

**PREVALENCE OF PHYSICAL INACTIVITY
AMONG SCHOOL GOING ADOLESCENTS IN
NAIROBI, KENYA**

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ABSTRACT

Physical inactivity is recognized as an important determinant for chronic diseases of lifestyle. According to World Health Organization (WHO) physical inactivity is one of the major underlying causes of non-communicable diseases, which contributes significantly to the global burden of death, disease and disability. In developing economies and specifically Sub-Saharan Africa physical inactivity has been identified as a risk factor along with tobacco use, poor nutrition and poor diet as this has increasingly formed part of today's lifestyle. Physical activity declines with age this decline is more marked during the adolescent period. The aim of this study was to determine the prevalence of physical inactivity and factors associated with it among adolescents in Nairobi, Kenya. A descriptive quantitative research design using a cross sectional survey was used. Four hundred and twenty (420) high school learners were selected using a stratified random sampling technique. A self administered questionnaire adopted from the Sub-Saharan African Questionnaire (SSAQ) was used to collect data. A response rate of 86.9% was obtained. Descriptive and inferential statistics using the Statistical Package for Social Scientist (SPSS version 14.0) was used to analyze the data. Chi square test was used to determine the relationship and association between different variables. Alpha level was set at 0.05. The mean age of the sample was 16.19 years (SD=0.969). Females constituted 54.7% while males were only 45.3% of the sample. The majority (84.1%) of the learners reported current participation in physical activity. Almost a third (28.2%) of the participants was classified as physically inactive while 71.8% were classified as physically active when the WHO's guidelines for classification of physical activity was used. No significant difference in the frequency of learners that participated in physical

activity by gender was observed. A significant decrease in the prevalence of physical activity was observed from form 2 to form 4. Older learners were significantly more likely to be classified as sedentary than younger learners. The study findings demonstrate that socio-demographic characteristics such as age, physical education, after school activities, and socio-economic factors influence the learners' participation in physical activity. The study further highlighted the need for health promotion intervention aimed at promoting physical activity among school going learners. These physical activity promoting programmes should consider the factors influencing physical activity levels.

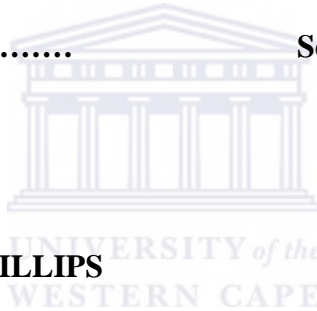


DECLARATION

I hereby declare that “*Prevalence of physical inactivity among school going adolescents in Nairobi, Kenya*”, is my own work, that it has not been submitted 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 complete references.

JEPKEMOI JOANNE KIBET

Signature..... September 2007



Witness: Dr. J S PHILLIPS

Signature September 2007

DEDICATION

I dedicate this thesis to my husband Ken for his continuous support and understanding through out the good and bad times of my study and to my son Kelvin who never doubted me. You all considered this a shared goal. May God bless you.

To my parents, Josiah and Judith Kibet this accomplishment is reaping of seeds you have sown. Your ability to embrace my deepest needs and accept the challenge to invest in me without conditions I am grateful to God for who you are. May God bless you



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CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

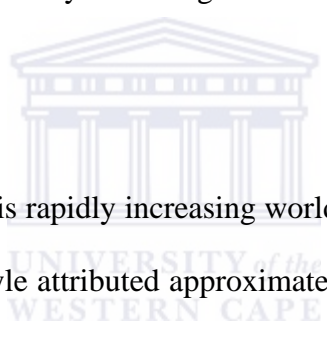
In this chapter the background of the study describes how physical inactivity is a health burden in the world and the initiatives of World Health Organisation (WHO) in addressing the increasing burden of chronic diseases of lifestyle as a result of physical inactivity. The statement of the problem, aims, and specific objectives of the study are stated. Finally the significance of the study demonstrates the need for a study on participation in physical activity among school going adolescents in Nairobi Kenya. The chapter ends with definition of terms used in the study.

1.2 BACKGROUND OF THE STUDY

Physical inactivity or sedentary lifestyle is a major underlying cause of major non communicable disease/chronic diseases of lifestyle, which contributes significantly to the global burden of diseases, death and disabilities (WHO, 2002a). Initial findings from a WHO study on risk factors suggests that physical inactivity is one of the 10 leading causes of death and disability globally. Physical inactivity is responsible for more than two million deaths every year (WHO, 2003a).

Furthermore physical inactivity is an established risk factor for chronic diseases of lifestyle like diabetes, cardiovascular diseases, colon cancers, overweight, depression and anxiety (Booth, Bauman & Owen, 2002). Booth (2000) stated that chronic diseases of

lifestyle is responsible for 50% of all deaths in developing countries like Kenya and 85% of all deaths in developed countries. As modernization gradually increases in most developing countries, people become more sedentary (Dressler, 2000). According to Biddle & Mutrie (2001) most of the people around the world are living in an advanced technology society where physical activity is less of a central focus in their daily lives. The WHO (WHO, 2002a; WHO, 2003a) reported that in countries around the world between 60% and 80% of their adults are simply not physically active enough to benefit their health. During the 55th World Health Assembly (WHA, 2004), Move for Health was officially launched as part of a wider WHO strategy to address the alarming growing burden of chronic diseases of lifestyles through its Global Strategy on Diet, Physical activity and Health.



The burden of chronic diseases is rapidly increasing world wide. It was calculated that, in 2001, chronic diseases of lifestyle attributed approximately 60% of the 56.5 million total reported deaths in the world and approximately 46% of the burden diseases (WHO, 2001). The proportion of the burden of non communicable diseases (NCDs) is expected to increase to 57% by 2020. Almost half of the total chronic diseases deaths are attributable to cardiovascular diseases, obesity and diabetes are showing worrying trends not only because they already affect a large population, but also because they have started to appear earlier in life. The chronic diseases of lifestyle problem are far from being limited to the developed regions of the world. Contrary to widely held beliefs, developing countries are increasingly suffering from high levels of public health problems related to communicable diseases. In five out of the six regions of the WHO, deaths caused by

chronic diseases dominated the mortality statistics (WHO, 2002a). Although HIV/AIDS malaria and tuberculosis along with other infectious diseases still predominate in Sub-Saharan Africa and will do so for the foreseeable future, 79% of all deaths world wide that are attributable to chronic diseases are already occurring in developing countries (WHO, 2002a).

Significant causes of diseases, disability and death in growing economies and with specific reference to Sub Saharan Africa, has been associated with infectious diseases and malnutrition and these problems are still public health concerns in Sub Saharan Africa countries (Caballero, 2001). The WHO (WHO, 2002a) states that this situation is worse where existing burden of infectious diseases is intensified by the HIV/AIDS pandemic. It was reported by the Regional Advisor for Health promotion for WHO Regional Office for Africa (AFRO) that in addition to these alarming problems of infectious disease faced by Sub-Saharan Africa, non communicable diseases have become a major problem due to the rapid transition in lifestyle leading to reduced physical activity, tobacco use and changes in diets (WHO, 2002a). He further states that although distinct physical activity patterns are not yet discernible in Africa, 'there is a clear and unmistakable tendency towards sedentary lifestyle among all age groups'.

A projection of an increase in chronic diseases of lifestyle mortality in all developing countries in the world is due to a lifestyle associated with industrialization, anticipated increase in life expectancy, urbanization and changes in diets (WHO, 2002a). According

to Unwin (2001) communicable diseases will remain the predominant health problem for the populations in sub-Saharan Africa for the next 10 to 20 years and it is estimated that by 2020, chronic diseases of lifestyle in Sub-Saharan Africa will constitute almost 50% of the burden of diseases. The burden of non-communicable diseases in Sub-Saharan Africa is already substantial and patients with these conditions make significant demands on health resources. In a study by Torun, Stein, Schroeder, Grajeda, Conlisk, Rodriguez, Mendez & Martorell (2002) they commented that the rise in urban rural migration in developing countries leads to change in lifestyle and that living or working in an urban environment increases sedentary lifestyle. Increased opportunities for mechanized or sedentary employment, which accelerates the development of adult high risk behaviours, have been associated with the urban environment (Torun et al., 2002).

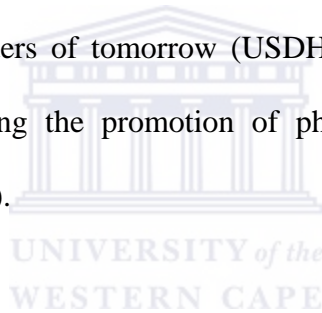
It is clear that the earlier labeling of chronic diseases as 'diseases of affluence' is increasingly a misnomer, as they emerge both in poorer countries and in the poorer population groups in developed countries. This shift in the patterns of diseases is taking place at an accelerating rate; furthermore, it is occurring at a faster rate in developing countries than it is in the industrialized regions of the world half a century ago (Popkin, 2002). This rate of change, together with the increasing burden of disease is creating a major public health threat which demand immediate and effective action. It has been projected that, by 2020 chronic diseases will account for almost three quarters of all deaths worldwide, and that 71% of deaths due to ischemic heart disease, 75% of deaths due to stroke, and 70 % of deaths due to diabetes will occur in the developing countries

(WHO, 2002a). On a global basis, 60% of burden of chronic diseases will occur in developing countries (Aboderin, 2001).

Due to the wide range of health consequences, physical inactivity is a health risk behavior that results in a high morbidity and mortality rate in many countries, and adversely increases national health expenditures (Colditz, 1999). Scientific evidence has shown that habitual physical activity in its widest sense provides people of all ages with substantial physical, social and mental gains and well being through out their life span (WHO, 2003a; Fox & Boutcher, 2000). The Center for Disease Control and Prevention in the USA warned that physical activity levels of all people across all ages tended to decrease (Center for Disease Control and Prevention, 2001).

Sallis, Calfas, Nichols, Sarkin, Marilyn, Caparosa, Thomson & Alcaraz (1999) argued that a huge decline of physical activity occur during the transition from high school to college. There is a growing concern about inadequate physical activity levels among adolescents in developed countries. This trend of physical inactivity in the developed world is also reflected in the developing countries. In the Global School-based Student Health Survey (GSSHS) in Kenya among students aged 13-15 years, 12% of these students were found to be physically active for a total 60 minutes per day on all 7 days during the 7 days preceding the survey (GSSHS, 2003). In the same survey, it was found that overall 37.8% of the students spent three or more hours per day sitting and watching television, playing computer games, talking to friends, or doing other sitting activities (GSSHS, 2003).

Adolescence represents a unique period in the life cycle that brings special challenges and opportunities. No longer children and not yet adults, adolescents make significant choices about their health and develop attitudes and health practices that continue into adulthood. These practices affect their current safety and wellbeing as well as influence their risk for future serious chronic diseases. In this period of exploration, adolescents' also consciously starts to make choices about their future and develop ideas about their roles in society. Adolescents thus represent opportunity to encourage healthy choices and pro-social behaviours. Promoting the health and safety of adolescents is of critical importance to the future of a nation. By investing in adolescents' health today, we invest in workforce, parents and leaders of tomorrow (USDHS, 2004). Patterns of inactivity begin early in life thus making the promotion of physical activity among children imperative (Summerfield, 2000).



1.3 PROBLEM STATEMENT

Physical inactivity is an established risk factor for most chronic diseases of lifestyle. Between 60% and 80% of adults in countries around the world are simply not active enough to benefit their health. The decline in physical activity is mostly experienced during the transition from adolescence to adulthood. The WHO (2003b), has identified physical inactivity as a public health concern globally. Therefore to address the growing concerns regarding the burden of chronic diseases of lifestyle, WHO through its global strategy on diet, physical activity and health mandated World Health Assembly (WHA) to put in place strategies to fight the rise of these non communicable diseases. Among the

strategies suggested by WHA, the health sector was requested to take the leading role in making policy decisions through the global strategy on physical activity to address the growing burden of diseases (WHO, 2003b). Since it is generally important that the onset of many chronic diseases of lifestyle lies in childhood through to adolescence, preventive strategies should start as early in life as possible. To date no study about prevalence of physical inactivity among high school going adolescents has been done in Kenya. It is in this regard that a study of this kind is needed to explore the prevalence and factors contributing to physical inactivity among high school going learners in Nairobi, Kenya.

1.4 AIM OF THE STUDY

The overall aim of the study is to determine the prevalence of physical inactivity among high school learners in Nairobi, Kenya and to determine the factors influencing their levels of physical activity in relation to their socio-economic characteristics.

1.5 SPECIFIC OBJECTIVES

1. To identify background characteristics of learners reporting current participation in physical activity.
2. To establish the levels of physical activity (according to WHO guidelines) among adolescents in high schools in Nairobi, Kenya.
3. To identify factors influencing levels of physical activity among high school learners in Nairobi, Kenya.
4. To make recommendations based on the results of the study.

1.6 SIGNIFICANCE OF THE STUDY

One of the strategies suggested by the World Health Assembly was that the health sector be called upon to take up the leading role in making policy decisions through the Global Strategy on physical activity to address the growing burden of chronic diseases (WHO, 2003b). It is hoped that the results of this study will identify the prevalence and factors contributing to physical inactivity among high school going adolescents in Nairobi. The results will serve as a strategy to raise public awareness about the health needs, as well as knowing what is required of the community towards the health needs of adolescence. The results of the study will be a guiding source of information to the decision makers when enacting policies involving adolescence. The findings of the study will contribute to the knowledge of physical activity among adolescents in Kenya. Finally the results of this study will contribute to the development and implementation of a physical activity health promotion programmes among high school going learners. This will be done by the Ministry of Education and Ministry of Health.

1.7 DEFINITIONS OF KEY TERMS

Adolescents: This refers to the young population between the ages of fourteen and twenty-five years for males and twelve to twenty one years for females (Spear and Kulbok, 2001).

Physical activity: This is any bodily movement produced by skeletal muscles that results in energy expenditure and is positively correlated with physical fitness (Centre for Disease Control and Prevention, 2002).

Physical inactivity: It is defined as a state in which bodily movement is minimal. Referring to energy expenditure; inactivity represents a state in which energy expenditure approximates resting metabolic rate (Dietz, 1996).

Sedentary: This is the work or activities in which and individual spends a lot of time sitting down and not moving (Hornby, 2000).

Lifestyle: The way in which a person or a group live (Hornby, 2000)

Chronic disease of lifestyle: These are a group of disease that share similar risk factors as a result of exposure, over many decades, to unhealthy diets, smoking, lack of exercise and possibly stress. The major risk factors include high blood pressure, tobacco addiction, high blood cholesterol and diabetes. These are also called non-communicable diseases or degenerative disease (Fourie, 2001).

Health promotion: It is defined as the process of enabling people to increase control over, and to improve, their health; to reach a state of complete physical, mental and social well-being (Coulson, Goldstein & Ntuli, 2002).

Public health: It is the science and art of promoting, and protecting and improving health and well being through organized efforts of society (McPherson, 2001).



1.8 OUTLINE OF CHAPTERS

Chapter one includes the rationale, aims and significance of the study. The overall objective of the study was to identify the prevalence of physical inactivity among high school learners in Nairobi.

Chapter two presents a review of relevant literature to understand the need for the study. It focuses on the health benefits of physical activity to health, the recommended levels of physical activity and the current guidelines of physical activity participation for the youth. The prevalence of physical inactivity among adolescents and the consequence of physical inactivity are also reviewed. Factors influencing physical activity among the youth was reviewed, the factors included physiological, physical environment, weather, social and role of physiotherapist in the promotion of physical activity w also reviewed.

Chapter three considers the methodological issues relevant to the study. It also provides an overview on the study design. Other aspects discussed in this chapter include, but are not limited to, research settings, procedures, and the study sample and data analysis.

Chapter four contains the results of the statistical analysis of the data that attempt to answer the objectives stated in the chapter one.

Chapter five presents the discussion of the results presented in the chapter four.

Chapter six draws conclusions based on the study. It also attempts to make recommendations based on the study. The limitations of the study are also outlined.



CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews relevant literature on the benefits of physical activity, the recommended levels of physical activity and the current guidelines of physical activity participation for youth. The prevalence of physical inactivity and the consequence of physical inactivity are also reviewed. The chapter concludes with a review of the literature on the role of the physiotherapist in the promotion of physical activity.

2.2 BENEFITS OF PHYSICAL ACTIVITY TO HEALTH

Physical activity is an effective way for individuals to help prevent serious diseases and a cost effective way for societies to improve public health (WHO, 2003c). Physical inactivity or sedentary lifestyle is one of the leading causes of major non-communicable diseases; which contribute substantially to the global burden of diseases, deaths and disabilities (WHO, 2002a). The WHO (2002a) further stated that regular physical activity provides young people like adolescents with consequential physical, mental, and social health benefits. Physical activity can improve quality of life in many ways for people of all ages. The WHO (2003c) stated that one of the major challenges in the prevention of non-communicable diseases and the promotion of physical activity is communicating the importance of benefits of physical activity to health. Scientific evidence has shown that participation in regular physical activity, in its widest sense, provides people of all ages with significant physical, social and mental health benefits and well being throughout

their life span (Biddle, Fox & Boutcher, 2000; WHO, 2003d). Thus physical activity can improve quality of life in various ways for people of all ages. Studies have shown that people who are physically active can live longer than those who are sedentary. Besides living longer, those who participate in regular physical activity may have advantage in the ability to perform activities of daily living and enjoy many aspects of life (Kaplan, 2000). Benefits of physical activity to health are not limited to adolescents only, however its benefits have been well documented and are numerous. The following section focuses on the benefits of physical activity with specific reference to high school going adolescents (learners) and young adults.

2.2.1 Prevention of chronic diseases of lifestyle

Chronic diseases of lifestyle are a group of diseases that share similar factors as a result of exposure, over a number of years, to unhealthy diets, smoking, physical inactivity and possibly stress. The major risk factors include hypertension, tobacco addiction, high blood cholesterol and diabetes. Physical inactivity is a well-established risk factor for several chronic diseases. Given that physical activity (PA) habits developed early in life and may continue into adulthood, regular participation in PA during childhood and adolescence may be of critical importance in the prevention of chronic disease later in life (Talema, Yang, Viikari, Valimaki, Wanne & Raitakari, 2005). The importance of physical activity in reducing morbidity and mortality from chronic diseases and conditions has been well established (Pratt, Macera & wang, 2000; Martison, O'Connor & Pronk, 2001). According to Martison et al., (2001) physical inactivity is a predictor of subsequent disability in midlife and older populations. Childhood and adolescence are

ideal developmental periods for cultivating regular physical activity to reap health benefits across the lifespan (Kientzler, 1999). In addition to preventing chronic diseases of lifestyle, greater levels of physical activity can lessen complications among people with chronic diseases of life style (Hu, Stampfer, & Solomon, 2001).

Cardiovascular diseases remain the number one cause of death among adults. Literature on the relationship between cardiovascular diseases and physical activity clearly suggests that death from cardiovascular diseases decrease with increased physical activity participation (Dubbert, 2002). Physical inactivity is recognized as a risk factor for coronary artery disease, and physical activity may have a direct effect on the heart: It increases myocardial oxygen supply, decreases oxygen demand, and improves myocardial contraction and its electrical impulses stability (Thompson, Paffenbarger & Lee, 2001). Physical activity also increases the diameter and dilatory capacity of coronary arteries, increases collateral artery formation and reduces rates of progression of coronary artery atherosclerosis (Hambrecht, Wolf & Gielen (2000). Additionally, high levels of physical activity are associated with lower systolic and diastolic pressures (Fagard, 2001).

Several researchers and organization recommended that participation in physical activity can improve cardiovascular fitness, prevent or delay the development of high blood pressure and reduce symptoms of chronic depression (WHO, 2002a; WHO, 2003d; Dielh, Brewer, Van Raalte, Shaw, Fiero & Sorensen, 2001; Center for Disease Control and Prevention, 1999). Participation in regular aerobic physical activity increases exercise capacity and plays a big role in both primary and secondary prevention of cardiovascular

disorders (Fletcher, Balady, Blair, Blumententhal, Garsperen, Gaitman, Epstein, Froelicher, Pain & Pollock, 1996).

Physical activity and exercise can have a positive impact on physiological parameters affecting overall health, symptoms, and quality of life measures, as well as the incidence and course of specific diseases. For example, declines in cardiovascular fitness and muscle strength, important determinants of functional independence and performance of activities of daily living, can be reversed with aerobic and resistance training (Hunter, McCarthy & Bamman, 2004). Regular physical activity, fitness, and exercises are critically important for health and well being of people of all ages. Research has demonstrated that virtually all individuals can benefit from regular physical activity, whether they participate in vigorous exercise or some type of moderate health-enhancing physical activity (CDC, 2002). Even among the frail and very old adults, mobility and functioning can be improved through physical activity (Butler, Davis & Lewis, 1998). Regular physical activity has been shown to reduce the morbidity and mortality from many chronic diseases.

Participation in physical activity may intensify myocardial oxygen delivery and utilization (Pollock, Gaesser, Butcher, Despres, Dishman, Franklin & Garber, 1998). In a study done in Tanzania the demographic data showed that age-specific death rates from chronic diseases of lifestyles were higher than in wealthier countries, and mortality rates (Unwin, Setel, Rashid, Mugusi, Mbanya, Kitange, Hayes, Edwards, Aspray & Alberti, 2001). Non communicable diseases add to health inequalities within and between

countries, mainly affecting poor populations largely because of inequalities in the distribution of major risk factors (Mackenbach, Cavelaars & Kunst, 2000). The global burden of death will increasingly be dominated by non-communicable diseases; by 2020, congenital heart diseases and stroke are expected to be the leading causes of death and loss of disability-adjusted life years (WHO, 2002a). The role of physical inactivity as an independent lifestyle risk factor for development of cardiovascular disease, cancer, diabetes mellitus, obesity, depression and anxiety has been the subject of debate for a long time (Potvin, Gauvin & Nguyen, 1997). It also increases the risks of colon cancer, high blood pressure, osteoporosis, depression and anxiety.

A study by Pigman, Gan & Krousel-Wood (2002) reported that physical activity reduces the risk of cardiovascular diseases as well as some cancers and type 2 diabetes. Researchers have stated that physical activity lowers the risk of developing colon cancer (Slevin, 2002 & WHO, 2003d. Mackinnon (2002) demonstrated that physical activity may minimize the risk of colon cancer by effects of prostaglandin, reduce intestinal transit time and higher antioxidant levels. Fentem (1994) reported that physical activity is associated with reduced risk of breast cancer, which may be the result of effects on hormonal metabolism. Breast cancer has been recognized as a major health concern for all women across all ages, globally, which may start in early stages of young adulthood. Studies have shown that women who have been active throughout their lives reduce their risk of breast cancer (Steindorf, Schmidt, Kropp & Chang-Claude, 2003; Mackinnon, 2002; Bahr, 2001; Littman, Voigt, Beresford & Weiss, 2001).

A study done in South Africa recommended that physical activity be part of a treatment regime for individuals with Type 2 Diabetes mellitus (Van Rooijen, Rheeder, Eales & Molatoli, 2002). Birrer & Sedaghat, (2003) further stated that physical activity improves glucose tolerance by increasing insulin sensitivity and this may lower insulin requirement in insulin-treated diabetics. Pigman et al. (2002) also demonstrated that regular physical activity induces weight loss and positive changes in glucose metabolism. Furthermore, study done in Cameroon by Sobngwi, Mbanya, Unwin, Kenge, Fezeu, Minkoulou & Aspray (2002) evaluating and comparing physical activity patterns and its relationship with obesity, diabetes and hypertension in urban and rural dwellers in Cameroon, established that the prevalence of obesity, diabetes and hypertension was higher in urban than rural dwellers and this was significantly associated with lower levels of physical activity among urban dwellers.

Increasing rates of overweight and obesity among children and adolescents associated with physical inactivity is a global public health concern (WHO, 2003f). Childhood obesity increases the risk of adult obesity as well as chronic diseases of lifestyle such as type 2 diabetes, hypertension and cardiovascular diseases (Dietz, 1998).

2.2.2 Muscular-skeletal benefits

Regular physical activity is important for maintaining muscle strength, joint structure, joint functioning and bone health (CDC, 1996). Physical activity improves muscle strength and muscle flexibility. Developing muscle strength and flexibility is important for overall activity to improve one's ability to perform tasks and to reduce the potential of

injury (Pollock et al., 1998). While physical activity improves tendon and connective tissue functions (Fentem, 1994), it also improves flexibility, improves joint range of motion, increases lubrication of joints surface, reduces potential of injury and limits the effects of degenerative arthritis (Pollock et al., 1998). Pain and disability that may result from various types of arthritis often abate with appropriate exercise and physical activity (Roddy, Zhang & Doherty, 2005).

Weight bearing physical activity is essential for normal skeletal development during childhood and adolescence and for achieving and maintaining peak bone mass in young adults. The study by Shilton & Naughton, (2001) demonstrated that adolescents who are physically active influence the increase of uptake of calcium in the bones. Peak bone mass is achieved in physically active adolescents (Kesanieni, Danforth, Jensen, Kopelman, Lefebvre & Reeder (2001). Di Brezzo, Fort & Hoyt (2002) indicated that by increasing muscle strength and endurance and improving flexibility and posture, regular exercise helps to prevent back pain. Various studies done have recommended exercise as one of major priorities in the prevention and treatment of low back pains (O`Sullivan, 2000). Strength activities also help to maintain lean and flaccid muscle mass, which is often lost with dieting programmes alone (Lee, Rippe & Wilkinson, 1995).

2.2.3 Effects of physical activity on weight control and body composition

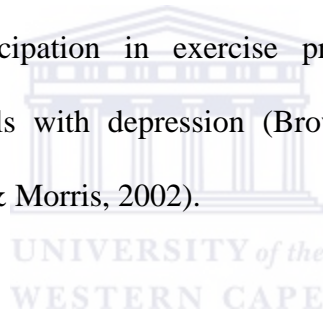
With adolescence obesity emerging as a major public health crisis as argued by Flegal, Carroll, Orgen & Johnson (2002) physical inactivity and sedentary behaviour are key targets for altering energy balance in reducing obesity (Centers for Disease Control and

Prevention, 1996; Goran, Reynolds & Lindquist, 1999). Fentem (1994) stated that participation in regular physical activity regulates energy balance and enhances control of body weight, thus preventing obesity related diseases and excessive weight gain. Pollock, et al., (1998) and Roberts, (2002) in his study showed a greater total fat loss with exercises and food restrictions than with food restriction alone, despite similar changes of body weight. Regular participation in physical activity can alter fuel oxidation, and exercise has been suggested to modify the composition of weight loss produced by food restriction alone.

Obese people who are active have lower morbidity and mortality rate than people whose weight are normal but are sedentary. This means that for obese people, starting and maintaining a regular exercise programme yields important health benefits, even in the absence of substantial weight loss. (Bahr, 2001 ; Deforche, De Bourdeaudhij & Tanghe, 2006) demonstrated in their study that overweight and obese adolescents show lower sport participation and have a less positive attitude toward physical activity. Regular participation in physical activity can modify both energy intake and body composition. Studies have shown that exercise may increase fat loss and decrease the loss of fat free-mass, which is essential for long- term weight maintenance (Serdula, Khan & Dietz, 2003). Heath & Smith, (1994) also stated that during adolescence, many risk factors like overweight, increased levels of blood lipids and cholesterol, increased anxiety and depression are linked to physical inactivity.

2.2.4. Mental and psychological benefits

When adolescents are involved in regular physical activity it helps them to prevent and control feelings of anxiety and depression. Studies on the psychological effects of exercise have found that regular physical activity can improve mood, reduce depression, better cognitive function, self esteem and self efficacy and improved feelings about self (Stathi, Fox & Mckenna, 2002). Researchers have found that physical activity is likely to reduce tension and anxiety, helps to better manage stress and influence sleep (Hong & Dimsdale, 2003). Physical inactivity characterizes many depressed persons and physical activity has been used with some success in the treatment of depression (Babyak, Blumenthal, Herman, Khatri, Doraiswamy & Moore, 2000; Paluska & Schwenk, 2000). Evidence suggests that participation in exercise programmes can add value to pharmacotherapy in individuals with depression (Brown, Ford, Burton, Marshall & Dobson, 2005; Manber, Allen & Morris, 2002).



Physical activity among adolescents is consistently related to higher levels of self esteem and lower levels of anxiety, stress and high-risk health behaviours (Rich, 1999). Females that exercise and who experience Pre-Menstrual Stress (PMS) show reduced symptoms such as fatigue, depression, anxiety and decreased appetite (Scully, Kremer, Meade, Graham & Dudgeon, 1998). Fox (2002) concluded that exercise has an effect on developing a positive self in adolescents and it can be particularly important for adolescents with low self-esteem. Through its effects on mental health, physical activity increases student's capacity for learning. One study found that spending more time in physical education did not have harmful effects on the standardized academic

achievement test scores of elementary school students; in fact, there was some evidence that participation in a two year health –related physical education programme had several significant favourable effects on academic achievement (Sallis, Mackenzie, Kolody, Lewis, Marshal & Rosengard (1999). Participating in physical activities and time away from the classroom and studying may be refreshing as a relief from boredom and time for mental diversion (Lindner, 1999). Among people who suffer from mental health illness, physical activity appears to improve the ability to perform activities of daily living (CDC, 1996). Physical activity can minimize the rates of violence among young people, promote tobacco free lifestyles and decrease other risky behaviours such as illicit drug use or unsafe sex (Ojukwu & Onah, 2002). Physical activity appears to improve quality of life by enhancing psychological wellbeing and by improving physical functioning in persons compromised by poor health. Physical activity may positively influence the immune system and may be of assistance in a range of disease state (Brown, Ballus & Heath, 2003). Research has shown that regular participation in physical activity enhances the effectiveness of psychological treatments and improves the quality of life and management of symptoms for people with various cases of mental health problems (Jones, Martin, O’Beney & Caro, 2004

2.2.5 Social benefits

Benefits of physical activity for population is not limited to health only but there is scientific evidence that physical activity has significance in education, socialization and working life, among other things (Yang, Telama, Leino & Viikari, 1999). Research has shown that children who engage in regular physical activity usually enjoy lots of

heartening experiences for example fun, success, enjoyment and peer relationship (Yang et al., 1999).

Regular participation in physical activity provides adolescents with important social health benefit. Research has demonstrated that the importance of physical activity for a society is not only limited to health. Physical activity provides opportunities for social interaction, can help enhance a community to identify and promote community integration (WHO, 2005c). Socialization is a strong significance of physical activity. In a study by Huddleston, Mertesdorf & Araki (2002) they emphasized that most of the highly scored reason for regular participation in physical activity among adolescents and young adults was to have fun and competition with others.

Team games and play promote positive social integration and facilitates the development of social skills in adolescents. During sports and recreation activities, individuals learn and share community values and attitudes and gain a better understanding of other groups in the society. Therefore, games and other physical activities gives young people opportunities for self-expression, building self confidence, feelings of achievement and social integration (WHO, 2002b). The WHO (2002b) further highlighted that physical activity is one of the major activities to build teamwork games that promotes social integration and facilitates the development of social skills in young children. These positive effects also help counteract the risks and harm caused by the demanding, competitive, stressful and sedentary way of life that is so common in young people's lives today. Regular participation in physical activity can have a dissuading effect on anti

social behaviour, including vandalism and petty crime. There is evidence that physical activity reduces sense of isolation and loneliness, it also encourages community network, and it prolongs independence in older people and help build social skills in children (WHO, 2005d). Research has shown that adolescents who participate in interscholastic sports are less likely to be regular and heavy smokers or use drugs (Eyre, Kahn, & Robertson, 2004). Lack of recreational activity may contribute to making young people more vulnerable to gangs, drugs, or violence. Infrequent participation in sports, a low grade in schools sports, and a poor school performance in adolescents is associated with physical inactivity in adulthood (Tammelin, Nayha, Laitinen, Rintamaki & Jarvelin, 2003). Physical inactivity in youth is associated with other health -compromising behaviors including cigarettes smoking, lower fruit and vegetable consumption, and more hours of watching television (O'Loughlin, Paradis, Gray-Donald & Renaud, 1999).

2.2.6. Economic benefits

Physical inactivity and its associated health problems have substantial economic consequences for health care systems. Physically inactive populations are at both medical and financial risk for many chronic diseases and conditions including heart disease, stroke, colon cancer, diabetes, obesity, and osteoporosis. Economic outcome of physical inactivity has an effect on individuals, businesses and nations. The WHO, reported that physical activity also has economic significance/impact especially in terms of reduced health care expenditures, increased productivity as well as healthier physical and social environments (WHO, 2003e).

A Study done in the United States of America (Center for Disease Control and Prevention, 2002) established that physically active individuals had on average, lower annual direct medical expenditures than did inactive people. It found that physically active people had fewer hospital stays and physicians visits and used less medication than physically inactive people. The researchers concluded that adoption of a population-wide physical inactivity strategy might produce health care cost savings among most adult age groups. According to Yang et al. (1999) there is more evidence that physical activity also has significance in the economy, working life, socialization and education.

Data from studies done in developed countries show that the cost of physical inactivity is immense. For instance, in the United States of America individuals who engage in physical activity save an estimated \$500 per year in health care related costs as per the 1998 World Health Organization's data (WHO, 2003e). Although there is no data available for the developing world, it is estimated that reduction of this kind of preventable costs is prospectively important, especially in the developing world where there is great shortage of resources and accompanied by other problems (WHO, 2003e). Work place physical activity programmes in the USA has been effective in reducing short term sick leave by (6-32%), reduce health care cost by 20-55%, and increase productivity by 2 to 52 % (WHO, 2003e; CDC, 1996). Some studies have indicated that physical inactivity is a public health burden that influences even other measures of quality of life (Gregory, Gallo & Armenian, 2001; Stofan, Dipietro, Davis, Kohl & Blair, 1998). Burdens that are either related directly or indirectly to physical inactivity include the use and cost of Medicare, impairment and disability, inferior physical and mental function,

deficient bodily and emotional well being (Dietz, 1996). Physical inactivity is a serious and expensive public health problem and the costs associated with physical inactivity are borne by tax payers, employers and individuals in the form of higher taxes to subsidize public insurance programmes and increased health insurance premiums (Garrett, Brassure, Kathryn, Schmitz, Schultz & Huber, 2004).

2.3 THE PREVALENCE OF PHYSICAL INACTIVITY GLOBALLY

Opportunities for people to be physically active exist in four major domains of their day to day lives, at work, for transport, in domestic duties or in leisure time. Physical activity has gained much attention for its role in preventing premature disease and disability (Valois, Zulling, Huebner & Drane, 2004). Center for Disease Control, (2001) established that physical inactivity was a major public health stumbling block in 2000 because physical activity levels of people across all ages tended to decrease. Not only is physical inactivity a major public health concern globally, but the public health burden of inactivity is also substantial (Colditz, 1999; Kohl, 2001; Lindstrom et al., 2001). The high prevalence of physical inactivity in developed countries emphasizes its significance as a public health hazard (USDHHS, 1996). Adult physical activity is believed to be influenced by early experiences of sports and person's adult life situation and social circumstances, therefore the adolescence period seems to be critical with regard to adult physical activity (Telema & Yang, 2000). Low levels of physical activity appear prevalent in a significant number of children and adolescents, but are most prevalent among preadolescents and adolescent girls (Sallis, Prochaska & Taylor, 2000).

There is a growing concern about inadequate physical activity levels among adolescents. (Telama, Yang, Laakso, & Viikari, 1997). Transition from childhood to adulthood marks a striking age related physical activity decline (Kimm, Glynn & Kriska, 2002; Aaron, Storti, Robertson, Kriska & LaPorte, 2000; Telama & Yang, 2000). However sedentary behaviours such as television viewing, video game are also notably high during this period (Popkin, McMurray & Gordon-Larsen, 2000; Pratt, Macera & Blanton, 1999). According to Frantz, Phillips and Amosun, (2003) a physically inactive adolescent is more likely to become a physically inactive adult.

Approximately 50% of United States youth do not currently meet the public health recommendations for frequency and vigor of physical activity (Sallis et al, 2000). A study done in the United States of America showed that children living in modern urban areas in the USA spend their free time engaging in various types of leisure activities that include watching television and playing video games for a minimum of 24 hours per week (Simons-Morton, McKenzie, Stone, Mitchell, Osganian, Stikmiller, Ehlinger, Cribb & Nader, 1997). The patterns of inactivity are not confined to the USA only, as similar patterns have been noted in other developed countries. This is the same trend in Canada, where according to the 1998 Physical Activity Monitor (2000), over 60% of Canadian youth could not be considered active enough to support a habit of lifelong activity. Physical inactivity levels for Canadian children and youth are increasing tremendously. According to Katzmarzyk, Gledhill & Shepherd, (2000) the Canadian government public health objective was to strive for a 10% decrease in the level of physical inactivity by 2003. According to a study done in New Zealand the current physical inactivity mortality

burden was estimated to be 2600 deaths per year (9% of all deaths and the prevalence of physical inactivity is further estimated that by 2021 it will be 4% (Tobias & Roberts, 2001). Despite these high prevalence levels, only 38% of young people aged 13-17 years in New Zealand are considered physically inactive (Hohepa, Schofield & Kolf, 2004). In Australia physical inactivity is so substantial that it ranks second to smoking as the major cause of death and disability, 7% and 11% respectively (Struber, 2004).

This trend of physical inactivity in the developed world is also reflected in the developing countries. The promotion of physical activity among the youth and adolescents has become a national priority in South Africa but the current status of involvement of children and adolescents in physical activity is not well documented (DSR,1995). In a community based study among high school learners in the Western Cape, Phillips (2006) found that more than 60% of the sample was considered to be irregularly active. This was confirmed by Frantz (2006) in a similar study that found 37.5% of the learners participated in insufficient or no physical activity. Elsewhere in Africa, researchers have also expressed concerns about the marked decrease in levels of physical activity. In a study among Senegalese adolescents Benefice, Garnier & Ndiaye (2001) found that younger adolescents were more sedentary than the older adolescents and this was because older adolescents spent most of the time doing subsistence work like farming, fetching water and carrying firewood. In a study done in Rwanda on 'habitual activity patterns among adolescent's learners' Murenzi (2001) reported that learners spent more time on sedentary activities than on non sedentary activities.

Very little is known about the physical activity habits of people living in other developing countries, although it may reasonably be speculated that leisure-time physical activity accounts for a relatively small proportion of total activity (Booth, 2000). It is evident that physical inactivity is thus prevalent in many countries around the world and the reduced levels of physical activity are a major public health concern.

2.4 RECOMMENDED QUALITY AND QUANTITY OF PHYSICAL ACTIVITY FOR HEALTH

Lifestyle physical activity has deviated from the traditional methods of exercise prescription by advocating accumulated, unstructured activities of daily living, according to individual preference and convenience (Pescatello, 2001). Considerable research evidence demonstrates that significant health benefits can be obtained from 30 minutes of moderate intensity physical activity on most of if not all days of the week. Moderate intensity physical activity includes brisk walk and cycling (US Department of Health and Human Services, 1996). Recent Canadian guidelines suggest that children should engage in 60 minutes or more of active play daily, alternating between bouts of activity and rest periods as needed (Canadian Fitness and Lifestyle Research Institute, 2000).

The guidelines further recommended that adolescents should engage in three or more sessions per week of activities that last 20 minutes or more at a time, that require moderate to vigorous levels of activity participation. Approximately 50% of U.S. youth do not currently meet the public health recommendation for frequency and vigorousness of physical activity (Sallis et al., 2000; USDHS, 2000). It has been recommended that an

active life style does not require a regiment and vigorous exercise programme, rather small but consistent changes of physical activity do enable individuals to reduce the risk of chronic illness (USDHHS, 2000).

According to the literature, a lower risk of chronic disease can be achieved by incorporating moderately intense physical activities, which do not require a formal exercise programme, into everyday programme, into every day life (Lee, et al., 1995). Engaging in at least 30 minutes of physical activity of moderate intensity every day or on most days of the week for an average sedentary adult will be sufficient to obtain health benefits. In a greater extend these 30 minutes can be accrued throughout the day in small bouts of exercise or activity. Therefore it is not imperative to practice vigorous sports, join expensive fitness clubs or purchase sophisticated equipments to achieve health benefits (WHO, 2005e). Therefore physical activity needs not be strenuous to promote health; neither should it be seen as a new action but as part of a person's daily life settings and activities (WHO, 2002b). In addition physical activity does not need to be sustained for long periods of time in order to provide health benefits.

The American Public Health recommendations for physical activity have been expanded to a broader spectrum of activity including: gardening, walking, swimming and house work, in addition to more vigorous aerobic exercises such as jogging, to derive health benefits (Centre for Disease Control and Prevention, 1995). Although physical activity does not need to be arduous to provide health benefits, the amount of health benefits is directly related to the amount of regular physical activity; hence the amount of physical

activity is more important than the type of intensity (Lee et al., 1995; U.S. Surgeon General, 1996). The dose- response curve shows that the greatest health benefits are gained by people who are inactive and introduce some physical activity into their daily lives (Lee et al., 1995). Therefore the quantity and quality of exercise needed to attain health-related benefits may differ from what is recommended for physical-fitness benefits. Exercise requiring moderate endurance and performed on an almost daily basis is more likely to be adopted and maintained than vigorous physical activity. Regular activity requiring moderate endurance is probably the most feasible exercise prescription, with considerable potential to reduce coronary heart disease while increasing the likelihood of long term compliance in individuals who are completely sedentary (Kennon, 1996). American College of Sports Medicine and Centers for Disease Control and Prevention recommendations suggests that individuals who can exhaust approximately 200 calories per day or 1000-1400 kcal per week can expect many of the health benefits associated with physical activity (Stofan et al., 1998). Participation in youth sports programmes offers adolescents a potential means of obtaining recommended levels of physical activity.

2.5 FACTORS INFLUENCING ADOLESCENTS'S PARTICIPATION IN PHYSICAL ACTIVITIES

Identifying correlates that may facilitate or hinder a physically active lifestyle is currently a topic of increasing research interest in the field of public health. The understanding of factors that influence physical activity behaviour is significant for health promoters and behavioural specialist interested in influencing the physically inactive population groups

to become physically active (Bauman, Marshal, Mohsin & Westley-Wise, 2002). Substantial documentation of the various important health benefits of physical activity has created need to understand the factors that influence physical activity behaviours Sallis, Johnson, Calfas, Caparosa & Nichols, (1997).

Adolescents physical activity is influenced by factors that exist in a variety of domains including psychological, biological, social, cultural and physical environmental; these factors may affect an individual's decision to adopt and maintain a physically active lifestyle (Buckworth & Dishman, 2002; Sallis et al., 2000). The adolescent period seem to be critical with regard to adult physical activity, because activity is reported to decline dramatically during the transition from adolescence to adulthood (Van Machelen, Twisk, Post, Snel & Kemper, 2000; Telama & Yang, 2000). Factors that influence physical activity participation have been divided into two groups i.e. those that facilitate or promote physical activity and those that hinder physical activity participation (Markus, Goldfine & Collins, 2003).

2.5.1 Physiological

Puberty limits access of many adolescents and especially girls to physical activity and sports. The increase in body fat in the female at puberty may serve to discourage participation in physical activity and to decrease aerobic power (Rowland, 1999). For example, increased fat makes exercise more difficult and causes a tendency to avoid physical activity; which in turn results in more body fat and a diminish urge to exercise (Rowland, 1999). In a study done among Canadian youth aged 12-24 years, females were

less likely to be active and more likely to be overweight (Higgins, Gaul, Gibbons & Van Gyn, 2003). Participation in physical activity has been found to consistently inversely relate to age (Eyle, 2003; and Wilcox, Bropp, Oberrecht, Kammermman & Mc Elmurray, 2003; Seefeldt, Malina & Clark, 2002; Chen, Miller, 2001; Booth, 2000). In an investigation of adolescents' participation in physical activity programmes in the United States of America, the findings showed that 12 year old had a higher frequency of physical education as compared to 17 year olds (Gordon-Larsen, McMurray & Popkin, 2000). Males are generally more active than females, and the sex difference is greater for high intensity activities than for activities of low and medium intensity (Malina, 2001). Martin, Morrow, Jackson, Dunn & Andrea, (2000) reported that men usually report greater levels of total and vigorous activity, where as women tend to report participating in low to moderate activities. Numerous descriptive and correlational studies show that physical activity levels decline as children age (Sallis et al., 2000), and the decline is so great within adolescents that this age group has been referred to as a risk factor for physical activity (Rowland, 1999).

Studies have demonstrated that healthy people are likely to be more active than individuals with a medical problem (King & Kriska, 1992). Having a chronic disease or a physical disability may reduce ability or restrict opportunity to engage in sport or any other type of physical activity (Vilhjalmsson & Thorlindsson, 1998).

2.5.2 Physical environment

Physical environment have an important role in influencing participation in physical activity in that those environments with facilities that are relevant for physical activity, such as pavements, fields, parks may make its easier for people to be physically active (De Bourdeaudhij, Sallis & Saelens, 2003; Killingsworth, 2003; Killingsworth, Earp & Moore, 2003; Kaaks & Lukanova, 2001) reported that the presence of facilities for physical activity within 5 minutes drive from home was positively correlated with vigorous physical activity for both female and male. Physically active people were also more likely to report a high level of access to facilities, including local exercises halls, recreation centers, cycle paths, swimming pools, tennis court and gyms. Sallis et al., (1997) in their study they showed that those who engaged in recommended exercise reported a greater number of facilities around their homes.

The components of neighbourhood characteristics include the presence of side walks, street lights, heavy traffic, unattended dogs, hills, high crime rates, aesthetics, safety for exercise and a frequent observation of people exercising. Low perceived safety and crime rate negatively influences participation in physical activity (Humpel, Owen, Iverson, Leslie & Bauman, 2004; Booth, 2000; Gordon-Larsen et al., 2000; MMWR, 1999). Booth (2000) reported that footpath safety for walking was significantly associated with participation in physical activity among older population. In a study examining the determinants of adolescents' physical activity or inactivity, Gordon-Larsen et al., (2000) found that high levels of neighbourhood crime were associated with decreased likelihood of being physically active. This was further supported a study done by King, Castro,

Wilcox, Eyler, Sallis & Brownson (2000), which found that those who perceived a high crime rate in their neighbourhood were more likely to be inactive.

2.5.3 Weather

The perception of bad weather is considered as a barrier to physical activity. A study done in Australia by Salmon, Owen, Crawford, Bauman & Sallis (2003) found that people who reported weather as a barrier to physical activity were 50% more likely to do TV watching and have a higher total of sedentary behaviour.

2.5.4 Social

Duncan, Duncan & Strycker (2005), in their study on sources and types of social support in youth physical activity demonstrated that having friends who support and watch youth engaging in physical activity were significantly and positively related to youth physical activity. Peers and family support are possibly important source of social support for adolescent's participation in physical activity and for efficacy beliefs regarding physical activity (Heitzler, Martin, Luke & Huhman, 2006; Bauman, Sallis Dzewaltowski & Owen, 2002). In addition, peers emotional support such as encouragement which may render esteem support or reassurance which might augment self efficacy to perform the desired behaviour (Duncan et al., 2005).

2.6. PHYSICAL ACTIVITY AND HEALTH PROMOTION

The promotion of adolescents' physical activity is a complex task. Despite its complexity, the public health benefits of having a physically active youth population outweigh the

difficulties associated with designing and implementing a health promotion programme (Wallhead & Buckworth, 2004). During this century, disease prevention has changed largely from focusing on reducing environmental exposures over which individual had little personal control, such as providing portable water, to emphasizing behaviours such as avoiding use of tobacco, fatty foods and sedentary lifestyle (Breslow, 1999).

Health promotion was defined by the Ottawa charter as “a process of enabling people to take control over and improve their health, to reach a state of complete physical, mental, and social well being” (Coulson, Goldstein & Ntuli, 2002). A study by Markus et al., (2003) stated that health promotion has been associated strongly with personal lifestyles. They further describe that this involves two processes, stopping the unhealthy behaviours such as sedentary, smoking and alcohol consumption and starting healthy behaviours such as exercise, good dietary practices among others. Physical activity plays a fundamental role in health promotion and may be a tool in the prevention of sedentary behaviour, overweight, obesity and obesity related diseases. In addition physical activity helps to educate, it plays a role in social integration, develop tolerance and respect for others, increase interindividual and international exchange and contributes to an increase in individual sustainable development.

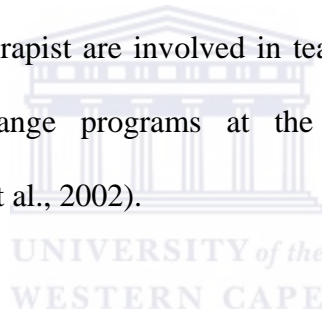
Despite the abundance of information that demonstrates the role of physical activity in health and quality of life, this information alone has not been sufficient to promote active lifestyle among the majority of the population. In general, people do not exercise just because scientific evidence indicates that they should. Also, it appears that the tradition

sports-centered physical education curricular, aggravated by the decreasing time allocated to such programmes, are not effective in promoting active life styles (Dale & Corbin, 2000).

The WHO (2005a) stated that effective public health measures are urgently required to promote physical activity and improve public health globally. Ewa & Marika, (2003) stated that the aim of physical activity is to promote a long health and autonomous life, in accordance with the physical and social environments and economic needs. The World Health Organisation called upon all health sectors in collaboration with other policy makers in all nations to provide nation wide evidence for advocacy on the health and social and economic benefits of physical activity (WHO, 2005b). The WHO, (2005f) further recommended the development of action oriented networks with other relevant sectors and stake holders on physical activity. Research indicates that many individuals who start exercise programmes have difficulty adhering to them and tend to drop out within the first six months. One major reason for this is that intervention (exercise programmes) are not designed to meet individuals physical goals and are, therefore, easy to start but difficult to maintain (Rodger, Blanchard, Sullivan, Bell, Wilson & Gesell, 2002). Therefore by promoting simple, realistic, achievable lifestyle physical activity using health promotion behaviour strategies, individuals will be more prepared and motivated to remain with the exercise programme (Rodgers et al., 2002). There is clear evidence that physical activity patterns can be changed (Sallis & Owen, 1999), but the best approach for promoting such changes or predicting the extend of those changes is difficult to determined.

2.7 THE ROLE OF PHYSIOTHERAPIST IN HEALTH PROMOTION

Physical activity is an effective method for individuals to help prevent serious disease, and a cost effective way for societies to improve public health (WHO, 2003a). Currently, throughout the world, the practices of health and health care are changing dramatically. There is a major shift away from focusing on the cure of individuals presenting at health care services towards the prevention of illness in population, and strengthening of the community's capacity to deal with its own health. It is fundamental to involve and mobilize the community to create an environment that will support the adoption and maintenance of positive health behavior (Sawatzky & Naimark, 2002). Health professionals generally focus primarily on change processes that affect well-being. Health specialist e.g. physiotherapist are involved in teaching or educating, advocating, and administering health change programs at the individual, organizational, or community level (Huddleston et al., 2002).



One of the strategies that the Ottawa health promotional conference in 1986 advocated was the re-orientation of health services from clinical and curative services to a health promotional approach that include the prevention of health problems (Dennill, King & Swanapoel, 1999). Therefore, physiotherapists are clearly placed to play a vital role in health promotion by accepting the challenge identified by the Ottawa charter to extend beyond the physiotherapist/patient partnership and in turn to address issues pertinent to groups, communities and societies (Copeland, 1999).

Physiotherapists are experts in exercise prescription for the unfit, healthy persons who require specific fitness and injury prevention advice, and the injured or disabled persons who have specific needs and considerations. To ensure effective, appropriate, and safe exercise it is important that exercise prescription is supervised by a physiotherapist, used appropriately, performed with adequate initial assessment to identify the main problem and its causes in the case of an injured person, and undertaken with ongoing re-assessment and modification as appropriated (Australian physiotherapy, 2002). Wilson, (2002) stated that physiotherapist, with their expertise in body mechanics, anatomy, and physiology can play a fundamental role in helping people develop appropriate and safe exercise programmes and injury prevention advice. The role of physiotherapist in health promotion is to step in and work with individuals, groups and whole populations to promote health, to prevent disease and disability in schools, factories and community facilities (Raphael, Steinmetz, Renwick, Rootman, Brown, Sehdev, Phillips & Simith, 1999; Higgs, Refshauge & Ellis, 2001). Physiotherapists are appropriately skilled and ideally suited to promote physical activity. They recognize the physical and psychological benefits of physical activity and are well versed in the art of motivating people (Carter & O'Driscoll, 2000). In addition Physiotherapist can assist the public by promoting physical activity and describing the type, quantity, and quality of activity that accords health benefits (Kennon, 1996).

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

This chapter outlines the methods and procedures used in the study. Other aspects discussed in this chapter includes, research settings, the study design used and the study sample.

3.2 RESEARCH SETTING

The study was conducted in Kenya. Kenya is located in east Africa bordering Somalia in the east, Indian Ocean in the southeast, Tanzania in the south, Uganda in the west, Ethiopia in the north and Sudan in the North West. Kenya covers an area of 582,650 kilometers square. The country has eight provinces with an approximate total population of 31 million people (Kenyan Ministry of Planning, Kenya, 2005).The study was conducted in six government boarding high schools in Nairobi province, Kenya. Nairobi province is one of the eight provinces in Kenya.

Nairobi, the capital city of Kenya is 45 Km/30Miles south of the Equator. It was founded in the late 1890's as a British railroad camp on the Mombassa to Uganda railroad. From 1899 to 1905 it served as a British provincial capital. In 1905 the city became the capital of the British East Africa Protectorate and was called Kenya colony from 1920 to 1963 when Nairobi became the capital of independent Kenya. Nairobi is Kenya's principal

economic, administrative and cultural center. It has a population of more than two million people. It covers mainly the capital city and its environs. Nairobi city has eight administrative sub districts namely Dagoretti, Westlands, Langata, Embakasi, Starehe, Kamukunji, Kasarani and Makadara.

There are 12 government boarding high schools in Nairobi province which offer high school education to adolescents who are aged between 13-19 years.

3.3 STUDY DESIGN

A descriptive quantitative research design using a cross sectional survey was used. A quantitative research method is used in gathering facts which can be captured in a numerical format and analyzed with statistical methods. Katzenellenbogen & Joubert (2002), speculated that descriptive quantitative study design is preferred because it sets out to quantify the extent or prevalence of a problem. This is probably the best method available for social scientist interested in collecting original data for describing a population too large to observe directly (Mouton, 2001). In this study, the design was used to describe and quantify the prevalence of physical inactivity among adolescents in government high schools in Nairobi Province, Kenya and the factors influencing inactivity among them. A cross sectional study design is appropriate for describing the relationship of a phenomenon at one point in time and it is economical and easy to manage within a limited time frame (Polit, Beck & Hungler, 2001). Sarantakos (2000), clearly states that the quantitative study design has advantages of using high levels of measurements which gives high levels of representativeness and generalisability of

findings, it explains the social life of the participants and theory testing. Moreover it is a very effective and response rate may be high for a target population that is well educated or has a strong interest in the topic or the survey organization (Neuman, 2000). In addition, a cross-sectional design offers information about a population at a given point in time (Bless & Higson-Smith, 2000). The research design was therefore appropriate for this study as it explored the necessary information with regard to the study objectives that were stated.

3.4 POPULATION AND SAMPLE

There are twelve government boarding high schools in Nairobi province, these schools are distributed within the province and students come from within and outside the province. Schools represent a suitable setting for intervention programmes aiming to promote physical activity to benefit health. The study population included all school going adolescents registered for 2006 at the government boarding schools in Nairobi. The total number of the population was approximately 7800 learners. Purposive sampling was used to select the six schools to participate in the study. Due to limited time and resources only six schools were contacted for participation in the study. These schools were chosen because of the researcher easy access to them and their proximity. Furthermore these schools were located in two neighbouring sub districts. Due to lack of sufficient funds and limited time, the other 6 schools were not contacted for participation in the study.

De Vos (2002) states that this technique is based on the judgment of the researcher, such that a sample size is composed of the subjects that contain the most characteristics, which are a representative or typical of the population under study. For the present study it was

important that both males and females were represented in the study sample. These six schools were further chosen because of their proximity to the researcher and easy access to them. The inclusion criteria for the learners in this study were both females and males who were boarders and had registered in any of the participating schools and who voluntarily agreed to participate in the study.

A stratified random sampling technique was used to select the participants from the six participating schools. According to De Vos (2001) this type of sampling is suitable for heterogeneous populations because the inclusion of small subgroups percentage wise can be ensured. This sampling technique allows the researcher to make sure that all the different forms in each participating school were represented in the sample. The form level (grade in school) was thus used as individual stratum. This means that the learner had to be enrolled for one form/grade only and inclusion in one stratum would automatically exclude them from any other stratum. At the time of data collection form ones had not reported to school. Therefore, the sample was stratified into three strata corresponding to form, two, three and four respectively.

In order to minimize disruptions in the school academic programme, the researcher decided to randomly select one class in every school in every stratum or form. Eighteen (18) classes in which four hundred and twenty (420) learners were enrolled were randomly selected from form 2, 3, and 4 in the six participating schools. Of the learners selected only three hundred and sixty five (365) signed the consent form and returned

completed questionnaires. Thus the overall response rate was 86.9%. The final sample thus consisted of three hundred and sixty five (365) learners.

3.5 DATA COLLECTION

3.5.1 Questionnaire

A structured self administered questionnaire was used to collect data (Appendix 7). Questionnaires allows one to be able to reach large group of respondents at a time and it is one way of obtaining data relatively quick (Romaine, 1995). The use of questionnaire method was supported by Burns (2000) as appropriate when dealing with many respondents. This type of survey offers respondents anonymity and avoids the interview biasness. This type of survey is less expensive and respondents can fill in the questionnaire when it is convenient to them. Questionnaires are very effective and response rate is higher for a target population that has interest in the topic (Neuman, 2000). The use of questionnaires allows participants to get a similar assessing tool to complete which may result in standardized response (Burns, 2000). In addition it provides a possibility of complete anonymity of the respondent. Such anonymity may be necessary in obtaining information about deviant behaviour or embarrassing characteristics (Polit et al., 2001). Questionnaires were used because it has been found that health questionnaires are frequently used in secondary schools for monitoring the health and social problems of adolescents (Mangunkusumo et al., 2005).

The questionnaire was divided into two sections. The first section of the questionnaire measured demographic and socio-economic characteristics of the participants while the second section assessed the physical activity levels.

The second part of the questionnaire was adopted from the Sub-Saharan African Questionnaire (SSAQ). Sobongwi et al. (2001) stated that the question of most appropriate method for measuring population physical activity level has been debated, and questions are seen to be the best consensual method for this purposes.

Activities were classified into three different categories according to their intensity, Light activities, moderate activities and vigorous activities according to the (WHO, 2003 f) as illustrated in table 3.1 below.



Table 3.1: Activity classification

<i>Activity classification</i>	<i>Examples of the activities</i>
Vigorous activities	Running, Jogging, football, volleyball, basketball, dancing
Moderate activities	Brisk walking, washing clothes with hands, cleaning the house, swimming, table tennis.
Light activities	Playing computer games, watching TV, chatting with friends, doing homework, personal care, playing table games like cards, chess, writing, reading, listening to music

Section A-The first section of the questionnaire measured demographic and socioeconomic characteristics of the participants. The following variables were assessed; age gender, school, form, head of household, occupation, head of household employment status and their educational level, friends and family members who participate and encourage participation in physical activity, neighbourhood safety, current participation in any kind of physical activity and how long do they take to exercise, whether they suffered from any medical illness that in some way limit physical activity. Finally what activity they preferred to do after school was assessed.

Section B-This section of the questionnaire measured personal evaluation of physical activity levels of school going learners. This section consisted of six questions. Participants were requested to describe their physical activity in the past year, whether they could like to do more, less or the same, how many teams they participated in competitive level, which games/sport they participated in and how many minutes they spent watching TV, chatting with friends and playing computer games.

The adapted questionnaire was piloted before the final version was adopted for use in the study. It was pre- tested at two schools who were conveniently selected and who did not participate in the main study, but had the same characteristics as those which participated in the main study (for example, same age group, boarders in government high schools). The participants in the pilot study included twenty students from two schools each ten students who volunteered to participate. Questionnaires were administered to learners and oral explanations were given on how to complete them. Participants were allowed to ask

questions concerning filling of questionnaire. They were requested to complete the questionnaire during their free time and the researcher went to the schools the following day to collect the questionnaires. The purpose of piloting the study was to obtain clarity and find out its appropriateness, understanding and reliability of the instrument. The pilot study provided the researcher with orientation /experience in conducting the research procedure and determining the length of the time needed to complete the questionnaire. Questionnaire was administered in English as it is the national official language and majority of the respondents at their level of schooling can easily communicate, write and read English without difficulties. It is also the language of instruction in all schools in Kenya.

Fortunately, the results from the pilot study indicated that most of the questions in the questionnaire were clear and understood by students. All participants reported that it took approximately 15 minutes to complete the questionnaire. The results from the pilot study indicated that the adopted questionnaire could measure the prevalence of physical inactivity among school going learners in Nairobi, Kenya. The reliability of the questionnaire among this population was proved after piloting to suit the circumstances of high school learners in Nairobi, Kenya.

3.5.2 Administrative procedure

Permission to conduct research was obtained from the Senate Research Grant and Study Leave Committee of the University of the Western Cape (UWC). Clearance was also obtained from the Ministry of Education Research and Ethics committee after the

researcher gave the letter seeking permission to include high school students in the study and depositing two copies of the proposal (Appendix 1). A Research permit was given to the researcher on condition that she avails the results of the study to the Ministry of Education and that schools that participated will not be referred to specifically in the results (Appendix 3). Arrangements were made with the chairman of the Research and Ethics committee to introduce the researcher to the chief provincial education officer who further introduced the researcher to the heads of the relevant schools. Later, permission was obtained from the principals of the respective schools, who took the ethical responsibility of explaining to parents who were present at the parent's teachers' association meeting since it was the start of the term. Therefore the parent-consent forms (Appendix 4) and the learners' consent forms (Appendix 5) were distributed during the parents-teachers association meetings at the schools. In each school a teacher was allocated to introduce the researcher to the students and the same teacher coordinated the collection of the signed learners consent forms and the parent consent forms. Therefore, the final sample consisted of those learners whose parents were present at the parent teachers association meeting and returned signed the parent consent form and learners consent form.

In the letter seeking permission to conduct the study, explanation of the nature of the study and its purpose was included (Appendix 1). Students were randomly selected from purposively selected schools. Students were approached in the first lesson after lunch, after making necessary arrangements with the teacher responsible for the particular lesson. Each teacher was requested to spare at least 10 minutes for the researcher to

explain the study to the students and to ask for their consent. After the informed consent was obtained from the participants, the questionnaires were distributed and agreed to be collected the following day.

3.6 DATA ANALYSIS

Data were recoded from question responses into meaningful prevalence variables. The Statistical Package for the Social Sciences (SPSS) Version 14.0 was used for analysis of the data. Descriptive statistics were employed to summarize the demographic data of the study sample. The demographic data were presented using frequency tables and was expressed as percentages, means and standard deviation. Inferential statistical analysis was used to determine the association between various socio demographic characteristics and levels of physical activity. This was done in the form of cross tabulations using chi-square to determine the relationship between various variables. Inferential statistics were reported as chi square, degree of freedom and p values. Alpha significance level was set at 0.05.

3.7 ETHICAL CONSIDERATIONS

Following approval of the research proposal by the Ethics Committee and Senate of the University of the Western Cape, further permission was requested from Ministry of Education, Research and Ethics Department in Kenya (Appendix1) and the authorities of the respective schools to include students in the study. The explanation concerning the purpose and aim of the study was provided to the participants and written consents were requested from the participants, parents and guardians of the participants partaking in the

study. Permission for students to participate was obtained from the head teachers of the various schools (Appendix 6). The aim and importance of study was explained clearly to parents and students and the head teachers. Informed consents were signed by the parents / guardians of the students and students before data collection. Participation was voluntary and the participants were allowed the opportunity to withdraw from the study at any time. Information obtained would be handled with confidentiality and anonymity. Lastly, data was collected from those whose informed consent was obtained and were ready to participate in the study.

3.8 SUMMARY

In chapter three, the research setting, study population, study design and sampling procedure are described. The chapter also explains relevant methodological issues as methods of data collection, reliability and the validity of the study and study procedure. A self administered questionnaire was used in data collection. Descriptive and inferential statistics were used to analyze the questionnaire. Administrative procedures and ethical consideration that the study was conducted in an ethical manner were explained. The results of the study are presented in the next chapter.

CHAPTER FOUR

RESULTS

4.1 INTRODUCTION

This chapter describes the results of the statistical analysis that attempted to answer the research objectives stated in chapter one.

4.2 SOCIODEMOGRAPHIC CHARACTERISTICS OF THE STUDY

SAMPLE

Eighteen (18) classes in which 420 learners were enrolled were randomly selected from 3 forms in the six participating schools. Three hundred and sixty five (365) learners completed and returned the questionnaires. The overall response rate was thus 86.9%. The final sample consisted of 54.7 % (n = 200) females and 45.3% (n=165) males. The participants ages ranged from 14 -19 years with a mean age of 16.19 years (SD=0.969). The majority, of the participants (83.3 %; n=304) had the father as the head of the household of which 58.9% (n=215) were employed. Most of the participants' (82.2 %; n=215) head of household's educational level was at tertiary level. There were an equal number of participants in all the school forms. The socio demographic characteristics of the sample are illustrated in table 4.1 below

Table 4.1 Distribution of selected socio demographic characteristics of the study sample (n=365)

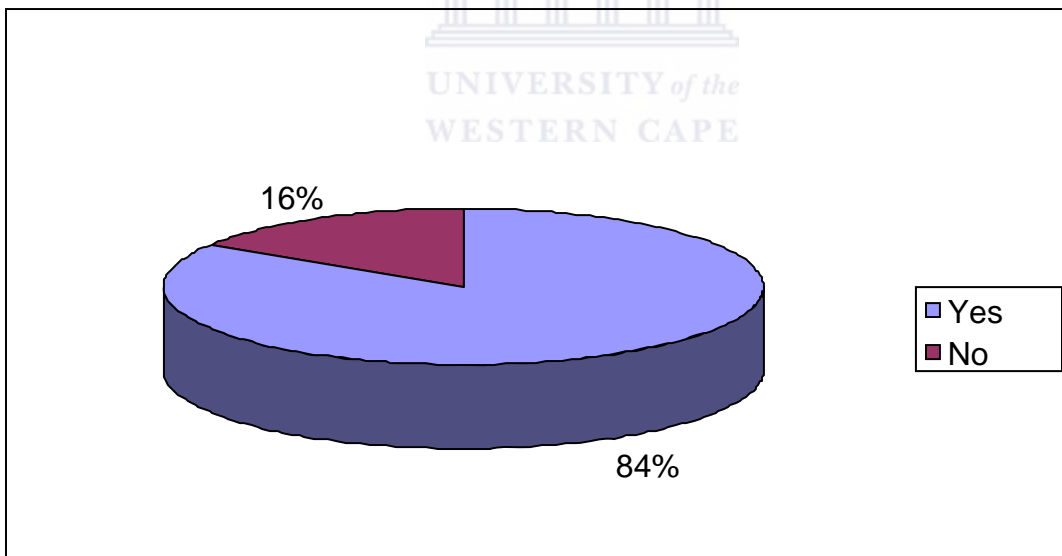
Variable	n	%
Gender		
Male	190	52.1
Female	175	47.9
Age (years)		
14	8	2.2
15	94	25.8
16	108	29.6
17	132	36.2
18	22	6.0
19	1	0.3
School grade		
2	121	33.2
3	122	33.4
4	122	33.4
Head of household		
Father	304	83.3
Mother	47	12.9
Grand parent	14	3.8
Employment of head of household		
Employed	215	58.9
Self employed	133	36.4
Unemployed	17	4.7
Education level of head of house hold		
No formal education	1	0.3
Primary	10	2.7
Secondary	54	14.8
Tertiary	300	82.2
Neighborhood		
Safe	281	77
Unsafe	84	23

4.3 PHYSICAL ACTIVITY BACKGROUND CHARACTERISTICS AS REPORTED BY LEARNERS

4.3.1 Current reported participation in physical activity

The majority of the learners (84.1%) reported current participation in physical activity as illustrated in figure 4.1. Of those reporting current participation in physical activity 50.8% were females and 49.2% were males. Of those who reported no current participation in physical activity 58.6% were females and 41.4% were males.

Figure 4.1 Percentage of learners who reported current participation in physical activity.



4.3.2 Social support

Table 4.2 illustrates the frequencies and percentages of learners who had friends and family support towards current reported participation in physical activity. Those participants that had a friend participating in any form of physical activity (76.2%) or a friend that encouraged physical activity (40.3%) were significantly more likely to report current participation in physical activity ($p < 0.05$). Percentages of learners who had a family member participating in any form of physical activity (45.5%) or a family member that encouraged physical activity (28.2%) was not significantly more likely to report current participation in physical activity. Table 4.2 further illustrates the frequencies and percentages of learners who reported current participation in physical activity and considered their neighborhood as either safe or unsafe.



Table 4.2 The relationship between selected social factors and current participation in physical activity

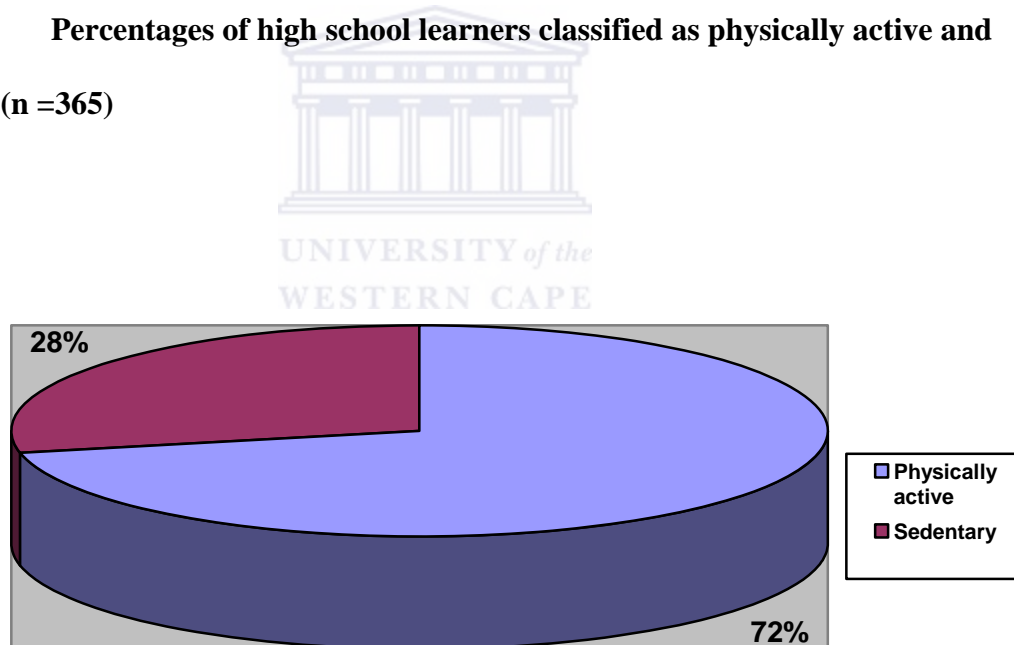
Variable Question and Responses	Frequency	Percentage	χ^2	p value
Do you have friends who participate in any form of physical activity?			5.813	<0.05*
Currently participating in PA	278	76.2		
Not currently participating in PA	87	23.8		
Do you have a friend who encourages you to exercise?			5.954	<0.05*
Currently participating in PA	147	40.3		
Not currently participating in PA	218	59.7		
Do you have a family member(s) who participate(s) in any form of physical activity?			1.766	>0.05
Currently participating in PA	166	45.5		
Not currently participating in PA	199	54.5		
Do you have a family member who encourages you to exercise?			2.915	>0.05
Currently participating in PA	103	28.2		
Not currently participating in PA	262	71.8		
Do you participate in PE in school?			36.790	<0.05*
Currently participating in PA	356	97.5		
Not currently participating in PA	9	2.5		
Is your neighborhood safe?			3.696	<0.05*
Currently participating in PA	281	77		
Not currently participating in PA	84	23		

* = statistically significant, i.e. $p < 0.05$

4.4 LEVELS OF PHYSICAL ACTIVITY

The participant's level of physical activity was determined according to the World Health Organisation guidelines on recommended quality and quantity of physical activity. The World Health Organisation (WHO) recommended that for an average adolescents engaging in at least 30 minutes of physical activity of moderate intensity everyday or most of the days of the week should be sufficient to gain health benefits. In addition, these 30 minutes can be accumulated throughout the day in small bouts of activity (WHO, 2005e). Almost three-quarters (71.8%) of the participants were classified as physically active and (28.2%) were classified as sedentary as illustrated in the figure 4.2 below

Figure 4.2 Percentages of high school learners classified as physically active and sedentary (n =365)

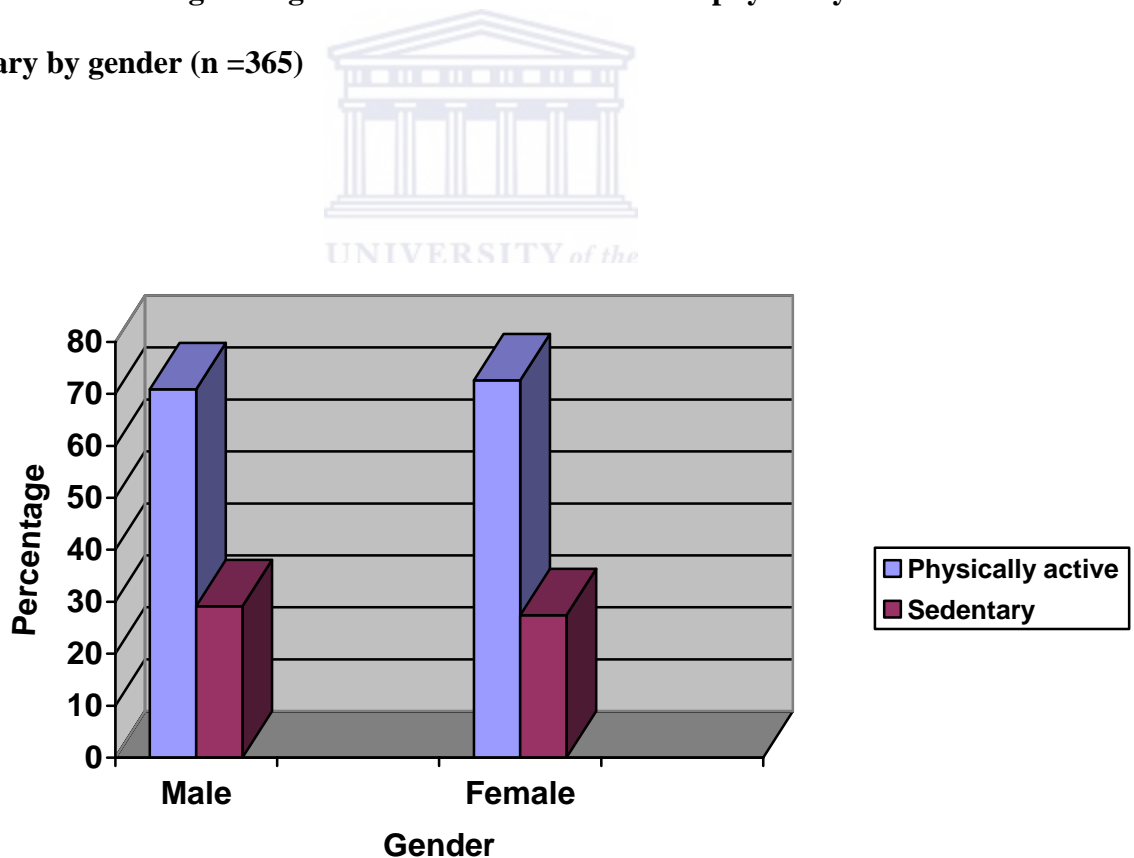


4.5 FACTORS INFLUENCING THE LEVELS OF PHYSICAL ACTIVITY OF HIGH SCHOOL LEARNERS

4.5 Gender

A higher prevalence of female learners (72.2%) than male learners (70.9%) participated in physical activity. There was no significant difference in the frequency of learners that participated in physical activity by gender ($\chi^2=0.142, p>0.05$) as illustrated in figure 4.3 below.

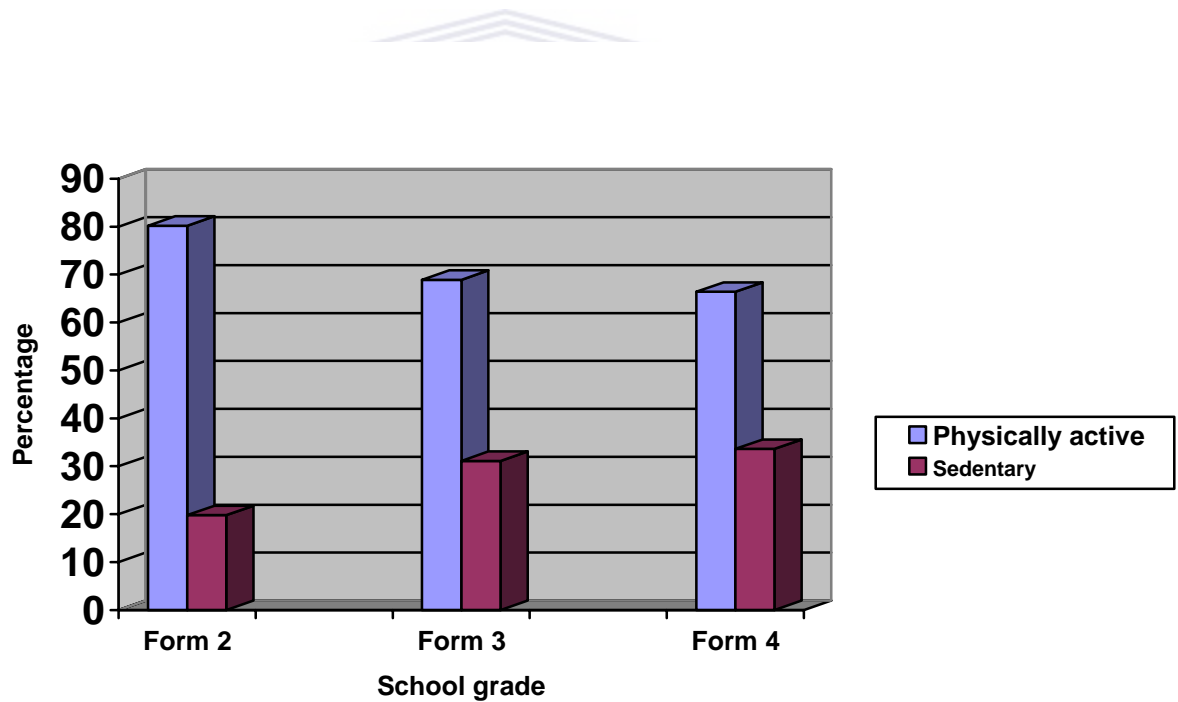
Figure 4.3 Percentage of high school learners classified as physically active and sedentary by gender (n =365)



4.5.2 School grade

There was a significant decrease in the prevalence of learners who were physically active from form 2 (80.2%) to form 4 (66.4%) ($\chi^2 = 6.464$; $p < 0.05$). Figure 4.4 summarizes the prevalence of learners who were classified as physically active and sedentary among form 2 to form 4.

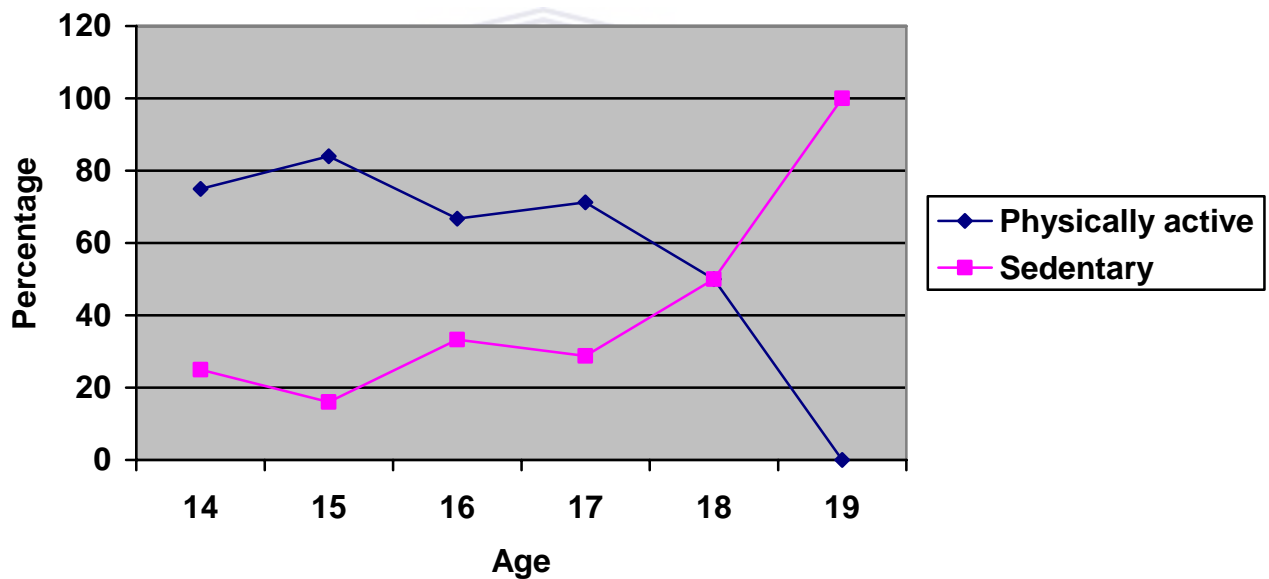
Figure 4.4 Percentage of high school learners classified as physically active and sedentary by school grade (n =365)



4.5.3 Age

There was a significant difference in the prevalence of high school learners who were classified as physically active by age ($\chi^2=16.130$, $p<0.05$). Older learners were significantly more likely to be classified as sedentary than younger learners. Figure 4.5 illustrates the decrease in physical activity by age among high school learners

Figure 4.5 Percentage of high school learners classified as physically active and Sedentary by age (n =365)

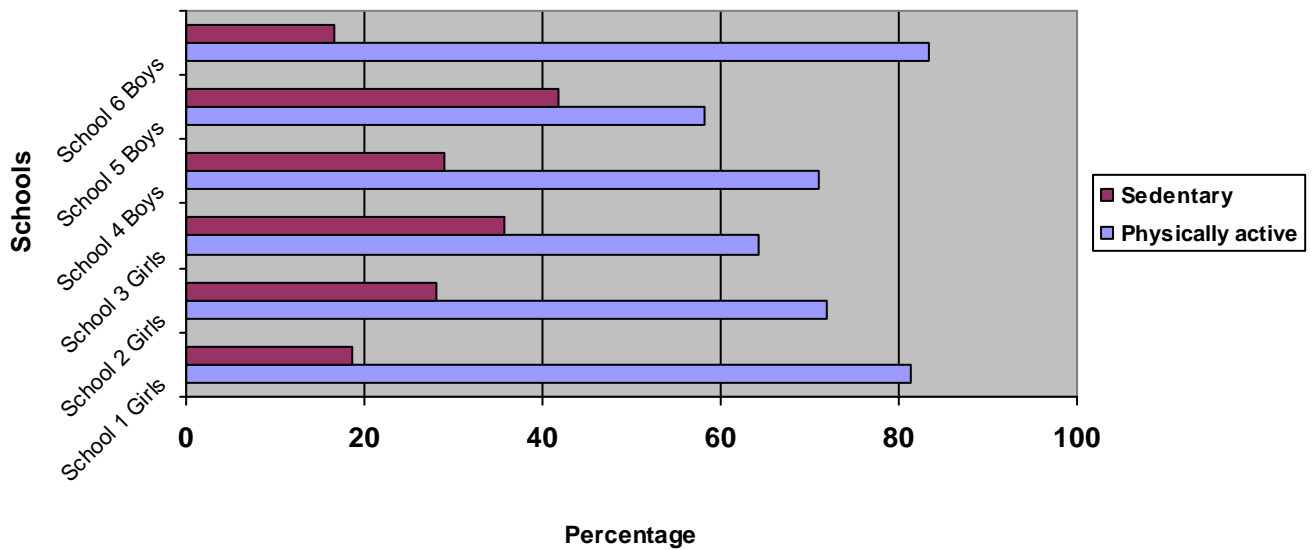


4.5.4 School

There was a significant difference in the prevalence of learners who were physically active in the different schools ($\chi^2=14.489$, $p<0.05$). Figure 4.6 summarizes the

prevalence of high schools that were classified as physically active and sedentary in the different schools.

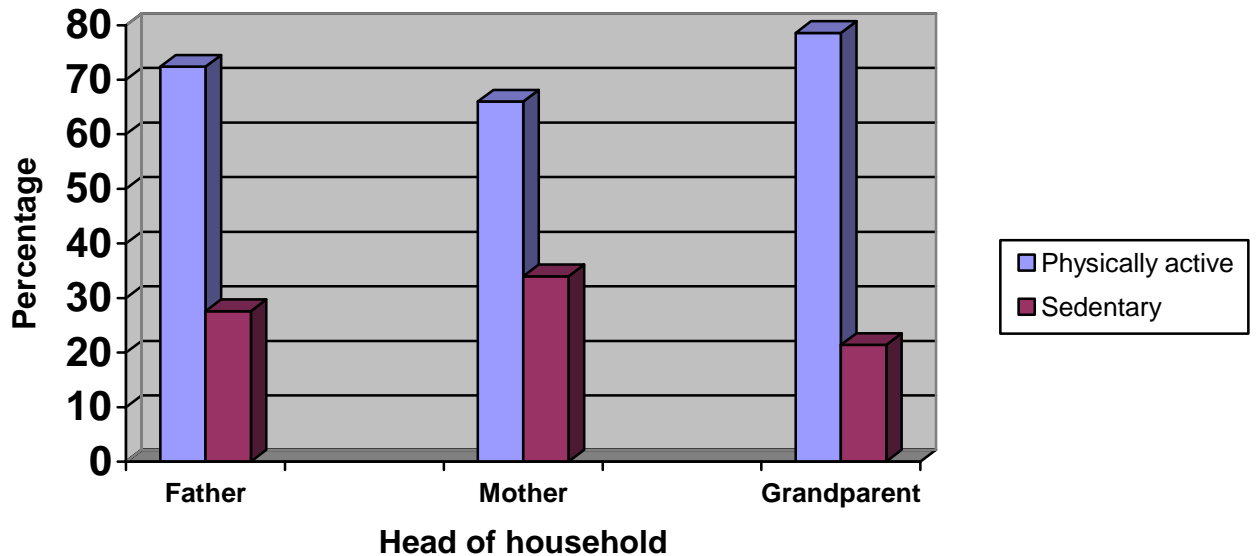
Figure 4.6 Percentages of high school learners classified as physically active and sedentary by school (n =365)



4.5.5 Head of household

There was no significant variation in the prevalence of high school learners who were classified as physically active by the head of household ($\chi^2 = 1.157, p > 0.05$). A higher prevalence of high school learners who had their fathers as the head of household (72.4%) were classified as physically active as illustrated in figure 4.7

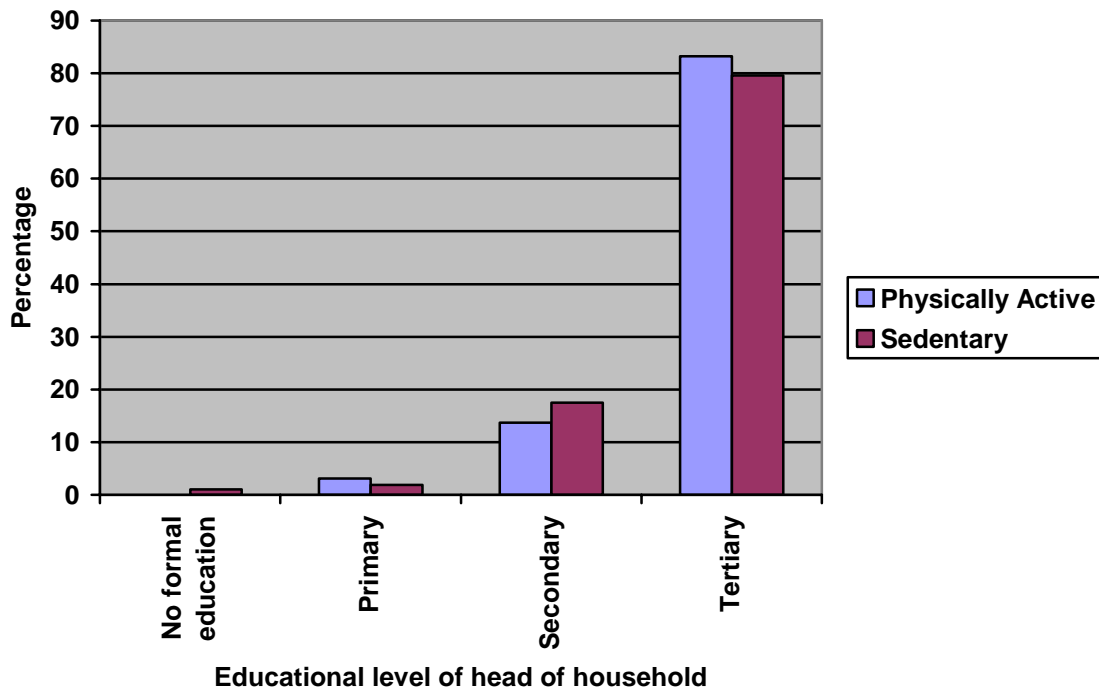
Figure 4.7 Percentage of high school learners classified as physically active and sedentary by head of household



4.5.6 Educational level of Head of Household

There was no significant difference in the prevalence of high school learners who were classified as physically active by educational level of head of household. ($\chi^2=3.691$, $p=0.297$). A higher prevalence of learners (72.3%) who had head of households educational level as tertiary were more likely to be considered as physically active.

Figure 4.8 Percentage of high learners classified as physically active and sedentary by education level of head of household (n =365)



4.5.7 Occupation of head of household

A significant difference was found in the prevalence of high school learners who were classified as physically active and those not by the employment status of household. Participants whose head of household was employed was statistically more likely to be classified as physically active than those whose head of household were unemployed

($\chi^2 = 12.5.42, p < 0.05$) as illustrated in figure 4.9

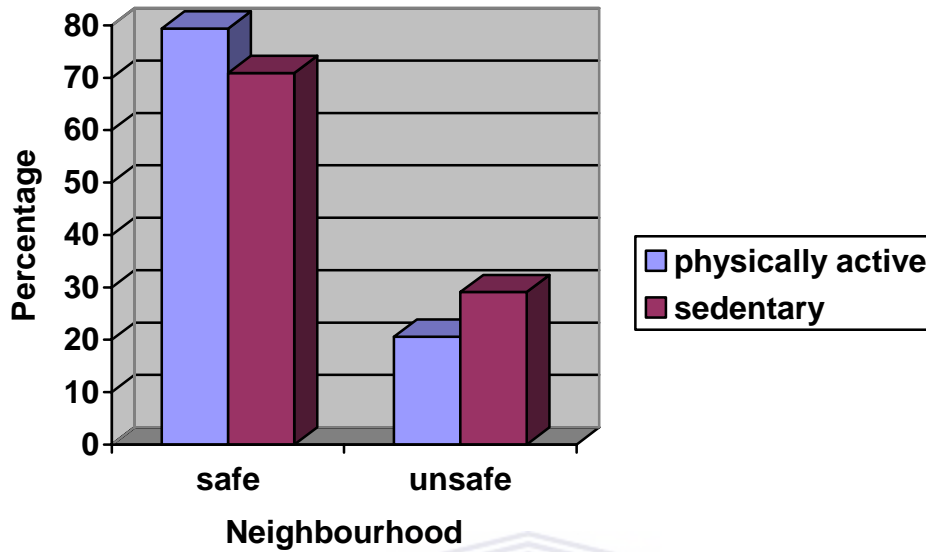
Figure 4.9 Percentage of learners classified as physically active and sedentary by occupation of head of household (n =365)



4.5.8 Neighbourhood

There were no significant difference in the prevalence of high school learners who were classified as physically active by the neighbourhood ($\chi^2 = 3.026, p > 0.05$). A high prevalence of high school learners who reported their neighbourhood as safe (74%) were classified as physically active as illustrated in figure 4.10.

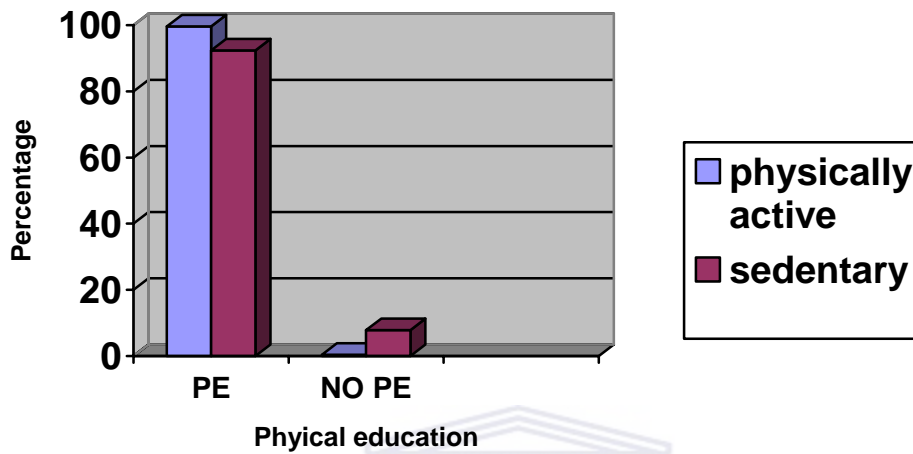
Figure 4.10 Percentage of high school learners classified as physically active and sedentary by neighborhood (n =365)



4.5.9 Physical Education

Significantly more learners who participated in physical education at school were classified as physically active ($\chi^2 = 16.768, p < 0.05$) as illustrated in figure 4.11.

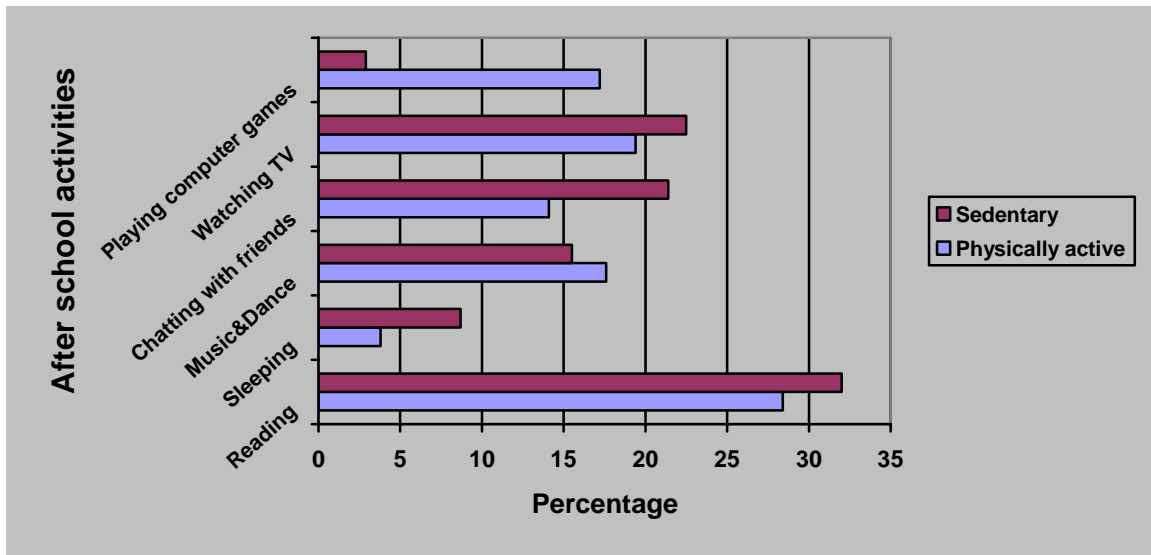
Figure 4.11 Percentage of high school learners classified as physically active and sedentary by physical education (n= 365)



4.5.10 After school activities

Significantly more learners who engaged in after school activities of a sedentary nature were classified as physically inactive ($\chi^2 = 19.218, p < 0.05$) as illustrated in figure 4.12 below. Almost a third (33.7%) of the learners who read as an after school activity were classified as sedentary as illustrated in figure 4.12.

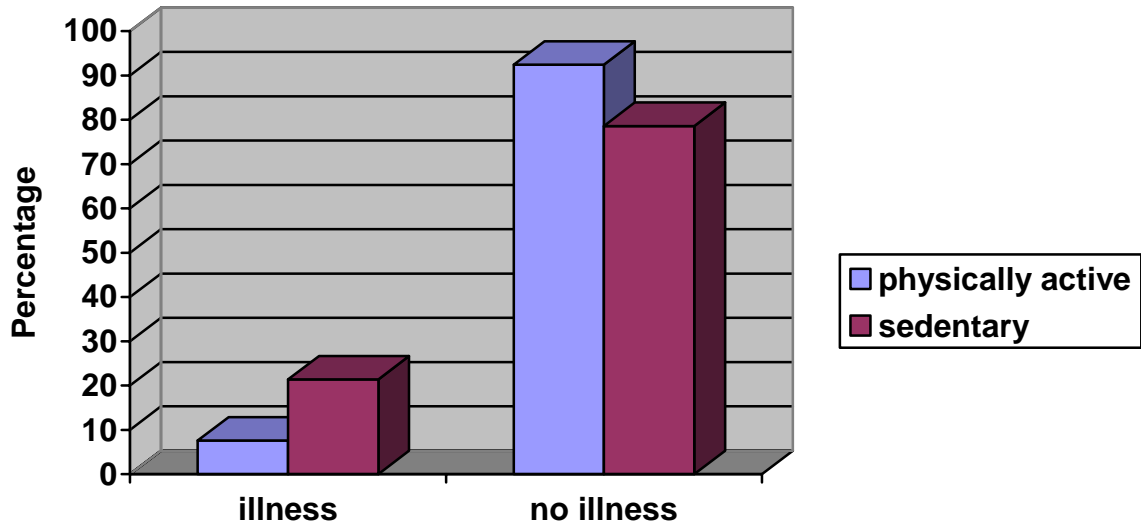
Figure 4.12 Percentage of high school learner classified as physically active and sedentary by after school activities (n=365)



4.5.11 Illness

Reported illness had an influence on physical activity. Learners who reported an illness (52.4%) were significantly more likely to be classified as physically inactive compared to those that reported no illness (74.9%) ($\chi^2 = 13.679$, $p < 0.05$).

Figure 4.13 Percentage of high school learners classified as physically active and sedentary by illness (n =365)



4.6 SUMMARY

The study aimed to assess the levels of physical activity among high school learners in Nairobi, Kenya. Fair percentages (28.2%) of learners were classified as sedentary. Furthermore significant factors influencing levels of physical activity were identified, such as age, school grade, occupation of head of household and physical education.

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

This chapter presents a discussion of the results presented in the previous chapter. The chapter is organized so that the objectives of the study, outlined in chapter one are discussed.

5.2 LEVELS OF PHYSICAL ACTIVITY

There is a growing concern about inadequate physical activity levels among adolescents globally. Physical inactivity has become a major public health concern contributing to the non communicable diseases epidemic. This study highlights that a substantial number of learners are physically inactive. To determine the participants' levels of physical activity, the participants were classified as either physically active or sedentary. This classification was based on guidelines from the Center for Disease Control and Prevention, the American College of Sport Medicine and the World Health Organisation on recommended quantity and quality of physical activity. The Center for Disease Control and Prevention, the American College of Sports Medicine and the World Health Organisation's guidelines stipulates that all adolescents perform at least 30 minutes of moderate to vigorous intensity physical activity daily or on most days of the week. The guidelines also suggested that additional health benefits of physical activity can be obtained by adding more time to exercise sessions or by working at a higher intensity; therefore physical activity need not to be strenuous to promote health. In addition the 30

minutes of exercise can be accrued throughout the day in small courses of activity (WHO, 2005e; American College of Sports Medicine, 2000).

Approximately seventy two percent (71.8%) of the respondents in the current study were considered physically active while twenty eight percent (28.2%) were considered physically inactive or sedentary. The results of the present study are consistent with findings from a study done in the Western Cape Province of South Africa among school going adolescents, which found that 32% of the learners in that study did not meet the requirements for being physically active for at least 30 minutes per day or on seven days of the week (Frantz, 2005). The findings of the current study however differ from the study by Phillips (2006) among black female adolescents in the Western Cape, South Africa in which 50.9% of them were considered physically inactive. The big discrepancy between the current study and that of Phillips (2006) could be attributed to the fact that her study sample was only female high school learners and literature has shown that females are considered more physically inactive than males.

The results of the current study are consistent with studies done elsewhere in developed countries like the findings of a study done in New Zealand which found that only 38% of adolescents aged 13-17 years were considered physically inactive (Hohepa et al., 2004). Contrary to the current study a Canadian study found that 60% of the youth were considered physically inactive (1988 Physical Activity Monitor, 2000). However, the comparisons should be made with caution as these studies might differ methodologically. The present data suggests that the level of physical activity in this sample was similar or

slightly higher than that found elsewhere in Africa continent among same-age adolescents

5.3 FACTORS INFLUENCING LEVELS OF PHYSICAL ACTIVITY

5.3.1 Gender

Several studies have concluded that levels of participation in physical activity are related to gender. There is consistent evidence that males are more active than females (Sallis et al., 2000). Some reports from the USA show that school going males adolescents are 15 to 25% more active than girls and that inactivity levels increase throughout the school years, more steeply among girls than boys (Sallis et al., 2000). Contrary to these findings the present study found no statistically significant difference between the levels of physical activity of males and females. Over 70% of both males (70.9%) and females (72.2%) were classified as physically active.

The slightly higher prevalence of physically active females could be due to the availability of more recreational facilities at the girls' schools which were not found at the boys' schools. These recreational facilities included swimming pools, tennis court, squash court and Karate. Although these findings could reflect a lack of availability of various sporting activities in the three schools for boys, it could also reflect a lack of interest among them to participate in school sports. In either case, it is disconcerting that a substantial percentage of learners are considered sedentary. One could speculate that, with an easily accessible sports programme or availability of various sporting facilities at school, participation by school going adolescents learners could be substantially higher.

Giles-Gorti & Donovan (2002) also concluded that people reporting less availability of facilities were less likely to exercise. Sallis et al. (1997) showed that those who engaged in the recommended amount of exercise reported a greater number of facilities within their reach. Overall, recreational facilities or available programmes are strongly associated with levels of physical activity in an individual lifestyle.

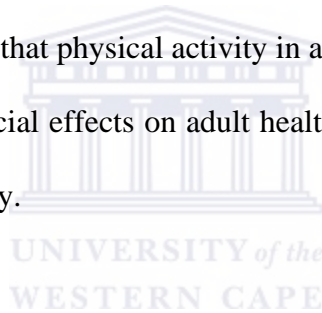
5.3.2 Age

Physical activity reduces as age increases and this reduction is more marked during the period of adolescence (Sallis et al., 2000). Participants in the current study tended to become sedentary as they grew older. Older learners or 18 years old (50%) were significantly more likely to be classified more sedentary than the 14 years old (75%). These findings are consistent with results of a study done in the United States of America which showed that participation in either moderate or vigorous activity decrease with increasing age and physical activity patterns generally decline mostly from ages 14 through to 18 years of age (Grunbaun et al. , 2002). Similar studies with regard to decrease in levels of physical activity with age have been found for youth in England, Australia and Canada (Cameron, Welbon & Zimmet, 2003; Craig, Cameron, Russell & Beaulieu, 2001). This tendency was also found in a study done in South Africa that showed that as the age of the learners increased the participation in physical activity decreased (Frantz, 2005).

The decline in physical activity with age however was not found in developing countries. A study done in the rural parts of Senegal found that older adolescents were more active

than younger ones (Benefiece et al., 2001). These differences could be attributed to the fact that the study by Benefiece et al. (2001) was conducted in a rural area where older adolescents do activities to earn a living. These activities included fetching water, getting firewood and working in the farms.

In the current study increase in inactivity with age was observed in both males and females, although the increase was greater among boys. In the current study this was probably due the fact that there were limited physical activity facilities at the boys' schools that participated. Overall the current data suggests that intervention is warranted to prevent or slow age related declines in physical activity levels especially among adolescents. It is recommended that physical activity in adolescents be strongly supported because of its long-term beneficial effects on adult health through its tendency to reduce the probability of adult inactivity.



5.3.3 Physical education

Physical education provides adolescents with meaningful amounts of daily physical activity (Fair Clough & Swatton, 2005; Tudor-Locke, Lee, Morgan, Beighler & Pagrazi, 2004). In recent years, physical education has been reduced in many schools, resulting in long periods of inactivity during the school day without opportunities for physical activity. This resulted in many adolescents failing to meet the minimal daily activity requirements. Therefore school physical education, organized sports and other programmes influencing physical activity among young people should be given all support in efforts to develop and implement effective physical activity programmes.

Although physical education is still mandated in Kenyan government schools, high school participation level in school physical education is declining, both in terms of enrollment and the number of classes students have per week. This reduction in curriculum time limits physical education's potential to influence adolescents' physical activity.

In the current study learners who participated in physical education (73.3 %) were significantly more likely to be classified more active than those who did not participate in physical education (26.7%). This is in line with research that suggests that youth who participates in physical education are more likely to be active in non-school settings (Dale, Corbin & Dale, 2000). More than half of the learners (77%) participated in physical education once a week for more than twenty minutes. The findings of this study differ from studies in the USA which found that between 34% (Lowry et al., 2001) and 55% (Grunbaum, Kann & Kinchen, 2002) of high school learners were enrolled in physical education classes. The findings also differed from a study by Frantz (2005) in South Africa in which 76% of the learners did not participate in physical education at school. However due to the limitation of the physical activity assessment instrument utilized within this study (self-report) some caution should be taken in interpreting the results.

A coordinated multilevel approach including schools, communities and policy makers is needed to increase participation in daily, quality physical education among students. This might be particularly important for high school students as physical activity levels tend to

decline substantially during adolescents. By taking individual preference in consideration and providing opportunities for individual success, physical education instructors can help create positive gym-class experiences among the students. It also appears that schools have the power to influence physical activity levels through the curriculum, especially when it stresses the importance of sport and exercise. Therefore if the same strategy is employed in Kenyan high schools, it might improve their level of participation in physical activity. A programme with a major goal like making physical education compulsory might influence adolescents to be involved in physical activity in Kenya.

In order to be effective in promoting physical activity among high school students, physical education needs to evaluate its curriculum and professional preparation in conjunction with strategies which have proven to work in settings such as schools. The quality physical education in high school need to be increased and classroom ratios must be manageable to enable instructors to employ individual behaviour change strategies. Physical education teachers must consider the fact that students are not in the same stage of behaviour change and must consider some individualization in their programmes. Quality/improved physical education programmes are needed to increase the physical competence, health related fitness, self-esteem and enjoyment of physical activity for all learners so that they can be physically active for lifetime (Brown et al., 2003). Physical education should be promoted to ensure that the maximal amount of opportunities for involvement in sedentary activities is offered to all learners regardless of gender. However, studies for identifying the factors influencing these differences should be encouraged so as to plan the interventions targeted to eliminate them.

5.3.4 Socioeconomic status

Several researchers have confirmed that physical activity is associated with socioeconomic status (Sallis et al., 2000; Tammelin et al., 2003; Frantz, 2005). Generally youth with a lower social economic status are more likely to report less physical activity than those with a higher socioeconomic status. In the present study learners who reported their head of household to be employed (77.2%) were more likely to be physically active than those who reported no employment (41.2%) for their head of household. This was consistent with several other studies, that reported not only the occupation of the head of household but also education level of the head of household to be positively associated with an active lifestyle (Ainsworth, Wilcox, Thompson, Richter,& Hauderson, 2003; Tammelin et al., 2003; Chen & Millar, 2001; King et al., 2000; Sallis et al., 2000). The results of this study are consistent with the findings from a study done in Western Cape Province of South Africa, which found that learners who were classified as upper socio-economic status group were found to participate in more extra mural activities such as going to the gym than the learners who were classified as of lower socio-economic status group (Frantz, 2005) However the findings of this study differ from a study done in China which revealed that adolescents with a lower socio economic status elicited the highest physical activity level, mainly from housework. It further stated that adolescents with a higher socio economic status or fathers with higher education were more likely to be classified a sedentary (Shi, Lien, Kumar & Holmboe-Ottensen, 2006). The lack of consistent findings on this aspect could possibly be due to the different measures used for

socio economic status in different studies. It could also be attributed to the type of activities included in “physical activities”.

Possible reasons for differences in higher and lower socio economic groups could be that lower income may restrict adolescent participation in high cost sports in societies where youth sports do not receive government subsidies. Another possibility could be that parents with a low educational level may be inactive themselves providing an unfavorable role model for the adolescents. Furthermore these parents may not be aware of the consequences of physical inactivity thus not encouraging their children to participate in physical activity. In the present study however no significant difference between parental educational levels and learners’ physical activity participation were found. Adolescent learners’ from low socioeconomic status may encounter barriers in after school programmes, and this may be the cost of the programmes, convenience of the location. Another factor may be lack of time because adolescents from low socioeconomic status are likely to have household responsibilities like baby sitting and chores.

5.3.5 Social support

Social support for physical activity from friends and family members are strong predictors of physical activity level. It is therefore, a common assumption that most of the healthy or unhealthy habits originate, at least in part, in family socialization. The findings of the current study showed that encouragement from friends and family to participate in physical activity positively influenced learners’ physical activity levels. This is supported

by various studies that have found that the social support from friends or families were positively associated with levels of initiation or maintenance of physically active lifestyle (Ainsworth, Wilcox, Thompson, Richter & Hauderson, 2003; Higgins et al, 2003). Peer motivation in particular by the family members and friends is one of the main factors influencing physical activity participation among populations primarily in adolescence and young adults (Tergerson & King, 2002; Sallis & Owen, 1999). Heitzler et al. (2006) and Davidson, Cutting & Birch (2003) supported the notion that parental support and encouragement are of key importance in shaping physical activity levels in elementary and middle school age youth, especially in terms of organized physical activity. Several studies have that shown peer influence and lack of social support was a barrier to physical activity (Dwyer, Allison, Lemoine, Aldaf, Gooman, Faulkner & Lysy, 2006; O’dea, 2003). Interventions to increase children’s and adolescents physical activity levels should thus involve increasing parental participation in physical activity. This notion was supported by the study of Phillips (2006) in which the learners clearly expressed a desire for more parental involvement and control in physical activities and sport.

5.3.6 Neighbourhood

Low perceived safety and high crime rates in the neighbourhood negatively influences physical activity levels (Humpel, Owen, Iverson, Leslie & Baumann, 2004; Gordon-Larsen, et al., 2000). Research has shown that neighborhoods that are perceived as unsafe for walking, cycling, jogging because of traffic, lack of sidewalks, unleashed dogs and gangs might hinder physical activity participation among adolescents (Gordon-Larsen et al., 2000). In the present study learners that reported their neighbourhood as unsafe

(64.3%) were significantly more likely to have lower levels of physical activity than those who reported their neighbourhood as safe (74%). These findings are consistent with previous research examining the determinants of adolescents' physical activity or inactivity. Gordon-Larsen et al., (2000) also found that high levels of neighbourhood crimes or unsafe neighbourhood were associated with the decreased likelihood of being active among young adults aged 18 years or older in the United States. This notion was further emphasized by the Center of Disease Control and Prevention that reported that people who described their neighbourhood as unsafe were more likely to be inactive.

Contrary to the results of the current study Romero, Robinson & Kreamer (2001) reported that perceptions of more neighbourhood hazards like crime, gangs, traffic and noise were associated with more physical activity. Unsafe neighbourhood is a powerful practical barrier that can influence a person's decision to be active. This is supported by a study done by US Department of Health and Human Services which indicates that in order for one to implement successful strategies in promoting physical activity, the environment should be conducive to physical activity participation.

5.3.7 Sedentary activities

The use of current advances in entertainment technology, such as television and computer constitutes the greatest barrier to physical activity among adolescent learners especially in urban areas of the developing world. In contrast to adolescents in developed countries, the present study results show that school going adolescents in Nairobi, Kenya spends relatively little time watching television (22.4%). A study done in China to assess

patterns of overweight, inactivity and snacking in Chinese children found that they spent little time watching television because of a high study load (Waller et al., 2003; Tudor-Locke, et al., 2003). This raises the question whether the little time spent watching television by the participants in the current study was due to high study load. This however is only a speculation as the study load was not assessed in this study.

However, promoting physical activity through the medium of television also exists if one gets opportunity to advertise (Suminski et al., 2002). This needs to be considered by people involved in health promotion directed at changing behaviour. In the present study more than three-quarters of the learners (83%) spend their free time after school in doing sedentary activities. These activities included reading, sleeping, chatting with friends, watching TV and playing computer games.

5.4 HEALTH PROMOTION PROGRAMME

Promotion of physical activity during childhood and adolescence is a global public health priority intended to ease the burden of chronic diseases later in life (WHO, 2003f). As discussed earlier in the previous chapters chronic diseases of lifestyle accounts for 50% of all diseases in developing countries like Kenya. Chronic diseases of lifestyle have thus become a major epidemic due to a rapid transition in lifestyle leading to decreased physical activity. Increase in morbidity will definitely have a negative impact on the health sector. Therefore the recommendation to increase physical activity is a key element of any health promotion strategy. There is an urgent need to intervene in the current situation regarding learner's sedentary lifestyle.

Gender differences were apparent among the participants with males being less active than girls. Considering that physical activity levels for both males and females decline during high school years, providing positive experiences in activities such as physical education may assist in offsetting the trend. Modification of the current legislative school policies regarding physical education classes and other school activity opportunities, such as more team sports is justified to ensure optimal engagement of students both males and females. Incorporate strategy like same gender physical education classes and physical activity promotion in general. In terms of gender, health promoters should employ gender specific physical education classes and allowing student input in determining the design of physical education class may help to ensure that physical education provides a more positive experience especially for males. Another suggested strategy that can be applied for both male and female is having a wider variety of sports available at school especially at the boys' school.

The current reduction in curriculum time for physical education limits its potential to influence youth physical activity. With the current allocated time of physical education lesson time, it is still insufficient to meet the demands of the CDC recommendation for health promoting levels of physical activity. If physical education is to play an important role in the promotion of youth physical activity, exposing students to range of fitness, sport and recreation physical activities is only the start of the process. In the present study a significant relationship was found between PE attendance and learners levels of physical activity, where by more than half of the learners participated in PE once a week

for about twenty minutes. Therefore as discussed earlier in the chapter, it is very important for health promoters to convince the education authorities about the importance of learners participating in PE to benefit health. In the present study sample, government financial support for adolescents' sports would offer opportunities for all children to participate regardless of their family's socioeconomic situation. Compulsory lesson in physical education at school, a setting in which to promote physical activity, are notable because this is a way to reach all adolescents regardless of their social class, interest in physical activity or skills at sport. Physical education for adolescents should be critically evaluated with regard to their contribution to lifetime physical activity regarding whether they give young people positive experiences, enhance the variety of their sport skills, and increase their motivation for habitual physical activity regardless of their natural skills. To ensure the continuity and progression of the intervention, teachers and non teaching staff in schools like the caretakers need to be incorporated in the health intervention programmes. It may be vital for health professionals like physiotherapists and other health promoting officers to deliver the information on the importance of being physically active and the consequences of sedentary lifestyle to schools.

The present study highlighted that peers and family had significant influences on learners' participation on physical activity. They motivated the learners to maintain a physically active lifestyle by providing encouragement for physical activity. In Kenya physical activity programmes targeting the entire family could thus be beneficial for learners especially when they are on holiday. Parents serve as role models to the adolescents and they often organize and fund adolescents' involvement in physical

activity. Moreover, parental participation in physical activity, encouragement to participate in physical activity and provision of transport to sporting events have been linked to high levels of physical activity among children and adolescents. Health promoters should involve parents and guardians in physical activity instruction and in extracurricular and community physical activity programmes and encourage them to support their children's participation in enjoyable physical activities.

The findings of the current study suggest that neighbourhood safety concerns play a key role in limiting adolescents' physical activity. Health promoters should thus consider community involvement in the development and implementation of community programmes aimed at improving and maintaining safety in the neighbourhood. For this to be successful all the role players should be brought on board, example safety and security, sports and recreation, health professional, schools and the youth . Community programme can complement the efforts of schools by providing the children and adolescents opportunity to engage in the types and levels of physical activity that may not be offered in school.

5.5 SUMMARY

Chapter five interprets the results of the study, compares and contrasts the findings of the current study with similar studies and presents both the immediate and long-term impact of the findings.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 INTRODUCTION

This final chapter presents the conclusion of the study. The fundamental points of the study are outlined. Recommendations based on the results for future actions including the development of physical activity promotion programmes are stated. The chapter concludes by highlighting the limitation of the study.

6.2. CONCLUSION

Promotion of physical activity during childhood and adolescence is a global public health priority intended to ease the burden of obesity and chronic diseases later in life (WHA, 2004). Physical inactivity is recognized as an important determinant for chronic diseases and the prevalence of physical inactivity is increasing during adolescence. These chronic diseases share key risk factors such as tobacco use, physical inactivity, unhealthy diets and alcohol use (WHO, 2002b). Even though the clinical symptoms do not become apparent until much later in life, it is known that the origin of many chronic diseases lies during this period. The period of adolescence can thus be considered a critical developmental period from a public health point of view with regard to physical activity. The period of adolescence seems to be especially important. Research has shown that amount of habitual physical activity is decreasing dramatically in this age range. Adolescents are therefore important as a target population for preventive strategies aimed at improvement of physical activity.

Regular moderate to vigorous physical activity can provide adolescents with numerous health benefits, this includes, physical, mental and social. It can also help improve quality of life, reduce health care costs and prevent a number of diseases. Sedentary lifestyle is on the increase among population as people in the world are or are tending to live in technologically advancing society. The rapid urbanization growth with changes in lifestyle in Africa and other developing countries globally, such as Kenya increases this risk behaviour. As a result the complexities of the increasing burden of non communicable diseases/chronic diseases of lifestyle in these countries threatens to overwhelm already overstretched health services, which has been made worse by existence of associated factors such as, poverty, malaria, and infectious diseases like tuberculosis and AIDS, dilapidated infrastructure and economic hardship. There is little recognition that has been given to consequence of the burden of chronic diseases of lifestyle and their risk factors. Researchers have stated that the increased burden of chronic diseases in countries that also have high infectious disease burden, is straining their health services (Yach, Hawkes, Gould & Hofman, 2004). There is an urgent need therefore for an appropriate intervention programme to be put in place before the future impact of the current situation becomes a matter of public health concern.

The present study aimed to identify background characteristics of learners reporting current participation in physical activity, to establish the levels of physical activity according to the WHO guidelines among adolescents in high school in Nairobi and to identify factors influencing levels of physical activity among school going adolescents in

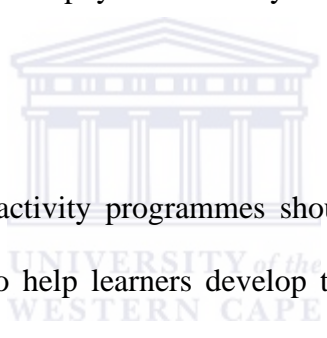
Nairobi, Kenya. The present study identified that 84.1% of the learners reported current participation in physical activity. Among them 50.8% were females and 49.2% were males. In general learners were motivated to participate in physical activity by their friends and family who were currently participating in a form of physical activity. The present study also identified that there was no significant difference in the frequency of learners that participated in physical activity by gender but there was a higher prevalence of female learners who (72.2%) than males (70.9%) that participated in physical activity. However a significant difference was found between grade in school and levels of physical activity, there was a decrease in the prevalence of learners who were physically active from form 2 (80.2%) to form four (66.4%). In the current study levels of physical activity declined as the age increased. Older learners were significantly more likely to be classified as physically inactive /sedentary than the younger learners. It also found a significant difference between physical education attendance and levels of physical activity, learners who participated in physical education at school were more likely to be classified as physically inactive.

The present study highlights issues related to physical inactivity in the study sample. It further highlights the need for planning of an intervention programme relevant to this study sample in which all key stakeholders should be involved in decision-making processes. For example interventions like same gender physical education classes and increasing the current allocated time for physical education. The current study also highlighted that family had significant influences on learners' participation on physical activity. Therefore for this sample physical activity programmes targeting the entire

family could thus be beneficial for learners especially when they are on holiday. The findings of the current study further suggested that neighborhood safety concerns influences the adolescents participation in physical activity. Therefore interventions like involving the community in the development and implementation of programmes aimed at improving and maintaining safety in the neighborhood would be beneficial

6.3 RECOMMENDATIONS

The following recommendations are offered to Government high schools authorities, the Ministry of Health, Education, and Youth affairs, parents and other health promoters interested in increasing levels of physical activity among school going adolescent learners.



1. Health education- physical activity programmes should be implemented in schools from primary levels in order to help learners develop the knowledge, attitudes, motor skills, behavioural skills and confidence needed to acquire a non-sedentary lifestyle among adolescents' learners.

2. The Ministry of education, health, ministry of culture and sports and the Ministry of youth affairs need to support physical activity programmes for Kenyan adolescents in general and work together in creating enabling environment and effective intervention. More specifically the ministries need to increase budget allocation to improve the facilities used by learners for physical activity especially in boarding high schools where they spent three-quarters of the year.

3. Modification of the current physical education curriculum is recommended for example, increasing the weekly number of physical education classes and that teachers should involve students in the decision-making process of choosing specific activities for the session. By allowing students input in determining the content of physical education classes may help ensure that physical education provides a more positive physical activity experience, especially for females. It is necessary to give standardized training packages for specialized physical education teachers and non specialist for all age groups. On the other hand opportunities and practices should be promoted that build activity into the rest of the school day, not just during the physical education lesson.

4. The concept of health promoting schools should be encouraged as it is an excellent way to promote not only physical activity in schools, but it takes a whole school approach to health and physical activity is a whole component of the concept. Furthermore, schools should be 'healthy living centers' for students and for wider community to increase after school hour's use of school sport facility. Schools should be able to provide safe and enjoyable extracurricular non sedentary activities that meet the needs and interest of all learners.

5. Assessing students' interest in participating in physical activity programmes will be required. School-based physical activity opportunities may only ever attract a minority of students and therefore it is important to focus complementary efforts on promoting physical activity outside the 'school' context. Further research should examine how best to promote access to existing community physical activity programmes and how school

facilities can be used to contribute to the delivery of these programmes outside the school hours.

6. Recommendation for future studies:

- A longitudinal study should be done on the same cohort throughout the academic year to ascertain the variation in different periods of annual academic programmes.
- Physical activity patterns of the adolescents may differ in different parts of the country especially in rural areas where activities like farming, carrying firewood and water are involved. More studies are needed including different settings to obtain solid knowledge about the image of physical activity patterns for adolescents in Kenya.
- Another study which combines both quantitative and qualitative study designs (triangulation/mixed methods) could be conducted for deeper insights into the factors that influence physical activity participation and levels of physical activity among high school learners.
- Research examining the feasibility of providing a PE environment that incorporates students-driven activities, with the appropriate physical (for example a variety of activities and social support for example encouragement from parents, friends and teachers) element is therefore warranted. To help enhance levels of



physical activity among the adolescents population, a diverse range of strategies that transcended various environments including school, neighbourhood, peer and home settings is recommended. Strategies employed, however, should be individualized to the target community because appropriate strategies will likely differ according to community location for example rural versus urban setting, target population for example male and female and the community needs like what activity opportunities or activity promoting infrastructure is lacking.

6.4 LIMITATIONS OF THE STUDY

The results of the present study should be interpreted in the light of the following limitations.

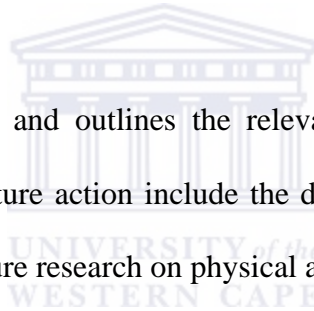
1. Collection of data was based on self report as self-administered questionnaires were used. Self report measures are open to bias and misreporting through errors in exaggeration especially where behaviour is seen as undesirable for example physical inactivity.

2. The cross-sectional nature of the study may limit the ability to make causal inferences. An individual currently participating in a physical activity will not necessarily continue to do so. Therefore caution should be exercised in interpreting the results of cross-sectional study in the absence of longitudinal data.

3. The sample was relatively homogenous in terms of age and schooling for example it was urban high school learners aged between 14 and 19 years. The sample did not include those who had dropped out of school.

4. The study was conducted among students in boarding schools in an urban area. The levels of physical activity may differ from those in other urban and rural areas. Because of this the results cannot be generalized to all boarding high schools in Kenya. Comparisons of the results of this study with those conducted in other countries should be done with caution due to environmental, sampling and methodological variations between the different studies.

This final chapter summarizes and outlines the relevant points of the current study. Recommendations made for future action include the development of physical activity-promotion programmes and future research on physical activity.



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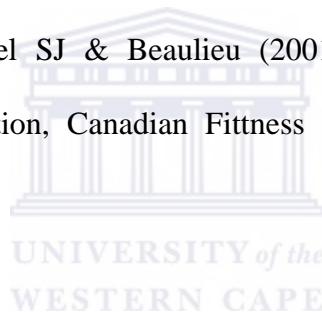
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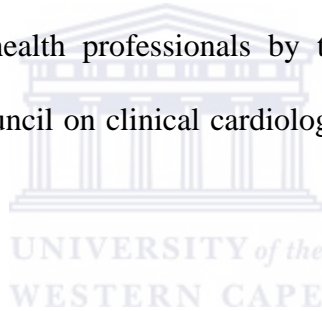
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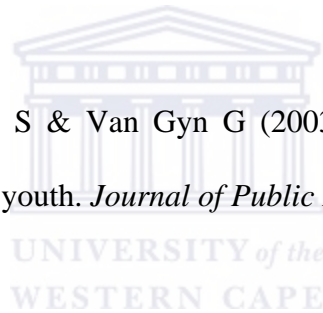
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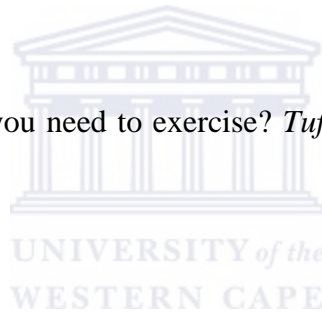
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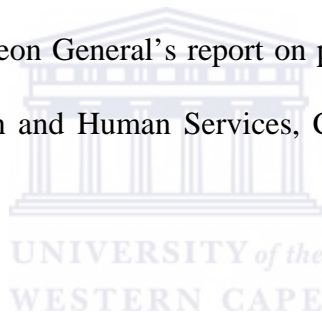
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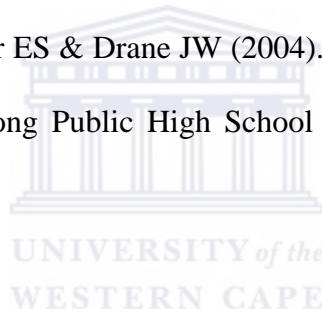
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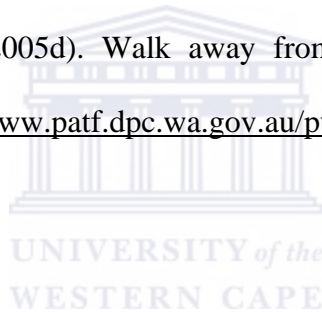
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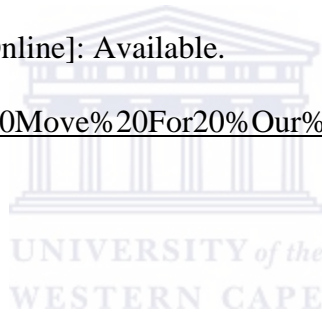
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