaiterais mentionner quelques problèmes rencontrés concernant cette étude, tu es prié de contacter:

**Directeur du Comité National d'éthique, Rwanda: Dr Wane Justin au 0788500499**

**Secrétaire du Comité National d'éthique, Rwanda: Dr. Emmanuel Nkeramihigo au 0788557273**

**Coordinatrice d'étude : Prof Julie Phillips**

**Université du Western Cape**

**Private Bag X17, Belville 7535**

**Mobile: (021) 959 2542**

**Fax: (021) 959 1217, Email: jphillips@uwc.ac.za**



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## APPENDIX O

### QUESTIONNAIRE FOR ADULTS WITH HYPERTENSION

All questions are strictly confidential. Please be as honest.

#### SECTION A: SOCIO-DEMOGRAPHIC AND HEALTH-RELATED DATA

1. How old are you? Years
2. Gender: Male  Female
3. What is your marital status? Single  Widowed  Divorced   
Separated  Married
4. What is your highest education? Never went to school  Primary, 1-6  Secondary, 1-3   
Secondary, 4-6  Tertiary education
5. Which area do you live in? Urban  Rural
6. a) Have you ever smoked in your lifetime? Yes  No   
b) Have you smoked in the past 30 days? Yes  No
7. a) Have you ever use alcohol in your lifetime? Yes  No   
b) Have you ever use alcohol in the past 30 days? Yes  No
8. Do you ever suffer from Diabetes mellitus? Yes  No
9. Height .....
10. Weight .....
11. Calculated BMI .....
12. Blood Pressure readings.....
13. How would you rate your overall health at the present time?  
1.....2.....3.....4.....  
Poor Fair Good Very good

#### SECTION B: SELF-EFFICACY FOR HYPERTENSION

We would like to know how confident you are in doing certain activities. For each of the following questions, please choose the number that corresponds to your confidence that you can do the tasks regularly at the present time.

- **Get Information About Disease Item**
- 1. How confident are you that you can get information about your disease from community resources?  
1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally  
confident at all confident



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- **Obtain Help from Community, Family, Friends Scale**

2. How confident are you that you can get family and friends to help you with the things you need (such as household chores like shopping, cooking, or transport)?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Not Totally

confident at all confident

3. How confident are you that you can get emotional support from friends and family (such as listening or talking over your problems)?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Not Totally

confident at all confident

4. How confident are you that you can get emotional support from resources other than friends or family, if needed?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Not Totally

confident at all confident

5. How confident are you that you can get help with your daily tasks (such as housecleaning, yard work, meals, or personal hygiene) from resources other than friends or family, if needed?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Not Totally

confident at all confident

- **Communicate With Physician Scale**

6. How confident are you that you can ask your doctor things about your illness that concerns you?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Not Totally

confident at all confident

7. How confident are you that you can discuss openly with your doctor any personal problems that may be related to your illness?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Not Totally

confident at all confident

8. How confident are you that you can get work out differences with your doctor when they arise?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Not Totally

confident at all confident

- **Manage Disease in General Scale**



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9. Having an illness often means doing different tasks and activities to manage your condition. How confident are you that you can do all the things necessary to manage your condition on a regular basis?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally

confident at all confident

10. How confident are you that you can judge when the changes in your illness mean you should visit a doctor?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally

confident at all confident

11. How confident are you that you can do the different tasks and activities needed to manage your health condition so as to reduce your need to see a doctor?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally

confident at all confident

12. How confident are you that you can reduce the emotional distress caused by your health condition so that it does not affect your everyday life?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally

confident at all confident

13. How confident are you that you can do things other than just taking medication to reduce how much your illness affects your everyday life?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally

confident at all confident

## • Do Chores Scale

14. How confident are you that you can complete your household chores, such as vacuuming and yard work, despite your health problems?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally

confident at all confident

15. How confident are you that you can get your errands done despite your health problems?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally

confident at all confident

16. How confident are you that you can get your shopping done despite your health problems?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally

confident at all confident

## • Social/Recreational Activities Scale

17. How confident are you that you can continue to do your hobbies and recreation?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally

confident at all confident





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18. How confident are you that you can continue to do the things you like to do with friends and family (such as social visits and recreation)?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally  
confident at all confident

### • Manage Symptoms Scale

19. How confident are you that you can reduce your physical discomfort or pain?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally  
confident at all confident

20. How confident are you that you can keep the fatigue caused by your disease from interfering with the things you want to do?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally  
confident at all confident

21. How confident are you that you can keep the physical discomfort or pain of your disease from interfering with the things you want to do?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally  
confident at all confident

22. How confident are you that you can keep any other symptoms or health problems you have from interfering with the things you want to do?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally  
confident at all confident

23. How confident are you that you can control any symptoms or health problems you have so that they don't interfere with the things you want to do?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Not Totally  
confident at all confident

## SECTION C: LEVELS OF PHYSICAL ACTIVITY PARTICIPATION

1. Considering a **7-Day period** (a week), how many times on the average do you do the following kinds of exercise for **more than 15 minutes** during your **free time** (write on each line the appropriate number).

### Times Per Week

a) STRENUOUS EXERCISE (HEART BEATS RAPIDLY)  
(i.e. running, jogging, hockey, football, soccer, squash, basketball, judo, roller skating, vigorous long distance bicycling) .....

b) MODERATE EXERCISE (NOT EXHAUSTING)  
(i.e. fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, popular and .....



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folk dancing)

c) **MILD EXERCISE (MINIMAL EFFORT)**

(i.e. yoga, archery, fishing from river bank, bowling, horseshoes, golf, easy walking)

.....

## **SECTION D: BARRIERS AND FACILITATORS TO PHYSICAL ACTIVITY PARTICIPATION**

Select by tick (✓) responses from list below that most closely reflect your perception of what decreases (barriers) and increased (facilitators) your willingness to engage in physical activity.

<b>Barriers</b>	<b>Facilitators</b>
Lack of motivation <input type="checkbox"/>	Feeling healthy <input type="checkbox"/>
Preferring to spend time doing other things <input type="checkbox"/>	Wanting to feel better <input type="checkbox"/>
Bad weather <input type="checkbox"/>	Wanting to improve health <input type="checkbox"/>
Being too fatigued <input type="checkbox"/>	Wanting enhanced physical mobility <input type="checkbox"/>
Health conditions <input type="checkbox"/>	Wanting increased strength <input type="checkbox"/>
Lack of interest <input type="checkbox"/>	Knowing the value of increased exercise <input type="checkbox"/>
Depression <input type="checkbox"/>	Wanting increased energy <input type="checkbox"/>
Shortness of breath <input type="checkbox"/>	Enjoying how exercise feels <input type="checkbox"/>
Lack of time <input type="checkbox"/>	Wanting to manage weight <input type="checkbox"/>
Anxiety <input type="checkbox"/>	Belief in one's ability to be physically active <input type="checkbox"/>
Fear of increase of pain <input type="checkbox"/>	Encouragement from healthcare providers <input type="checkbox"/>
Not having access to exercise facilities <input type="checkbox"/>	Encouragement from family or friends <input type="checkbox"/>
Fear of injury <input type="checkbox"/>	High expectations from family or friends <input type="checkbox"/>
Not wanting to become more fatigued <input type="checkbox"/>	Exercising with others <input type="checkbox"/>
Self-conscious about appearance <input type="checkbox"/>	High expectations from healthcare providers <input type="checkbox"/>
Limited financial resources <input type="checkbox"/>	Having less pain <input type="checkbox"/>
Fear of falling <input type="checkbox"/>	Receiving information on how to exercise <input type="checkbox"/>
No place to sit down while exercising outside	Wanting to decrease pain <input type="checkbox"/>
Lack of support from family and friends <input type="checkbox"/>	Wanting to decrease depression <input type="checkbox"/>
Unpleasant sensation associated with exercise	Wanting to decrease anxiety <input type="checkbox"/>
Lack of encouragement <input type="checkbox"/>	Having a supportive exercise leader <input type="checkbox"/>
Low expectations by self to exercise <input type="checkbox"/>	Attending exercise classes <input type="checkbox"/>
Fear of making health worse <input type="checkbox"/>	Having financial resources <input type="checkbox"/>
Poor sidewalks <input type="checkbox"/>	
Fear of crime during outside activity <input type="checkbox"/>	
Physically demanding job <input type="checkbox"/>	
Kidney disease <input type="checkbox"/>	
Low expectations from family or friends <input type="checkbox"/>	
Lack of knowledge of the benefits of exercise	
Doctor advise not to exercise <input type="checkbox"/>	
Concerns exercise will make you too thirsty <input type="checkbox"/>	
Low expectations from healthcare providers <input type="checkbox"/>	

***Thank you for your participation***



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## APPENDIX P

### QUESTIONNAIRE FOR HEALTH PROFESSIONALS

#### PHYSICAL ACTIVITY EXIT INTERVIEW

Below are some physical activity ideas that can be discussed between you and the patient. Please answer either YES or NO by the indication of a tick (✓).

	QUESTIONS	YES	NO
1	Do you discuss the topic of physical activity with your patients?		
2	Do you advise your patients to become more physically active?		
3	Do you discuss the benefits of physical activity with your patients?		
4	Do you discuss with your patients on their past experiences with physical activity?		
5	Do you discuss the difficult situations patients might encounter or problems they might have in trying to become more physically active?		
6	Do you inform your patients on how FREQUENTLY they should exercise?		
7	Do you inform your patients on how LONG they should exercise?		
8	Do you inform your patients on how HARD they should exercise?		
9	Do you inform your patients on the TYPES of exercise they should do?		
10	Do you and your patient put the plan to become more physically active in writing?		
11	Do you give any written materials about physical activity or exercise during each day's clinic visit?		
12	Do you state to the patients that you are planning to discuss their physical activity on a future visit?		

***Thank you for your participation***



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## APPENDIX R

### **IBIBAZO KU BANTU BAKURU BAFITE HYPERTENSION.**

Turakwizeza ibanga muri ibi bibazo byose. Gira ukuri uko bishoboka kose.

#### **IGICE A: IBIJYANYE N'IRANGAMIMERERE N'UBUZIMA BYAWE**

1. Ufite imyaka ingaha? Imyaka  2. Igitsina: Gabo  Gore
3. Subiza ibi bibazo bikurikira? Ingaragu Umupfakazi Natandukanye nuwo twashakanye   
Simbana nuwo twashakanye Ndubatse
4. Amashuri wize ni angaha? Nabwo nize rwose Amashuri abanza, 1-6 Ayisumbuye, 1-3   
Amashuri yisumbuye Amashuri makuru
5. Uba mu kihe gice? Umugi  icyaro
6. a) Wigeze unywa itabi mu buzima bwawe? Yego  Oya   
b) Wigeze unywa itabi mu minsi 30 ishize? Yego  Oya
7. a) Wigeze unywa inzoga mu buzima bwawe? Yego  Oya   
b) Wigeze unywa inzoga mu minsi 30 ishize? Yego  Oya
8. Wigeze udwara diabeti? Yego  Oya
9. Uburebure ..... 10. Ibiro .....
11. Ikigereranyo cy'ibinure ufatiye ku burebure n'ibiro .....
12. Ingano y'umuvuduko w'amaraso .....
13. Ese wumva ubuzima bwawe bumeze bute?  
1.....2.....3.....4.....  
Bubi Bugereranyije Bwiza Bwiza cyane

#### **IGICE B: UKO WITWARA BIGENDANYE N'UMUVUDUKO UKABIJE W'AMARASO**

Twifuzaga kumenya uburyo witwara mu mibereho yawe ya buri muni. Usabwe guhitamo umubare ukwiriye n'ububashe mu mirimo ikurikira kuri buri kibazo.

- **Kubona amakuru agendanye n'indwara:**

24. Ese byaba bigushobokera kubona amakuru ajyanye n'indwara ava mu bigenewe abaturage?  
1.....2.....3.....4.....5.....6.....7.....8.....9.....10  
Ntibishobokera rwose Ndabishobora rwose

- **Kubona ubufasha kubaturage, umuryango n'inshuti:**



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25. Ese biragushobokera mu kuba umuryango wawe cyangwa inshuti bagufasha mu byo ukeneye nko guhaha, guteka kimwe no mu ngendo ukora?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera  
rwose

Ndabishobora  
rwose

26. Ese biragushobokera ko umuryango wawe cyangwa inshuti bakuba hafi mu kukumva kimwe no kukuvugisha ku bibazo byawe?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera  
rwose

Ndabishobora  
rwose

27. Ese biragushobokera ko ugira ibindi bintu bigukomeza mu bitekerezo bitari inshuti n'umuryango wawe, igihe ubikeneye?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera  
rwose

Ndabishobora  
rwose

28. Ese biragushobokera mu kubona ikigufasha mu mirimo ya buri muni nko gusukura mu inzu, ahakikije inzu, icyo kurya kimwe n'isuku yawe bitavuye ku inshuti n'umuryango wawe, igihe ubikeneye?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera  
rwose

Ndabishobora  
rwose

• **Gushyikirana n'umuganga:**

29. Ese biragushobokera mu kubaza umuganga wawe ibintu bijyanye n'uburwayi bwawe kandi bikwerekeye?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera  
rwose

Ndabishobora  
rwose

30. Ese biragushobokera ko muganira n'umuganga wawe mweruye ku bibazo ibyo aribyo byose birebana n'uburwayi bwawe?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera  
rwose

Ndabishobora  
rwose

31. Ese biragushobokera mu gukora akazi binyuranye n'ibyo wumvikanyeho na Muganga wawe mu gihe bizamutse?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera  
rwose

Ndabishobora  
rwose

• **Kubana n'indwara muri rusange:**

32. Kugira uburwayi akenshi bivuga kugira ibintu bimwe na bimwe ukora mu kukorohereza. Ese biragushobokera gukora ibintu byose bikenewe mu korohereza uburwayi bwawe ngo butazamuka?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera  
rwose

Ndabishobora  
rwose



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33. Ese biragushobokera gufata icyemezo cyo kureba muganga wawe mu gihe uburwayi bwawe bugize impinduka?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora

rwose

rwose

34. Ese biragushobokera gukora ibintu bitandukanye bikenewe mu koroshya uburwayi bwawe bishobora kugabanya ugushaka kujya kureba umuganga?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora

rwose

rwose

35. Ese biragushobokera ko ushobora kugabanya ukwiheba ushobora guterwa n'uko uburwayi bwawe bwifashe bikaba byagira icyo bihungabanya ku mibereho yawe ya buri munsu?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora

rwose

rwose

36. Ese biragushobokera mu gukora ibintu bitari ugufata imiti gusa mu kugabanya uburyo uburwayi bwawe buhungabanya imibereho yawe ya buri munsu?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora

rwose

rwose

• **Gukora imirimo:**

37. Ese biragushobokera mu kuzura imirimo yo mu rugo nko gutunganya/gusukura aho utuye n'akandi kazi bigendanye ugendeye ku bibazo by'ubuzima bwawe?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora

rwose

rwose

38. Ese biragushobokera gusohoka ugatembera ugendeye ku bibazo by'ubuzima bwawe?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora

rwose

rwose

39. Ese biragushobokera kujya guhaha/ kugira ibyo ugura ugendeye ku bibazo by'ubuzima bwawe?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora

rwose

rwose

• **Ubusabane n'ukwidagadura:**

40. Ese biragushobokera gukomeza gukora ibyo ukunda cyangwa kwishimisha?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora

rwose

rwose

41. Ese biragushobokera gukomeza gukora ibintu ukunda n'inshuti n'umuryango wawe nko gusurana cyangwa kwishimisha?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora



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rwose

rwose

• **Kubana n'ibimenyetso by'indwara:**

42. Ese biragushobokera kugabanya ukwiyumva utameze neza cyangwa ububabare?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora

rwose

rwose

43. Ese biragushobokera kumenyera umunaniro utewe n'indwara biva ku bintu ushaka gukora?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora

rwose

rwose

44. Ese biragushobokera kumenyera ukumva utameze neza cyangwa ububabare bw'indwara yawe biva ku bintu ushaka gukora?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora

rwose

rwose

45. Ese biragushobokera kumenyera ibindi bimenyetso cyangwa ibibazo b'ubuzima ufite biva ku bintu ushaka gukora?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora

rwose

rwose

46. Ese biragushobokera kugenzura ibimenyetso ibyo ari byo byose cyangwa ibibazo by'ubuzima ufite biva ku bintu ushaka gukora?

1.....2.....3.....4.....5.....6.....7.....8.....9.....10

Ntibishobokera

Ndabishobora

rwose

rwose

## **IGICE C: IMIRIMO NTAKAZANGUFU INYURANYE MU BUZIMA BUSANZWE**

2. Uhereye ku **minsi 7 ishize**, ni kangahe wakurikiranye imyitozo mu gihe kiri **hejuru y'iminota 15** mu gihe cy'umwanya wawe usanzwe (wandike kuri biri murungo umubare ukwiriye).

**Inshuro mu cyumweru**

d) IMYITOZO IGORANYE (UMUTIMA UTERA VUBA)

(i.e. kwiruka, umupira w'amaguru, umupira w'intoki wa "basketball", umukino wo gukirana, kunyonga igali ahantu harehare)

.....

e) IMYITOZO IGERERANYIJE (ITANANIJE)

(i.e. kugenda wihuta, umukino wa "tennis", kunyonga igali, umupira w'intoki wa "volleyball", koga, kubyina/guceza)

.....

f) IMYITOZO YOROSHYE (IMBARAGA NKE)



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(i.e. yoga, kurasa intego, kuroba ku mugezi, umukino  
wa "golf", kugenda) .....

## **IGICE D: IMBOGAMIZI N'IBYOROHAREZA UKWITABIRA IMIRIMO NTAKAZANGUFU**

Hitamo ukoresheje (√) ibisubizo byo kuru uru rutonde rwo hasi byerekana imyumvire yawe ku bigabanya (imbogamizi) cyangwa byongera (ibyorohereza) ubushake bwawe bwo kwitabira kwawe mu murimo ntakazangufu.

### **Imbogamizi**

- Nta kibinkangurira
- Gutakaza umwanya wo gukora
- Igihe/ ikirere kibi
- Kumva unaniwe
- uko ubuzima buhagaze
- Nta bushake
- Ubwigunge
- Umwuka muke
- Kubura umwanya
- Ubwoba
- Ubwoba kukuzamuka k'ububabare
- Kutagira aho gukorera imyitoto
- Ubwoba bwo gukomereka
- Kudashaka kurushaho kunanirwa
- Uko numva ngaragara
- Nta buryo/ bushobozi
- Ubwoba bwo kugwa
- Ntaho kwicara mugihe ukorera hanze
- Nta guterwa imbaraga ku muryango/inshuti
- Kumva ntameze neza biva ku myitoto
- Nta guterwa imbaraga
- Nta byiyumvo mu gukora imyitoto
- Kugira ubwoba ko ubuzima bumera nabi
- Aho abanyamaguru bagendera hameze nabi
- Ubwoba kukugirirwa nabi hanze mu imyitoto
- Bisaba akazi
- Uburwayi bw'imyiko
- Nta byiyumvo biva ku muryango/ inshuti
- Nta bumenyi ku kamaro ko gukora imyitoto
- Muganga ntabwo yabwiye gukora imyitoto
- Umwitoto untera inyota
- Nta byiyumvo biva ku baganga

### **Ibyorohereza**

- Kumva ufite ubuzima bwiza
- Kumva umerewe neza
- Gushaka kwongera ubuzima
- Bitera ingingo gukora neza
- Gushaka kongera gukomera
- Kumenya agaciro ko kongera imyitoto
- Gushaka kongera imbaraga
- Kwishimira uko umwitoto uagenda
- Gushaka kutongera ibiro
- Kwizera akamenyero ko kumva ukomeye
- Uguterwa imbaraga bivuye ku baganga
- Uguterwa imbaraga biva ku muryango/inshuti
- Ibyiyumvo birenze biva ku muryango/ inshuti
- Gukorana imyitoto n'abandi
- Ibyiyumvo birenze biva ku baganga
- Kugira ububabare buke
- Kubona amakuru yuko bakora imyitoto
- Gushaka kugabanya ububabare
- Gushaka kuganya ubwinguge
- Kugabanya ubwoba
- Kugira umuyobozi w'imyitoto ugukomeza
- Kwitabira amahuriro bakoreramo imyitoto
- Kugira uburyo/ubushobozi

***Murakoze cyane mu kwifatanya natwe***





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## APPENDIX S

### QUESTIONNAIRE POUR LES PROFESSIONNELS DE SANTE

#### INTERVIEW DE SORTIE POUR L'ACTIVITE PHYSIQUE

Les idées aux activités physiques ci-dessous peuvent être discutées entre vous et le patient. Répondez QUI ou NON en indiquant la réponse par la marque (√).

N <sup>o</sup>	QUESTIONS	OUI	NON
1	Discuteriez-vous avec vos patients d'un thème d'activité physique?		
2	Conseilleriez-vous vos patients à devenir plus actif physiquement ?		
3	Discuteriez-vous avec vos patients du rendement d'activité physique?		
4	Discuteriez-vous avec vos patients sur les expériences vécues en activité physique ?		
5	Discuteriez-vous des situations difficiles des patients rencontrées ou des problèmes qu'ils auraient eu en essayant de devenir plus actif physiquement ?		
6	Informeriez-vous vos patients au comment ils s'exerceraient <i>fréquemment</i> ?		
7	Informeriez-vous vos patients au <i>combien de temps</i> ils s'exerceraient ?		
8	Informeriez-vous vos patients à <i>quel niveau</i> ils s'exerceraient ?		
9	Informeriez-vous vos patients à <i>quel genre</i> d'exercices ils pourraient faire ?		
10	Et vous et votre patient, instauriez-vous un plan pour devenir plus actif physiquement à l'écrit ?		
11	Donneriez-vous un matériel didactique écrit sur l'activité ou l'exercice physique pendant chacune de visite clinique ?		
12	Etabliez-vous aux patients ce que vous planifiez à discuter à leur activité physique lors de leur prochaine visite ?		

***Merci de votre accueil et de votre participation***