


**HIGH SCHOOL GIRLS' PERCEPTIONS OF ENVIRONMENTAL
AND SOCIAL SUPPORT FOR PHYSICAL ACTIVITY**

BY

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The logo of the University of the Western Cape, featuring a classical building with a pediment and columns.

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the degree of Masters of Science (Physiotherapy) in the
Department of Physiotherapy, University of the Western Cape.**

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DECLARATION

I hereby declare that “*High School Girls’ Perceptions of Environmental and Social Support for Physical Activity*” is my own work, that it has not been submitted, or part of it, for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

Kirenga B. Liliane

Signature.....



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DEDICATION

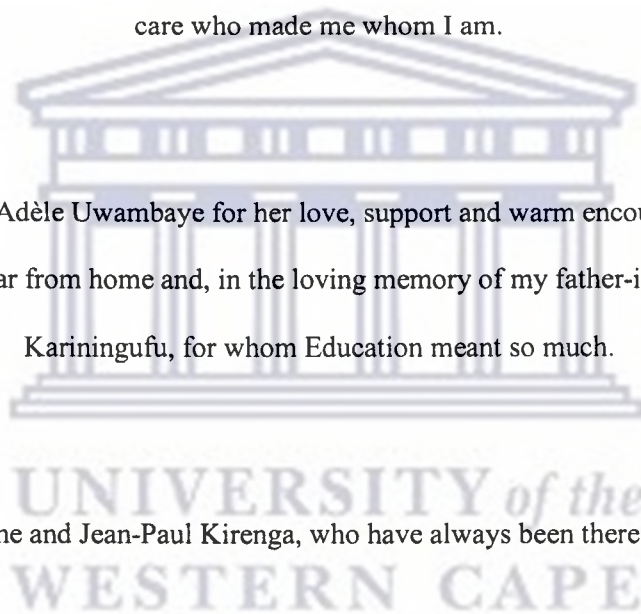
To my loving husband Patrick Kariningufu to whom I am eternally grateful for his love, patience and support through my life and to my lovely sons Yann and Allan.

You have been and are a blessing source of inspiration.

To my parents, Vital Kirenga and Therese Kayonga, whom I am forever grateful for their parenting care who made me whom I am.

To my mother-in law, Adèle Uwambaye for her love, support and warm encouragements throughout these two years far from home and, in the loving memory of my father-in-law, late Emile Kariningufu, for whom Education meant so much.

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MAY GOD RICHLY BLESS YOU ALL

ABSTRACT

According to the World Health Organization (WHO), physical inactivity or sedentary life is one of the leading causes of the major non-communicable diseases, which contributes to the global burden of diseases, death and disability. Regular physical activity has significant benefits for health and everyone should engage in at least 30 minutes of moderate physical activity every day. Girls are reported to be less active than boys. The amount of physical activity declines with the increasing age and this decline is greater in girls than boys. The aim of study was to determine Rwandese high school girls' perceptions regarding environmental and social support for physical activity. A descriptive study using a cross sectional survey was used. Six high schools in Kigali, Rwanda, registered for the academic year 2008-2009, were selected. Three hundred and fifty (350) high school female learners were selected using a stratified random sampling technique. The participants were selected by class or grade. A self-administered questionnaire, including questions from the Physical Education Program Improvement and Self-study as well as the Modifiable Adolescent Physical Activity Questionnaire was used to collect data. Descriptive and inferential statistics were calculated with the Statistical Package for Social Sciences (SPSS) version 16.0. Chi square and student t-tests were used to determine the association between perceived support and socio demographic characteristics. Alpha level was set at 0.05. The mean age was 16.06 years (SD=1.4). The majority of learners in both categories reported not to meet the average of days required for moderate days of physical activity (66%) as well as for vigorous days of physical activity (70.9%). Almost one third (34%) of the participants were classified as physically inactive while 66% were classified as physically active when the WHO's guidelines for classification of physical activity was used. The overall study sample responded positively when asked about support for physical activity in the school environment. Furthermore, the overall study sample responded positively to friends' support but negatively when asked about the family support. Significant differences were observed between support from family, social support and moderate physical activity. The findings of the present study highlight the need for the planning and implementation of a physical activity intervention program for high school girls in Rwanda.

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CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

In this chapter, the background of the study is given to highlight the health burden of physical inactivity, threatening people's health worldwide and the initiatives of the World Health Organisation (WHO) to address the growing burden of chronic diseases as a result of physical inactivity. It also describes the consequences of physical inactivity as it relates to adolescence. The chapter further reflects on the physical activity levels among adolescents in some countries around the world including Rwanda. The statement, aims and objectives of the study and the significance of the study are outlined. The chapter ends with definitions of terms used as well as a summary of the chapters that will follow in this study.

1.2 BACKGROUND OF THE STUDY

Physical activity is essential for our health and well being. Physical activity for an individual is a strong means for prevention of diseases and for nations, a cost-effective method to improve public health across the population (WHO, 2003a). Regular physical activity – such as walking, cycling, or dancing, has significant benefits for health. It can reduce the risk of cardiovascular disease, diabetes and osteoporosis, help control weight and promote psychological well-being (WHO, 2007). However, the WHO (WHO, 2007) further states that more activity may be required for weight control. 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 (Centers for Disease Control and Prevention, 2002). Guidelines from a Canadian Research Institute recommend 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 exertion (Canadian Fitness and Lifestyle Research Institute, 2002).

According to a study done in the United States by Slevin (2002), heart disease, one of the major non-communicable diseases, remains the leading cause of death in women. Sedentary lifestyle and poor nutrition are major risks factors for heart disease and stroke in women. The World Health Report (2002) identified five out of the ten leading global disease burden risk factors as high blood pressure, high cholesterol, obesity, physical inactivity and unhealthy diet. Together with alcohol and tobacco use, these preventable risks play a key role in the development of chronic diseases. Physical activity is known to reduce the risk of cardiovascular disease (Lee, Paffenbarger, Thompson, 2001), some cancers (Hardman, 2001) and type 2-diabetes (Diabetes UK, 2003).

The insufficient amount of physical activity in children and adolescents has a disturbing effect in term of health. 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). Consequently, overall 2.7 million deaths annually are attributable to low fruit and vegetable intake and overall 1.9 million deaths are annually attributable to physical inactivity (WHO, 2008a). Encouraging increased physical activity is one way to aid young people in achieving a balance energy intake and expenditure and establishing healthy behavior that will continue into adulthood. In addition to contributing to weight control, physical activity helps

young people to build and maintain healthy bones and muscles and contributes to psychological well-being (Troiano, 2002). There is scientific evidence showing that habitual physical activity provides people of all ages with considerable physical, social and mental gains and well being throughout their life span (WHO, 2003a; Fox & Boutcher, 2000).

The Centers for Disease Control and Prevention (2001) in the USA warned that physical activity levels of all people across all ages tend to decrease. According to a study done in the United States by Ward, et al. (2006), a decline in activity begins in late elementary school and continues throughout high school and young adulthood. Van Mechelen, Twisk, Post, Snel and Kemper (2000) also confirmed that the amount of physical activity declines with increasing age and this decline is greater in girls than boys. Yang, Telema, Leina and Viikari (1999) also affirmed also that physical activity in childhood and in adolescence is an important prerequisite to physical activity in adulthood. Young, Phillips, Yu and Haythornthwaite (2006) stated in their study that a National Youth Risk Behavior Survey in United States found 40% of high school girls and 27% of high school boys to have insufficient physical activity to meet these recommendations. Tobias and Roberts, 2001 further stated that 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%. Riddoch and Boreham (1995) also found that decline in physical activity levels in adolescents, especially amongst girls in New Zealand.

The decline in physical activity among adolescents as they age has also been noted in Africa. Phillips (2006) found that the high school learners in grade 9 were more likely than those in grade 10 to participate in physical activity in a study among female high school learners in South Africa. A study done among high school going adolescents in Kenya also revealed that older learners were significantly more likely to be classified as more sedentary than younger learners (Kibet, 2006). A study done in 2001 among high school learners in Kigali found that participants were spending an average of 10.8 hours per day in sedentary activities (Murenzi, 2001). This study further found that girls were more likely to engage in sedentary activities than boys. Although there is little recent information about physical activity participation among female adolescents in Rwanda, there is evidence of physical inactivity among adult women. In 2004, a study conducted in urban Kigali, found that working adults were living sedentary lifestyles. The study found that 72% of women workers were classified as sedentary and only 28% were physically active (Kagwiza, Phillips & Struthers, 2005).

Interventions that provide opportunities and motivation for young people to be active could help address this problem of physical inactivity. Schools present unique opportunities to provide time, facilities and guidance for young people to participate in physical activity. In most countries, through physical education programmes, schools offer the only systematic opportunity for young people to take part in and learn about physical activity. According to the National Association of Sport and Physical Education in America (2001), physical education can serve as a vehicle for helping students to develop the knowledge, attitudes, motor skills, behavioural skills and confidence needed to adapt and maintain physically active lifestyles. School physical education classes can assist young people to "Move for Health" by providing them with opportunities and time to safely access physical activity facilities in an environment that is supported by teachers, parents and friends (WHO, 2008b).

The outcomes of physical education programmes should include the development of each student's physical competence, health-related fitness, self-esteem and overall enjoyment of physical activity. These outcomes enable students to make informed decisions about and choices leading to a physically active lifestyle.

According to Motl et al. (2002), perceived neighborhood safety and equipment accessibility are two physical environmental variables that might influence the physical activity behaviours of adolescent girls. The same authors further state that perceived lack of accessible equipment in the home (e.g., bicycles, balls, skates) and in the community (e.g., playgrounds, parks, gyms) might impede physical activity participation among adolescent girls. This is supported by Dunton, Janner, & Cooper, 2003; Saunders, Motl, Dowda, Dishman, & Pate, 2004) who stated that perceptions of equipment accessibility, neighborhood safety, social support, and self-efficacy have been identified as correlates of self-reported physical activity in adolescent girls.

The association of social support, particularly peer and family, and PA levels in adolescents is well established (Troost et al., 2003; Davison, Cutting and Birch, 2003; Neumark-Sztainer, Story, Hannan, Tharp & Rex, 2003). Adolescent girls' perceptions of support for physical activity (PA) in the school environment (ie, school climate) may be particularly important because most adolescents spend significant time at school and many opportunities for PA, such as physical education [PE] and school-based sports and activities, take place within the school setting (Grieser, et al., 2008).

The-increasing levels of inactivity among adolescents and specifically adolescent girls highlight the urgent need to investigate the reasons for physical inactivity among them. This

could assist in implementing appropriate interventions at schools to increase levels of physical activity.

1.3 PROBLEM STATEMENT

Physical activity levels are decreasing among young people, especially female adolescents in countries around the world, –more so in poor urban areas. It is estimated that less than one-third of young people are sufficiently active to benefit their present and future health and well-being (WHO, 2008a). Many factors such as lack of time, poor motivation, inadequate support and guidance, lack of safe facilities and limited accessibility to physical activity facilities influence the participation of young people in physical activity (WHO, 2008b). Similar to what happens internationally, female adolescents in Rwanda are not physically active and the knowledge on the benefits of physical activity is not known. To date, no study has been done to determine Rwandese high school girls' perceptions of environmental and social support of physical activity which may increase their awareness about it and thus increase the promotion of a healthy lifestyle.

1.4 RESEARCH QUESTIONS

- What is the level and type of physical activity among female high school learners?
- What are high school girls' perceptions of social support of physical activity in and outside of the school environment?
- Do perceptions of support for physical activity influence their participation in physical activity?

1.5 AIM OF THE STUDY

The aim of the study is to determine high school girls' perceptions regarding environmental and social support for physical activity.

1.6 OBJECTIVES

2. To determine the patterns of physical activity participation (vigorous and moderate) among high school girls in Kigali, Rwanda.
3. To determine high school girls' perceived social support for physical activity in the school environment.
4. To determine high school girls' perceived social support for physical activity outside the school environment (i.e. family and friends).
5. To determine high school girl's enjoyment of physical activity and physical education.
6. To establish the association between perceived support for physical activity and patterns of participation.

1.7 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, 2008c). The impact of these diseases influences physiotherapy services as they are indicated in the prevention and rehabilitation process. Most of the challenging chronic health problems that might result in disabilities rehabilitated by physiotherapists are caused by risk factors due to physical inactivity (Australian Physiotherapy Association, 2008). The physiotherapists' role in public health promotion, disease prevention and education in primary health care therefore comes into effect.

Studies done in Rwanda regarding levels of physical activity among high school learners indicate that levels might be low. The physiotherapists in Rwanda will be challenged and helped by the results of this study to develop more preventive measures of such chronic health problems rather than rehabilitating them. This will be done through promoting physical activity, which is likely to prevent chronic conditions including back pain, chronic diseases of lifestyle and some disabilities. In addition, adolescence is the best time for learning behaviours that are likely to persist in adulthood (Bradley, McMurray, Harrell, Deng & Shiging, 2000). Consequently, there is a need for intervention programmes. Physiotherapists, with their expertise in body mechanics, anatomy, and physiology can play a vital role in helping people develop appropriate and safe exercise programmes (Wilson, 2002). But for intervention programmes to be successful, we need to pay attention to environmental and social factors related to physical activity. Therefore the results may have implications for school-based programmes and recommendations of this study may serve as a strategy to raise awareness about the importance of physical activity among the youth in general, but the girls specifically.



1.8 DEFINITION OF KEY TERMS

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

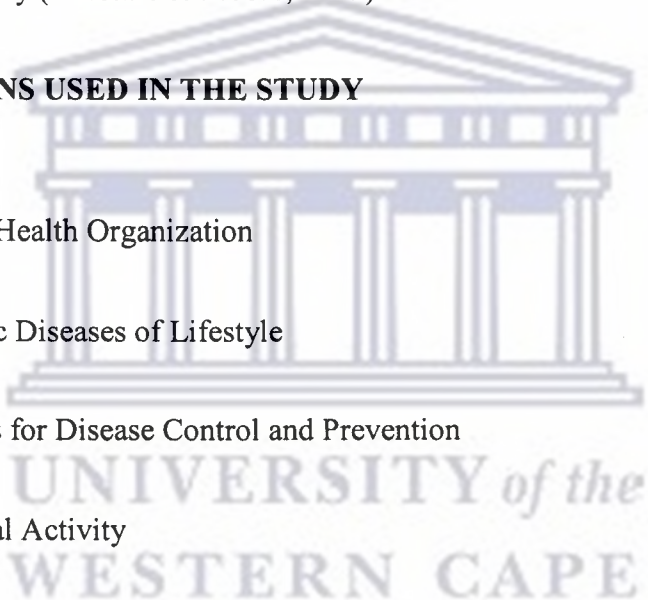
Health Promotion: It is the process of enabling people to increase control over, and to improve, their health; to reach a state of complete physical, mental and social well-being, (Coulson, Goldstein & Ntuli, 2002).

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 & Kulbok, 2001).

High school learners: High school learners are learners aged 13-18 years who attend a secondary school.

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

1.9 ABBREVIATIONS USED IN THE STUDY



WHO:	World Health Organization
CDL:	Chronic Diseases of Lifestyle
CDC:	Centers for Disease Control and Prevention
PA:	Physical Activity
PE:	Physical Education
VPA:	Vigorous Physical Activity
MPA:	Moderate Physical Activity
MMWR:	Morbidity and Mortality Weekly Report
SPSS:	Statistical Package for Social Sciences
YRBS:	Youth Risk Behavior Survey

1.10 OUTLINE OF THESIS

Chapter one describes the background of the study, including the benefits of physical activity and levels of physical activity among female adolescents. It highlights how the WHO has put forward physical activity to be one of the strategies to reduce the burden of CDLs due to sedentarism or physical inactivity. The chapter highlights the motivation for the study, which is due to the fact that most of declines in physical activity occur among adolescents as they age. Finally, the statement of the problem, aim and objectives, significance of the study and lastly the definitions of key terms are all given by this chapter

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 adolescent girls 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 the research setting, procedures, 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. The limitations of the study are also outlined.

Chapter six draws conclusion based on the study. It also attempts to make recommendations based on the study.



CHAPTER TWO LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews literature regarding the benefits of physical activity specifically among youth and girls in particular. It highlights the levels of physical activity among youth with emphasis on girls as well as the factors that influence their participation in physical activity. The role of the school environment in promotion of physical activity is also described and lastly the role of physiotherapy in health promotion.

2.2 GUIDELINES ABOUT PHYSICAL ACTIVITY FOR YOUTH

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). 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 recommend 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 (Kibet, 2006).

Katzmarzyk and Arden (2004) in their review of physical activity in Canadian children and youth, stated that the development of guidelines for physical activity levels in children and youth does not have a long history, primarily due to the fact that children and youth have traditionally been more active and presumed to be healthier than adults. They further summarized physical activity guidelines used up to 2002 internationally as shown in Table

2.1 below.

Table 2.1 Physical activity Guidelines for children and youth

<i>Organization</i>	<i>Year</i>	<i>Recommendation</i>
1993 Seattle Conference of Pediatric Exercise Scientists	1993	Daily physical activity as part of lifestyle, plus vigorous physical activity for at least 20 min/session, 3 times/ week.
US Surgeon General	1996	30 min of moderate physical activity on most, preferably all, days of the week.
UK Health Education Authority	1998	60 min of at least moderate-intensity physical activity per day, or, for those doing little activity currently, at least 30 min of at least moderate-intensity activity, plus activities to enhance muscular strength, flexibility and bone health at least 2 times/week
US National Association for Sport and Physical Education	1998	30–60 min of active play or sustained physical activity on all, or most, days of the week, plus accumulation of >60 min, and up to several hours of activity per day is encouraged.
Australian Commonwealth Department of Health and Aged Care	1999	30 min of moderate activity on most, preferably all, days of the week, plus vigorous exercise for 30 min/d, 3–4 times/week.
Health Canada	2002	Children and youth should increase the time they currently engage in moderate or vigorous physical activity by at least 30 min/d (in periods at least 5–10 min long), progressing to ≥90 min more of increasingly vigorous physical activity, plus decrease the time spent doing sedentary activity (television, video games, Internet) by at least 30 min/d, eventually decreasing by ≥90 min the amount of time spent daily on these activities.

Katzmarzyk & Arden (2004)

According to the WHO (2009), young people aged between 5 and 18 years old should engage in at least 60 minutes of moderate- to vigorous-intensity physical activity each day that is developmentally appropriate and involves a variety of activities. This can provide young people with important physical, mental and social health benefits. People aged 18 years old and above (classified in the adult group) should engage in 30 minutes of moderate-intensity physical activity 5 days per week; or 20 minutes of vigorous intensity physical activity 3 days per week. All this should be combined with 8-10 muscular strengthening exercises (8-12 repetitions) at least 2 days per week. Moreover, the 30 minutes recommended moderate intensity physical activity can be accumulated through the day in the small bouts of activity or exercise. Therefore, it is not necessary to practice vigorous sports, join costly fitness clubs, or purchase special equipment to achieve health benefits (Bahr & Loald, 2001, as cited in Nizeyimana, 2005; WHO, 2000).

The WHO (2009) further summarized the examples of moderate-intensity and vigorous-intensity exercise to be done in order to meet these guidelines. However, the intensity of different forms of physical activity varies between people. Therefore, the examples are given as a guide and must vary according to individual's previous exercise experience and level of fitness. The moderate-intensity physical activity requires a moderate amount of effort and noticeably accelerates the heart rate. It can be achieved by doing a brisk walking, dancing, gardening, doing housework and domestic chores, traditional hunting and gathering; being actively involved in games and sports with children; walking domestic animals; doing general building tasks (roofing, thatching, painting) or carrying or moving moderate loads inferior to 20kg. The vigorous-intensity physical activity requires a large amount of effort and causes rapid breathing and substantial increase in heart rate. It can be achieved by running, walking/climbing brisk up a hill or fast cycling, aerobics, fast swimming; being involved in

competitive sports and games; doing heavy shovelling or digging ditches or carrying/moving heavy loads superior to 20 kg.

As indicated in the literature reviewed above, various organizations have come forward with recommendations regarding adequate physical activity for adolescents. It is however clear that although different recommendations or guidelines are proposed, it is evident that adolescents should engage in at least 30-60 minutes of activity on at least 3 days per week to gain the benefits associated with physical activity. Although these organizations offer different guidelines regarding the intensity, it could be assumed that for moderate activities both formal and informal should be considered.

2.3 LEVELS OF PHYSICAL ACTIVITY AMONG YOUTH

Physical inactivity has become a major public health problem, contributing to the chronic, non-communicable disease epidemic. According to Katzmarzyk and Shepard (cited in Phillips, 2006), physical inactivity as a risk factor for several chronic diseases, can potentially be a substantial public health burden. It is supported by Martinson, O' Connor and Pronk (2001) who stated that physical inactivity is a predictor of subsequent disability in midlife and older populations. Physical inactivity in youth specifically, is associated with other health-compromising behaviours, including cigarettes smoking and an increase in television watching (Phillips, 2006). Physical inactivity was estimated to cause 1.9 million deaths worldwide annually (WHO, 2002). However, the WHO (2002) data estimates the prevalence of physical inactivity among people aged 15 years and over, which suggests the total figures could be higher. Various researchers have cautioned that although children and adolescents are generally more active than adults, their participation in physical activity often falls below

the recommended levels especially among pre-adolescents and adolescents girls (Sallis, Prochaska & Taylor, 2000).

A study by Ransdell et al. (2002), illustrated that adolescent girls were more at risk for inactivity when compared to boys. Girls seemed to place less value on participation in physical activity because of a lack of interest in the activities included in the physical education programmes. This notion is further supported by Felton et al. (2002) who stated that physical inactivity is more prevalent among females than males and that physical activity participation declines with age, particularly among girls. The prevalence of physical inactivity among youth worldwide has increased and might continue to increase if the governments, decision makers and population in general do not adopt a daily healthy lifestyle, including proper diet and physical activity.

Literature therefore clearly indicates that youth are not meeting the required levels of physical activity. The levels of physical activity in both developed and developing countries will be reviewed and outlined in detail in the next section.

2.3.1 Levels of PA among adolescent girls in developed countries

Ward et al. (2006) state that physical inactivity and sedentary lifestyles contribute to obesity in the United States of America and may be fundamental sources of energy imbalance. Researchers have shown that physical activity levels steadily decrease throughout adolescence, more among girls than boys (Faith, Leone, Ayers, Heo & Pietrobelli, 2002). Girls, at all ages, are less active than boys, and this difference is particularly large during the adolescent years (Troost et al., 2002). Despite heightened awareness about the health risks

associated with a sedentary lifestyle, rates of physical inactivity among adolescents in the United States are on the rise (YRBSS, 2006). The prevalence of inactivity is particularly high among adolescent females; with almost 10% fewer females meeting recommendations for regular activity than adolescent males by the time they reach the 12th grade (Grunbaum et al., 2004). They further state that vigorous physical activity in girls declined about 30% between grades 9 and 12. According to the Center for Disease Control and Prevention (2004), African-American girls seem to be at greater risk for physical inactivity than other population groups. The patterns of inactivity are not restricted to the USA only, as similar patterns have been noted in other developed countries.

Physical inactivity levels for Canadian children and youth are increasing tremendously. According to Vail (2001), the following concerns were raised about inactive young people in Canada: 2/3 of the children and youth were not active enough to lay a foundation for health and well-being and 40% of the children already had at least one risk factor for heart disease, namely reduced fitness due to an inactive lifestyle and 25% of the children were overweight.

More than half of Canadian teenagers are inactive and do not accumulate the equivalent of at least one hour of walking per day and 82% may not be active enough to meet international guidelines for optimal growth and development (Canadian Fitness and Lifestyle Research Institute, 2002). The Institute further reported that girls are significantly less active than boys, with 64% of girls and 48% of boys being physically inactive. The levels of physical inactivity for Canadian children and youth are increasing. According to a public health objective of the Canadian government, the government would strive for a 10% reduction in the level of physical inactivity in Canada by 2003 (Katzmarzyk, Gledhill & Shepherd 2000). The statistics in Canada among adolescent Canadians showed that 86.7% of males versus 80.8%

of females averaging at least 1 hour per day of physical activity. Findings from The Canadian Fitness and Lifestyle Research Institute (2005) furthermore indicated that 91% of Canadians between the ages of 5 and 19 years are not active enough. Recent evidence also shows that 58% of children (aged 12-19 years) are physically inactive and that physical activity levels decline sharply during adolescence (Canadian Fitness and Lifestyle Research Institute, 2009). If no significant interventions are made, the impact of this trend will result in staggering increases in health problems and in many cases premature death.

Surveys in the United Kingdom (British Heart Foundation, 2000; Gregory & Lowe, 2000) have confirmed trends that many children are insufficiently active for optimal health benefit. The National Diet and Nutrition Survey of over 2000 children and adolescents between the ages of 4 and 18 years in the United Kingdom (Gregory & Lowe, 2000) indicated that 51 % of girls aged 7-10 years and 69 % of girls aged 15-18 years did not achieve 1 hour of moderate physical activity daily. At all ages, but particularly from early adolescence, girls are much less active than boys and for both girls and boys, activity decreases as they get older.

The current fatal burden of physical inactivity in New Zealand was estimated to be 9% of all deaths (Tobias & Roberts, 2001). According to Schofield (2003), surveillance in the area of physical activity levels of youth had been neglected and he identified a need for research to identify the determinants of physical inactivity in youth in New Zealand. Hohepa, Schofield and Kolf (2004) found that 38% of young people aged 13-17 years in New Zealand are considered physically inactive. It is estimated that by 2021, the prevalence of physical inactivity will increase by 4%. The Active Australia survey found that during the year 2000, 15% of all Australians were inactive and among the young people 10% were inactive (Bauman & Campbell, 2001). This is in accordance with a study done by Struber (2004),

which recorded that physical inactivity in Australia is to be so substantial that it ranks second to smoking as the major cause of death and disability, 7% and 11% respectively.

2.3.2 Levels of physical activity among adolescent girls in developing countries

It has been shown that the trend of physical inactivity is not exclusive to the developed world but it is also reflected in the developing countries. It was found that the levels of physical activity are much lower than expected in South African children (Birth to Twenty [BTT], 2002). More than 40% of young people do not participate in regular physical activity. The BTT study found that physical activity was less common among girls, than boys. This reduction in physical activity among adolescents, specifically among girls has also been found by other researchers in Africa (Kibet, 2006; Phillips, 2006; Frantz, 2005). In a study in a local community in South Africa, Frantz (2005) found that 32% of the learners in Belhar did not meet the requirements of being physically active for at least 30 minutes per day on seven days of the week. Furthermore more female (36%) than male learners (28%) were considered physically inactive. The author further states that clear gender differences emerged as to the learners' motivation for participation in physical activity among high school learners in South Africa.

Elsewhere in Africa, researchers have also expressed concerns about the marked decrease in levels of physical activity. In a study among Senegalese adolescents, Garnier and Benefice (2001) found that younger adolescents were more sedentary than the older adolescents. This was because older adolescents spent most of their time doing subsistence work such as farming, fetching water and carrying firewood.

In a study done on 'habitual activity patterns among adolescent's learners, Murenzi (2001) reported that learners spent more time on sedentary activities than on physical activities. In

2004, a study conducted in urban Kigali, also found that working adults were living sedentary lifestyles. The study found that 72% of women workers were classified as sedentary and only 28% were physically active (Kagwiza, Phillips & Struthers, 2005). Other studies were done in Nigeria to measure the activity patterns among students at university and college. Although these studies were not representative because of sample size and sample methods, they revealed the problem of physical inactivity among the adolescents and young adults in Nigeria (Murenzi, 2001).

As outlined in the literature in the previous two sections, both developed and developing countries are experiencing a high prevalence of physical inactivity which increases the risk of developing non-communicable diseases, therefore impacting on public health problems of this century. Although the levels of physical activity are well documented in most of the developed countries in America and Europe, there is insufficient information on adolescents' levels of physical activity, specifically in Africa and particularly in Rwanda. No monitoring is done about levels of physical activity among Rwandese adolescent girls. Therefore, one could speculate that there is lack of knowledge about physical activity guidelines for children and youth in some developing countries like Rwanda.

2.4 BENEFITS OF PHYSICAL ACTIVITY

Physical activity has numerous beneficial physiologic effects. It is known that constant physical activity improves fitness, endurance, muscle strength and cardiovascular health.

Ainsworth et al. (2000) indicate that a physical active lifestyle contributes to the overall health of individuals. Physical activity thus, is known to reduce the risk of cardiovascular disease (Lee, Paffenbarger & Thompson, 2001), some cancers (Hardman, 2001) and type 2-diabetes (Diabetes UK, 2003).

The WHO (2003c) summarised the benefits of regular physical activity as:

- * reducing the risk of dying prematurely
- * reducing the risk of dying from heart disease or stroke
- * reducing the risk of developing heart disease, colon cancer and type 2 diabetes
- * prevention/reduction of hypertension
- * prevention/reduction of osteoporosis
- * reducing the risk of developing low back pain
- * helping to build and maintain healthy bones, muscles and joints
- * promoting psychological well-being, and reducing stress, anxiety and depression
- * helping to prevent or control risky behaviours, especially in children and young people.

According to Vuori (2007), this is especially true concerning degenerative diseases of the organ systems mentioned above and include some of the most common morbid or premorbid conditions of the populations of industrialised countries, such as coronary heart disease, cerebrovascular disease, hypertension, maturity onset diabetes, overweight and obesity, osteoporosis, and poor physical and health-related fitness as summarized in Table 1. The author further stated that in these conditions, causal link to lack of physical activity has been established with great certainty, and increased physical activity has been shown to decrease the risk of most of these conditions. The following section highlights the benefits of physical activity with specific reference to adolescent girls (learners) and young adults in general.

2.4.1 Musculoskeletal benefits

Exercise therapy is a regular component in the management of various (chronic) disorders, such as musculoskeletal, neurological, cardiovascular, and respiratory disorders (Smidt, De Vet, Bouter & Dekker, 2005; Gordon et al., 2004; Woolf et al., 2004; Pina et al., 2003;

Chartered Society of Physiotherapy, 2001). Pain and disability that may result from various types of arthritis often abate with appropriate exercise and physical activity (Roddy, Zhang & Doherty, 2005). Results from a study done by Yannakoulia, Keramopoulos and Matalas (2004), evaluating the combined effect of several environmental factors on bone mineral density (BMD) in a group of highly active young women dancers, showed that long-term and intensive physical activity is beneficial to BMD. Physical activity improves muscle strength and muscle flexibility. Strength training is particularly important for improving and maintaining bone density, muscle strength, joint stability, balance and flexibility (Di Brezzo, Fort & Hoyt, 2002). Kesaniemi et al. (2001) indicate that peak bone mass is achieved in adolescence. It is also believed that adolescents who are physically active positively influence the uptake of calcium in the bones (Shilton & Naughton, 2001; Savage & Scott, 1998; Bailey & Martin, 1994). Therefore, a physically active lifestyle should be considered important in determining bone mass and also throughout life even for elder people. It is also believed that regular physical activity improves muscle function, prevent soft tissue injuries and improve physical performance (Healthy People, 2010; Bahr & Loald, 2001).

2.4.2 Effects of Physical Activity on weight control

Obesity is a condition characterized by an excessive percentage of body fat, resulting from an energy-intake that exceeds the habitual energy expenditure (Abdel-Hamid, 2002; Martinez, 2000). Numerous studies have suggested that higher levels of physical activity are associated with lower body weight, or body fat, and more favourable patterns of body fat distribution (Ball, Owen, Salmon, Bauman & Gore, 2001). Literature recommends exercise as essential long-term weight maintenance (Serdula, Khan & Dietz, 2003). This is supported by Bahr (2001) who stated that for overweight or obese people, starting and maintaining a regular

programme yields important health benefits, even in the absence of substantial weight loss. A study by Ball, Owen, Salmon, Bauman and Gore (2001) examining an association of physical activity with body weight and fat in men and women found that higher level of leisure physical activity were positively associated with the likelihood of being in normal body mass index (BMI) and lower body fat range for women.

During the past decades the increased obesity prevalence has been observed in youth. Noteworthy is that the risk of becoming overweight during adolescence appears to be higher among girls than it is among boys. A systematic semi-quantitative review by Ferreira, Van der Host and Wendel-Vos (2007) found that physical activity of subjects was positively correlated with the father's level of physical activity, time spent outdoor and school related policies regarding activity.

Other observations found that up to 80% of overweight adolescents will become obese adults (Amin & Daniels, 2002). The prevalence of obesity within South African children aged 3–16 years was found to be 3.2% for boys and 4.9 % for girls, whereas the prevalence of overweight was 14.0 % for boys and 17.9 % for girls (Armstrong, Lambert, M. I., Sharwood, & Lambert, E.V., 2006).

In Tunisia, Morocco and Egypt, obesity is a growing problem, especially since female fatness is viewed as a sign of social status and a cultural symbol of beauty, fertility and prosperity. In 1998, the pharmaceutical company ROCHE funded a national level survey in Morocco on 1500 men and women aged 5 to 60 year. The results indicated that the prevalence of obesity among women was 17.8% (ROCHE, 1999). In Tunisia, the National Nutrition Institute completed a national survey in 1997, revealing female obesity to be a serious public health

problem in that country with a prevalence of overweight and obesity increased from 28.3% in 1980 to 51% in 1997. Prevalence of overweight and obesity in Morocco and in Tunisia are 12.2% in Morocco and 14.4% in Tunisia. The authors further state that the risk of overweight among adolescent girls increases with age. The risk of obesity at 19 years of age is 9.5% in girls compared to 5.1% in boys. Another study in Tunisia showed higher rates of overweight among adolescents; 16 % of girls and 11% of boys were overweight (Ghannem et al., 2001). In another study among female adolescents in Egypt, 35 % of the girls were overweight and 13 % were obese (Jackson, Rashed & Saad-Eldin, 2003). It is believed that physical activity plays a critical role in obesity development in Northern Africa.

This finding is in accordance with evidence collected in the last several years showing that physical activity in adolescence is an important contributing factor to adult activity because people establish many of their lifestyle choices as they proceeded through adolescence (Hallal et al., 2006). With adolescence obesity emerging as a major public health crisis as argued by Flegal, Carroll, Orgen and Johnson (2002), it has been shown that regular physical activity reduces many of the health risks associated with overweight and obesity.

As rates of overweight among children and adolescents continue to rise, public health professionals and educators look for potential strategies to address the problem. Youth spend much of their time in school, where programs and professionals are in place to address behaviors associated with healthy weight (Katz et al., 2005). The school environment has the potential to positively influence childhood obesity prevention efforts (Schwimmer, 2005).

2.4.3 Prevention of Cardiovascular diseases

The importance of physical activity in reducing morbidity and mortality from chronic diseases and conditions has been well established (Martison, O'Connor & Pronk, 2001; Pratt, Macera & Wang, 2000). Hu, Stampfer, and Solomon (2001) also argued that in addition to preventing chronic diseases of lifestyle, greater levels of physical activity can lessen complications among people with chronic diseases of lifestyle. Physical inactivity is recognized as a risk factor for coronary artery disease, and physical activity has 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).

A physically active lifestyle leads to modification in the development of cardiovascular diseases and also favourably modifies other cardiovascular disease risk factors that include high blood pressure, stroke, insulin-resistance and obesity (Bar-Or, 2001; Ainsworth et al., 2000 & Pollock et al., 1998). Additionally, high levels of physical activity are associated with lower systolic and diastolic pressures (Fagard, 2001). 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). It has been proved in several studies over the years that elderly patients benefit from cardiac rehabilitation programmes to the same extend as younger patients when exercise capacity and quality of life are measured (Hage, Mattsson & Stahle, 2003).

2.4.4 Prevention of Diabetes Mellitus

Regular physical activity lowers the risk of developing non-insulin-dependent diabetes mellitus (NIDDM). According to Alberti et al., (2004), girls are 1.7 times more likely than

boys to develop Type 2 diabetes. The evidence linking physical inactivity to the future risk of Type 2 diabetes is strong, and modification of behaviour is a critical and effective element of strategies aimed at the prevention of this increasingly prevalent disorder (Wareham, 2007). Physical activity is recommended as part of the management regimen for subjects with Type 2 Diabetes Mellitus (Van Rooijen, Rheeder, Eales & Molatoli, 2002). This is due to the fact that regular physical activity induces weight loss and positive changes in glucose metabolism, as proved by several studies (Pigman, Gan & Krousel- Wood, 2002). Physical activity improves glucose tolerance by increasing insulin sensitivity and may reduce the insulin requirement in insulin-treated diabetics (Birrer & Sedaghat, 2003). Both aerobic and resistance types of exercise have been shown to be associated with a decreased risk of Type 2 diabetes (Warburton, Nicol & Bredin, 2006). However, resistance training may have greater benefits for glycemic control than aerobic training may have (Dunstan et al., 2005 cited in Warburton, Nicol, & Bredin, 2006.). Moreover, Marwick et al. (2009) strongly recommend that patients with Type-2 diabetes mellitus should accumulate a minimum of 150 minutes per week of at least moderate-intensity and/or 90 minutes per week of at least vigorous-intensity cardiorespiratory exercise to improve cardiovascular risk. In addition, resistance training should be encouraged.

According to the American Diabetes Association (2005), overweight and obesity are strongly linked to the development of type 2 diabetes and can complicate its management. They added that obesity complicates the management of type 2 diabetes by increasing insulin resistance and blood glucose concentration. Given the rates of obesity and type 2 diabetes and the contribution of a sedentary lifestyle on these diseases, it is crucial therefore, to properly educate obese patients and patients with glucose tolerance or impaired fasting glucose about the importance of regular physical activity and weight loss in preventing diabetes, especially

because many individual with diabetes may make the presumption that medical therapy is the more important approach in preventing diabetes (Fowler, 2007; Zacker, 2005).

2.4.5 Prevention of Osteoporosis and fall-related injuries

Osteoporosis is a skeletal disorder characterized by compromised bone strength, which predisposes a person to increased risk of fracture (Gass & Dawson-Hughes, 2006). Osteoporosis consists of a major health problem of ageing population, especially in postmenopausal women. The disease is associated with increased susceptibility to fractures due to decreased bone density (Renno, Granito, Driusso, Costa, & Oishi, 2005). Another risk factor in the elderly is the susceptibility to falls (Brown & Jose, 2002).

For skeletal development during childhood and adolescence, weight-bearing physical activity is fundamental, also for achieving and maintaining peak bone mass in young adults. Because bone loss is positively associated with age, the prevalence of osteoporosis increases from 19% among women aged 65 to 74 years to more than 50% in women aged 85 years or more (US Department of Health and Human Services, 2004). They further pointed out that as a result of the aging of the population; the number of people aged 50 years or more with osteoporosis is expected to increase to 12 million by 2010 and to nearly 14 million by 2020. However, because 40 to 45% of bone mass develops in early adulthood, prevention is most effective if done in childhood and adolescence (Weaver, 2000). In addition, if people develop and commit to lifestyles that support strong bones when they are adolescents or young adults, they increase the likelihood that they will have healthy bones throughout their lives (Bachrach, 2001).

According to Going, Lohman and Houtkooper (2003), physical activity is necessary for bone formation and maintenance throughout life. The US Surgeon General (2004) has recommended a pyramidal approach to treatment of which the base consists of lifestyle changes, including adequate calcium and vitamin D intake, physical activity, and fall prevention. Measures, such as high calcium diet and exercise among adolescents, have been very effective in preventing osteoporosis, particularly among women (Galler & Derman, 2001). If people develop and commit to lifestyles that support strong bones when they are adolescents or young adults, they increase the likelihood that they will have healthy bones throughout their lives (Bachrach, 2001).

Although the onset and manifestation of bone disease and osteoporosis occurs primarily in the elderly, it is now well established that the foundations and origins of imbalances in bone metabolism that eventually lead to overt disease are established in youth (Jones, Hoelscher, Kelder, Hergenroeder & Sharma, 2008). The authors further suggest that one of the primary means of preventing osteoporosis is to affect modifying factors (such as diet and physical activity) that influence bone density so that peak bone mass is achieved during the first twenty years of life.

2.4.6 Low Back Pain

Lack of physical fitness and strength measured at the back and abdominal muscles have been suggested as possible risk factors for developing new and recurrent low back pain (Van Tulder, Koes & Bombardier, 2002). Various studies have recommended exercise as one of major priorities in the prevention and treatment of low back pains (O'Sullivan, 2000). The same author proved that with stabilizing back muscles exercises, an individual is provided

with “natural back corset” of his or her back spine, which protects and prevents any occurrence of back pain due to back instability. There is evidence that strong and flexible leg, hip and back muscles are key essential in prevention of low back pain. Poor flexibility and weak muscle can lead to poor posture, which ultimately leads to dysfunction of the nerves, muscle and joints in the back (Silveri & Spinasanta, 2003).

Di Brezzo, Fort and Hoyt (2002) indicated that by increasing muscle strength and endurance and improving flexibility and posture, regular exercise helps to prevent back pain. The known health benefits of physical activity suggest that lifetime physical fitness and functioning may have a role in the primary prevention of low back pain (Underwood, 2000). Exercise therapies, either as single intervention or as part of multidisciplinary treatment programs, are commonly used for low back pain.

2.4.7 Mental health and psychological benefits

There is strong evidence from studies that physical activity has beneficial effects on mental health or psychological well being. Physical activity has been shown to enhance the effectiveness of psychological therapies and to assist in improving quality of life and symptoms management for people with a wide range of mental health problems (Jones, Martin, O’Beney & Caro, 2004). According to Paluska and Schwenk (2000), aerobic exercise or strength training programmes can reduce symptoms of depression. This finding is in accordance with literature which has shown that physical activity can lower anxiety, decrease tension, relieve stress and influence sleep (Hong & Dimsdale, 2003). Accumulating evidence shows that exercise can be successful in the treatment of depression and anxiety, and can enhance the mental well-being of otherwise healthy populations, including children (Biddle et al. 2000).

Ward et al. (2006) stated that positive associations between physical activity and self-esteem in adolescents have been reported. They further highlight that it has been demonstrated that adolescents who rarely exercise are more likely to experience loneliness, shyness, and feelings of hopelessness. Several studies (Sabo, Miller, Melnick & Heywood, 2004; Marsh & Kleitman, 2003) have shown that girls who are physically active perform better academically and have higher self-esteem and self-worth when compared with their more sedentary counterparts. Guinn, Vincent, Semper and Jorgensen (2000) also mentioned that research regarding the association between self-esteem and physical activity has suggested that girls' self-esteem influences participation in physical activity.

Moreover, body image has been associated with both self esteem (Furnham, Badmin & Sneade, 2002) and physical activity (Strelan, Mehaffey & Tiggeman, 2003). The authors further argue that among adolescent girls, weight and appearance concerns have been found to be motivators for physical activity with perceived and ideal body size discrepancies predictive of weight management motives for physical activity. A similar argument was presented by Talaferro, Rienzo, Miller, Pigg, and Dodd (2003) that body appearance as an important determinant of physical and global self-esteem, especially among female adolescents. A number of studies (Cockburn & Clarke, 2002; Porter, 2002) reported pressure to conform to popular ideals of beauty as important reasons for teenage girls being physically active. Flintoff and Scraton (2001) interviewed very active girls who described having learnt new skills, increased self-esteem, improved fitness and developed new social networks as motivation to be physically active. While many girls want to be physically active, a tension exists between wishing to appear feminine and attractive and the sweaty muscular image attached to active women (Cockburn & Clarke, 2002). According to Debate, Gabriel, Zwald, Huberty and Zhang (2009), programs designed to engage and maintain girls in physical

activity should provide instruction and experiences that focus on increasing self-esteem, positive body image, valuation of PA, motivation to be physically active and develop a sense of commitment to be physically active.

Robbins, Nola, Pender and Kazanis (2003) reported that active involvement of girls in physical activities they enjoy may also reduce the occurrence of risky behaviors, such as smoking, drinking, and premature sexual activity. Moreover, studies on the psychological effects of exercise have found that regular physical activity can improve mood, decrease depression, better cognitive function, self esteem and self efficacy and improved feelings about self (Stathi, Fox & Mckenna, 2002). Furthermore, some researchers have shown that physical activity influence (Hong & Dimsdale, 2003) and can also improve memory span (Friis et al., 2003).

According to the US- National Association for Sport and Physical Education (NASPE, 2001), children with daily physical education exhibit better attendance, a more positive attitude to school, and superior academic performance. A national study conducted in 2006 analyzed data collected from 11,957 adolescents across the U.S. to examine the relationship between physical activity and academic performance. Adolescents who reported either participating in school activities, such as PE and team sports, or playing sports with their parents, were 20 percent more likely than their sedentary peers to earn an “A” in math or English (Nelson and Gordon-Larson, 2006). In the same line, two large national studies done in Australia (Dwyer, Sallis, Blizzard, Lazarus & Dean, 2001) and Korea (Kim et al., 2003) along with two smaller studies conducted in the U.S (Castelli, Hillman, Buck & Erwin, 2007) found physical fitness scores to be significantly and positively related to academic performance. These studies included students from elementary through high school.

Regular physical activity provides adolescents with important physical, mental, and social health benefits. 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 adolescents. Therefore, one could question if these benefits will be found the same in Rwandan adolescent as they were experienced by people with different background, thus would change the approach of solving this problem of physical inactivity.

2.5 FACTORS INFLUENCING PHYSICAL ACTIVITY

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, and can help enhance a community to identify and promote community integration (WHO, 2005). Socialization is a strong significance of physical activity.

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).

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). A study conducted by Gorden-Larsen, McMurray and Popkin (2000) found that although participation in physical activity was most influenced by environmental factors, physical inactivity was much more influenced by socio-demographic factors. These factors included level of education of parents, family income and

gender. Thus it became clear from this study that key modifiable environmental factors that had an effect on physical activity participation did not affect inactivity.

2.5.1 Social support for physical activity

The significance of physical activity for society is not only limited to health. The family also plays an important role as it is one of the most important instruments having an influence on children and adolescents regarding their interaction with people and their integration in society. This seems to shift as children and adolescents grow up and are more influenced by their peers. Many studies emphasized social support from family and peers as one of the major motivators to participate in physical activity (Canergie et al., 2002). It is in the same line with the view of Higgins, Gaul, Gibbons and Van Gyn (2003) who revealed that social support is considered the most well-established determinant reinforcing physical activity particularly among women. Societal concern and opposition relative to the involvement of girls and women in sport and physical activity has been present throughout the 20th century (Motley & Lavine, 2001). Those belief systems have an impact on the self-perceptions of girls and women about the correctness of their involvement as well as the availability of their participation (Motley & Lavine, 2001; Schell & Rodriguez, 2000 as cited by McCallister, Blinde & Phillips, 2003; Baum, 1998; McClung, 1996).

According to a study done by Coakley and White (1992) as cited in Murenzi (2001), the choice of any activity may be influenced by parents or friends in girls but not in boys. This trend could possibly be similar in the Rwandan culture. Davidson, Cutting and Birch (2003) however, are of the opinion that both parents can play an important role in promoting the physical and emotional well being of their daughters by encouraging them to be physically active. With regard to parental support, a study by Dagkas and Stathi (2007) supports the

view that family structure plays an important role in shaping habits and taste for physical activities.

Duncan, Duncan and 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 possible important sources of social support for adolescent's participation in physical activity and for efficacy beliefs regarding physical activity (Heitzler, Martin, Luke & Human, 2006; Bauman, Sallis, Dzewaltowski & Owen, 2002). In addition, peer emotional support such as encouragement might render esteem support or reassurance so as to augment self efficacy (Duncan, Duncan & Strycker, 2005). Moreover, a study by Lindström, Hanson and Ostergren (2001) found that the extent to participation in leisure-time physical activity was influenced by socio-economic status. According to Gordon-Larsen et al. (2000) low socio-economic status appears to be associated with physical inactivity in young people.

Several studies found that support from family members, friends, sociability, perceived importance of sport and of health improvement and satisfaction with mandatory gym classes in school were the factors motivating adolescents to participate in physical activity (Vilhajalmsson & Tomlinson, 1998; Tergerson & King, 2002; Tumusiime, 2004).

As shown in the literature above, the support from family members and friends play a positive role in the participation of adolescent girls in physical activity.

2.5.2 Environmental support for physical activity

Over the past decade a number of studies have been conducted to evaluate the effectiveness of school-based interventions to improve the levels of physical activity among school-going adolescents (Cale & Harris, 2006). Kann (2001) stated that schools provide opportunities for physical activity that are appropriate and enjoyable for adolescents of all ages with all skill levels and which are not limited to competitive sports or physical education classes. He further indicated that physical activity in schools appeals to girls as well as to boys and youngsters from diverse backgrounds, and can serve as a foundation for activities throughout life when offered on daily basis. The WHO (2008a) however highlighted that physical education is declining in schools worldwide; inactivity generally higher amongst girls and women.

Adkins, Sherwood, Story and Davis (2004) also found that environmental factors affect the likelihood of a girl to be physically active. Girls, who reported having access to a safe place to play or equipment necessary to play a sport, were more active. Similarly, girls whose parents reported their daughters not having close access to play areas were less likely to report walking or biking to neighborhood areas of recreation. Moody et al. (2004) however argued that, although parks have the potential to support youth physical activity, this is seldom observed either because of the state of facilities or their location. Rees et al. (2006) also argued that interventions which take into account young people's views require rigorous evaluation. These interventions include those which aim to increase the range of "free" diverse activities through after school clubs and community-based initiatives, provide community and school facilities, improve physical education facilities at school and provide young people with choices about types of physical activity. Dagkas and Stathi (2007) in their

study stress the need for better and wider provision of structured physical activity in schools in economically deprived areas to compensate for lower participation levels in physical activity outside school. Furthermore the future initiative to promote physical activity should also take these views as a starting point.

Among adolescents, three recent studies identified the value of recreation facilities as a stimulant to increased activity (Frank et al., 2007; Gordon-Larsen et al., 2006; Norman et al., 2006). Popkin et al. (2005, p. 606) stated that “access to facilities and opportunities to exercise are consistent predictors of physical activity in children and adolescents.” Environments that support recreational opportunities for children and adolescents also support the engagement of adults as they supervise, coach, and mentor youth (American Academy of Paediatrics, 2009).

As identified by literature, physical environmental factors are essential keys in adolescent girls' participation in physical activity. In a country like Rwanda only some adolescent girls get access to different facilities such as recreation and education facilities, a safe neighbourhood to walk around or places where different activities could be organised for them.

2.5.3 Biological and physiological factors

The biological factors influencing physical activity include age, gender, ethnicity and musculoskeletal injuries. 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). This is strongly

supported by Benefice, Garnier and Gnagna (2001) in their study among rural Senegalese adolescents who found that there is an interaction between biological, behavioral and cultural factors in the determination of physical activity. Males are generally more active than females (Eyler and Vest, 2002, WHO, 2002; Brownson, Baker, Housemann, Brennan & Bacak, 2001; Cooper et al., 2000) and the sex difference is greater for high-intensity activities than for those of low and moderate intensity (Malina, 2001 as cited by Kibet, 2006).

According to Treuth, Butte, Puyau and Adolph (2000), physical activity habits have been shown to be heritable. Both genetics and ethnicity have been shown to be associated with fitness. Furthermore research has indicated that obesity and other body composition measures may also be genetically determined and could affect an individual's inclination to be active (Stunkard, Harris, Pederson & McClearn 2000; Yanovski & Yanovski 1999).

2.5.4 Psychological factors

Research on how a young person's beliefs about behaviour, perceived benefits of behaviour and enjoyment of physical activity and physical education classes influence physical activity participation is not conclusive (Crocker et al. 2000). Valois, Zulling, Huebner and Drace (2004) revealed that relative declines in physical activity were associated with low life satisfaction, social isolation, and depression. This finding was similar to the findings of a national survey done by Neumark-Sztainer, Peter and Hannan (2000) which reported that the high prevalence of weight-related concerns suggests that all youth need to be reached with appropriate interventions. However, special attention needs to be directed toward youth at greatest risk for engaging in disordered eating behaviours, such as overweight youth, youth

engaging in other high-risk behaviours, such as substance use and youth with psychological concerns, such as low self-esteem and depressive symptoms.

Psychosocial factors such as preferences for physical activity and self-efficacy to be physically active are also positively related to activity level among girls (Adkins, Sherwood, Story & Davis, 2004). The authors further highlight that girls who report enjoying physical activity and feeling confident in their ability to perform the task report being more active. Adolescent women are profoundly affected by a number of health risks related to their behaviour. Interestingly, there is evidence that physical activity can reduce some health related risk behaviour like smoking, alcohol and drug use as a result of improved psychological well being. This was pointed out by Sarigiani, Ryan and Petersen (1999) as cited in Phillips (2006), many of these risks are shared by their male peers (e.g. smoking, drinking, use of other drugs, and violence) but have a specific adverse effect on women because of either higher prevalence of these behaviours or via a risky relationship. According to Higgins, Gaul, Gibbons and Van Gyn (2003), physical activity among youth correlates with less cigarette smoking, particularly in discouraging the initiation of smoking among female adolescents, and in deterring smoking among males later in adulthood.

The literature clearly points to various factors influencing participation in physical activity. Various researchers have eluded to motivating and encouraging factors influencing physical activity participation. Whether these factors would be the same for adolescents in Africa and Rwanda specifically, could be questioned.

2.6 SCHOOL ENVIRONMENT FOR PROMOTION OF PHYSICAL ACTIVITY

Kagwiza (2003) reported that urban design features, including the availability of footpaths, traffic control measures, walking paths, and access to local shops and aesthetic features of the physical activity environment had an influence to walking. Several researchers (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. Some studies suggest that larger school campuses, buildings, and play areas may promote youth physical activity during the school day (Cradock, Melly, Allen, Morris & Gortmaker, 2007).

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). This is also argued by the view of Gordon-Larsen et al., (2000) who found that high levels of neighbourhood crime were associated with decreased likelihood of being physically active. The perception of equipment that is accessible in the home (e.g., bicycles and balls) or in the community (e.g., playgrounds and parks) might promote physical activity participation among adolescent girls by increasing perceived self-efficacy for overcoming barriers.

A health promoting school is one in which all members work with available resources to promote the well-being of the entire school community. The promotion of physical activity is to be one of the primary interventions through which health promotion takes place (Phillip et al., 2000). Factors such as the decline of walking and the reduction of physical education and

sport in schools are given as reasons behind the increase of sedentary behaviours (Hardman and Stensel, 2004).

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). 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 education helps students develop the knowledge, attitudes, skills, behaviors, and confidence needed to be physically active for life, while providing an opportunity for students to be active during the school day. Physical education provides adolescents with meaningful amounts of daily physical activity (Fair Clough & Swatton, 2005; Tudor-Locke, Lee, Morgan, Beighler & Pangrazi, 2004).

According to Fairclough and Stratton, school physical education (PE) provides a context for regular and structured physical activity participation. This is also argued by Green et al. (2005) and Kirk (2005) who suggested that physical education and school sport should provide a diversity of activities to meet the needs and interests of students by establishing better links with sports/leisure and community clubs. This reflects comments from Wright et al. (2003) who suggest that school and recreational programmes should be designed and funded to enhance adolescents' participation. Dishman et al. (2005) further found that increased enjoyment resulted in higher levels of daily physical activity in adolescent girls. Wallhead and Buckworth (2004), in their review found that for many girls, a positive PE experience can have a significant effect on their willingness to be involved in physical

activity. Other researchers found that a previous bad experience or dislike of exercise (Saxena et al., 2002) or PE (Sleap & Wormald, 2001), and feeling inadequate or incompetent (Sleap & Wormald, 2001) were barriers to physical activity. According to Dwyer et al., (2006), uncomfortable physical exertion during physical education classes and ridicule and embarrassment are also barriers to physical activity among adolescent girls. Therefore, PE teachers and other educators must pay greater attention to the needs of this population and consider modifying existing school PE programs to accommodate girls' interests.

According to Barr-Anderson, et al. (2008), efforts to enhance girls' self-efficacy and perceived benefits and to provide a supportive PE class environment that promotes gender equality can potentially increase PE class enjoyment among young girls. Physical educators are key personnel that can assist young people to achieve physical activity goals. Apart from their teaching role, they are well placed to encourage physical activity outside the school environment, help students become independent participants and inform them about initiatives in the community (McKenzie et al., 2000). They further suggest that they can also have a direct impact by promoting increased opportunities for physical activity within the school context.

According to the National Association of Sport and Physical Education (2001), physical education can serve as a vehicle for helping students to develop the knowledge, attitudes, motor skills, behavioural skills and confidence needed to adapt and maintain physically active lifestyles. The outcomes of physical education programmes should include the development of each student's physical competence, health-related fitness, self-esteem and overall enjoyment of physical activity. These outcomes enable students to make informed decisions about and choices leading to a physically active lifestyle.

However, the teaching of Physical Education in schools in Rwanda is now greatly diminished or non-existent as in most of the countries worldwide. The current reduction in curriculum time for physical education, as well as the lack of qualified PE teachers, can influence youth physical activity. With the current allocated time for physical education lesson in schools where physical education is still a compulsory module, it is still insufficient to meet the recommended time prescribed by the CDC to meet the health promoting levels of physical activity. Compulsory lesson in physical education is the best way to promote physical activity in the school setting as it reaches all learners, regardless of their interest in physical activity or skills at sport. Physical education for adolescents should be seriously planned taking into account what the adolescent will gain in engaging in different sports and acquiring different skills. As physical education in schools decreases steadily in availability, frequency and quality, health problems related to inactivity are increasing among children and adolescents. If physical education is to play an important role in the promotion of youth's physical activity levels, exposing students to a range of fitness, sport and recreation physical activities is only the start of the process.

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2.7 ROLE OF PHYSIOTHERAPY IN HEALTH PROMOTION

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). 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).

Within this context physiotherapy plays an essential role in the health care system. As a profession integral to health promotion, prevention, acute care and rehabilitation physiotherapy plays an essential role in the health care system (Department of Caring Science, Orebro University, 2000). Therefore, physiotherapists are being involved in teaching or educating, advocating, and administering health change programmes at individual level, organizational, or community level (Huddleston et al., 2002).

Physiotherapists are appropriately skilled and ideally suited to promote physical activity. They recognize the physical and psychological benefits of exercise/physical activity and are well versed in the art of motivating people (Carter & O'Driscoll, 2000). Physiotherapists, with their expertise in body mechanics, anatomy, and physiology can play a vital role in helping people develop appropriate and safe exercise programmes (Wilson, 2002). Carter and O' Driscoll (2000) further stated that physiotherapists need to be part of a team of players that include dieticians, occupational therapists, physicians and psychologists. Members of a team may support each other in providing measurements of health improvement, which are valid and objective.

2.8 SUMMARY

Chapter two reviewed the relevant literature for the study. This review focused mainly on the levels of physical activity as well as the consequences of physical inactivity, the benefits of physical activity grouped as musculoskeletal, mental and psychological and physiological benefits which are much crucial in prevention of risk factors of chronic diseases of lifestyle (CDL). The review highlights the lack of studies examining physical activity levels and factors influencing these among youth in Rwanda.

CHAPTER THREE METHODOLOGY

3.1 INTRODUCTION

This chapter highlights the methods and procedures used for this study. The study design, study population, sampling method and the research instrument are described. Furthermore data collection procedures are outlined. The chapter also gives the details of the pilot study, the data analysis method used and the ethical issues put forward.

3.2 RESEARCH SETTING

The study was conducted at secondary schools in Kigali, the capital city of the Republic of Rwanda. Rwanda is a small land-locked country of about 26,338 Km², located in Central Africa. Located at Rwanda's geographical heart, the rapidly growing City of Kigali is not only the national capital, but also the country's most important business centre and main port of entry. Kigali City, which started in 1907 as a small colonial outpost with little link to the outside world, is now 100 years old. Today, Kigali City has come of age - as the capital of Rwanda and made phenomenal strides. It is a city that has not just survived, but has prevailed and has grown into a modern metropolis - a heart of the emerging Rwandan economy and a pride of every Rwandan.

The city of Kigali is divided into three districts namely Nyarugenge, Gasabo and Kicukiro. It has approximately 1 million inhabitants. Kigali is 70% urban with a significant part that is rural. The population is relatively young with the youth constituting 60% of the total population, and females just over 50% (Kigali City, 2008).

The delivery of education has particularly been dominated by the private sector. Of the 631 schools in Rwanda in 2006, only 393 of them were public schools and 238 belonged to the private sector (Rwandan Ministry of Education, 2009). According to the Ministry, 55% of girls were in public schools whereas 45% of them were in private schools. The boys' attendance was slightly higher in private schools (62%) than public schools (38%). The statistics of the Ministry of Education (MINEDUC, 2009), estimate the number of secondary schools catering for the age range of 13-18 years old to be twelve for Nyarugenge and Kicukiro districts and 16 for the Gasabo district.

3.3 STUDY DESIGN

A descriptive quantitative study design using a cross-sectional survey was used. According to Bowling (1997) "Quantitative research is appropriate in situations in which there is pre-existing knowledge, which will permit the use of standardized data collection methods". The quantitative cross-sectional descriptive study design was chosen because it suitably addressed the aim of the study, which was to determine the high school girls' perceptions regarding environmental and social support for physical activity.

3.4 POPULATION AND SAMPLING

The study population included all secondary schools of Kigali City registered for the 2008-2009 academic year. Two schools from each of the 3 districts were randomly selected to participate in the study. It is estimated that there are three thousand six hundred (3600) learners at the six selected schools. Of the total number of learners at each school, about forty percent (40%) were female.

When using Yamane's formula $n = \frac{N}{1 + N(e^2)}$ to calculate the

sample size, whereby n stands for sample, N for study population and e is equal to 0.05, as recommended by Israel (1992), 313 female high school learners should be included. To accommodate for learners or parents not giving consent to participate in the study, 390 learners were approached to make sure the minimum number of learners are included in the study. Therefore the preliminary sample consisted of approximately 390 learners.

Only the learners of the second, third, fifth and sixth year were included as the first and fourth years were still waiting for their exam results before starting and being given a school according to the marks obtained. A stratified sampling technique was used to recruit the participants from each school. The stratum was school year of study. According to Babbie and Mouton (2007), the stratified sampling method is used to obtain a greater degree of representativeness and decreasing the probable sampling error. The inclusion criterion was all female students aged between 13 to 18 years with parental consent. The selected classes were brought to the venue of data collection on the basis of availability during class time. Three hundred and ninety (390) students were selected and given the questionnaires. Three hundred and fifty (350) learners returned their completed questionnaires and signed consent forms. Thus the overall response rate was 89.7%. The final sample therefore consisted of three hundred and fifty (350) learners.

3.5 DATA COLLECTION

3.5.1 Research Instrument

Data was collected by means of a structured, self administered questionnaire (Appendix O and P). According to Walliman (2006), the advantage of self administered questionnaires is

that respondents can be helped to overcome difficulties with the questions, and the researcher can use personal persuasion as reminder to ensure a high response rate. The estimated time to complete the questionnaire was approximately 15-20 minutes.

The self-administered questionnaires consisted of five sections: The first section requested for information regarding demographic data such as age, school/grade, and race/ethnicity, parental level of education, height and weight.

The second section assessed the support that learners get from teachers, other girls and boys at school for physical activity. This scale was adopted from the Physical Education Program Improvement and Self-study (NASPE, 1998). Confirmatory factor analyses using structural equation modeling indicated 2 distinct subscales: perceived support for girls' Physical Activity from teachers ($n = 2$ items, reliability = 0.59) and from boys ($n = 3$ items, reliability = 0.56). Perceived support from other girls was assessed by an additional item ($\kappa = .34$). Participants rated each item on a 5-point Likert-type scale ranging from disagree a lot (1) to agree a lot (5) (Birnbaum, Evenson & Motl, 2005).

The third section assessed the learners' physical education and physical activity enjoyment. This was measured using seven items from the Physical Education Program Improvement and Self-study (NASPE, 1998), on 5-point Likert-type scale ranging from 1 (disagree a lot) to 5 (agree a lot). The physical education and physical activity enjoyment scales were also deemed reliable for the adolescent age group with coefficients of 0.84 and more (Dishman, Motl & Sallis, 2005; Motl et al., 2001).

The fourth section assessed the social support for physical activity (including family and friends). The social support of learners for physical activity scale was used to assess these as a 5 point Likert-type scale. Three items were used to assess support from friends and five items to assess support from family. This scale has been deemed reliable with kappas ranging from 0.9 for friends subscale to 0.8 for family subscale (Dishman et al., 2005; Motl et al., 2001).

The last section assessed the levels of physical activity. This was assessed by the Modifiable Adolescent Physical Activity Questionnaire (Aaron, Kriska, Cauley, Metz & LaPorte, 1995; Aaron, Kriska & Dearwater, 1993). It consisted of 4 items. Participants were requested to describe their physical activity, in how many days they were involved in moderate (light exercises) or vigorous activity (hard exercises) during the last seven days in and outside school. They were also requested to describe the number of hours they usually spend watching television or playing computer or video games. Lastly, the learners were asked in how many team or individual sports or activities they participated over the last year on a competitive level.

The questionnaire was translated from English to French since these were the two basic languages used in secondary schools in Rwanda. It was then back translated into English from French by an independent translator to make sure that the content of the questionnaire was translated accurately.

A pilot study was done to check for clarity of the instrument prior to data collection. The pilot study was conducted among 15 students who were conveniently selected from the selected

schools and who did not participate in the study. Thereafter a focus group was also done with 5 of these students to ensure the stability and consistency of the respondents' answers. No changes to the questionnaires were required. The results from the pilot study indicated that the adopted questionnaire could measure the high school girls' perceptions regarding environmental and social support for physical activity in Kigali.

3.5.2 Data Collection Procedure

Once permission from the Senate Higher Degrees Committee, and Senate Research Grant and Study Leave Committee of the University of the Western Cape (UWC) (Appendix A) was obtained; the permission from the Ministry of Education (Appendix B), different district authorities (Appendix C, D, E and F) as well as relevant schools authorities were sought. After the authorities granted permission (Appendix G, H, I and J), the research assistants were trained and informed about the aim and objectives of this study, ethical considerations as well as their role in the study. The research assistants were trained for two days on how to collect the data from the learners and other processes involved. The research assistants were the physical education teachers in the respective schools where the study was conducted.

Furthermore permission was sought from both the parents and the learners (Appendix K and M). Arrangements were made with the school authorities to introduce the researcher to the learners and teachers. The learners were approached during free hours after making arrangements with the physical education teacher and the dean of students. When no free time was available, arrangements were done with the lecturer responsible for that particular lesson to request at least 5 -10 minutes for the researcher to explain the study to the students and ask for their informed consent. Questionnaires were administered to consenting learners at an arranged time in a class setting. After informed consent was obtained from both the

learners and the parents, the questionnaires were distributed. The researcher and research assistants were present in the class setting to assist with any questions or difficulties that may arise.

3.6 DATA ANALYSIS

Descriptive statistics were used to analyze demographic data and to calculate the mean scores of each scale. These were expressed in terms of frequencies, percentages, means and standard deviations. Inferential statistics were employed to determine differences between groups. T-test was used to determine statistically significant differences between groups (independent t-test). Bivariate correlations between social support for physical activity variables and moderate physical activity were measured. Alpha level was set at 0.05.

3.7 ETHICAL CONSIDERATIONS

Once permission from the Senate Higher Degrees Committee, and Senate Research Grant and Study Leave Committee of the University of the Western Cape was obtained, the researcher requested permission to conduct the study from the Republic of Rwanda through the Ministry of Education, the Rwanda National Research Committee as well as the different district authorities. The researcher also requested permission from the Directors of schools. Furthermore, permission was sought from both the parents, teachers, principal and the learners themselves. An information sheet was sent to parents and learners, explaining the purpose of the study and a consent letter (Appendix L and N) were given to each participant. The information sheet as well as the consent form was translated from English to French. Those who were willing to participate in the study marked their approval by signing and returning it back to the researcher. Students were assured of respect, confidentiality and

anonymity. Participation in the study was voluntary, and they were free to withdraw from the study at any time without prejudice. The researcher will make the findings available to the Ministry of Education, the Ministry of Health as well as the concerned schools with any recommendation given.

3.8 SUMMARY

In Chapter three, the study setting, which comprised six secondary schools, the study design, study population and sampling are described. In addition, the chapter also explains relevant methodological issues, such as data collection methods, which was mainly done by means of a self-administered questionnaire. The reliability and validity of the questionnaire were described. The study procedure, language and its translation are also highlighted. Data analysis by means of both descriptive and inferential statistical analysis and tests involved were given much attention in this chapter. Ethical considerations conclude the chapter.



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Table 4.1 Demographic characteristics of the study sample (n=350)

Variables	n	%
Age (Years)*		
13	17	4
14	30	8
15	77	22
16	91	26
17	67	19
18	62	17
19	6	1
School Grade		
2 nd year	95	27
3 rd year	95	27
5 th year	106	30
6 th year	54	15
Head of Household		
Father	216	61.7
Mother	105	30
Other	29	8.3
Employment Status of Head of Household		
Employed	291	83.1
Unemployed	59	16.9
Educational level of Head of household		
No schooling	15	4.3
Primary	43	12.3
Secondary	106	30.3
Post secondary	186	53.1

*Mean= 16.06 years (SD=1.4)

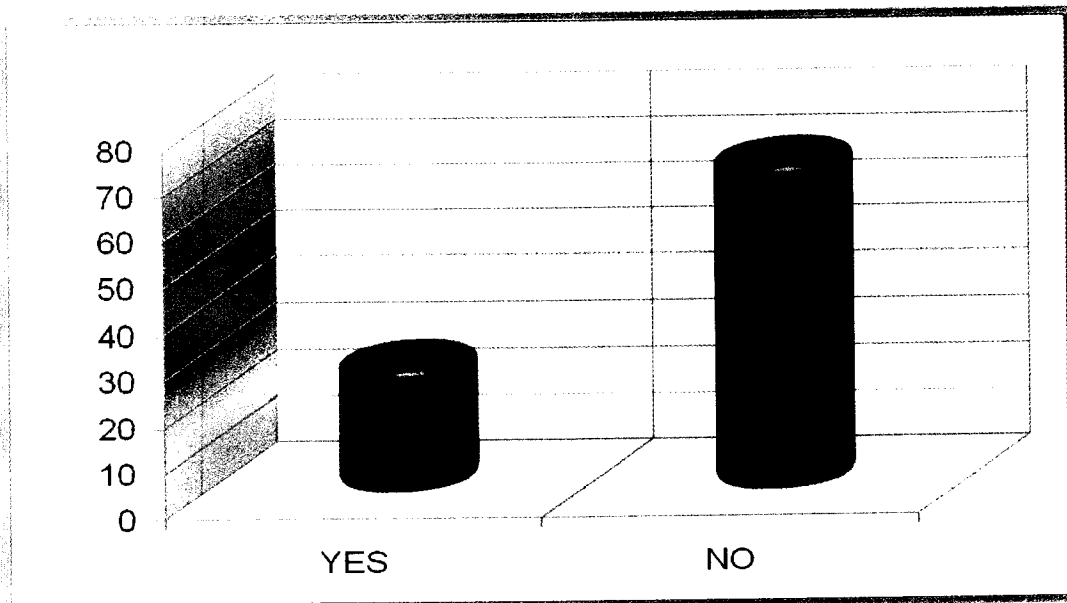


Figure 4.1 Participation in Youth Organization

The type of youth activities learners reported to participate in, included youth choir, youth drama, and other activities (scouts, TV / media activities, genocide survivors group) as outlined in Table 4.2.

Table 4.2 Participation in a Youth Organization and involvement in different categories of Youth Organizations (n=350)

Variable	YES	
	n	%
Other Activities	37	10.6
Youth Choir	29	8.3
Youth Drama	16	4.6
Youth Religious	14	4.0
Youth Health	4	1.1
Youth Dance	3	0.9

4.3 LEVELS OF PHYSICAL ACTIVITY

According to the participants' number of days of vigorous and moderate days of physical activity, the learners were classified as either physically active or sedentary. The participant's level of physical activity was determined according to the World Health Organisation guidelines which recommended that adolescents should engage in at least 30 minutes of moderate-intensity physical activity 5 days per week or 20 minutes of vigorous-intensity physical activity 3 days per week. Physical activity can also be accumulated throughout the day in blocks as short as 10 minutes (WHO, 2009). The majority of learners in both categories did not meet the number of days required for moderate days of physical activity (66% as shown in Fig. 4.2) and for vigorous days of physical activity (70.9% as shown in Fig. 4.3).

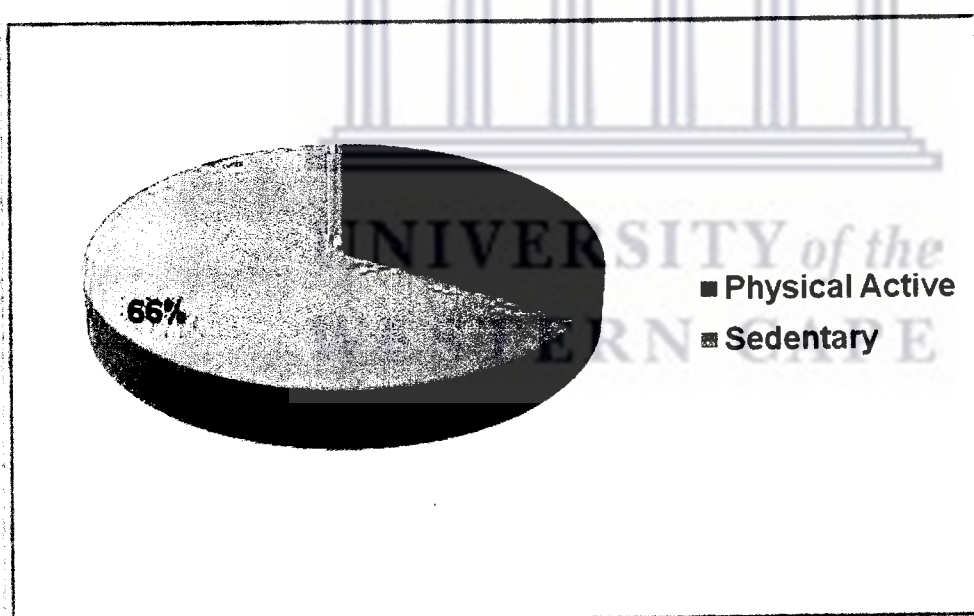


Figure 4.2 Percentage of learners classified as physically active and sedentary according to required number of days involved in moderate physical activity

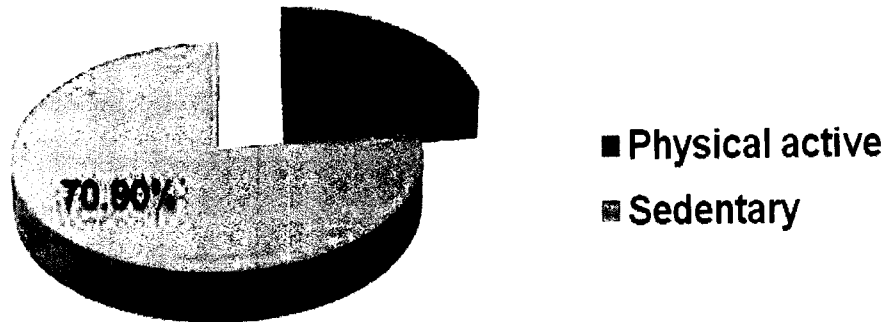
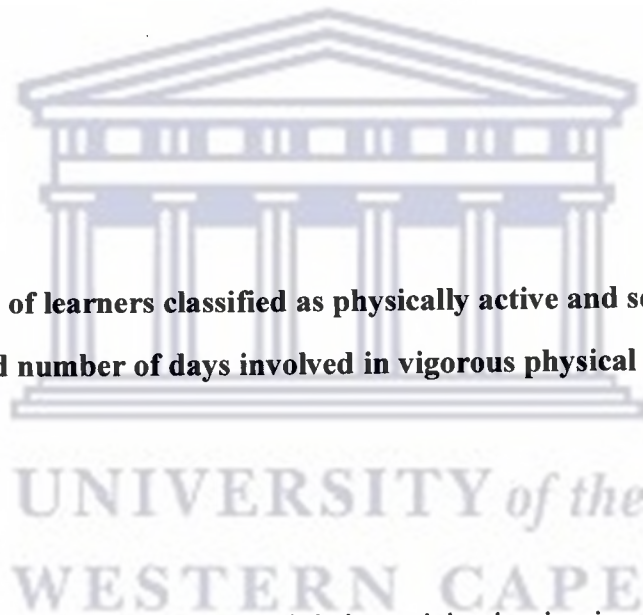


Figure 4.3 Percentage of learners classified as physically active and sedentary according to required number of days involved in vigorous physical activity



The majority of the learners (n=164) reported their participation in vigorous physical activity once a week whereas the majority of them (n=108) were also involved in moderate physical activity once a week as shown in Table 4.3

Table 4.3 Number of days of vigorous and moderate physical activity per week (n=350)

	VPA	MPA
Variables	n	n
1 day	164	108
2 days	83	59
3 days	53	40
4 days	19	22
5 days	10	27
6 days	2	18
7 days	19	76

4.3.1 Hours of watching television per week

More than one-third (35.1%) reported watching television for 7 or more hours per week as outlined in Table 4.4.

Table 4.4 Mean Hours per week spent watching television (n=350)

Hours of television	n	%
1- 2	92	26.3
3 - 4	93	26.6
5 - 6	42	12.0
7 or more	123	35.1

4.3.2 Participation in team or individual sports or activities

Overall 57.4% of the sample reported not being involved in any team sports on a competitive level during the past 12 months. The number of team sports participated in by the learners are outlined in Table 4.5 More than one-fifth (23.1%) of the study sample, participated in one team sport on a competitive level during the past 12 months.

Table 4.5 Team sports participation in a competitive level (n=350)

Variables (number of times)	Frequency	Percentage
Never	201	57.4
1	81	23.1
2	41	11.7
3	14	4.0
4	9	2.6
5	2	0.6
6	2	0.6

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The grade 5 had a higher number of learners involved in different team sports than those in grade 6 as outlined in Table 4.6.

Table 4.6 Number of team sports participation by school grade

Variables	Grades			
	2	3	5	6
Volley	12	10	13	4
Basket	14	16	22	5
Football	15	7	7	3
Cricket	1	3	4	0
Swimming	7	5	12	3
Tennis	0	2	2	0
Jogging	2	2	2	1
Athletics	2	4	4	0
Walking	3	1	3	3
Netball	2	2	2	0
Handball	0	0	2	0
Karate	0	0	1	1
Cycling	2	0	1	1
Modern dance	1	2	0	1
Traditional dance	2	0	1	0

Of the learners who participated in a competitive team or individual sports during the past year, almost one fifth (16.3%) participated in basketball while (0.66%) participated in

handball. The most frequently reported activities were basketball (16.3%), volleyball (11.1%) and football (9.1%) as shown in Table 4.7.

Table 4.7 Different sports participated in by sample

Variables	Frequency (n)	Percentage (%)
Basketball	57	16.3
Volleyball	39	11.1
Football	32	9.1
Swimming	27	7.7
Athletics	10	2.9
Walking	10	2.9
Cricket	8	2.3
Jogging	7	2.0
Netball	6	1.7
Tennis	4	1.1
Cycling	4	1.1
Modern Dance	4	1.1
Traditional Dance	3	0.9
Handball	2	0.6

* Learners could indicate involvement in more than one team sport

4.4 PERCEIVED SUPPORT FOR PHYSICAL ACTIVITY WITHIN THE SCHOOL ENVIRONMENT

Perceptions regarding support for physical activity from teachers, boys and other girls at school were assessed. The minimum value for each response was 1 for disagree a lot and the maximum value was 5 for agree a lot. For each statement, participants rated agreement on a 5-point Likert-type scale, anchored by disagree a lot (1) and agree a lot (5). Items were scored so that a lower score corresponds with a more positive perception in the case of support for physical activity from teachers and boys. A higher score for perceived support for physical activity from girls indicated a more positive perception.

4.4.1 Perceived Support from teachers

Perceived support from the teachers was assessed with two items from the perceived climate for PA scale. As indicated in Table 4.8, the majority of the learners (68.3%) disagreed a lot or disagreed that “PE teachers act like they like, it is more important for boys to be physically active than girls”. Again the majority (66%) also disagreed a lot or disagreed that “most other teachers act like they think, it is more important for boys to be physically active than girls” as shown in Table 4.8. Overall the study sample responded positively when asked about support for physical activity from PE teachers and other teachers at school with the mean score lower than the midpoint (M= 4.33).

Table 4.8 Teachers Perceived Support for physical activity at school (n=350)

Variable statements	n	Mean (SD)	Disagree a lot	Neutral	Agree a lot
			Disagree %	%	Agree %
PE teachers act like they think it is more important for boys to be physically active than girls	350	2.13(2.18)	68.3	18.0	13.7
In my school, most other teachers act like they think it is more important for boys to be physically active	350	1.20(1.14)	66.0	20.6	13.5

4.4.2 Perceived Support from Boys

Overall the study sample responded positively when asked about support from boys at school. The mean score was lower than the midpoint ($M=6.6$). The majority of the learners (71.5%) disagreed a lot or disagreed that “boys stare at girls who being physically active” and “being physically active around boys makes me uncomfortable”. The majority (71.5%) also disagreed a lot or disagreed to “the boys making rude comments around girls who are being physically active” as illustrated in Table 4.9



Table 4.9 Overall perceived support for physical activity from Boys (n=350)

Variable statements	n	Mean (SD)	Disagree a lot Disagree %	Neutral %	Agree a lot Agree %
Boys make rude comments around girls Who are being physically active	350	2.50(1.34)	57.5	15.4	27.1
Being physically active around boys Make me feel uncomfortable	350	2.05(1.18)	71.5	13.1	15.4
Boys stare too much at girls who are being physically active	350	2.05(1.18)	71.5	13.1	15.4

4.4.3 Perceived Support from Girls

Overall the study sample responded positively when asked about support from other girls at school. The mean score was higher than the midpoint ($M=3.38$). The majority of the learners (52%) agreed that most girls think it is important to be physically active.

Table 4.10 Perceived support for physical activity from girls (n=350)

Variable statements	n	Mean (SD)	Disagree a lot Disagree %	Neutral %	Agree a lot Agree %
Most girls think it is important to be physically active	350	3.38(1.28)	28.2	19.7	52.0

4.5 ENJOYMENT OF PHYSICAL EDUCATION AND PHYSICAL ACTIVITY

Enjoyment of PE was assessed by a 5-point Likert-type item anchored by 1 (disagree a lot) to 5 (agree a lot). PA enjoyment was assessed by 7 items on a 5-point Likert-type scale ranging from 1 (disagree a lot) to 5 (agree a lot). A higher score indicated a more enjoyment for physical education and a lower score, a more enjoyment for physical activity.

Overall the study sample responded positively to physical education (PE) as illustrated in Tale 4.11. The mean score was higher than the midpoint (M=3.87).

Table 4.11 Enjoyment of physical education (n=350)

Variable statements	n	Mean (SD)	Disagree a lot Disagree %	Neutral %	Agree a lot Agree %
I enjoy physical education	350	3.87(1.12)	14.3	12.3	73.4

The majority of the learners (77.4%) disagreed with the statement saying that it's not interesting at all when they are physically active as shown in Table 4.12

Table 4.12 Enjoyment of physical activity (n=350)

Variable statements	n	Mean (SD)	Disagree a lot		Neutral		Agree a lot	
			Disagree %	%	%	Agree %		
I feel bored when I'm active	350	2.19 (1.26)	72.6	9.4	18.0			
I dislike when I'm active	350	2.00 (1.44)	76.6	10.0	13.5			
It's not fun at all when I'm active	350	2.31 (1.33)	62.3	14.0	23.7			
It makes me depressed when I'm active	350	2.08 (1.20)	62.9	10.3	16.8			
It frustrates me when I'm active	350	1.95 (1.11)	76.3	12.3	11.4			
It's not at all interesting when I'm active	350	1.96 (1.16)	77.4	7.4	15.2			
I feel as I'd rather be doing something else	350	2.17 (1.29)	68.0	10.9	21.2			

4.6 PERCEIVED SOCIAL SUPPORT FOR PHYSICAL ACTIVITY

Perceptions of social support outside of school were specifically assessed among friends and family. Perceived support for physical activity from friends and family were measured on a 5-point Likert scale. Learners were requested to indicate support from either friends or family with them in physical activity encouragement from friends to participate at least once a week. As far as family support was concerned, most participants indicated little support for physical activity participation (such as encouragement: never = 47.1 %, n=165).

The majority of the learners (24.9%, n=87) reported a family member encouraged them to do physical activity and a big number also of friends (28.3%, n=99) also reported friends' encouragement for physical activity once a week as shown in Table 4.13.

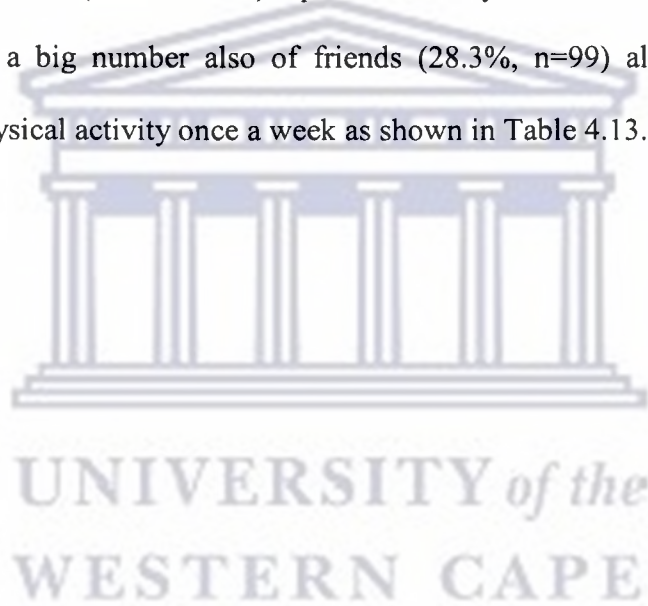


Table 4.13 Perceived social support from friends and family outside the school environment (n=350)

Variables	Never		Once		Twice		Thrice		Everyday	
	n	%	n	%	n	%	n	%	n	%
Friends encourage you	93	26.6	99	28.3	46	13.7	25	17.1	87	24.9
Friends do PA with you	92	26.3	130	37.1	58	16.6	24	6.9	46	13.1
Friends tell you that you're doing well PA	136	38.9	82	23.4	42	12.0	21	6.0	69	19.7
Family member encourages you	165	47.1	87	24.9	32	9.1	15	4.3	51	14.6
Family member play with you	142	40.6	117	33.4	39	11.1	26	7.4	26	7.4
Family member provides transportation	169	48.3	94	26.9	38	10.9	16	4.6	33	9.4
Family member watches you playing	168	48.0	99	28.3	42	12.0	22	6.3	19	5.4
Family member tells you that you're doing well in PA	165	47.1	87	24.9	32	9.1	15	4.3	51	14.6

Vigorous PA among participants were highly correlated with family and friends participation in physical activity, encouragement from friends and whether family provided transportation to PA as indicated in Table 4.14. The mean number of sessions of moderate physical activity increased with the frequency of family and friends social support. All bivariate correlations between the family and friends social support variables and moderate physical activity were positive and some were statistically significant ($p < 0.05$) as highlighted in table 4.14.

Table 4.14 Bivariate correlations of family and friends social support variables with days of moderate and vigorous activity after intervention (n=350)

Variable	Vigorous PA	Moderate PA
Family Participation ^a	0.187 **	0.065
Family encouragement ^b	0.116*	0.261**
Friend Participation ^a	0.223**	0.012
Friend Encouragement ^b	0.187**	0.132*
Family Transportation ^c	0.205**	0.011

^a Family /Friend participation: frequency that family or friends did physical activities with student during typical week based on 5-point scale from never to everyday.

^b Family/Friend encouragement: frequency that family or friends encourage students to be physically active during typical week based on 5-point scale from never to everyday.

^c Family transportation: frequency that family provided transportation to where they can participate in physical activity in a typical week based on 5 point-scale from never to everyday.

* $p < 0.05$, ** $p < 0.01$

CHAPTER FIVE

DISCUSSION

5.1 INTRODUCTION

This study aimed to determine the high school girls' perceptions of social support for physical activity in and outside of the school environment. The findings of the study are discussed in relation to previous similar studies and contextual data to give inferences. The chapter concludes by highlighting the limitations and strength of the study.

5.2 RESPONSE RATE

The study obtained a very good response rate of 89.7%. This could indicate the participants' willingness and high interest to be involved in physical activity. It is an optimistic component for hope in successful future beneficial interventions to promote, encourage and increase the participation in physical activity among adolescents' high school girls in Rwanda.

5.3 LEVELS OF PARTICIPATION IN PHYSICAL ACTIVITY

5.3.1 Patterns of Physical Activity

There are rising concerns about levels of physical activity, or inactivity, among young people in particular. Although physical activity is important for young people's health (Biddle, Gorely & Stensel, 2004), a substantial proportion of young people have lower physical activity levels than recommended for good health (Verstraete, Cardon, De Clercq & De Bourdeaudhuij, 2006). This trend is also evident in the present study which found that the majority of participants (66%) in the current study did not meet the recommended requirements for engagement in moderate physical activity. The results of the current study are consistent with the findings of a study done by Phillips (2006) among black female adolescents in the Western Cape, South Africa in which 50.9% of them were considered

physically inactive. However, the findings of the current study differ from the study by Kibet (2006) which found that twenty eight percent (28.2%) were considered physically inactive or sedentary. The big discrepancy between the present study and that of Kibet (2006) could be attributed to the fact that male school going adolescents were also included in her study. Literature has shown that males are considered to be more physically active than females. Another reason for the discrepancy between the present study and that of Kibet (2006) could be that the adolescents in the later study attended boarding schools which might have had more facilities available to engage into physical activity.

Activity protocols varied somewhat among studies, but most used programs of continuous moderate to vigorous activities for 30 to 45 minutes duration for 3 to 5 days per week.

The Health Education Authority in the United Kingdom made recommendations at the “Young and Active” symposium, suggesting that all young people should be physically active for at least 60 minutes per day at moderate intensity. Furthermore, inactive youth should begin by participating in physical activity of moderate intensity activity for at least 30 minutes per day. Participants in the present study were engaging more in moderate physical activity (34%) than in vigorous physical activity (28.1%). The World Health Organization also stated that much health gain can be obtained by participating in physical activities that are moderate in amount performed for a minimum of 30 in most of the days of the week (WHO/OMS, 1999). This ensures that adolescent are gaining at least the minimum of health benefits of physical activity rather than not being engage in physical activity at all as it may be difficult for them to engage in regular vigorous activities as recommended by international organizations and physical activity experts. Strong et al. (2005) stated that the recommended 60 minutes or more of physical activity can be achieved in a cumulative manner in school during physical education, recess, extramural sports, and before and after school programs.

The present study showed that the majority of the participants (n=108) were engaged in physical activity of moderate intensity only once a week.

This decrease in physical activity participation among girls as they age should be taken seriously when designing or implementing intervention programmes to encourage physical activity among young girls.

5.3.2 Participation in team sports or individual sports

In the current study, only 23.1% of the learners reported participation in one team sports during the past 12 months. The findings of this study differ from studies done in the USA by Pate, Trost, Levin and Dowda (2000) which found that 53% of participants participated in at least one team in the past 12 months. The findings of this study could reflect a lack of opportunities for adolescent girls in Kigali to be active outside of PE classes or it could also reflect a lack of interest among them to participate in school sports. Can an increase of sports programmes in the curriculum and organization of extracurricular activities for Rwandan high school girls influence the participation in moderate or vigorous activity among the learners?

One should also consider the lack of outdoor and indoor facilities beneficial for adolescents to be one of the factors for non participation of adolescents in physical activity.

Research furthermore suggests that physical activity programs that are for girls only as well as non competitive programs that emphasize fun and skill development could facilitate girls' participation in physical activity (Dwyer et al., 2006). Katzmarzyk and Arden (2004) found that children in their study reported participation in more than 1 sport during the year, with soccer, basketball and swimming listed among the top 5 activities. These findings are similar

to those of the current study in which learners reported mostly engaging respectively in basketball, volleyball, soccer and swimming. Contrary to this study, Phillips (2006) in her study found that girls spent more time participating in recreational physical activities that lead to lifetime habits such as walking, running, swimming and dancing. This could possibly be because adolescent girls in Kigali are engaging more in activities they are used to engage in during PE classes at school. Hovel et al. (1999) however stated that although formal sports may be valuable for teaching character, establishing strength and aerobic fitness, they may not lead to lifetime physical activity.

5.3.3 Sedentary activities

Sedentary behaviours such as watching television have been associated with potentially adverse health conditions such as overweight and obesity among children. It has also been hypothesized to displace time spent in physical activity (Springer, Kelder and Hoelscher, 2006). Fox and Riddoch (2000) also found that the time spent watching television and videos or playing computer games has been of interest, because many children and adolescents are in front of a screen for more than 4 hours per day. The present study results confirmed that the majority of the learners (35.1%) spent a large time watching television and /or playing computer games. This is contrary to the findings of a study done by Kibet (2006) which found that school going adolescents in Nairobi, Kenya spends relatively little time watching television (22.4%). The discrepancy noted between these studies could be due to the time allocated to television in boarding schools in Kenya compared to learners at home who have more time to spend in sedentary activities.

This is in line with research which found that two common sedentary behaviours among children are watching television and playing computer video or game, with one study indicating that U.S. children view an average of 3 hours of television per day (Woodard & Gridina, 2000). The authors furthermore reported that 48% of households with U.S. children between the ages of 2 and 18 have all four of the principal media staples (a television, video game equipment, and a computer). According to Springer, Kelder and Hoelscher (2006), 65% of children between the ages of 8 and 18 years had a television set in their bedroom and that children spend an average of 6 hours and 32 minutes per day with various media. The findings from abovementioned studies as well as findings from the present study indicate that learners should be encouraged to spend less time in sedentary activities. In addition, parents and or guardians of adolescents must be made aware of the negative consequences of sedentary activities for this age group.

5.4 PERCEIVED SUPPORT FOR PA

5.4.1 Perceived support for PA within the school environment

Learners have opportunities at school to be physically active. In addition, researchers have shown that adolescents' perceptions of support for physical activity at school could thus be very important as they are at school for a big portion of their day (Grieser et al., 2008). The overall sample of the present study responded positively to support from PE teachers, other teachers and boys. Teachers in general and PE teachers specifically must be more aware of learners' perceptions of their support for physical activity.

Support and encouragement from PE teachers plays a major role in adolescents' participation into physical activity as their guidance and expertise helps maintain their involvement in sporting activities within school. Therefore, the more the PE support, the better the levels of

PA among adolescent girls as researchers have found the support from teachers for girls' PA to be a strong predictor in the process of changing PA levels among inactive girls (Barr-Anderson et al, 2008; Neumark-Sztainer, Story, Hannan, Tharp & Rex, 2003). Teachers' encouragement has the advantage of increasing adolescents' participation levels in physical activity by explaining the benefits of a healthy lifestyle, healthy living and physical activity to them. Although in the present study learners perceived support for physical activity from teachers at school positively, their participation into physical activity was still low and should be investigated further.

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 teachers in Rwanda should consider the fact that learners perform at different levels. They should therefore consider some individualization in their programmes.

With regard to PE teachers' support and the school environment in Rwanda, the school could be the only setting in which some learners experience physical activity. The level of participation into physical activity among adolescent girls in Rwanda could be low as a result of a lack of provision of structured physical activity in schools as well as access to a wider range of activities within the school. PE and school sport should provide a diversity of activities to meet the needs and interests of learners by establishing better links with sports, leisure and community clubs (Green et al., 2005; Kirk, 2005). Moreover, PE teachers should use a more focused approach as to improve the quality of PE and thus promote physical activity among girls by emphasizing on the importance of physical activity and participation in PE.

5.4.2 Perceived support for PA outside the school environment

Social support for physical activity from friends is a strong predictor of physical activity levels. Peer motivation specifically by friends is one of the major factors contributing to physical activity participation among populations especially in young adults and adolescents (Tergerson & King, 2002). The result of the present study suggested a stronger indication towards peer influence in relation to support, encouragement and motivation for physical activity. The overall study sample responded positively when asked about the perceived support from friends for physical activity. The findings of the current study also showed that encouragement from friends 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).

Moreover, the findings of the present study highlighted that girls reported positively on enjoyment of physical activity and physical education. Could this be due to the peers' motivation they received? Research has shown that the perception that physical activity was fun to be related to higher physical activity participation (DeBourdeaudhuij et al., 2005). A study on physical activity motivation also found that personal performance, including enjoyment, was the strongest motivator to be physically active (Haverly & Davison, 2005). Physical activity should not only be perceived as a kind of sports which one has to go for competitions and takes much time but should be rather simple and enjoyable like few minutes of brisk walking, jogging, etc to benefit health (Tumusime, 2004).

The World Health Organization (as cited in Kabanda & Phillips, 2010) has realized that in poor and middle income countries people walk more for transportation purpose than in developed countries. This has led to increased attention being paid to walking and how to improve the quality of it. Most of Rwandans like many other African populations faces one of many challenges caused by poverty which is to afford cost of public transportation. Although this constitutes a burden, especially for adolescents who may sometimes have to walk long distances, this may be beneficial as it increases physical activity levels. On the other hand, leisure-time physical activities could be perceived by adolescents as a luxury which can only be afforded by children of high-income families.

Intervention programs promoting physical activity among adolescent girls should thus take enjoyment of activities into consideration when designing or implementing these programs. This notion illustrates also the need and importance in Rwanda of education and specific guidance of adolescents on the various types and intensity of physical activities which could be included in their daily lives.

Parents play an important role in the development of healthy lifestyles in their children. Generally, results showed that parental physical activity and parental support together, one support can directly or indirectly (e.g. through self- hypothesis for the split in findings with respect to efficacy) predict child's physical activity level (Gustafson & Rhodes, 2006). According to Trost et al. (2003), parental support, a variable that included parental participation in physical activity with child and parental encouragement, directly influences child physical activity and mediate the relation between parental physical activity and child physical activity. The inverse relation between time spent in sedentary pursuits and higher family physical activity participation found in a study done by Springer et al. (2006), along

with the strong body of evidence for the role of family support with adolescent physical activity suggest that families may exert important influences over an adolescent's available time within the home environment and that families are an important target for reducing sedentary behaviour. However, the learners in the present study responded negatively about their perceived support for physical activity from their family. This is a cause of concern as the levels of physical activity among the learners in the present study were relatively low.

The participation of more boys than girls in vigorous activity is also influenced by culture (Murenzi, 2001). The same features are also observed in Rwandan culture with regards to family patterns in relation to gender. Exercise and sport have been gender-typed as masculine in Rwanda's culture and boys have more leading models and support for exercise.

The majority of the participants in the present study reported little support from family in terms of encouragement, participation into PA by a family member or even transportation to a place to do physical activities. In Rwanda, the majority of the population is still not aware of the benefits of physical activity. For these parents to encourage their children, they should themselves have the necessary knowledge about physical activity. Being a developing country, Rwanda is still facing many challenges regarding its economy and development. Most of people do not own a vehicle and still depend on public transportation when they can afford it. One could hypothesize that this could be one of the reasons why parents could not provide transportation for their children. Another possibility maybe that Rwandese families have more important needs to focus on, hence physical activity is not a priority. It is therefore evident from all the participants' responses, that financial support is very closely linked with parental support, motivation and encouragement to participate in physical activities. Duncan et al. (2004) have suggested that higher socioeconomic status is linked with higher

involvement in physical activity. In addition, higher educational attainment and family income contribute to higher involvement in physical activity (Wilson, 2002).

Several studies have shown lack of social support to be a barrier to physical activity (Dwyer et al., 2006; O’dea, 2003). According to Motl, Dishman, Saunders, Dowda, and Pate (2007), increasing perceptions of social support might be important for encouraging participation in physical activity among adolescent girls because the performance of physical activity often requires the support of others.

5.5 LIMITATIONS OF THE STUDY

The following limitations of this study should be noted:

- All the high schools involved in this study are situated in Kigali (urban area). As a result, the constraints to physical activity among learners in the urban areas may differ from those in rural areas. Therefore, the results of this study cannot be generalised to all high school learners in Rwanda.
- Cross-sectional data may consistently describe patterns of association but not causality. A learner not participating in physical activity will not necessarily continue to do so. Thus caution should be employed when interpreting the results of a cross-sectional study when longitudinal data is not present.
- All data were self-reported, thus vulnerable to misrepresentation through errors in simplification or exaggeration.

- The questionnaire mainly consisted of close-ended responses. This limited the study to gain deeper information on the perceptions of support for physical activity. A triangulated study design would be better.

Despite its limitations, this study had the following strengths:

- The study used a questionnaire which was adapted from validated and reliable studies, to adequately measure the levels of physical activity, assess the social and environmental support and lastly determine the factors associated with those levels with respect to the validity and reliability issues. The study questionnaire included variables that correlated with physical activity in previous studies. The sample was randomly selected using a stratified random sampling technique. The response rate was high- meaning that the response bias was unlikely, the study questionnaire included variables that correlated with physical activity in previous studies. In addition, the analysis considered numerous interactive relationships between variables.

5.6 SUMMARY

The levels of physical activity and their association with various socio-demographic characteristics are thoroughly discussed in relation to previous similar studies. Factors influencing that participation in a physical activity were also discussed. Finally, limitations and strengths of the study were highlighted.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

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

6.2 SUMMARY AND CONCLUSION

The aim of this study was to determine high school girls' perceptions regarding environmental and social support for physical activity. To achieve this, the levels of physical activity were determined, and the high school girls' perceived social support for physical activity inside and outside the school environment were also assessed.

Literature has emphasized the increasing prevalence of physical inactivity both in developed and developing countries. Moreover, it has indicated that prevalence rates are significantly rising among youth and particularly among adolescent high school girls in the developing countries. Physical activity is considered as a cornerstone in the management of chronic diseases of lifestyle for its valuable benefits. However, literature has demonstrated that the recommended amount of physical activity is not achieved in individual's daily lives. The motivation for this study was to assess the levels of physical activity among adolescent girls and to identify the factors associated with it and the possible barriers to physical activity. The information collected were hoped to provide useful information for intervention programmes to increase levels of physical activity among sedentary/inactive high school learners.

The study was a descriptive cross-sectional study including female learners aged between 13 and 19 years in high school in Kigali, Rwanda. Three hundred and fifty (350) learners participated in the study and completed a self-administered closed-ended questionnaire. Both descriptive and inferential statistical analyses were used to analyze the data.

The results of the study showed that the majority of participants were not engaging in either vigorous intensity or moderate intensity of physical activity. The majority (70.9%) of the participants were categorized as sedentary for the vigorous intensity of physical activity and 66% for the moderate intensity of physical activity. Furthermore learners reported negatively on perceived support for physical activity from teachers and family. It is thus clear that female high school learners should be given enough support from both teachers and family for physical activity to encourage them to engage more in physical activities.

6.3 RECOMMENDATIONS

1. The secondary school curriculum should be revised as PE is no longer a compulsory module in secondary school. The importance of PE as part of the curriculum should be re-emphasized to the relevant governmental departments.
2. Schools in accordance with the Ministry of Sports and culture as well as the Ministry of Youth should establish a policies or guidelines for effective promotion in physical activity for Youth in general with specific reference to girls.

3. Schools should have policies requiring that physical education specialists teach physical education and qualified people direct school and community physical activity programs and coach young people in sports and recreation programs.
4. All secondary schools should be encourage to be part of the association of sports' schools to be able to organize and participate into interschool competitions or extracurricular non sedentary activities for learners.
5. Proper training about physical activity, its benefits, its recommended amount and how to achieve it should be given to teachers in general but also school authorities so as to be role models and support more girls being involved into physical activities.
6. Physiotherapists in association with the Ministry of health and different medical schemes should organize shows, debates, talks on television as well as on radio to emphasize the health promotion importance of PA and maybe organize competition to reward adolescents being physically active.
7. A health education curricula and instruction should be implemented to help students develop the knowledge, attitudes, behavioural skills, and confidence needed to adopt and maintain physically active lifestyles.
8. 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.

9. Levels of participation in PA of adolescent girls may differ in different parts of the country and different settings. More studies should be carried out to obtain a more generalized picture of adolescent girls' participation in PA.

10. Research should be done among adolescent girls to determine what they think should help them taking more part in physical activity or to know the ideas they have on what could or should be done to promote their participation in physical activity.



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REFERENCES

Aaron, D. J., Kriska, A. M., Dearwater, S. R., Cauley, J. A., Metz, K. F., & LaPorte, R. E. (1995). Reproducibility and validity of an epidemiologic questionnaire to assess past year physical activity in adolescents. *American Journal of Epidemiology*, *142*(2), 191-201.

Abel-Hamid, T. K. (2002). Exercise and diet in obesity treatment: An integrative system dynamics perspective. *Medicine & Science in Sports & Exercise*, *35*, 400-421.

Adkins, S., Sherwood, N. E., Story, M., & Davis, M. (2004). Physical Activity among African –American Girls: The Role of Parents and the Home Environment. *Obesity Research*, *12*, 38–45.

Ainsworth, B. E., Basset, D. R., Strath, S. J., Swartz, A. M., O' Brien, W.L., Thompson, R.W, Macera, C. A., & Kimsey, C. D. (2000) Comparison of three methods for measuring the time spent in physical activity. *Medicine and Science in Sports and Exercise*, *32*, 457-464.

Alberti, G., Zimmet, P., Shaw, J., Bloomgarden, Z., Kaufman, F., & Silink, M. (2004). Type 2 Diabetes in the Young: The Evolving Epidemic. The International Diabetes Federation Consensus Workshop. *Diabetes Care*, *27*(7), 1798-1811.

Amaro, H., Blake, S., Schwartz, P., & Flinchbaugh, L. (2001). Developing theory-based substance abuse prevention programs for young adolescent girls. *Journal of Early Adolescence*, *21*, 256-293.

American Academy of Pediatrics, Committee on Environmental Health (2009). The Built Environment: Designing Communities to Promote Physical Activity in Children. *Pediatrics*, 123, 1591–1598.

American Diabetes Association (2005). Weight management using lifestyle modification in the prevention and management of type 2 diabetes: rationale and strategies. *Clinical Diabetes*, 23(3), 130.

Armstrong, M. E., Lambert, M. I., Sharwood, K. A., & Lambert, E.V. (2006). Obesity and overweight in South African primary school children—The Health of the Nation Study. *South African Medical Journal*, 96, 439–444.

Amin, R., & Daniels, S.R. (2002). Relationship between obesity and sleep-disordered breathing in children: is it a closed loop? *Journal of Pediatrics*, 140, 641– 643.

Australian Physiotherapy Association (2008). Physiotherapy and exercise prescription, Retrieved on September 11, 2008 from:

http://apa.advsol.com.au/independent/documents/position_statements/ExercisePrescription.pdf

Babbie, E., & Mouton, J. (2007). The practice of Social research, Oxford University Press Southern Africa, 7th Ed. pp191.

Bachrach, L. K. (2001). Acquisition of optimal bone mass in childhood and adolescence. *Trends in Endocrinology and Metabolism*, 12, 22-28.

Bahr, R., & Loald, (2001). Recent Advances: Sports Medicine. *British Medical Journal*, 323, 7308.

Bahr, R. (2001). Recent advances: Sport Medicine. *British Medical Journal*, 323, 7308-7314.

Barr-Anderson, D. J., Neumark-Sztainer, D., Schmitz, K. H., Ward, D. S., Conway, T. L., Pratt, C., Baggett, C. D., Lytle, L., & Pate, R.R. (2008). But I Like PE: Factors Associated With Enjoyment of Physical Education Class in Middle School Girls. *Research Quarterly for Exercise and Sport*, 79(1), 18–27.

Bailey, D. A., & Martin, A. D. (1994). Physical Activity and Skeletal Health in Adolescents. *Pediatric Exercise Science*, 6, 330-347.

Ball, K., Owen, N., Salmon, J., Bauman, A., & Gore, C. J. (2001). Association of physical Activity and body Weight, Fat in Men and Women. *International Journal of Obesity*. 25, 914-919.

Bar-Or, O. (2000). Juvenile obesity, physical activity and lifestyle changes. *The Physician and Sports medicine*, 28, 1-7.

Baum, A. L. (1998). Young females in the athletic arena. *Child and Adolescent Psychiatric Clinics of North America*, 7, 754-755

Bauman, A. L., Marshall, M., Mohsin, V., & Westley-Wise, B. L. M. (2002). Perception on physical environment, stage of change for activity, and walking among Australian adults. *Research Quarterly for Exercise and Sport*, 73, 146-156.

Bauman, A. E., Sallis, J. F., Dzewaltowski, D. A. & Owen, N. (2002). Towards better understanding of influences of physical activity: The role of determinants, correlates, casual variables, mediators, moderators and confounders. *American Journal of Preventive Medicine*, 23(25), 5-14.

Bauman, A., & Campbell, T. (2001). Heart Week 2001: Get Active! A call to action. *Medical Journal of Australia* 174, 381-382.

Benefice, E., Garnier, D., & Ndiaye, G. (2001). Assessment of Physical Activity among Rural Senegalese Adolescence Girls: Influence of Age, Sexual Maturation, and Body Composition. *Journal of Adolescence Health*, 28, 319-327.

Biddle, S. J., Gorely, T., & Stensel, D. J. (2004). Health-enhancing physical activity and sedentary behaviour in children and adolescents. *Journal of Sports Sciences*, 22, 679-701.

Biddle, S. J. H., Fox, K. R., & Boutcher, S. H. (editors) (2000). *Physical Activity and Psychological Well-being*. London: Routledge.

Birnbaum, A. S., Evenson, K. R., & Motl, R. W. (2005). Scale development for perceived school climate for girls' physical activity. *American Journal of Health Behavior* 29(3), 250-257.

Birrer, R. B., & Sedaghat, V. D. (2003). Exercise and diabetes mellitus. *The Physician and Sports Medicine*, 31, 29-33.

Birth To Twenty Study (2002). Physical activity and South African children – some shocking findings. March 2002. Study Updates.

Booth, M. (2000). Assessment of physical activity. An international perspective. *Research Quarterly for Exercise and Sport*, 71, 144-120.

Bowling, A. (1997). *Research Methods in Health: Investigating Health and Health Services*. Buckingham: Press Celtic Court, pg 173.

Bradley, C. B., McMurray, R. G., Harrell, J. S, Deng., & Shiging (2000). Changes in common activities of 3rd through 10th graders: the CHIC Study. *Medicine and Science in Sports and Exercise*, 32, 2071-2078.

British Heart Foundation (2000) *Couch Kids – The Growing Epidemic*. London: British Heart Foundation.

Brown, D W., Balluz, L.S., & Heath, G.W., (2003). Association between recommended levels of physical activity and Health related quality of life. Findings from 2001 Behavioural risk factor surveillance system (BRFSS) Survey. *Journal of Preventive Medicine*, 37, 520-528.

Brown, J. P., & Jose, R. G. (2002). For the Scientific Advisory Council of the Osteoporosis Society of Canada. 2002 clinical practice guidelines for the diagnosis and management of osteoporosis in Canada. *Canadian Medical Association Journal*, 167(10), 1-34.

Brownson, R.C., Baker, E. A., Houseman, R. A., Brennan, L.K., & Bacak, S.J. (2001). Environmental and policy determinants of physical activity in the United States. *The American Journal of Public Health*, 91, 1995-2003.

Buckworth, J., & Dishman, R. K. (2002). *Determinants of physical activity and exercise*. In J Buckworth & R Dishman (Eds), *Exercise Psychology* (pp.191-209).Champaign, IL: Human Kinetics.

Cale, L., & Harris, J. (2006). Interventions to promote young people's physical activity: Issues, implications and recommendations for practice. *Health Education Journal*, 65(4), 320-337.

Canadian Fitness and Lifestyle Research Institute. 2002. *Physical Activity Monitor*. Canadian Fitness and Lifestyle Research Institute, Ottawa, Ont.

Canadian Fitness and Lifestyle Research Institute. 2005. *2005 Physical activity monitor*. Canadian Fitness and Lifestyle Research Institute, Ottawa, Ont.

Canadian Fitness and Lifestyle Research Institute, Ottawa, Ont. Retrieved on September 15, 2009 from:

<http://www.cflri.ca/cflri/pa/surveys>

Canergie, M. A., Bauman, A., Marshall, A. L., Mohsin, M., Westley-Wise, V., & Booth, M. L. (2002). Perceptions of the physical environment, stage of change for physical activity, and walking among Australian adults. *Research Quarterly for Exercise and Sport*, 73, 146-152.

Caspersen, C., Pereira, M., & Curran, K. (2000). Changes in physical activity patterns in the US by sex and cross-sectional age. *Medicine and Science in Sports and Exercise*, 32, 1601-1609.

Carter, N., & O'Driscoll, M. C. (2000). Life Begins at Forty. *Physiotherapy* 86, 85-93.

Castelli, D. M., Hillman, C. H., Buck, S. M., & Erwin, H. E. (2007). Physical fitness and academic achievement in third- and fifth-grade students. *Journal of Sport and Exercise Psychology*, 29, 239-252.

Centers for Disease Control and Prevention (2004). Youth risk behavior surveillance: United States, 2003. *MMWR*, 53, 1–96.

Centers for Disease Control and Prevention. Surveillance summaries (2004). *MMWR*, 53 (2), 1-96.

Centre for Disease control and Prevention (2002). Get students thinking about how Physical activity fits into their lives. *Curriculum Review*, 42, 9-11.

Chartered Society of Physiotherapy (2001): Neurology, Parkinson's disease, multiple sclerosis and severe traumatic brain injury. *Physiotherapy Effectiveness Bulletin*, 3, 1–11.

Coakley, J., & White, A. (1992). Making decisions: Gender and sport participation among British adolescents. *Sociology of Sport Journal*, 9, 20–35.

Cockburn, C., & Clarke, G. (2002). “Everybody’s looking at you!”: Girls negotiating the “femininity deficit” they incur in physical education. *Women’s Studies International Forum*, 25(6), 651–665.

Cooper, R., Cutler, J., Desvigne-Nickens, P., Fortmann, S.P., Friedmann, L., Havlik, R., Hogelin, G., Marler, J., McGovern, P., Morosco, G., Mosca, L., Pearson, T., Stamler, J., Stryer, D., & Thom, T. (2000). Trends and disparities in coronary heart disease, stroke, and other cardiovascular diseases in the United States: findings of the national conference on cardiovascular disease prevention. *American Heart Association*, 102, 3137-3147.

Coulson, N., Goldstein, S., & Ntuli, A. (2002). *Promoting health in South Africa: An action manual*. Heinemann Higher and Further Education (Pty) Ltd, Cape Town-South Africa.

Cradock, A., Melly, S. J., Allen, J., Morris J., & Gortmaker S. (2007). Characteristics of school campuses and physical activity among youth. *American Journal of Preventive Medicine*, 33(2), 106–113

Crocker, P., Eklund, R., & Kowlaski, K. (2000). Children's physical activity and physical self perceptions. *Journal of Sports Sciences*, 18(6), 383-394

Davison, K. K., Cutting, T. M., & Birch, L. L. (2003). Parents' activity-related parenting practices predict girls' physical activity. *Medicine & Science in Sports & Exercise*, 35, 1589-1594.

Dagkas, S., & Stathi, A. (2007). Exploring social and environmental factors affecting adolescents' participation in physical activity. *European Physical Education Review* 13(3), 369-384.

Diabetes UK (2003). Care recommendation: Physical activity and Diabetes. 1-14. Retrieved on June 10, 2009 from :

www.diabetes.org

Di Brezzo, R., Fort, I. L., & Hoyt, G. L. (2002). Frequency of training on strength development in women 40-65 years of age. *Women in Sport and Physical Activity Journal*, 11, 49-62.

Dishman, R. K., Motl, R.W., & Sallis, J. F. (2005). Self-management strategies mediate self-efficacy and physical activity. *American Journal of Preventive Medicine*, 29(1), 11-18.

Dishman, R., Motl, R. W., Saunders, R., Felton, G., Ward, D. S., Dowda, M. & Pate, R. R. (2005). Enjoyment Mediates Effects of a School-Based Physical- Activity Intervention. *Medicine & Science in Sports & Exercise*, 37(3), 478-487.

Dishman, R. K, Motl, R.W., Saunders, R., Felton, G., Ward, D.S. & Dowda M. (2004). Self-efficacy partially mediates the effect of a school-based physical-activity intervention among adolescent girls. *Preventive Medicine*, 38, 628–636.

Debate, Gabriel, Zwald, Huberty, & Zhang (2009). Changes in psychosocial factors and physical activity frequency among third to eighth grade girls who participated in a developmentally focused youth sport program: A Preliminary Study. *Journal of School Health*, 79(10), 474-484.

DeBourdeaudhuij, I., Lefevre, J., Deforche, B., Wijndaele, K., Matson, L., & Philippaerts, R. (2005). Physical Activity and Psychosocial Correlates in Normal Weight and Overweight 11-19 year Olds. *Obesity Research*, 13(6), 1097-1105.

De Bourdeaudhuij, I., Sallis, J. F., & Saelens, B. E. (2003). Environment correlates of physical activity in a sample of Belgian Adults. *American Journal of Health Promotion*, 18, 83-92.

Department of Caring science, Orebo University, Orebo, Sweden (2000). Adherence to Healthy Physical Activity: A comparison of occupational therapy students with nurses and physiotherapy students. *Scandinavian Journal of Occupational Therapy*, 7, 156-164.

Duncan, J.M., Al-Nakeeb, Y., Nevill, A., & Jones, M.V. (2004). 'Body Image and Physical Activity in British Secondary School Children', *European Physical Education Review*, 10(3), 243–60.

Dunstan, S. C., Duncan, T. C., & Strycker, A. L. (2005). Sources and Types of Social Support in Youth Physical Activity. *Health Psychology Journal*, 24, 3-10.

Dunton, G. F., Janner, M. S., & Cooper, D. M. (2003). Assessing the perceived environment among minimally active adolescent girls: Validity and relations to physical activity outcomes. *American Journal of Health Promotion*, 18, 70–73.

Durstine, J. L., & Moore, G. E. (2003). *Exercise management for persons with chronic diseases and disabilities*. USA: ACSM's Edition

Dwyer, J. J. M., Allison, K. R., Goldenberg, E. R., Fein, A. J., Yoshida, K. K., & Boutilier, M. A. (2006). Adolescent girls' perceived barriers to participation in physical activity. *Adolescence*, 41(161), 75-89.

Dwyer, J. J. M., Allison, R. K., Lemoine, N. K., Adlaf, E. M., Goodman, J., Faulkner, J. E. G. & Lysy, D.(2006). A provincial study of opportunities for school based physical activity in secondary schools. *Journal of Adolescent Health*, 39, 80-86.

Dwyer T., Sallis, J. F., Blizzard, L., Lazarus, R., & Dean, K. (2001). Relation of academic performance to physical activity and fitness in children. *Pediatric Exercise Science*, 13, 225-237.

Eaton, D., Forthofer, M., Zapata, L., McCormack, Brown. K., Bryant, C., McDermott, R., & Reynolds, S. (2004). Factors related to alcohol use among 6th through 10th graders: The Sarasota County Demonstration Project. *Journal of School Health* 74 (3): 95-104.

Epstein, J, Griffen, K., & Botvin, G. (2004). Efficacy, self-derogation, and alcohol use among inner-city adolescents: gender matters. *Journal of Youth and Adolescence*, 33, 159-166.

Eyler, A. A., & Vest, J. R. (2002). Environmental and policy factors related to physical activity in rural white women. *Women Health*, 36, 111-21.

Eyre, H., Kahn, R., & Robertson, R. M. (2004). Preventing cancer, cardio vascular diseases and diabetes: A common agenda for the America cancer society, the American diabetes association and the American heart foundation. *Journal of Diabetes Care*, 27, 1812-1824.

Fagard, R. H. (2001). Exercise characteristic and blood pressure response to dynamic physical training. *Medicine Science in Sport and Exercise*, 33(6), 484-492.

Fairclough, S., & Stratton, G. (2005). Physical education makes you fit and healthy'. Physical education's contribution to young people's physical activity levels. *Health Education Research*, 20 (1), 14-23.

Faith, M.S., Leone, M.A., Ayers, T.S., Heo, M., & Angelo Pietrobelli, A. (2002). Weight Criticism during Physical Activity, Coping Skills, and Reported Physical Activity in Children. *Pediatrics*, 110 (2).

Fiatarone, M. A., Marks, E. C., Ryan, N. D., Meredith, C. N., Lipsitz, L.A., & Evans, W.J. (1990). High-intensity strength training in nonagenarians: effects on skeletal muscle. *Journal of American Medical Association*, 263, 3029-3034.

Felton, G., Dowla, M., Ward, D., Dishman, R., Trost, S., Saunders, R., & Pate, R. R. (2002). Differences in physical activity between Black and White girls living in rural and urban areas. *Journal of School Health*, 72, 250-255.

Ferreira, I., Van der Horst, K., & Wendel-Vos, W. (2007). Environmental correlates of physical activity in youth ,a review and update. *Obesity Reviews*, 8, 129-54.

Flegal, K. M., Carroll, M. D., Ogden, C. L., & Johnson, C. L. (2002). Prevalence and trends in obesity among U.S adults 1999-2000. *Journal of American Medical Association*, 288, 1723-1727.

Flintoff, A., & Scraton, S. (2001). Stepping into active leisure? Young women's perceptions of active lifestyles and their experiences of school physical education. *Sport, Education and Society*, 6, 5–21.

Fowler, M. J. (2007). Diet and exercise (Diabetes treatment, part 1). *Clinical Diabetes*, 25(3), 105.

Fox, K., & Boucher, S. (2000). *Physical Activity and Psychological Well-being*, London Routledge.

Fox, K. R., & Riddoch, C. (2000). Symposium on 'Growing up with good nutrition: a focus on the first two decades'. Charting the physical activity patterns of contemporary children and adolescents. *Proceedings of the Nutrition Society*, 59, 497–504.

Frank, L., Kerr, J., Chapman, J., & Sallis, J.F. (2007). Urban form relationships with walk trip frequency and distance among youth. *American Journal of Health Promotion*, 21 (4), 305–311.

Frantz, J. (2005). Physical inactivity among high school learners in Belhar – A public health concern. Unpublished PhD Thesis. University of the Western Cape, Physiotherapy Department.

Furnham, A., Badmin, N., & Sneade, I. (2002). Body image dissatisfaction: gender differences in eating attitudes, self-esteem, and reasons for exercise. *Journal of Psychology*, 136(6), 581–596.

Friis, R. H., Nomura, W. L., Ma, C. X. & Swan, J. H. (2003). Socioepidemiologic and health-related correlates of walking for exercise among the elderly: Results from the longitudinal study of aging. *Journal of Aging & Physical Activity*, 11, 54-65.

Galler, S. E., & Derman, R. (2001). Knowledge, beliefs, and risk factor osteoporosis among African–American and Hispanic women. *Journal of the National Medical Association*, 93, 13–21.

Garnier, D., & Benefice, E. (2001). Habitual physical activity of Senegalese adolescent girls under different working conditions, as assessed by a questionnaire and movement registration. *Annals of Human Biology*, 28, 79-97.

Gass, M., & Dawson-Hughes, B. (2006). Preventing Osteoporosis-Related Fractures: An Overview. *The American Journal of Medicine*, 119 (4), 3-11.

Ghannem, H., Darioli, R., Harrabi I., Liman, K., Gaha, R., Trabelsi, L., Fredj, A., & Bouslama, A. (2001). Epidemiology of cardiovascular risk factors among school children in Sousse, Tunisia. *Journal of Cardiovascular Risk*, 8(2), 87–91.

Going, S., Lohman, T., & Houtkooper, L. (2003). Effects of exercise on bone mineral density in calcium-replete postmenopausal women with and without hormone replacement therapy. *Osteoporosis International*, 14, 637- 643.

Gordon-Larsen, P., Nelson, M. C., Page, P., & Popkin, B. M. (2006). Inequality in the built environment underlies key health disparities in physical activity and obesity. *Pediatrics*, 117, 417–424.

Gorden-Larsen, P., Mc Murray, R. G., & Popkin, B. (2000). Determinants of adolescent physical activity and inactivity patterns. *Pediatrics*, 105(6), 83-90.

Gordon, N. F., Gulanick, M., Costa, F., Fletcher, G., Franklin, B. A., Roth, E. J., & Shephard, T. (2004). Physical activity and exercise recommendations for stroke survivors. *Circulation*, 109, 2031–2041.

Green, K., Smith, A., & Roberts, K. (2005). 'Social Class, Young People, Sport and Physical Education', in K. Green and K. Hardman (eds) *Physical Education: Essential Issues*, pp. 180–96. London: SAGE.

Gregory, J., & Lowe, S. (2000). *National Diet and Nutrition Survey: Young People Aged 4 to 18 Years*. London: The Stationery Office.

Grieser, M., Neumark-Sztainer, D., Saksvig, B. I., Lee, J. S., Felton, G. M., & Kubik, M. Y. (2008). Black, Hispanic, and White Girls' Perceptions of Environmental and Social Support and Enjoyment of Physical Activity. *Journal of School Health*, 78, (6).

Grunbaum, J. A., Kann, L., Kinchen, S., Ross, J., Hawkins, J., & Lowry, R. (2004). Youth Risk Behavior Surveillance —United States, 2003. *Morbidity and Mortality Weekly Report*, 53, 1–89.

Guinn, B., Vincent, V., Semper, T., & Jorgensen, L. (2000). Activity involvement, goal perspective, and self-esteem among Mexican American adolescents. *Research Quarterly for Exercise and Sport*, 71(3), 308–311.

Gustafson, S. L., & Rhodes, R. E. (2006). Parental Correlates of Physical Activity in Children and Early Adolescents. *Sports Medicine*, 36(1), 79-97.

Hage, C., Mattsson, E., & Stahle, A. (2003). Long-term effects of exercise training on physical activity level and quality of life in elderly coronary patients. *Physiotherapy Research International*. 8, 13-22.

Hallal, P. C., Victora, C. G., & Azevedo, M. R. (2006). Adolescent physical activity and health. A systematic review. *Sports Medicine*, 36, 1019-1030.

Hardman, A. (2001). Physical activity and cancer risk. *Proceedings of Nutrition Society* 60(1), 107-113.

Hardman, E. A., & Stensel, D. (2004). *Physical activity and Health: The Evidence Explained*. London: Routledge.

Haverly, K., & Davison, K. K. (2005). Personal Fulfillment Motivates Adolescents to be Physically Active. *Archives of Pediatric and Adolescent Medicine*, 159(12), 1115-1120.

Healthy People 2010. Physical activity and Fitness. Retrieved on July 26, 2009 from:

<http://www.healthpeople.gov/document/HTML/volume2/22physical.htm>.

Heitzler, C. D., Martin, S. L., Duke, J., & Human, M. (2006). Correlates of physical activity in a national sample of children aged 9-13 years. *Journal of Preventive Medicine*, 42, 254-260.

Higgins, J. W., Gaul, C., Gibbons, S., & Van Gyn, G. (2003). Factors Influencing Physical Activity Levels Among Canadian Youth. *Canadian Journal of Public Health*, 94(1), 45-51.

Hohepa, M., Schofield, G., & Kolf, G. (2004). Adolescents obesity and physical inactivity. *New Zealand Medical Journal*, 117(1207), 1218.

Hong, S., & Dimsdale, J. E. (2003). Physical activity and perception of energy and fatigue in obstructive sleep apnoea. *Medicine & Science in Sports & Exercise*, 35, 1088-1092.

Hu, F.B., Stampfer, M. J., & Solomon (2001). Physical activity and the risk for cardiovascular events in diabetic women. *Annals Internal Medicine*, 134, 96-105.

Huddleston, S., Mertesdorf, J., & Araki, K. (2002). Physical activity behavior and attitudes towards involvement among physical education, health and leisure services pre – professionals. *College Student Journal*, 36, 555-573.

Humpel, N., Owen, N., Iverson, D., Leslie, E., & Bauman, A. (2004). Perceived environment attributes residential location and walking for particular purposes. *American Journal of Preventive Medicine*, 26(2), 119-125.

Humpel, N., Owen, N., & Leslie, E. (2002). Environmental factors associated with adults' participation in physical activity. *American Journal of Preventive Medicine*, 22, 188-199.

Hunter, G. R., McCarthy & Baumann, M. M. (2004). Effects of resistance training on older Adults *Sports Medicine*, 34(5), 329-348.

Israel, G.D. (1992). Determining Sample Size: University of Florida. Retrieved on August 04, 2008 from: <http://edis.ifas.ufl.edu/PD006>

Jackson, R. T., Rashed, M., & Saad-Eldin, R. (2003). Rural urban differences in weight, body image, and dieting behavior among adolescent Egyptian schoolgirls. *International Journal of Food Sciences and Nutrition*, 54, 1–11.

Jones, Martin, O'beney., & Caro (2004). Promoting mental health through Physical Activity: Examples from practice. *Journal of mental health promotion*. Retrieved on August 8, 2009 from:

http://www.findarticles.com/p/articles/mi_qa4122/is_2004o3/ai_n9465303

Jones, D., Hoelscher, D. M., Kelder, S. H., Hergenroeder, A., & Sharma, S. V. (2008). Increasing physical activity and decreasing sedentary activity in adolescent girls – The Incorporating More Physical Activity and Calcium in Teens (IMPACT) study. *International Journal of Behavioral Nutrition and Physical Activity*, 5, 42.

Kaaks, R., & Lukanova, A. (2001). Energy balance and cancer: The role of insulin and insulin like growth factor1. *Procedures Nutritional Society*, 60, 91-106.

Kagwiza, J. N., Phillips, J. S., & Struthers, P. (2005). Physical activity profile of urbanized Rwandan women. *African Journal for Physical, Health Education, Recreation and Dance*, 11 (1), 59-67.

Kagwiza, J.N (2003). Health risk behaviour among adult women in Kigali Rwanda. Unpublished theses. University of the Western Cape.

Kann, L. (2001). The youth risk behavior surveillance system: Measuring health risk behaviors. *American Journal of Health Behavior*, 25(3), 272-277.

Katz, D. L., O'Connell, M., Yeh, M. C., Nawaz, H., Njike, V., Anderson, L. M., Cory, S., & Dietz, W. (2005). *Public Health Strategies for Preventing and Controlling Overweight and Obesity in School and Worksite Settings: A Report on Recommendations of the Task Force on Community Preventive Services*. Atlanta, GA: Centers for Disease Control and Prevention.

Katzmarzyk, P. T., & Arden, C. I. (2004). Physical Activity Levels of Canadian Children and Youth: Current Issues and Recommendations. *Canadian Journal of Diabetes*, 28(1), 67-78

Katzmarzyk, P., Gledhill, N., & Shephard, R. J. (2000). The economic burden of physical inactivity in Canada. *Canadian Medical Association Journal*, 163, 1435-1440.

Kesaniemi, Y. A., Danforth, E., Jensen, M. D., Kopelman, P. G., Lefebvre, P., & Reeder, B. A. (2001). Dose-response issues concerning physical activity and health: an evidence-based symposium. *Medicine and Science in Sports*, 33, 351-358.

Kibet, J. J. (2006). Prevalence of physical inactivity among school going adolescents in Nairobi, Kenya. Unpublished master's thesis. Physiotherapy Department, University of the Western Cape.

Kigali City (2008). About Kigali. Retrieved on May 2, 2008 from:

<http://www.kigalicity.gov.rw/spip.php?article2>.

Killingsworth, R. E. (2003). Health promoting community design: A new Paradigm to promote healthy communities. *American Journal of Health Promotion*, 17, 169-170.

Killingsworth, R.E., Earp, J., & Moore, R. (2003). Supporting health through design: Challenges and opportunities. *American Journal of Health Promotion*, 18, 1-2.

Kimm, S.Y., Glynn, N.W., Kriska, A.M., Barton, B.A., Kronsberg, S.S., Daniels, S.R., Crawford, P. B., Sabry, Z. I., & Liu, K. (2002). Decline in physical activity in black girls and white girls during adolescence. *New England Journal of Medicine*, 347(10), 709-715.

Kirk, D. (2005) 'Physical Education, Youth Sport and Lifelong Participation: The Importance of Early Learning Experiences', *European Physical Education Review*, 11(3), 239–255.

Lee, I., Paffenbarger, R., & Thompson, P. (2001). Preventing Coronary Heart Disease. *The Physician and Sports Medicine*, 29(2), 1-10.

Lindstrom, M., Hanson, B., & Ostergren, P. (2001). Socioeconomic differences in leisure-time physical activity: The role of social participation and social capital in shaping health-related behaviour. *Social Science and Medicine*, 52(3), 441-451.

Malina, R. M. (2001). Adherence to Physical Activity from to adulthood. A perspective from tracking studies. *Quest*, 53, 346-355.

Marsh, H., & Kleitman, S. (2003). School athletic participation: mostly gain with little pain. *Journal of Sport and Exercise Psychology*, 25, 205–228.

Martin, S., Morrow, J. Jr., Jackson, A., & Dunn, A. (2000). Variables related to meeting the CDC/ACSM physical activity guidelines. *Medicine and Science in Sports and Exercise*, 32(12), 2087-2092.

Martinson, B., O'Connor, P., & Pronk, N. (2001). Physical inactivity and short-term all-cause mortality in adults with chronic disease. *Archives of Internal Medicine*, 16, 1173-1180.

Martinez, J.A. (2000). Body-weight regulation: causes of obesity. *Proceedings of the Nutrition Society*, 59, 337-345.

Marwick, T. H., Horden, M. D., Miller, T., Chyun, D. A., Bertoni, A. G., Blumenthal, R. S., Miller, T., Philippides, G., & Rocchini, A. (2009). Exercise Training for Type 2 Diabetes Mellitus- Impacts on Cardiovascular Risk. *Circulation*, 119, 3244-3262.

McCallister, S. G., Blinde, E. M. & Phillips, J. M. (2003). Prospects for change in a new millennium: gender beliefs of young girls in sport and physical activity. *Women in Sport & Physical Activity Journal*, 12(2), 83.

McClung, L.R. (1996). Negotiation of the gendered ideology of sport: Experiences of women intercollegiate athletes. Unpublished dissertation, Southern Illinois University Carbondale.

McKenzie, T. L., Marshall, S. J., Sallis, J. F. & Conway, T. L. (2000). Student activity levels, lesson context and teacher behavior during middle school physical education. *Research Quarterly for Exercise and Sport*, 71, 249–259.

MMWR (1999). Neighbourhood safety and prevalence of inactivity... selected states 1996. *MMWR Morbidity Mortality Weekly Report*, 48, 143-146.

Mokhtar, N., Elati, J., Chabir, R., Bour, A., Elkari, K., Schlossman, N. P., Caballero, B., & Aguenou, H. (2001). Diet Culture and Obesity in Northern Africa. *Journal of nutrition*, 131(3), 887-892.

Moody, J. S., Prochaska, J. J., Sallis, J. F., McKenzie, T. L., Brown, M., & Conway, T.L. (2004). Viability for parks and recreation centers as sites for youth physical activity promotion. *Health Promotion Practice*, 5, 438-443

Motl, R. W., Dishman, R. K., Ruth, P., Saunders, R. P., Dowda, M., & Pate, R. R. (2007). Perceptions of Physical and Social Environment Variables and Self-Efficacy as Correlates of Self-Reported Physical Activity among Adolescent Girls. *Journal of Pediatric Psychology*, 32(1), 6-12.

Motl, R. W., Dishman, R. K., Ward, D. S., Saunders, R. P., Dowda, M., Felton, G., & Pate, R. R. (2005). Perceived physical environment and physical activity across one year among adolescent girls: self-efficacy as a possible mediator? *Journal of Adolescent Health*, 37, 403-408.

Motl, R. W., Dishman, R. K., Ward, D. S., Saunders, R. P., Dowda, M., Felton, G., & Pate, R.R. (2002). Examining social-cognitive determinants of intention and physical activity in adolescent girls using structural equation modeling. *Health Psychology, 21*, 459–467.

Motl, R. W., Dishman, R. K., Saunders, R., Dowda, M., Felton, G. M & Pate, R. R. (2001). Measuring enjoyment of physical activity in adolescent girls. *American Journal of Preventive Medicine, 21* (2), 110-117.

Motley, M. L., & Lavine, M. E. (2001). Century marathon: A race for equality in girls' and women's sports. *Journal of Physical Education, Recreation & Dance, 17*, 172-194.

Murenzi, J.G. (2001). Habitual activity patterns among adolescent learners in two urban areas in Rwanda. Unpublished master's thesis. Physiotherapy Department, University of the Western Cape.

National Association of Sport and Physical Education (2001). Physical education is critical to complete education. *American Alliance for Health, Physical Education, Recreation and Dance* 1-5.

Nelson, M.C., & Gordon-Larson, P. (2006). Physical activity and sedentary behavior patterns are associated with selected adolescent health risk behaviors. *Pediatrics, 117*, 1281-1290.

Neumark-Sztainer, D., Story, M., Hannan, P. J., Tharp, T., & Rex, J. (2003). Factors associated with changes in physical activity: a cohort study of inactive adolescent girls. *Archives of Pediatric and Adolescent Medicine*, 157 (8), 803-810.

Neumark-Sztainer, D., Peter, J., & Hannan, P. T. (2000). Weight- Related Behaviors Among Adolescent Girls. *Archives of Pediatrics Adolescent and Medicine*, 154, 569-577.

Nizeyimana, E. (2005). Perceived Constraints to Physical Activity Among Paramedical Institution Students in Uganda. Unpublished master's thesis. Physiotherapy Department, University of the Western Cape.

Norman, G. J., Nutter, S. K., Ryan, S., Sallis, J. F., Calfas, K. J., & Patrick, K. (2006). Community design and access to recreational facilities as correlates of adolescent physical activity and body-mass index. *Journal of Physical Activity and Health*, 3, 118–128.

Odebiyi, D., & Ohwovoriole, A. (2002). Exercise Tolerance in Type-2 Male Diabetics. *South African Journal of Physiotherapy*, 58(3), 17-20.

O'Sullivan, P. B. (2000). Lumbar segmental 'instability': Clinical presentation and specific stabilizing exercise management. *Manual Therapy*, 5, 2-12.

Paluska, S., & Schwenk, T. (2000). Physical activity and mental health – current concepts. *Sports Medicine*, 29, 167-176.

Pate, R. R., Stewart, G., Trost, S. G., Levin, S., & Dowda, M.(2000). Sports Participation and Health-Related Behaviors Among US Youth. *Archives of Pediatrics and Adolescent Medicine*, 154 (9), 902-911.

Pescatello, L. S. (2001). Exercising for health: The merits of lifestyle physical activity. *The Western Journal of Medicine*, 174(2), 114-118.

Phillips, E. L., Arnett, D. K., Himes, J. H., McGovern, P. G., Blackburn, H., & Luepker, R. V. (2000). Differences and trends in anti-oxidant dietary intake in smokers and non-smokers, 1980-1992. The Minnesota Heart Survey. *Annals of Epidemiology*, 10, 417-423.

Phillips, J. S. (2006). Concerns about Physical inactivity among adolescents in the Strand, South Africa. *Journal of the Community Health Sciences*, 1, 39-46

Phillips, J. (2001). *Recreational activities of high school learners in the Strand. Unpublished Master's Thesis.* University of the Western Cape.

Pina, I. L., Apstein, C. S., Balady, G. J., Belardinelli, R., Chaitman, B. R., Duscha, B. D., Fletcher, B. J., Fleg, J. L., Myers, J. N., Sullivan, M. J. (2003). Exercise and heart failure. A statement from the American Association Committee on exercise, rehabilitation and prevention. *Circulation*, 107(8), 1210–1225.

Pigman, T. H., Gan, X. D., & Krousel-Wood, M. A. (2002). Role of exercise for type -2 diabetic patient management. *Southern Medical Journal*, 95, 72-78.

Pollock, M. L., Gaesser, G. A, Butcher, J. D., Despres, J. P., Dishman, R. D., Franklin, B. A. & Ewing Garber, C. (1998). The recommended quantity and quality of exercise for developing cardio respiratory and muscular fitness, and flexibility in healthy Adults. *Medicine and Science in Sports and Exercise*. 30(6), 975-991.

Pope, M., Ashley, M., & Ferrence, R. (1999). The carcinogenic and toxic effects of tobacco smoke: Are women particularly susceptible? *Journal of Gender-Specific Medicine*, 2, 45-51.

Popkin, B. M., Duffey, K., & Gordon-Larsen, P. (2005). Environmental influences on food choice, physical activity and energy balance. *Physiology and Behavior*, 86, 603–613.

Porter, S. (2002). *Physical Activity: An Exploration of the Issues and Attitudes of Teenage Girls*. London: Scott Porter Research and Marketing.

Pratt, M., Macera, C. A., & Wang (2000). Higher direct medical cost associated with physical inactivity. *The physician and Sport Medicine*. Retrieved on May 17, 2009 from:

<http://www.physsportsmed.com/cover.htm>

Ransdell, L. B., Taylor, A., Oakland, D., Schimdt, J., Moyer-Milleur, L., & Shultz, B. (2002). Daughters and mothers exercising together: Effects of Home and Community- Based programs. *Medicine & Science in Sports & Exercise*, 35, 286-296.

Reddy, P., Panday, S., Swart, D., Jinabhau, C., Amosun, S., James, S., Monyeki, K.D., Stevens, G., Morejele, N., Kambaran, N. S., Omardien, R. G., & Van den Borne, H. W. (2003). Umthenthe Uhlaba Usamila – The 1st South African Youth Risk Behaviour Survey 2002. Cape Town: South African Medical Research Council.

Rees, R., Kavanagh, J., Harden, A., Shepherd, J., Brunton, G., Oliver, S., & Oakley, A. (2006). Young people and physical activity: a review matching their views to effective interventions. *Health Education Research*, 21 (6), 806-825.

Renno, A. C. M., Granito, R. N., Driusso, P., Costa, D., & Oishi, J. (2005). Effects of an exercise program on respiratory function, posture and on quality of life in osteoporotic women: a pilot study. *Physiotherapy*, 91, 113-118.

Riddoch, C., & Boreham, C. (1995). The health-related physical activity of children. *Sports Medicine*, 19(2), 86-102.

Robbins, L. B., Nola, J., Pender, N. J., & Kazanis, A. S. (2003). Barriers to Physical Activity Perceived by Adolescent Girls. *Journal of Midwifery and Women's Health*, 48, 206–212.

Roche, A., & Deehan, A. (2002). Women's alcohol consumption: emerging patterns, problems and public health implications. *Drug and Alcohol Review*, 21, 169-178.

ROCHE Foundation and Government of Morocco Ministry of Health. (1999). *Obesity in Morocco, Preliminary Report*.

Roddy, E., Zhang, W., & Doherty, M. (2005). Aerobic walking or strengthening exercise for osteoarthritis of the knee? A systemic review. *Annals of the Rheumatic Disease*, 64, 544-548.

Rwandan Ministry of Education (2009). Secondary Schools Per District 2009. Retrieved on October 14, 2009 from:

<http://www.mineduc.gov.rw/spip.php?article446>

Rwandan Ministry of High Learning Institutions. Retrieved on October 14, 2009 from:

<http://www.mineduc.gov.rw/spip.php?article193>.

Sabo, D., Miller, K., Melnick, M., & Heywood, L. (2004). *Her Life Depends on It: Physical Activity, and the Health and Well-Being of American Girls*. East Meadow, NY: Women's Sports Foundation.

Sallis, J., Prochaska, J., & Taylor, T. (2000). A review of correlates of physical activity of children and adolescents. *Medicine Science and Sports Exercise*, 32, 963-975.

Sarigiani, P., Ryan, L., & Petersen, A. (1999). Prevention of High-risk behaviors in adolescent women. *Journal of Adolescent Health*, 25, 109-119.

Saunders, R. P., Motl, R. W., Dowda, M., Dishman, R. K., & Pate, R. R. (2004). Comparison of social variables for understanding physical activity in adolescent girls. *American Journal of Health Behavior*, 28, 426-436.

Savage, M. P. & Scott, L. B. (1998). Physical activity and Rural middle School Adolescents. *Journal of Youth and Adolescents*, 27, 245-254

Sawatzky, J. V. & Naimark, B. (2002). Physical activity and cardiovascular health in aging women: A health promotion perspective. *Journal of Aging and Physical Activity*, 10, 396-412.

Saxena, R., Borzekowski, D. L., & Rickert, V. L. (2002). Physical activity levels among urban adolescent females. *Journal of Pediatric and Adolescent Gynecology*, 15, 279-284.

Schell, L., & Rodriguez, S. (2000). Our sporting sisters: How male hegemony stratifies women in sport. *Women in Sport & Physical Activity Journal*, 9(1), 15-34.

Schofield, G. (2003). Push Play: what's under the umbrella? *The New Zealand Medical Journal*, 116(1179), 1-3.

Schwimmer, J. B. (2005). A discussion of: Preventing childhood obesity: Health in the balance. *Environmental Health Perspectives*, 113, 706.

Serdula, M. K., Khan, L. K., & Dietz, W. H. (2003). Weight loss counselling revisited. *Journal of American Medical Association*, 289, 1747-1750.

Shilton, T., & Naughton, G. (2001). Physical activity and children: A Statement of Importance and Call to action from the Heart Foundation. Retrieved July 17, 2009 from:

<http://heartfoundation.isa.net.au/prof/docs/calltoaction>

Silveri, C. & Spinasanta, S. (2003). *Spine health benefits from physical activity*.
spineuniverse.com.

Sleap, M., & Wormald, H. (2001). Perceptions of physical activity among young women aged 16 and 17 years. *European Journal of Physical Education*, 6, 26-37.

Slevin, T. (2002). The cancer of Australia and the New Zealand cancer society: First Australian nutrition, physical activity and cancer conference, Sydney, 24-26 June 2002. *Nutrition & Dietetics: The Journal of the Dieticians Association of Australia*, 59, 207-209.

Smidt, N., De Vet, H.C.W., Bouter, L. M., & Dekker, J. (2005): Effectiveness of exercise therapy: A best-evidence summary of systematic reviews. *Australian Journal of Physiotherapy*, 51, 71–85.

Spear H., J & Kulbock P (2001). Adolescent health Behaviors and related factors: *A Review Public Health Nursing*, 18, 82-93.

Springer, A. E., Kelder, S. H., & Hoelscher, D.M. (2006). Social support, physical activity and sedentary behavior among 6th-grade girls: a cross-sectional study. *International Journal of Behavioral Nutrition and Physical Activity*, 3, 8.

Stathi, A., Fox, K. R. & Mckenna, J. (2002). Physical activity and dimensions of subjective well being in older Adults. *Journal of Aging and Physical Activity*, 10, 76-92.

Strelan, P., Mehaffey, S., & Tiggeman, M. (2003). Self-objectification and esteem in young women: the mediating role of reasons for exercise. *Sex Roles*, 48, 89–95.

Struber, J. (2004). Considering physical inactivity in relation to obesity. *The Internet Journal of Allied Health Sciences and Practice*, 2(1), 1-16.

Stunkard, A., Harris, J., Pederson, N., & McClearn, G. (2000). The youth risk behaviour surveillance – United States 1999. *Morbidity and Mortality Weekly Report*, 49, 1-95.

Sobngwi, E., Mbaya, J. C. N., Unwin, N. C., Kengne, A. P., Fezeu, L., Minkoulou, E., & Aspray, T. J. (2002). Physical activity and its Relationship with Obesity, Hypertension, and Diabetes in Urban and Rural Cameroon. *International Journal of Obesity*, 26, 1009-1016.

Talaferro, L. A., Rienzo, B. A., Miller, M. D., Pigg, R. M., & Dodd, V. J. (2003). School youth and suicide risk: exploring protection afforded through physical activity and sport participation. *Journal of School Health*, 78, 545-553.

Tammelin, T., Nayha, S., Laitinen, J., Rintamaki, H., & Jarvelin, M. (2003). Physical activity and social status in adolescents as predictors of physical inactivity in adulthood. *Journal of Preventive Medicine*, 37, 375-381.

Tergerson, J., & King, K. A. (2002). Do perceived cues and Benefits and Barriers to Physical Activity differ between Male and Female Adolescents? *Journal of School Health*, 72, 374-377.

Telama, R., & Yang, X. (2000). Decline of physical activity from youth to young adult hood in Finland. *Journal of Medicine Science Sport Exercise*, 32(9), 1617-1622.

Telama, R., Yang, X., Viikari, J., Wanne, O., & Raitakari, O. (2005). Physical activity from childhood to adulthood: A 21 –year tracking study. *American Journal of Preventive Medicine*, 28, 267-273.

Thompson, P. D., Paffenbarger, R. S., & Lee, I. M. (2001). Preventing coronary heart disease: The role of physical activity. *Physician Sports Medicine*, 29, 37-52.

Tobias, M. I., & Roberts, M. G. (2001). Modelling Physical activity: A multistate life- table approach. *Australian and New Zealand Journal of Public Health*, 25, 141-148.

Treuth, M., Butte, N., Puyau, M., & Adolph, A. (2000). Relations of parental obesity status to physical activity and fitness pre-pubertal girls. *Pediatrics*, 106(4), 49-62.

Troiano, R., Flegal, K., Kuczmarski, R., Campbell, S., & Johnson, C. (1995). Overweight prevalence and trends for children and adolescents: The National Health and Nutrition Examination Survey, 1963-1991. *Archives of Pediatrics Adolescent Medicine*, 149, 1085-1091.

Troiano, R. P. (2002). Physical inactivity among female adolescents. *The New England Journal of Medicine*, 347(10), 706-707

Trost, S., Sallis, J., Pate, R., Freedson, P., Taylor, W., & Dowda, M. (2003). Evaluating a model of parental influence on youth physical activity. *American Journal of Preventive Medicine*, 25, 277-282.

Trost, S. G., Pate, R. R., Sallis, J. F., Freedson, P. S., Taylor, W. C., Dowda, M. & Sirard, J. (2002). Age and gender differences in objectively measured physical activity in youth. *Medicine & Science in Sports & Exercise*, 34, 350-355.

Tucker Center for Research on Girls & Women in Sport. *Developing Physically Active Girls: An Evidence-Based Multidisciplinary Approach*. University of Minnesota, College of Education and Human Development; 2007.

Tucker, P., Irwin, D. J., Grilliland, J., He, M., Larsen, K., & Hes, P. (2009). Environmental influences on PA levels in youth. *Health & Place*, 15, 357-363.

Tudor-Locke, C., Lee, S. M., Morgan, C. F., Beighler, A., & Pagrazi, R. B. (2004). *Sex-Specific activity patterns of the segmented school day*. American Alliance for Health Physical Education Recreation and Dance. New Orleans, LA.

Tumusiime, D. K. (2004). *Perceived benefits of, barriers and helpful cues to physical activity among tertiary institutions in Rwanda*. Unpublished theses. University of the Western Cape.

Underwood, M. R. (2000). Exercise and the prevention of low back pain disability. *British Journal of Sports Medicine*, 34, 5.

Unwin, N., Setel, P., Rashid, S., Mugusi, Mbanya, J.C., Kitange, H., Hayes, L., Edwards, R., Aspray, T., & Alberti, K.G.M.M. (2001). Non communicable diseases in sub-Saharan Africa: Where do they feature in health research agenda? *Bulletin of the World Health Organisation*, 79(10), 947- 953.

US Department of Health and Human Services (2004). *Bone Health and Osteoporosis: A Report of the Surgeon General*. Rockville, MD: US Dept of Health and Human Services, Public Health Service, Office of the Surgeon General.

US National Association for Sport and Physical Education/Council of Physical Education for Children. (2001). *Physical education is critical to a complete education*.

Vail, S. (2001). *The invisible epidemic: Physical inactivity*. Fitness and recreation advisory committee. Canada.

Valois, F. R., Zulling, J. K., Huebner, E. S., & Drane, J. W. (2004). Physical activity Behaviour and Perceived life Satisfaction among Public High School Adolescents. *Journal of School Health*, 74, 59-65.

Van Mechelen, W., Twisk, J. W. R., Post, G. B., Snel, J., & Kemper, H. C. G. (2000). Physical activity of young people: the Amsterdam Longitudinal Growth and Health. *Medicine and Science in Sports*, 23, 437- 452.

Van Rooijen, A., Rheeder, P., Eales, C. & Molatoli, H. (2002). Barriers to and Expectations of Performing Physical Activity in Female subjects with Type-2 Diabetes. *South African Journal of Physiotherapy*, 58(1), 3-11.

Van Tulder, M., Koes, B., & Bombardier C. (2002). Low back pain. *Best Practice and Research Clinical Rheumatology*, 16, 761-75

Verstraete, S. J. M., Cardon, G. M., De Clercq, D. L. R., & De Bourdeaudhuij, I. M. M (2006). Increasing children's physical activity levels during recess periods in elementary schools: the effects of providing game equipment. *European Journal of Public Health*, 16, (4), 415–419.

Vilhjalmsson, R., & Thorlindsson, T. (1998). Factors related to physical activity: A study of Adolescents. *Social Science Medicine*, 47, 665-675.

Vuori, I. (2007). Physical activity and health: Metabolic and cardiovascular issues. *Advances in Physiotherapy*, 9, 50-64.

Wallhead, T. L., & Buckworth, J. (2004). The role of physical education in the promotion of youth physical activity. *Question*, 56, 285–301.

Walliman, N. (2006). *Social research methods*. London: Sage publications.

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

Ward, D. S., Dowda, M., Trost, S. G., Felton, G. M., Dishman, R. K., & Pate, R.R. (2006). Physical activity correlates in adolescent girls who differ by weight status. *Obesity*, 14, 97-105.

Ward, D. S., Saunders, R., Felton, G. M., Williams, E., Epping, J. N., & Pate, R. R. (2006). Implementation of a school environment intervention to increase physical activity in high school girls. *Health Education Research*, 21(6), 896-910.

Wareham, N. (2007). Epidemiological studies of physical activity and diabetes risk and implications for diabetes prevention. *Journal of Applied Physiology, Nutrition and Metabolism*, 32(4), 778-782.

Weaver, C. M. (2000). The growing years and prevention of orthopedic in later life. *The Proceedings of the Nutrition Society*, 59, 303-306.

Wilson, M. (2002). Obesity and Diabetes: The new epidemics. *Physical Therapy*, 82, 10- 11.

Wilson, T. (2002) 'The Paradox of Social Class and Sports Involvement', *International Review for the Sociology of Sport*, 37(1), 5–16.

Woodard, E. H., & Gridina, N. *Media in the home 2000: the Fifth Annual Survey of Parents and Children 2000*. The Annenberg Public Policy Center of the University of Pennsylvania. Survey Series No7.

Woolf, A. D., Zeidler, H., Haglund, U., Carr, A. J., Chaussade, S., Cucinotta, D., Veale, D. J., & Martin-Mola, E. (2004). Musculoskeletal pain in Europe; its impact and a comparison of population and medical perceptions of treatment in eight European countries. *Annals of the Rheumatic Diseases*, 63, 342–347.

World Health Organization (2009). *Global Strategy on Diet, Physical Activity and Health* Recommended amount of Physical Activity. Retrieved on May 10, 2009 from:

http://www.who.int/dietphysicalactivity/factsheet_recommendations/en/index.html

World Health Organization (2008a). *Global strategy on diet, physical activity and health*.

Retrieved on March 20, 2008 from:

<http://www.who.int/dietphysicalactivity/publications/facts/pa/en/>

World Health Organization (2008b). *Diet and physical activity: a public health priority*.

Retrieved on March 13, 2008 from:

<http://www.who.int/dietphysicalactivity/en/index.htm/>

World Health Organization (2008c). *Physical activity and young people*. Retrieved on March

13, 2008 from:

[http://www.who.int/dietandphysicalactivity/factsheet_young people/en/s](http://www.who.int/dietandphysicalactivity/factsheet_young%20people/en/s)

World Health Organisation (2007). *Recommended amount of physical activity*. Retrieved on

March 12, 2008 from:

http://www.who.int/dietphysicalactivity/factsheet_recommendations/en/

World Health Organization (2005). *Policy Related to Physical Activity*. Retrieved on

May 6, 2009 from:

<http://www.who.int/moveforhealth/advocacyinformation>

World Health Organization (2003a). *Sedentary Lifestyle: a global public health problem*.

Physical activity, non-communicable disease prevention and health promotion. Retrieved on

March 7, 2009 from:

<http://www.who.int/hpr/physiactiv/sedentary.lifestyle.shtml>

World Health Organisation (2003b). *Physical activity: Direct and Indirect health benefits. Non-communicable diseases and prevention and health promotion.* World Health Organisation, Geneva.

World Health Organization (2003c). *Towards Multisectoral Policy in Support of Physical activity: Non-communicable disease prevention and health promotion.* Retrieved on September 15, 2009 from:

<http://www.who.int/hpr/physactiv/women.shtml>

World Health Organisation (2002). *Lets' Move for our Health: AFROFEATURE, WHO/AFRO, Press Release.* Retrieved on March 25, 2008 from:

<http://www.who.int/A:/Lets's%20Move%For20%Our%20Health, htm>.

World Health Organization (2000). *Global strategy for the prevention and control of non-communicable diseases.* Report by the Director General. A53/4. Fifty-third World Health Assembly, May. Geneva.

World Health Organization / OMS (1999). *Active Living.* Retrieved on August 18, 2009 from:

<http://www.who.int/hpr/active/benefits.html>.

World Health Organization Regional Office for Europe (2006). Recent European research reveals that regular moderate physical activity can extend a person's life by three to five years. Press Release EURO/03/06. Retrieved on March 25, 2008 from:

http://www.euro.who.int/mediacentre/PR/2006/20060508_1

World Health Report (2002). Reducing Risks: Promoting Healthy Life. World Health Organisation. Geneva.

Wright, J., Macdonald, D., & Groom, L. (2003) 'Physical Activity and Young People Beyond Participation', *Sport, Education and Society*, 8(1), 17-33.

Yang, X., Telema, R., Leino, M., & Viikari, J. (1999). Factors explaining the physical activity of young adults: the importance of early socialization. *Scandinavian Journal of Medicine & Science in Sports*, 9, 120-127.

Yannakoulia, M., Keramopoulos, A., & Leda Matalas, A. (2004). Bone Mineral Density in Young Active Females. The Case of Dancers. *International journal of sports Nutrition and Exercise Metabolism*, 14, 285-297.

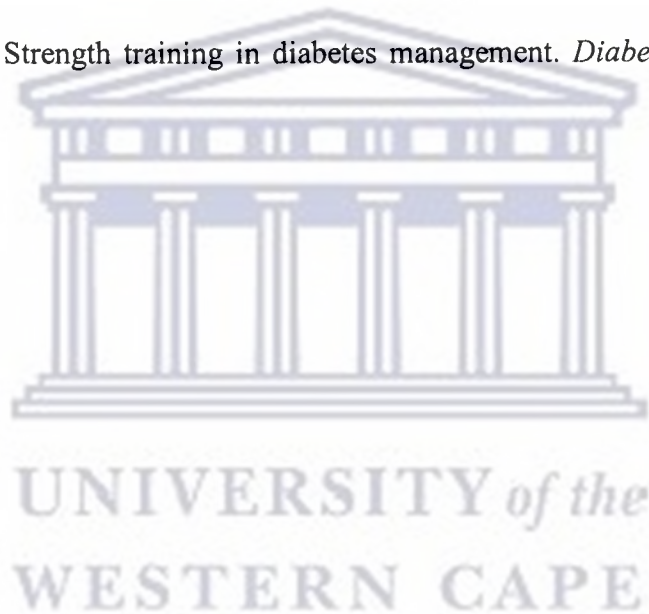
Yanovski, J., & Yanovski, S. (1999). Recent advances in basic obesity research. *Journal of American Medical Association*, 282, 1504-1506.

Young, D. R., Phillips, J. A., Yu, T., & Haythornthwaite, J. A. (2006). Effects of a life skills intervention for increasing physical activity in adolescent girls. *Archives of Pediatrics & Adolescent Medicine*, 160, 1255-1261

YRBSS Youth Online: Comprehensive Results. National Center for Chronic Disease Prevention and Health Promotion. Retrieved on April 19, 2006, from:

<http://apps.nccd.cdc.gov/yrbss/index.asp>

Zacker, R. J. (2005). Strength training in diabetes management. *Diabetes Spectrum*, 18(2), 71.



Higher Degrees Committee
Faculty of Community and Health Sciences

Private Bag X17, Belville, 7535
South Africa
Tel: +27 (0) 21 959 2163/2852
Fax: +27 (0) 21 959 2755
E-mail: csjohnson@uwc.ac.za
Website: www.uwc.ac.za

APPENDIX A

11th November 2008

To Whom It May Concern:

Dear Sir/ Madam

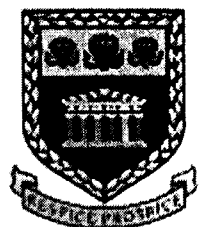
Re: Research project of Liliane Kirenga B: Student Number: 2817277

This letter confirms that Ms. Kirenga (student number: 2817277) is a postgraduate student in the Community and Health Sciences Faculty at UWC. Her proposed research entitled "*High School Girl's Perceptions of Environmental and Social Support for Physical Activity*" has been examined by the Higher Degrees Committee and found to be of high scientific value, methodologically sound and ethical. We fully support the research and urge you to allow him access to your organisation.

Yours sincerely



.....
Dr G. Reagon
Chairperson Higher Degrees Committee



UNIVERSITY of the
WESTERN CAPE

APPENDIX B

To the Ministry of Education, Science, Technology and Research
Republic of Rwanda
Kigali-Rwanda:

Honourable Minister,

RE: Request to conduct a research study regarding physical activity and high school girls

I am a Masters student in Physiotherapy at the University of the Western Cape, Cape Town, South Africa. My research project will be done as a partial fulfilment of the requirements for masters of Science (M. Sc.) in physiotherapy.

The title of my research is: **High School Girl's Perceptions of Environmental and Social Support for Physical Activity**. I therefore request for your permission to carry out this research in two different schools per district of Kigali City. The results of this study will be discussed with the school authorities, the teachers and the learners and it is believed that it will help promote physical activity among high school girls in Kigali, Rwanda.

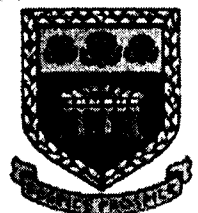
Confidentiality and anonymity will be assured regarding the participants' identity and information they provide. Codes will be used instead of names.

Yours faithfully,

Mrs Lillane Kirenga B.
Student Researcher

Professor Julie Phillips
Research Supervisor

Ms. Tania Steyn
Research Supervisor



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Private Bag X17, Bellville 7531,
South Africa
Telegraph: UNIBELL
Telephone: +27 21 959 2100
Fax: +27 21 959 1217
E-mail: info@uwc.ac.za
Website: www.uwc.ac.za

APPENDIX C

To the Mayor of Nyarugenge District

P.O. Box 3527 Kigali

Republic of Rwanda

Dear Madam,

RE: Request to conduct a research study regarding physical activity and high school girls

I am a Masters student in Physiotherapy at the University of the Western Cape, Cape Town, South Africa. My research project will be done as a partial fulfillment of the requirements for masters of Science (M. Sc.) in physiotherapy.

The title of my research is: **High School Girl's Perceptions of Environmental and Social Support for Physical Activity**. I therefore request for your permission to carry out this research in two (2) different schools of your district. The results of this study will be discussed with the school authorities, the teachers and the learners and it is believed that it will help promote physical activity among high school girls in Kigali, Rwanda.

Confidentiality and anonymity will be assured regarding the participants' identity and information they provide. Codes will be used instead of names.

Yours faithfully,

Mrs. Liliane Kirenga B.

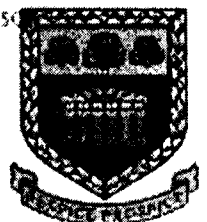
Student Researcher

Professor Julie Phillips

Research Supervisor

Ms. Tania Steyl

Research Supervisor



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APPENDIX D

To the Mayor of Kanombe District

Republic of Rwanda

Kigali/Rwanda

Dear Sir,

RE: Request to conduct a research study regarding physical activity and high school girls

I am a Masters student in Physiotherapy at the University of the Western Cape, Cape Town in the Republic of South Africa. My research project will be done as a partial fulfilment of the requirements for masters of Science (M. Sc.) in physiotherapy.

The title of my research is: **High School Girl's Perceptions of Environmental and Social Support for Physical Activity**. I therefore request for your permission to carry out this research in two (2) different schools of your district. The results of this study will be discussed with the school authorities, the teachers and the learners and it is believed that it will help promote physical activity among high school girls in Kigali, Rwanda.

Confidentiality and anonymity will be assured regarding the participants' identity and information they provide. Codes will be used instead of names.

Yours faithfully,



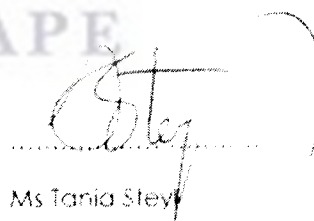
Mrs Lilliane Kirenga B.

Student Researcher



Prof Julie Phillips

Research Supervisor



Ms Tania Steyn

Research Supervisor



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APPENDIX E

To the Mayor of Gasabo District

Republic of Rwanda

Kigali/Rwanda

Dear Madam,

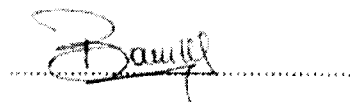
RE: Request to conduct a research study regarding physical activity and high school girls

I am a Masters student in Physiotherapy at the University of the Western Cape, Cape Town, South Africa. My research project will be done as a partial fulfillment of the requirements for masters of Science (M. Sc.) in physiotherapy.

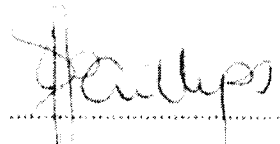
The title of my research is: **High School Girl's Perceptions of Environmental and Social Support for Physical Activity**. I therefore request for your permission to carry out this research in two (2) different schools of your district. The results of this study will be discussed with the school authorities, the teachers and the learners and it is believed that it will help promote physical activity among high school girls in Kigali, Rwanda.

Confidentiality and anonymity will be assured regarding the participants' identity and information they provide. Codes will be used instead of names.

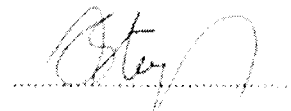
Yours faithfully,



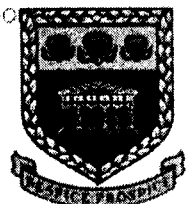
Mrs Liliane Kirenga B.
Student Researcher



Professor Julie Phillips
Research Supervisor



Ms. Tania Sney
Research Supervisor



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APPENDIX F

The Director
Republic of Rwanda
Kigali-Rwanda

Dear Sir/Madam,

RE: Request to conduct a research study among girls in Secondary Schools

I am a Rwandan postgraduate student enrolled in the Physiotherapy (Masters) program at the University of the Western Cape, Cape Town, South Africa. My research project will be done as a partial fulfilment of the requirements for masters of Science (M. Sc.) in physiotherapy.

The title of my research is: **High School Girl's Perceptions of Environmental and Social Support for Physical Activity**. I therefore request for your permission to carry out this research in Secondary in Kigali City. If permission granted, I would appreciate if I could carry out the study in January 2009. The results of this study will be discussed with the school authorities, the teachers and the learners and it is believed that it will help promote physical activity among high school girls in Kigali, Rwanda. Furthermore, a copy of the thesis will be provided to your office.

Confidentiality and anonymity will be assured regarding the participants' identity and information they provide. Codes will be used instead of names.

Yours faithfully,

Mrs Liliane Kirenga B.
Student Researcher

Professor Julie Phillips
Research Supervisor

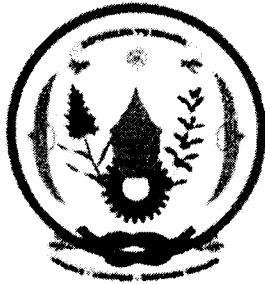
Ms. Tania Steyl
Research Supervisor



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REPUBLIC OF RWANDA



MINISTRY OF EDUCATION
B.P. 622 KIGALI.

Kigali, 20.01.2003

N° 108/12.02/03.00/REC9

APPENDIX G

TO WHOM IT MAY CONCERN

Mrs **Lilian Kirenga B** is a Rwandan student at University of the western Cape, Cape Town, SOUTH AFRICA for the Master's Degree, and she is carrying out a research on "*High School Girl's Perceptions of Environmental and Social Support for Physical Activity*".

The Ministry of Education has no objection to this, and wish to request whoever may be concerned to assist her get any information relevant to this research.

Thank you.

YISA KAMANA Claver
Permanent Secretary

Ag

A handwritten signature in black ink, appearing to read 'Yisa Kamana Claver'.

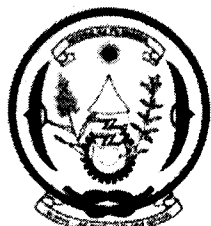


Cc:

- Minister of Education
- Minister of State in charge
- of Primary and Secondary Education

REPUBLIC OF RWANDA

27 JAN 2009
Kigali, ... /... /2009



KIGALI CITY COUNCIL
NYARUGENGE DISTRICT

Ref 254/01/07

APPENDIX H

To Mrs Liliane Kirenga B.
University of the Western Cape
Bellville 7535
South Africa

Dear Student,

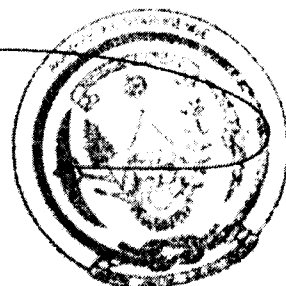
RE: **Permission to conduct a research study regarding Physical activity and high school girls**

Reference is made to your letter requesting to conduct a research in high schools: we are kindly informing you that, you are allowed to do the research in the schools you have selected.

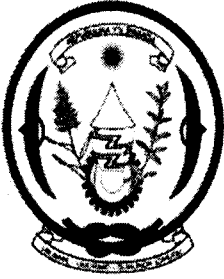
We hereby request all the school authorities concerned to help you in organizing it.

Sincerely

The Mayor Nyarugenge District
RUTAYISIRE Origène



APPENDIX I



**KIGALI CITY
KICUKIRO DISTRICT**

Ref No 2453 / 07.01.2008

Mrs KIRENGA Liliane
Student in South Africa

OBJECTIVE: Allowing you to conduct
a research.

Mrs.

With reference to your letter which you wrote on 12/12/2008 and the attached document is to whom it my concern from the Chairperson Higher Degrees Committee of University of the WESTERN CAPE;

We are grateful to inform you that, you're allowed to conduct a project research in department of education where you need to conduct a research.

Thanks.

Mayor of Kicukiro District

NDAMAGE Paul Jules

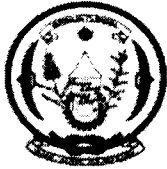
A handwritten signature in blue ink is written over a faint, circular official stamp. The stamp contains some illegible text and a central emblem.

APPENDIX J

REPUBLIC OF RWANDA

Gasabo, December 12th, 2008

No. (G.A.S) / 27 / 02 / 2008



**KIGALI CITY
GASABO DISTRICT
P.O Box 7066 KIGALI**

**Mrs Liliane KIRENGA. B
UNIVERSITY of the WESTERN CAPE
DEPARTMENT OF PHYSIOTHERAPY.
Private Bag X17, Bellville 7535
SOUTH AFRICA**

RE: Authorisation to conduct a research.

According to your letter asking an authorization to conduct a research study regarding physical activity and high school girls:

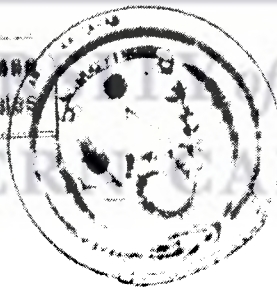
I have the pleasure to announce you that you are allowed to carry out your research in different schools of Gasabo District.

Yours truly;

P.O. Claudine

**NDAGIJIMANA Narcisse
V/M des Affaires Sociales**

**NYINAWAGAGA Claudine
Mayor of GASABO District**





UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa
Tel: +27 21-959, Fax: 27 21-959

APPENDIX K

PARENT'S INFORMATION SHEET

Project Title: HIGH SCHOOL GIRLS' PERCEPTIONS OF ENVIRONMENTAL AND SOCIAL SUPPORT FOR PHYSICAL ACTIVITY.

What is this study about?

This is a research project being conducted by KIRENGA BAMURANGE Liliane from the University of the Western Cape. We are inviting you to participate in this research project because you are a female student of this high school. As physical activity is considered to be a cornerstone in the prevention of chronic diseases of lifestyle such as obesity and diabetes, the purpose of this research project is to determine the perceptions of high school girls regarding environmental and social support for physical activity. The information gained therefore will help in improving the female high school learners' level of physical activity participation thus implement an adequate intervention programme.

What will my daughter be asked to do if I agree for her to participate?

She will be asked to fill in a questionnaire comprising of 4 different sections. The first section is about your demographic information such as age, gender, parent's level of education, height and weight. The 2nd Section will assess the support that learners get from teachers regarding physical activity. The 3rd section will assess the Physical education and physical activity enjoyment. The 4th section consists of questions assessing the levels of your knowledge about physical activity. For any difficulty which will arise when completing the questionnaire, the researcher will be available and ready to provide necessary information.

Would her participation in this study be kept confidential?

All her personal information will be kept confidential. To further protect her confidentiality, she will not be requested to write down her names. Identification codes using numbers will be used on data forms to ensure anonymity and the researcher will collect the questionnaires personally and will be responsible of ensuring their storage in a locked and secure place.

If we write a report or article about this research project, her identity will be protected to the maximum extent.

Are there risks in participating in this research?

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

What are the benefits of this research?

It is hoped that high school girls might benefit from this study through the promotion of a healthy lifestyle by encouraging physical activity participation among high school girls.

Does she have to participate in this research and may she stop participating at any time?

Her participation in this research is completely voluntary. She may choose not to take part at all. If she decides to participate in this research, she may stop participating at any time. If she decides not to participate in this study or if she stops participating at any time, she will not be penalized or lose any benefits to which she otherwise qualify.

What if she has questions?

This research is being conducted by **KIRENGA BAMURANGE Liliane**, a master's physiotherapy student, at the University of the Western Cape. If she has any questions about the research study itself, please contact:

KIRENGA BAMURANGE Liliane
PO Box 3915 Kigali
Rwanda
Cell phone: 08562130
E-mail: likirenga@gmail.com

Or

KIRENGA BAMURANGE Liliane
Department of Physiotherapy
University of the Western Cape
Email: 2817277@uwc.ac.za



Should she have any questions regarding this study and her rights as a research participant or if she wishes to report any problems she has experienced related to the study, please contact:

Head of Department: Professor Patricia Struthers
Dean of the Faculty of Community and Health Sciences: Professor MPOFU
University of the Western Cape
Private Bag X17
Bellville 7535

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



UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa
Tel: +27 21-959, Fax: 27 21-959

APPENDIX L

PARENTAL CONSENT FORM

Title of the Research Project: "High School Girls' Perceptions of environmental and social support for physical activity".

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

Participant's signature

Parent's name

Parent's signature.....

Date.....

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

Study Coordinator's Name: KIRENGA BAMURANGE Liliane

University of the Western Cape

Private Bag X17, Belville 7535

Cell: (00250) - 08562130 (Kigali- Rwanda)

(0027) - 798637418 (Cape Town-South Africa)

Email: likirenga@gmail.com



UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959, Fax: 27 21-959

E-mail:

APPENDIX M

PARTICIPANT INFORMATION SHEET

Project Title: HIGH SCHOOL GIRLS' PERCEPTIONS OF ENVIRONMENTAL AND SOCIAL SUPPORT FOR PHYSICAL ACTIVITY.

What is this study about?

This is a research project being conducted by KIRENGA BAMURANGE Liliane from the University of the Western Cape. We are inviting you to participate in this research project because you are a female student of this high school. As physical activity is considered to be a cornerstone in the prevention of chronic diseases of lifestyle such as obesity and diabetes, the purpose of this research project is to determine the perceptions of high school girls regarding environmental and social support for physical activity. The information gained therefore will help in improving the female high school learners' level of physical activity participation thus implement an adequate intervention programme.

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

You will be asked to fill in a questionnaire comprising of 4 different sections. The first section is about your demographic information such as age, gender, parent's level of education, height and weight. The 2nd Section will assess the support that learners get from teachers regarding physical activity. The 3rd section will assess the Physical education and physical activity enjoyment. The 4th section consists of questions assessing the levels of your knowledge about physical activity. For any difficulty which will arise when completing the questionnaire, the researcher will be available and ready to provide necessary information.

Would my participation in this study be kept confidential?

All your personal information will be kept confidential. To further protect your confidentiality, you will not be requested to write down your names. Identification codes using numbers will be used on data forms to ensure anonymity and the researcher will collect the questionnaires personally and will be responsible of ensuring their storage in a locked and secure place.

If we write a report or article about this research project, your identity will be protected to the maximum extent.

Are there risks in participating in this research?

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

What are the benefits of this research?

It is hoped that high school girls might benefit from this study through the promotion of a healthy lifestyle by encouraging physical activity participation among high school girls.

Do I have to participate in this research and may I stop participating at any time?

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

What if I have questions?

This research is being conducted by **KIRENGA BAMURANGE Liliane**, a master's physiotherapy student, at the University of the Western Cape. If you have any questions about the research study itself, please contact:

KIRENGA BAMURANGE Liliane
PO Box 3915 Kigali
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KIRENGA BAMURANGE Liliane
Department of Physiotherapy
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Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

Head of Department: Professor Patricia Struthers
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UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa
Tel: +27 21-959, Fax: 27 21-959
E-mail:

APPENDIX N

PARTICIPANT CONSENT FORM

Title of the Research Project: "High School Girls' Perceptions of environmental and social support for physical activity"

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

Participant's name.....

Participant's signature.....

Date.....

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

Study Coordinator's Name: KIRENGA BAMURANGE Liliane

University of the Western Cape

Private Bag X17, Belville 7535

Cell: (00250) - 08562130 (Kigali- Rwanda)

(0027) - 798637418 (Cape Town-South Africa)

Email: likirenga@gmail.com

No.

QUESTIONNAIRE

INSTRUCTION:

- ❖ Please answer all questions
- ❖ Please circle the appropriate response where applicable
- ❖ Give written response in the blank spaces provided
- ❖ Please be as truthful as possible.

SECTION A: SOCIO-DEMOGRAPHIC DATA

1. What is your age?.....years
2. Current year of study:
 1st year 2nd year 3rd year 4th year 5th year 6th year
3. Heightmeters
4. Weight kg
5. Are you a member of a youth organization (church, mosque)? YES NO
6. Which one?
7. Who do you live with?

Mom.....Dad..... Grandmother.....Grandfather.....
 Sister.....Brother.....
 Other.....

8. Which one person is in charge of/or is the head of your household?

Father Mother Other (specify).....

9. What is the number of persons living in your household?

10. What type of work does the head of household do?

Unemployed Employed (job description)

11. What is the highest level of education completed by the head of your household?

No schooling primary school secondary school post secondary

SECTION B: PERCEIVED SCHOOL CLIMATE

Instructions

Section B asks about what you think your Physical educator teacher, other teachers, schoolmates (boys and girls) behaviour or attitude is regarding to physical activity. You are requested to answer all the questions.

In my school, Physical Education teachers act like they think it is more important for boys to be physically active than girls

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a lot

In my school, most other teachers act like they think it is more important for boys to be physically active than girls

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a lot

In my school, boys make rude comments around girls who are being physically active

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a lot

In my school, being physically active around boys make me uncomfortable

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a lot

In my school, boys stare too much at girls who are being physically active

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a

In my school, most girls think it is important to be physically active

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a lot

SECTION C: PHYSICAL EDUCATION AND PHYSICAL ACTICVITY ENJOYMENT

In section C, we would like to know if you enjoy physical education at school or being physical active. For each of the following questions, please choose the number that corresponds to what you think and how you feel while physical active.

Physical Education enjoyment

I enjoy physical education

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a lot

Physical activity enjoyment

When I am active.....

1) I feel bored

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a lot

2) I dislike

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a lot

3) It's not fun at all

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a lot

4) It makes me depressed

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a lot

5) It frustrates me

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a lot

6) It's not at all interesting

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a lot

7) I feel as though I would rather be doing something else

1. Disagree a lot 2. Disagree 3. Neutral 4. Agree 5. Agree a lot

SECTION D: SOCIAL SUPPORT FROM FRIENDS AND FAMILY

Section D is about the support for physical activity you receive from either your friends or a family member. When answering, think back then consider a usual /typical week.

Social Support (friends)

During a typical week, how often

Do your friends encourage you to do physical activities or play sport?

1. Never 2. Once/ week 3. Twice a week 4. Three times/week 5. Everyday

Do your friends do physical activity or play sports with you?

1. Never 2. Once/ week 3. Twice a week 4. Three times/week 5. Everyday

Do your friends tell you that you are doing well at physical activities or sports?

1. Never 2. Once/ week 3. Twice a week 4. Three times/week 5. Everyday

Social support (Family)

During a typical week, how often has a member of your household (eg. Your father, mother, brother, sister, grandparent, or other relative).....

Encourage you to do activities or play sport?

1. Never 2. Once/ week 3. Twice a week 4. Three times/week 5. Everyday

Done a physical activity or played sport with you?

1. Never 2. Once/ week 3. Twice a week 4. Three times/week 5. Everyday

Provided transportation to a place you can do physical activities or play sport?

1. Never 2. Once/ week 3. Twice a week 4. Three times/week 5. Everyday

Watched you participate to a place where you can do physical activities or sports?

1. Never 2. Once/ week 3. Twice a week 4. Three times/week 5. Everyday

Told you that you are doing well in physical activities or sports?

1. Never 2. Once/ week 3. Twice a week 4. Three times/week 5. Everyday

SECTION E: LEVELS OF PHYSICAL ACTIVITY

Section E is about some of the physical activity you might have done in the **last 7 days** in and around at school (during physical education classes or after school hours) or at home (like housework: washing plates, preparing food, cleaning, etc...) or other activities in your community. When you answering, think back then consider a usual/typical week.

- 1) How many days in the past week have you done at least 20 minutes of exercises hard enough to make you breathe heavily and make your heart beat fast? (eg. Playing basketball, volleyball, jogging, etc).

1. 1 day 2. 2 days 3. 3 days 4. 4 days 5. 5 days 6. 6 days 7. 7 days

- 2) How many days in the past week have you done at least 20 minutes of light exercises that was not hard enough to make you breathe heavily and make your heart beat fast? (eg. Walking or slow bicycling)

1. 1 day 2. 2 days 3. 3 days 4. 4 days 5. 5 days 6. 6 days 7. 7 days

3) During a normal week how many hours a day do you watch television and videos or play computer game or video game before or after school.

1.1 2.2 3.3 4.4 5.5 6.6 7.7 or more

4) During the past 12 months, how many team or individual sports or activities did you participate in a competitive level?

1.1 2.2 3.3 4.4 5.5 6.6 7.7 or more

List the sports/ activities

.....

.....

.....



UNIVERSITY *of the*
WESTERN CAPE

No.

QUESTIONNAIRE

INSTRUCTION: ENCERCLEZ LA BONNE REPONSE SVP. DONNEZ UNE REPONSE ECRITE DANS LES CASES PREVUES

SECTION A: DONNEES SOCIO-DEMOGRAPHIQUES

1. Quel est ton âge?..... Ans
2. Année d'études:

1ere année	2eme	3ème	4 ème	5 ème	6 ème
------------	------	------	-------	-------	-------
3. Taille m
4. Poids kg
5. Es-tu membre d'une organisation des jeunes ? (Eglise, Mosquée) OUI NON
6. Laquelle?
7. Avec qui vis-tu/habites-tu?

Mère..... Père..... Grand-mère.....

Grand- Père.....Sœur.....Frère..... Autre
8. Laquelle de ces personnes prend en charge la famille ou est le chef de famille?

Père Mère Autre (spécifiez).....
9. Combien de personnes vivent dans votre maison?
10. Quel genre de travail fait le chef de ménage?

Sans emploi Employé (fonction/titre)

Quel est le plus haut niveau d'études qu'a le chef de ménage?

Pas étudié Ecole primaire Ecole secondaire Université

SECTION B: ATMOSPHERE PERCU A L'ECOLE

Dans mon école, les profs d'éducation physique agissent comme ils pensent: il est plus important pour les garçons d'être actifs que les filles.

1. désaccord total 2. désaccord 3. neutre 4. Consentement 5. Consentement total

Dans mon école, la plupart des autres profs (autres que ceux d'éducation physique), pensent qu'il est plus important pour les garçons d'être actifs que les filles.

1. désaccord total 2. désaccord 3. neutre 4. Consentement 5. Consentement total

Dans mon école, les garçons font des commentaires désobligeants envers les filles qui deviennent physiquement actives

1. désaccord total 2. désaccord 3. neutre 4. Consentement 5. Consentement total

Dans mon école, être physiquement active autour des garçons me met mal à l'aise

1. désaccord total 2. Désaccord 3. Neutre 4. Consentement 5. Consentement total

Dans mon école, la plupart des filles pensent que c'est important d'être physiquement active

1. désaccord total 2. Désaccord 3. Neutre 4. Consentement 5. Consentement total

SECTION C: APPRECIATION DE L'EDUCATION PHYSIQUE ET DE L'ACTIVITE PHYSIQUE

Appréciation de l'éducation physique

J'aime l'éducation physique

1. désaccord total 2. Désaccord 3. Neutre 4. Consentement 5. Consentement total

Appréciation de l'activité physique

Quand je suis active.....

1) Je m'ennuis

1. désaccord total 2. désaccord 3. neutre 4. Consentement 5. Consentement total

2) Je n'aime pas

1. désaccord total 2. désaccord 3. neutre 4. Consentement 5. Consentement total

3) Ce n'est pas marrant

1. désaccord total 2. désaccord 3. neutre 4. Consentement 5. Consentement total

4) Cela me déprime

1. désaccord total 2. désaccord 3. neutre 4. Consentement 5. Consentement total

5) Cela me frustre

1. désaccord total 2. désaccord 3. neutre 4. Consentement 5. Consentement total

6) Ce n'est pas intéressant du tout

1. désaccord total 2. désaccord 3. neutre 4. Consentement 5. Consentement total

7) Je pense que je devrais faire autre chose

1. désaccord total 2. désaccord 3. neutre 4. Consentement 5. Consentement total

SECTION D: SUPPORT SOCIAL PROVENANT DES AMIS ET DE LA FAMILLE

Support Social (amis/amies)

Dans une semaine normale, combien de fois

T'encourage à faire des activités physiques ou faire du sport?

1. Jamais 2. Une fois / semaine 3. 2 fois/semaine 4. 3 fois/semaine 5. Tous les jours

Tes amis font une activité physique ou font du sport avec toi?

1. Jamais 2. Une fois / semaine 3. 2 fois/semaine 4. 3 fois/semaine 5. Tous les jours

Tes amis(es) te disent que tu fais bien les activités physiques ou sport?

1. Jamais 2. Une fois / semaine 3. 2 fois/semaine 4. 3 fois/semaine 5. Tous les jours

Support Social (Famille)

Dans une semaine normale, combien de fois un membre de ta famille (ex: père, mère, frère, sœur, grand-père, ou un autre membre de famille).....

T'encourage à faire des activités physiques ou faire du sport?

1. Jamais 2. Une fois / semaine 3. 2 fois/semaine 4. 3 fois/semaine 5. Tous les jours

A fait une activité physique ou du sport avec toi?

1. Jamais 2. Une fois / semaine 3. 2 fois/semaine 4. 3 fois/semaine 5. Tous les jours

T'a amené dans un endroit où tu peux faire une activité physique ou du sport?

1. Jamais 2. Une fois / semaine 3. 2 fois/semaine 4. 3 fois/semaine 5. Tous les jours

T'a regardé faire une activité physique ou du sport dans un endroit approprié?

1. Jamais 2. Une fois / semaine 3. 2 fois/semaine 4. 3 fois/semaine 5. Tous les jours

T'a dit que tu fais bien les activités physiques ou du sport?

1. Jamais 2. Une fois / semaine 3. 2 fois/semaine 4. 3 fois/semaine 5. Tous les jours

SECTION E: NIVEAUX D'ACTIVITE PHYSIQUE

- 1) Combien de fois (jours) as-tu fait au moins 20 min d'exercices assez durs qui te font respirer profondément et font battre ton cœur rapidement? (ex: jouer au basketball, volleyball, jogging, football, etc.).

1. 1 jour 2. 2 jours 3. 3 jours 4. 4 jours 5. 5 jours 6. 6 jours 7. 7 jours

- 2) Combien de fois (jours) as-tu fait au moins 20 min d'exercices légers qui n'étaient pas assez forts pour te faire respirer profondément et font battre ton cœur rapidement? (ex: marche ou faire du vélo légèrement).

1. 1 jour 2. 2 jours 3. 3 jours 4. 4 jours 5. 5 jours 6. 6 jours 7. 7 jours

- 3) Dans une semaine normale, combien d'heures par jour regardes-tu la télévision ou des cassettes ou joues-tu aux jeux sur ordinateur avant ou après l'école ?

1. 1 2. 2 3. 3 4. 4 5. 5 6. 6 7. 7 ou plus

- 4) Durant les 12 derniers mois, dans combien d'équipes ou sport individuel ou activités as-tu participé dans un niveau compétitif?

1. 1 2. 2 3. 3 4. 4 5. 5 6. 6 7. 7 ou plus

Cites ces sports ou activités

.....
.....