

**THE PREVALENCE AND MANAGEMENT OF LOW BACK PAIN AMONG
HIGH SCHOOL CHILDREN IN NYAMASHEKE DISTRICT, RWANDA**

Paul Ndahimana

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SUPERVISOR: Prof. José Frantz

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KEYWORDS

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Prevalence

Management

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Predisposing factors

Impact

Prevention

Kibogora Hospital

Nyamasheke District

Rwanda



ABSTRACT

Low back pain among high school children is perceived to be uncommon in the clinic setting. However, previous studies have suggested that it may be an important and increasing problem to be managed in this age group. The overall aim of this study was to determine the prevalence, the predisposing factors and management of low back pain among high school children in Nyamasheke district in Rwanda. A cross-sectional descriptive study was conducted using a combination of quantitative and qualitative research methods. The study included a population of 10 330 high school children aged 13- 21 years old registered in high schools of Nyamasheke district. In addition, 13 service providers involved in addressing low back pain were included in the study. The study was conducted in ten schools selected randomly, four schools from nine urban schools and six schools from 15 rural schools. The sample size included 1 000 participants selected by a simple random sampling method and six service providers selected by purposive sampling method. A self-administered questionnaire was given to high school learners. Semi-structured interviews amongst service providers were conducted to validate information given by high school learners. The software SPSS version 19.0 for windows and Microsoft Excel package 2010 were used to analyze the quantitative data. Descriptive statistics using frequencies, percentages, means, and standard deviations and inferential statistics using chi-square and correlation tests were calculated to examine the association between variables. For qualitative findings, audiotaped interviews were transcribed and translated from Kinyarwanda into English, and the expressed ideas were coded and reduced into themes and categories.

Permission to conduct this study was obtained from the Senate Research Grants and Study Leave Committee at the University of the Western Cape, and the concerned authorities in Rwanda. Individual participants and their parents/guardians were informed of the study through an information sheet and written informed consent or assent was then obtained from the participants. The mean age of the quantitative study sample was 17 years, and 48.2% were females compared to 51.8% of males. The response rate was 96.2%. The low back pain prevalence was found to be 66.1%. The mean age of the first occurrence of low back pain was 14.5(SD = 2.28). One year prevalence was found to be 25.4% whereas the one month prevalence was 13.7%. Males were the most to report low back pain comparatively to females with 53.1% and 43.9% respectively. There was significant relationship between age group and low back pain ($p = 0.000$). High school children from the rural region were the most to report low back pain in comparison to those from urban region with 61.5% against 38.5% respectively. Regarding the predisposing factors to low back pain, a strong relationship was found between low back pain and posture (sitting and standing position) ($p=0.000$) with 83.2%. The findings of the interviews conducted among service providers showed that the main predisposing factors for low back pain could be posture/position in class and psychological factors. The study found that most of the participants do not attend medical services. The study highlighted that the impact of low back pain included medical costs, missing class when attending medical services and difficult to perform normal usual activities. It was found that the level of education in health promotion as preventive measures of low back pain is still at low level.

DECLARATION

I hereby declare that **“The prevalence and management of low back pain among high school children in Nyamasheke district, Rwanda”** is my own work, that it has not been submitted for any degree or examination in any other university, and that all the sources used or quoted have been indicated and acknowledged by complete references.

Paul Ndahimana



Signature.....

November 2011

Witness:

Prof. José Frantz

DEDICATION

I dedicate this thesis to my wife **Pierrine NYIRANGERI** for her love, patience and support, and to my sons **Théophile NIYONAGIZE**, **Bonheur NDAHIMANA**, and to my daughter **Charity Shema NDAHIMANA**. May God continue to protect you.



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Appendix I: Permission to conduct a study from the director of Institut John Wesley de Kibogora

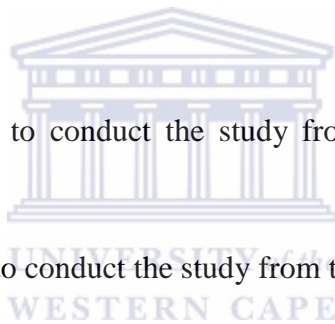
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ABBREVIATIONS

ADL: Activity of Daily Living

LBP: Low back pain

MSD: Musculoskeletal disorders

MRI: Magnetic Resonance Imaging

NIHOSH: National Institute for Occupational Safety and Health

SPSS: Statistical Package for Social Sciences

UK: United Kingdom

UN: United Nations

US: United States

USA: United State of American

WHO: World Health Organisation

UWC: University of the Western Cape

%: Percentage



Chapter one Introduction

1.1 Introduction

This chapter provides the background to the study and highlights the prevalence and management of low back pain among high school children. The significance of the study, statement of the problem, research question, aim, and objectives of the study are outlined.

1.2 Background

Low back pain was traditionally reported to be uncommon in children. Moreover, it was believed that this symptom was almost always due to a serious underlying illness (Spence, Jensen & Shepard, 1984). During recent decades, particularly since the publication of the thesis of Salminen in 1984 (Salminen, 1984), there has been an increase in the number of surveys that has demonstrated that non-specific low back pain in school children is much more frequent than thought in the past (Kristjansdottir, 1996; Brattberg, 1994; Balague, Dutoit & Waldburger, 1988). Later, various surveys have been published reporting factors associated with, or predisposing to low back pain (Pelisse et al., 2009; Cardon & Balagué, 2004). The methodological quality of the studies has improved progressively over time moving from cross-sectional studies, only allowing obtaining figures of prevalence and associated factors, to longitudinal studies reporting incidence and causal relationship (Cardon & Balagué, 2004). Furthermore, clinical and epidemiological data analysis of risk factors, Magnetic Resonance Imaging (MRI) and immunohistological findings

draw attention to the early degenerative changes of the spine and to the usefulness of precocious prevention (Phelip, 1999; Salminen, Erkintalo, Pentti, Oksanen & Korman, 1999). In addition, there is growing evidence that back pain at a young age has a predictive value on low back pain as an adult (Adams, Mannion & Dolan, 1999; Harreby, Neergaard, Hesselsoe & Kjer, 1995).

Low back pain is the most prevalent musculoskeletal condition and one of the most common causes of disability in the developed nations (Pelisse et al., 2009). However, it has been found that low back pain in children is different from low back pain in adults. Compared to an adult, a child with a backache is more likely to have serious underlying disorders (Balague et al., 1995). In addition, low back pain in children is a prevalent symptom with overall associated disability and impacting on health related quality of life. In a study conducted by Pelisse et al. (2009), low back pain in a group of children was associated with whole body pain and report of significant impairment which deserved much more attention.

Some existing research indicates that low back pain is a common complaint during childhood (Burton, Clarke, McClune & Tillotson, 1996). Furthermore, biannual nationwide surveys in Finland revealed that prevalence of low back pain in school children is on the increase (Vikat et al., 2000). It appears that most of these cases were mild in nature. They can be considered as a natural part of growing and represent little consequence to health (Salminen et al., 1999; Burton et al., 1996). In contrast, some children suffer from recurrent low back pain.

These cases have a more chronic evolution, lead to greater disability and require increased medical attention (Harreby et al., 1999; Salminen, Pentti & Terho, 1992).

The authors reported that further research needs to focus on evaluating prevalence and consequences of recurrent low back pain, since it is this group that is likely to suffer health consequences as a result of the low back pain. Moreover, recurrent low back pain during the adolescent years may be a precursor for chronic low back pain during adulthood (Salminen et al., 1999, Salminen, Erkinntalo, Laine & Pentti, 1995; Harreby et al., 1995).

In the United States of America (USA), the prevalence of low back pain in school children approaches that seen in adults due to heavy backpacks 37% (Balague, Dutoit & Waldgburger, 1998). Anecdotally, there is a general assumption that the prevalence of LBP in developing countries is comparatively lower than in developed countries (Gilgil et al., 2005; However, a systematic review conducted in Africa rejected that assumption (Louw, Morris & Grimmer, 2007). According to a study conducted in South Africa and in Nigeria among workers and school children, the mean LBP point prevalence among school adolescents was 12% and among adults was 32% (Louw et al., 2007). Up to now no research was conducted in Rwanda relating to low back pain among high school children. Literature indicates that the causes of low back pain in children could be due to muscle strain and imbalance (Balague et al., 1998). The main predisposing factors of low back pain in school children could be prolonged sitting position and carrying heavy bags on the back (Terti, Salminen, Paajanen, Terho & Kormano, 1991).

Management of low back pain requires multidisciplinary intervention such as doctors, physiotherapists, pharmacists, nurses, parents and surgeons (Deltto, Erchard & Bowling, 1995).

Low back pain cases associated with an initial episode could be resolved within 2-4 weeks (McKeon, Albert & Neary, 2006). However, it had been observed that individuals who suffered from low back pain problems might develop major physical, social and mental disruptions, which could affect their occupations (Tavafian, Jamshidi, Mohammad & Montazeri, 2007). Physical impact includes the loss of physical function and deteriorated general health. Social impact included decreased participation in social activities. Psychosocial impacts are manifested through insomnia, irritability, anxiety and depression (Clairborne, Vandenburg, Krause & Leung, 2002). Previous studies reported that there were significant relationship between psychosocial variables and musculoskeletal disorders (Chiu, Lau, Ho, Ma & Yeung, 2006; Tsuboi, Takeuchi, Watanabe, Hori & Kobayashi, 2002; Ariens, Bongers, Hoogerdoorn, Houtman & Van Der Wal, 2001). Although these findings may be prevalent amongst adults, further research amongst youth and children may find similar results if the prevalence of low back pain amongst children are allowed to increase. Thus, research into children's health and health behaviour and the factors that influence them is essential for the development of effective health education and health promotion policy, programmes and practice targeted at young people (Currie, Hurrelmann, Settertobulte, Smith & Todd, 2000).

Historically, back health and posture have internationally been important elements of the national curriculum for physical education (Tinning, 2001).

National cross-sectional surveys evaluating the prevalence of back, neck and shoulder pain amongst Finnish school children have identified that the prevalence of low back pain increased during the mid-1990s with the trend still continuing (Hakala, Rimpela, Salminen, Virtanen & Rimpela, 2002). It appears from the evidence that there is a strong case to re-introduce the concept of back health into the curriculum or as part of the healthy school initiative.

The World Health Organization has identified the school as an effective setting in which to improve children's health (WHO, 1996). School health programmes can simultaneously reduce health problems, increase efficiency of the education system and advance social development. The cause of low-back pain in children appears to be multifactorial, including biological, psychological, social and individual factors (Balague, Troussier & Salminen, 1999). Given the multifactorial causes of low back pain, several health education strategies within the school setting have the potential to reduce the incidence of low back pain. Linking to the World Health Organization, healthy schools initiative seems plausible; key areas would be elements of promoting a healthy environment, health education, opportunities for physical education and recreation, and offering programmes for social support. The epidemiological surveys have been followed by interventions targeting primary prevention in low back pain.

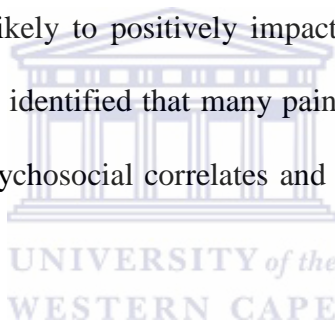
Various approaches have been used to prevent low back pain in schoolchildren. A majority of these studies could be grouped under the label of education (Cardon & Balagué, 2004; Cardon, De Bourdeaudhuij & De Clercq, 2002), because the interventions consisted of a variable number of hours of education with or without associated exercises. Some authors had a very limited target, such as lifting technique (Sheldon, 1994; Robertson & Lee, 1990; Spence, Jensen & Shepard, 1984), while others aimed at reducing LBP and its consequences (Cardon et al., 2002; Storr-Paulsen, 2002; Mendez & Gomez-Conesa, 2001; Chometon, Braize & Levy, 1999; Balague, Nordin, Dutoit & Waldburger, 1996).

It has been demonstrated that various interventions that successfully improved specific back care related knowledge and/or skills (Cardon, et al., 2002; Vicas-Kunse, 1992). However, this is not synonymous with prevention in low back pain. There have also been attempts to prevent low back pain by modifications of the school furniture (Hutchinson, 1999). However, no high quality study to test the possible protective effect of furniture could be located. Another approach could be focusing on modifiable risk factors. However, since primary causative mechanisms for common low back pain remain largely undetermined, caution should be exercised in considering risk factor modification as prevention, without evidence of influence on low back pain outcomes (Knusel & Jelk, 1994).

Health education strategies in school may be the most appropriate and could include advice along the lines of adult back schools regarding back health and ergonomic advice.

Preliminary studies have suggested that education about back health may be effective at reducing the incidence of low back pain in children (Cardon, De Bourdeaudhuij & Clercq, 2001); Balague et al., 1996). Furthermore, the introduction of ergonomic backpacks may be an effective health education strategy (Negrini & Carabolona, 2002).

Regarding physical education and recreation, the condition of the low back region and general physical activity of children is considered to be a risk indicator for low back pain. The introduction of specific exercises and increasing opportunity for recreational activities is likely to positively impact on low back pain. In terms of social support, it has been identified that many pain states, including low back pain, may be linked to other psychosocial correlates and may be psychosomatic in nature (Vikat et al., 2000).



The management of low back pain includes both conservative and surgical treatment. Conservative treatment includes physiotherapy with electro-physical agent such as cold, heat, modified electrical current and rehabilitation exercises. It also includes medication and injection prescribed by the doctors. In addition, back care education is very important in management of low back pain. Surgical treatment is only used when other modalities have been tried and failed. About 50% of high school children with low back pain will have self-limiting, short-lived pain caused by overuse or strain. Thus preventive measures with advice and education, physiotherapy and exercises are very important (Payton, Nelson & Hobbs, 1998; Balague et al., 1994).

Certainly, one of the vital challenges in the management of low back pain is to gain the better understanding of the individual's health education needs.

Also, to use the information to assist health professional plans and meet those needs during the implementation of any health education programme (Cherkin, 1998).

After all, in a patient centred health care, patient's needs are considered first and foremost at every point in the planning, implementation, and evaluation of service delivery (Thornquist, 1994). Improved treatment outcomes decreased rates of re-hospitalization, fewer complications and reduced cost on treatment (Payton, et al., 1998). Furthermore, patient centred care has been an important component of the therapist-patient interaction (Thornquist, 1994).

1.3 Problem statement

The large number of high school children complaining of low back pain in Nyamasheke District is anecdotal. The problem of low back pain has an impact on both school children and their parents. Most of the time children are absent from school in order to attend clinics or on being admitted to hospital. Low back pain thus not only incurs medical expenses but also impacts on the functional activity of school children with regards to participation restriction. However, to date, no study has been conducted to document the prevalence, predisposing factors and current management of low back pain among high school children in Rwanda in order to address the concern.

1.4 Research question

What is the prevalence of, predisposing factors for and management techniques of low back pain among high school children in Nyamasheke district?

1.5 Aim of the study

The overall aim of this study was to determine the prevalence of, predisposing factors for and management of low back pain among high school children in Nyamasheke District in Rwanda.

1.6 Objectives of the study

- To determine the prevalence of low back pain among high school children in Nyamasheke district.
- To determine the predisposing factors for low back pain among high school children in Nyamasheke district.
- To determine the management techniques used by health professionals in addressing low back pain among high school children at Kibogora hospital.
- To explore if there is a need for education among high school children relating to health promotion strategies to prevent low back pain.

1.7 Significance of the study

It seems to be important to carry out this study about prevalence, predisposing factors and management of low back pain among high school children in Rwanda as a developing country. The Ministries of Health and of Education can use the results of this study for better planning in prevention of low back pain and improving

management techniques addressing to low back pain. After identifying the predisposing factors the study will help to minimize them through education of children. Furthermore, the study will help service providers and school directors for better understanding of the challenges experienced by high school children with low back pain and improving preventive and management strategies.

1.8 Definiton of terms

Low back pain

It is defined as an ache, pain in the lower back whether or not it extends from there to one leg or both legs (Kuorinaka, Johnson, Kilborn, Vinterberg & Biering-Sorenson, 1987). The concept of low back pain in this study refers to non-specific low back pain without a specified physical cause, eg, trauma, infection or tumour, or nerve root compression (Bekkering et al., 2003).

Musculoskeletal disorders (MSD)

It is defined as a group of conditions that involves the nerves, tendons, muscles, joint, cartilage and spinal disc (NIHSOH, 2001).

Patient-centred model

Glenton (2002) cited that patient-centred model is a health care delivery system based on patient's expressed needs and pertains to the manipulations from the medical, social, economic, and environmental factors.

Ergonomics

It is the study of the relationship between people and their working environment. Ergonomics is derived from the Greek “ergon” which means “to work” and “nomos”

which means “study of” and is literally the study of work, or the work system, including the worker’s tools, and his or her work place. It is an applied science concerned with people’s characteristics that need to be considered in designing and arranging things that they use in order that people and things will interact most effectively and safely (La Dou, 1994).

Health education

It is a planned learning experience using a combination of methods such as demonstrations, dummies, pamphlets, sketches, as well as counselling and behaviour modification techniques, which may influence patient’s knowledge and health outcomes (Bartlett, 1985).



1.9 Abbreviations

LBP: Low back pain

MSD: Musculoskeletal disorders

UWC: University of the Western Cape

NIHOSH: National Institute for Occupational Safety and Health

WHO: World Health Organisation

MRI: Magnetic Resonance Imaging

USA: United State of American



Chapter two Literature review

2.1 Introduction

This chapter presents an overview of the literature on the epidemiology of low back pain in general and the prevalence of low back pain among high school children considered relevant to the current study. Possible predisposing factors to low back pain among high school children are also discussed in this chapter. Then, there is a discussion of various approaches used in management of low back pain and preventives measures used in prevention of low back pain. Classification and impact of low back pain are also discussed in this chapter.

2.2 Prevalence of low back pain among high school children

Low back pain has been on the increase in developed countries over the past decades (Gilgil et al., 2005) but little is known in developing countries. Information from other studies on the epidemiology of low back pain (LBP) is accumulating, but for the most part, studies are restricted to high-income countries, therefore little is known about the epidemiology of low back pain in the rest of the world (Gilgil et al., 2005; Walker, 2000). In developed countries such as the United States of America (USA) and Australia, low back pain prevalence ranges from 26.4% to 79.2% (Deyo, Mirza & Martin, 2006; Walker, Muller & Grant, 2004). There appears to be a general assumption that low back pain prevalence in Africa is lower than that reported in the developed nations (Gilgil et al., 2005).

A systematic review into the global prevalence of low back pain by Walker in 2000, identified that of the 56 included studies, only 8% were conducted in developing countries, with only one study conducted in Africa (Walker, 2000).

The lack of information on the prevalence of LBP in developing countries is therefore a significant shortcoming (Gilgil et al., 2005; Walker, 2000), particularly as it is predicted that the greatest increases in low back pain prevalence in the next decade will be in developing nations (WHO Scientific Group on the Burden of Musculoskeletal Conditions of the Start of the New Millennium, 2003).

However, a systematic review by Louw, Linzette and Grimmer-Somers (2007) indicated that the mean LBP point prevalence among the African adolescents was 12% and among the African adults 32% (range 10% to 59%). This finding negates any assumptions that LBP point prevalence is lower in the developing world than developed societies, as the range of low back pain point prevalence among western societies is also reported to range between 12% and 33% (van Vuuren, Zinzen, van Heerden, Becker & Meeusen, 2005; Walker, 2000). This revelation supports the findings of the global burden of disease studies which predict that the greatest increases in low back pain prevalence will be in developing nations (WHO Scientific Group on the Burden of Musculoskeletal Conditions of the Start of the New Millennium, 2003).

The one-year low back pain prevalence among Africans ranged from 14% to 72%, whereas the one-year prevalence among Western societies is reported to be between 20% and 62% (Walker, 2000).

Therefore it appears that the one-year prevalence estimated among Africans correlates with the one-year low back pain prevalence in Western societies. Similarly, comparable findings were observed for lifetime prevalence estimates as African lifetime prevalence ranged from 28% to 74%, whilst lifetime prevalence in Western societies ranged from 30% to 80% (van Vuuren et al., 2005). Advances in technology and the mechanization of industries in African countries may therefore be reflected in the high one-year and lifetime prevalence of low back pain among Africans, reported in the past decade of research.

However, there is insufficient data on rural populations as only three of the 18 methodologically acceptable studies provided data exclusively on rural populations (Fabunmi, Aba & Odunaiya, 2005; Omokhodion & Sanya, 2003). The prevalence reported in these studies is comparable to reported urban population prevalence, and may reflect that the considerable physical activities required for rural (farming) activities may be a risk factor for low back pain (Fabunmi et al., 2005; Omokhodion, & Sanya, 2003). The study by Omokhodion and Sanya (2003) illustrates that farming activities increase the odds of suffering low back pain by four, compared with individuals not exposed to farming activities. These findings related to one-year and lifetime prevalence, and further illustrates that LBP among all Africans is of concern. Further research into the most effective strategies to manage and prevent low back pain is warranted. Understanding prevalence and causality of low back pain in developing nations such as Africa may assist in the understanding of global low back pain causes and management (Gilgil et al., 2005; Walker, 2000), and will determine whether the factors differ in socio-cultural characteristics (Gilgil et al., 2005).

Low back pain is one of the most common health problems affecting people (Glasser, Lee & Fehr, 2005). The same authors said that every person will at least once in his/her lifetime suffer from low back pain and the majority (90%) of these patients will recover spontaneously during their first experience of acute phase of low back pain, but some of them experience recurrence which becomes increasingly severe and leads to chronic low back pain. There is however, evidence that low back pain is most prevalent among high school children compared to other adolescents. A study conducted in European countries such as Spain has shown that 52.6% of high school children were complaining of low back pain (Balague et al., 1995). According to a study by Jordan, Kruger, Stewart and Becker (2005) on high school children in South Africa, low back pain was found to increase notably at the ages of 15 and 17 years old. Up to now no research was conducted in Rwanda, researching low back pain among high school children. Studies were only conducted in developed countries such as European Countries, USA and few of Africans countries such as South Africa.

A cross-sectional survey of non-specific low back pain among 2083 schoolchildren in China by Lippincott and Wilkins (2011) showed that the occurrence of non-specific low back pain was high. It showed that 29.1% students were suffering from this condition in the past three months (24.7% in males, 33.1% in females). In addition, an increased occurrence was observed with age. The occurrences of low back pain in 10-14 years old and 15-18 years old were 21.5% and 38.2%, respectively (Lippincott & Wilkins, 2011).

In several aspects of low back pain, statistically significant differences were observed between males and females, including the frequency of the pain, the nature of the pain, and the likelihood of seeking for medical assistance, the impact on normal daily life, and the occurrence of low back pain after bending over the desk for a period of time (Lippincott & Wilkins, 2011). Female students had more frequent low back pain and were less willing to see a doctor. In addition, more female students had low back pain accompanied with radiating pain than male students (Lippincott & Wilkins, 2011).

From the literature, it can be concluded that back pain should be seen as an issue for all ages and all sectors of society in all countries. There is no known study on the extent of the problem for Rwandese school children; therefore the purpose of this study was to investigate the prevalence of low back pain in a population of secondary school children. It also aimed to investigate possible associated factors and the management offered by service providers to address low back pain.

2.3 Factors contributing to low back pain in school children

Several researches to date have been primarily on adult populations and studies have focused on occupations that involve manual handling (Cardon & Balague, 2004). Research on risk factors for back pain in school children and adolescents has been minimal as the disorder in this age group was previously thought to be rare (Negrini & Carabalona, 2002). Studies of low back pain in this age group are of particular importance, as back pain that occurs initially during this time may foreshadow the

subsequent, severe, chronic morbidity seen in adulthood (Lippincott & Wilkins, 2011).

2.3.1 Predisposing factors

Shehab, Al-Jarallah, Moussa and Adham (2003) cited that among school children and adolescents, several social and lifestyle factors are significantly associated with a higher prevalence of reported low-back pain. The same authors found, as have the others (Troussier, Davoine & de Gaudemaris, 1994; Balague, Dutoit & Waldburger, 1988), that there is an increase in low back pain after age 12, possibly reflecting pubertal growth and increased stress and constraints on the back (Troussier et al., 1994). This has been reported both in cross-sectional and longitudinal studies (Taimela, Kujala, Salminen & Viljanen, 1997; Burton et al., 1996; Balague et al., 1995; Troussier et al., 1994). Older children may be more exposed to physical and environmental insults than younger children owing to their increasing range of activity in terms of frequency and intensity. Back pain was reported to be more common among Kuwaiti girls than boys (Shehab et al., 2003), which is in concert with other studies (Balague et al., 1995; Troussier et al., 1994; Balague et al., 1988). This could be related to pubertal growth or gender differences in reporting symptoms. Another study suggested increase in stress on the back with longer duration of sitting position at school seemed to be the cause of low back pain, and disc degeneration does not seem to be the cause of low back pain, according to autopsy studies (Burton & Tillotson, 1991).

It may be hypothesized that school children and adults who spend more time watching TV and who are less active report more back pain (Shehab et al., 2003). The pain could be secondary to prolonged sitting, poor posture and less activity, or perhaps the back pain may cause them to be less active; however, the study by Shehab et al. (2003) did not support this. Also, more physical activity and participation in sports, as well as the level of physical activity, were found to be associated factors with low back pain, similar to findings by Balague et al. (1995) and Troussier et al. (1994). Some studies showed that sports can play a favorable role whereas others showed no clear effect (Hertzberg, 1985). According to the study conducted by Shehab et al. (2003), competitive sports activities are associated with increased low back pain. Smoking was another associated factor with reported low back pain among school children and adolescents, which accords with other studies (Balague et al., 1988). A higher proportion of students with low back pain reporting higher level of general physical activity (Shehab et al., 2003) is in contrast to Salminen (1994), who found that poor school performance among children was associated with lumbar pain. No significant association was found between back pain and the method of carrying school materials for some authors (Shehab et al., 2003), whereas others found it very significant. A previous study showed that method of carrying school materials was associated with back pain (Miller, Schmatz & Schultz, 1988). Also, the number of days absent from school was not significantly different between those who reported back pain and those who did not (Shehab et al., 2003). A previous study found it significant (Viry, Creveuil & Marcelli, 1999).

Prendeville and Dockrell (1998) cited that a higher percentage of the rural school children reported low back pain than the urban school children. Previous studies have not investigated the influence of different backgrounds on the incidence of low back pain. Salminen (1994) did suggest that the economic structure of a region may influence results. Children from an agricultural setting might participate in the work of their parents, and this may affect the condition of their muscles and joints, leaving them more susceptible to low back pain (Prendeville & Dockrell, 1998).

Symptoms associated with stress to the structures of the lower back during sitting depend on the actual sitting position and also on the design features of the desk and chair. Mandal (1986) concluded that incorrect sitting posture of school children was a sizeable contributor to low back pain. Many schools still contain furniture that was designed and made to be durable rather than ergonomically sound. More attention needs to be given to ergonomic improvements in chair and desk design and to the sitting posture of children in the classroom (Prendeville & Dockrell, 1998).

2.3.2 Modifiable risk factors

The following modifiable risk factors were evaluated in the literature: body mass index (BMI), mobility and flexibility of muscles and joints, muscular strength, sports participation, physical activity and physical fitness, backpack-related factors, sitting posture and sedentary activity, working, psychosocial factors, smoking and other factors.

2.3.2.1 Sports participation, physical activity and physical fitness

In the narrative reviews of Ebbehoj, Hansen, Harreby and Lassen (2002) and Duggleby and Kumar (1997), it is concluded that inactivity and intensive sports exposure are both important risk factors for low back pain in school children.

Along the same lines, according to the review of Balague et al. (1999), competitive sports activities and a high level of physical activity are associated with an increased risk of low back pain, particularly among young athletes. The risk depends on the type of sport, the level of competition, the intensity of physical training and acute spinal trauma (Balague et al., 1999). Ogon et al. (2001) reported an increased risk of low back pain in school children and adolescents who participate in elite sports under high performance training. However, in the latter study only skiers were included, and, as a result, findings cannot be generalized. Similarly, the findings of Hutchinson (1999), reporting that rhythmic gymnasts are at relative increased risk of suffering low back pain due to their sport, cannot be generalized. Moreover, in the study by Hutchinson (1999), only 11 subjects were included. Also, the findings of Kujala, Taimela, Erkintalo, Salminen and Kaprio (1996) that reports of low back pain lasting more than 1 week were higher among adolescent children athletes than among non-athlete children and were based on pain reports of a small sample of six subjects. As a result, the findings cannot be generalized.

Another study focusing on the influence of demanding physical activity, such as that imposed by dance or gymnastics is the report by McMeeken et al. (2001). This found that, in dancers, no association existed between low back pain and average total hours

of activity, until this exceeded 30 hours per week. Besides the studies pointing out the risk for low back pain in young athletes, several studies evaluated the risk of physical activity and sports in non-athlete populations. Kovacs et al. (2003) found in 7,361 subjects aged 13-15 years that cumulative low back pain was associated with practicing any sport more than twice a week.

In the recent cross-sectional study by Korovessis, Koureas and Papazisis (2004), the association between sports exposure and low back pain was only significant in girls. On the other hand, the cross-sectional survey by Harreby et al. (1999) and the 5 year longitudinal study by Burton et al. (1996) found a positive link between sports participation and back pain only for boys, while severity was not related to sport. Also, Kujala, Taimela and Viljanen (1999) found a positive association between low back pain and a high level of leisure physical activity.

Similarly, the study by Newcomer and Sinaki (1996) reported that low back pain was more common in children with increased physical activity. The recent prospective study by Jones, Watson, Silman, Symmons and Macfarlane (2003) showed an increased risk for low back pain in those undertaking a high level of physical exercise. On the other hand, in a sample of 2,173 school children, Kristjandottir and Rhee (2002) reported a negative correlation between back pain and sports participation or between back pain and physical activity. Along the same lines, the survey based longitudinal study by Salminen et al. (1995) pointed to low leisure time physical activity as a risk factor. Szpalski, Gunzburg, Balague, Nordin and Melot (2002) reported a higher incidence of low back pain in school children who did not

walk to school as compared with children who did walk to school, while sports participation had no significant influence. Moreover, according to findings by Cardon et al. (2004); Feldman, Shrier, Rossignol and Abenhaim (2001); Iyer (2001); Watson et al. (2003); Wedderkopp, Leboeuf-Yde, Andersen, Froberg and Hansen (2003) and Widhe (2001), total amount of physical activity was not associated with back-pain reports in school children.

The study by Wedderkopp et al. (2003) is the first making use of objectively measured physical activity in relation to back pain. It can be concluded that in school children and adolescents there are indications that high performance training in certain sports increases the risk for back pain, but the relationship between physical activity and back pain has inconsistencies (Cardon, & Balague, 2004).

Methodological shortcomings, such as the lack of definitions, the difficulty in measuring physical activity in children (Kohl, Fulton & Caspersen, 2000), the inconsistent classification of physical activity and a primary reliance on self-reported sports history, are the biggest difficulties in drawing evidence based conclusions regarding the link between physical activity and back pain at young age (Cardon & Balague, 2004).

2.3.2.2 Physical fitness

The association between back pain and physical fitness has also been studied in the literature. According to a recent study (Cardon et al., 2004) making use of a standardized fitness test, there is no correlation between back pain and fitness parameters in school children. On the other hand, Kristjandottir and Rhee (2002) and Sjolie (2002) reported that poor physical fitness increased the risk for back pain in children. However, in the two latter studies the fitness level was self-reported and as a result the validity can be questioned. It can be concluded that there is no evidence that being more physically fit has a preventive effect on low back pain in children (Cardon & Balague, 2004).

2.3.2.3 Backpack-related factors

In line with the recent review by Mackenzie, Sampath, Kruse and Sheir-Neiss (2003), conflicting study results are found for the association between backpack-related factors and low back pain in school children (Cardon & Balague, 2004).

Various studies have reported no association between backpack-related factors and back pain at young age. In one of the most carefully designed surveys, including 1446 school children, Watson et al. (2003), recently demonstrated the lack of significant association between low back pain and either the type of school bag, the method of carrying or the percentage of body weight carried. Actually, the lowest risk of reporting low back pain was found among those carrying the highest percentage of body weight (Cardon & Balague, 2004). Along the same lines, van Gent, Dols, de Rover, Sing and de Vet (2003) found that children with bags weighing more than

18% of their own body weight reported back complaints less frequently than children who carried lighter bags. Another recent survey by Goodgold et al. (2002) including 345 children showed no direct relationship between back pain and backpack use. Grimmer and Williams (2000) reported that the manner of backpack carrying was not associated with low back pain.

Similarly, Korovessis et al. (2004) found in a large sample of school children that backpack weight percentage and method of carrying were not associated with low back pain. On the other hand, at least two studies have described an association between reported perceived load and low back pain (Negrini & Carabalona, 2002; Szpalski et al., 2002). In the carefully designed study by Negrini and Carabolona (2002) the variable associated with low back pain was fatigue during backpack carrying, while the average backpack weight/body weight ratio, the maximum backpack weight/body weight ratio and feeling the backpack too heavy were not directly associated with low back pain. Moreover, the study showed large differences not only in terms of the backpack weights among the various schools tested, but also among the days of the week and among the students in the same class.

Along the same lines, in the study by Szpalski et al. (2002), children who responded affirmatively to the question, "Do you find your satchel too heavy?" were more prone to report ongoing back pain. The association between low back pain and items carried was also pointed out by Iyer (2001). However, as stated above, the quality of the latter study can be questioned. In the recent study by Shier-Neiss et al. (2003), carrying a sports bag in addition to a backpack was not associated with back pain.

Also, Kovacs et al. (2003) reported no significant association between low back pain and the manner in which books were carried by 13-15 year olds. Along the same lines, the study by Jones et al. (2003) showed little evidence of an increase in short-term risk for low back pain associated with mechanical load across the range of weights commonly carried to school by children. In the study by Viry et al. (1999), it was reported that 50% of the children carrying their school bags in one hand had missed school or sports due to back pain, while in the children carrying their backpacks over both shoulders this incidence was only 11.5%. However, since only 22 children carried their backpacks in one hand, the conclusion was based on only 11 children reporting school or sports absence due to back pain. A major problem is that, at best, many studies looked only once at the actual weight of backpacks, while Negrini and Carabalona (2002) showed large variations among the days of the week within the same class of the same school. Furthermore, Merati, Negrini, Sarchi, Mauro and Veicsteinas (2001) reported that the cardiovascular effort required for locomotion carrying a backpack is minimal.

It can be concluded that attributing a major role to backpacks alone seems a shortcut difficult to support (Cardon & Balague, 2004). Although it is recognized that there is a widespread interest in heavy school bags as a risk factor for low back, there is little persuasive scientific evidence for a causative relationship. Thus, it might follow that interventions to reduce school bag weight are not likely to be particularly effective to prevent low back pain in schoolchildren (Cardon & Balague, 2004).

2.3.2.4 Sitting posture and sedentary activity

According to a previous review (Balague et al, 1999), sitting for a long time was found to be the most common factor associated with back pain. Along the same lines, Sheir-Neiss et al. (2003) reported that adolescents with back pain spent significantly more hours sitting in classroom or watching TV than those without back pain did. Grimmer and Williams (2000) found gender and age-specific associations between the amount of time spent sitting and recent low back pain.

As a result, it was suggested by Grimmer and Williams (2000) that parents and teachers should insist on constraints that limit lengthy periods of sitting. However, in the studies by Kovacs et al. (2003) and Watson et al. (2003), the association between low back pain and hours of leisure sitting was not significant.

Along the same lines, Jones et al. (2003) prospectively demonstrated that prior sedentary activity cannot be considered a short-term risk factor for future low back pain. On the other hand, in the cross-sectional study by Gunzburg et al. (1999) in school children, back pain reports were higher in children who played video games for more than 2 h per day, whereas this was not the case for children who watched television for more than 2 h per day. According to the authors, differences between the postures may possibly explain the differences in pain reports.

Similarly, the cross-sectional study by Lebkowski (1997) of 2346 subjects aged 17 years reported a correlation between low back pain and incorrect sedentary position. Viry et al. (1999) found that sitting on the edge of the chair while completing a questionnaire was significantly associated with a history of a physician visit for back pain.

Further study is necessary to explore whether certain prolonged sitting postures or sedentary activities are risk factors for developing low back pain (Cardon & Balague, 2004). It can be concluded that the association between low back pain and sitting in school children remains unclear (Cardon & Balague, 2004). Furthermore, it proved impossible to locate a study evaluating whether the loading on young, growing body structures associated with poor prolonged sitting postures and a sedentary state has an impact later in life (Cardon & Balague, 2004).

2.3.2.5 Working

Feldman, Shrier, Rossignol, and Abenheim (2002) found that working during off-school hours increased the risk of low back pain in school children. Moreover, white collar jobs were associated with higher risk of low back pain than blue collar jobs. In line with the findings of Feldman et al. (2002) and Harreby et al. (1999) found a positive association between heavy jobs during off-school hours and low back pain. Also, in the cross-sectional survey based study by Watson et al. (2003), children with part-time jobs had a 60% higher chance of reporting low back pain, although among those with part-time jobs there was no association with reports of lifting heavy items. Along the same lines, having a part-time job significantly increased the risk for low back pain in the recent prospective study of Jones et al. (2003). It can be concluded that working during off-school hours is associated with reported LBP in school children (Cardon & Balague, 2004). However, there is no evidence that modification of working during off school hours has a preventive effect on low back pain in school children (Cardon & Balague, 2004).

Moreover, it needs to be taken into account that muscle fatigue from working may have influenced pain reports (Cardon & Balague, 2004).

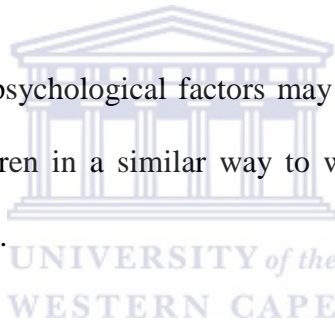
2.3.2.6 Psychosocial factors

According to a prior study (Balague et al., 1995), psychological factors, labeled "positive" were associated with a reduction of lumbar pain, whilst those factors considered "negative" were accompanied by an increase of this sort of pain. These findings are in agreement with other studies in the literature, resulting in the conclusion of a previous review paper (Balague et al., 1999) that depression and emotional factors have been found to be significantly associated with low back pain. Along the same lines, the review by Ebbelohj et al. (2002) points out that psychosocial factors are important risk factors for low back pain. Moreover, in a recent study by Watson et al. (2003), it was suggested that psychosocial factors are more important than mechanical factors in low back pain occurring in young populations. Similarly, Szpalski et al. (2002) found that lower scores for happiness, sleep quality and health perception were associated with higher back pain reports in 12-19 year-olds. It was concluded that psychological factors may play a role in the experience of back pain in school children in a similar way to what has been reported in adults. Moreover, Gunzburg et al. (1999) found in children that general well-being was correlated with back pain.

In line with these findings, numerous recent studies in school children have reported an association between back pain and psychological factors, such as morning tiredness and parental support (Kristjansdottir & Rhee, 2002), poor well-being, and,

in particular, poor self-perceived fitness (Sjolie, 2002), a higher degree of somatising, diminished self-esteem and augmented negative affect (Staes, Stappaerts, Lesaffre & Vertommen, 2003), dislike of going to school (Storr-Paulsen, 2002), psychosomatic factors (van Gent et al., 2003), life quality (Hereby et al., 1999) and poor mental health (Feldman et al., 2001). Furthermore, according to the prospective study by Jones et al. (2003) high levels of adverse psychosocial exposure, presence of behaviour problems such as anger, disobedience and violence, and high levels of hyperactivity were associated with an increased risk of developing LBP in adolescents.

It can be concluded that psychological factors may play a role in the experience of back pain in school children in a similar way to what has been reported in adults (Cardon & Balague, 2004).



2.3.2.7 Smoking

According to the systematic review by Goldberg, Scott and Mayo (2000), data of studies in adults are fairly consistent as to the idea that smoking is associated with non-specific back pain. However, little direct data exists regarding the pathologic origin of back pain in adolescents. In the non-systematic reviews of Ebbehoj et al. (2002), Rozenberg and Bourgeois (1999), Duggleby and Kumar (1997) and Balague et al. (1995), it was concluded that smoking was significantly associated with back pain in youngsters. Along the same lines, the association between back pain and smoking among school children was confirmed in the literature by Feldman, Rossignol, Shrier, and Abenhaim (1999), Harreby et al. (1999), Lebkowski (1997)

and Kristjandottir and Rhee (2002). By contrast, Kovacs et al. (2003) found no association between low back and cigarette smoking. According to Harreby et al. (1999), smoking habits in school children may indirectly reflect psychosocial and social problems as the main causes in developing low back pain. Similarly, Feldman et al. (1999) found lower mental health scores in smokers, compared with non-smokers (Cardon & Balague, 2004).

2.3.2.8 Other factors

Finally, some other modifiable factors have been studied in relation to back pain reports in school children. Kristjandottir and Rhee (2002) identified a strong positive relationship between back pain and eating habits, namely, irregular meals, fast food, snacking and coffee drinking. However, besides the cross-sectional design, the latter study is limited in that the many associated factors accounted for less than 10% of total variance of back pain in the sample, suggesting the existence of other potential, yet unmeasured, factors contributing to the incidence of pain. Furthermore, the recent cross-sectional study by Kovacs et al. (2003) found no association between LBP and alcohol intake, in a large sample of school children. However, as reported by the authors, the risk of underreporting of alcohol intake cannot completely be ruled out (Cardon & Balague, 2004).

It can be concluded that there is no consensus about contributing factors to low back pain. Some factors are considered to be positive for some authors while authors found negative results. More studies are needed to confirm or negate the association between low back pain and contributing factors.

2.4 Impact of LBP among high school children

The problem of low back pain has an impact on both school children and their parents because most of the time children are absent from school in order to attend clinics or on being admitted to hospital. Low back pain thus not only incurs medical expenses but also impacts on the functional activity of the school children with regards to participation in functional activities and sport.

2.4.1 Challenges experienced by high school children with low back pain

The challenges that are experienced by high school children with LBP can be classified within the framework of the International Classification of Functioning (ICF) as activity limitations, participation restrictions and environmental barriers (WHO, 2001).



2.4.1.1 Activity limitations

Activity limitations are difficulties an individual might have in activities of daily living (ADLs) (WHO, 2001). Within the ICF framework, ADLs refer to mobility, self-care and domestic life (WHO, 2001). Mobility activities refer to lifting and carrying objects and walking (WHO, 2001). Activity limitations which may be experienced by school children with LBP are mostly, difficulties in sitting in class for 1hour, bending down to tie shoe laces and even running, etc.

2.4.1.2 Participation restrictions

Participation refers to the ability of the person to manage the role they were previously fulfilling (WHO, 2001).

The participation restrictions that are experienced by school children are an inability to attend the class as previously, as well as limited involvement in recreational and social activities (Waddell, 1999).

2.4.1.3 Environmental barriers

Some environmental factors affect ADLs and social participation after LBP. Rather than helping, these factors can hinder the accomplishment of daily activities and social roles as highlighted by the Department of Health and Children website (2007), and hence being regarded as barriers. As mentioned by Vlaeyen and Linton (2006), the literature concerning environmental barriers experienced by LBP patients is limited.

2.4.2 Low back pain with a Psychological overlay

In certain cases the low back pain may have an additional psychological overlay that will prevent conservative treatment from being entirely effective. For instance, patients with compensation claim for their LBP tend to have a poorer prognosis than those without a claim (O'Mara, & Wiesel, 1997; Kirkay-Willis, 1992). Other causes of psychological overlay include poor performance in class, job dissatisfaction, chronic pain or an underlying psychological disorder such as depression, anxiety or somatization (Waddell, 1999; O'Mara & Wiesel, 1997; Kirkay-Willis, 1992). Some signs which show that a patient may have a psychological overlay to their LBP include the description of non-anatomical generalized pain, and inconsistent test results. Pain drawing can be used to help distinguish between organic and non-organic, or psychological, low back pain as they provide information regarding the

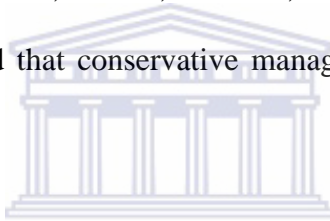
patient's subjective reaction to their pain (Swenson, 1999). Inconsistent test results include positives that should be functionally impossible such as low back pain caused by compression from the vertex of the head, or conflicting results such positive straight leg raise test but a negative slump test. It is also important to note any abnormal or excessive superficial tenderness, non-physiologic weakness, omnipresent symptoms, overuse of narcotics and distractibility or overreaction (Swenson, 1999). Although the patient may have a psychological overlay to their condition it must be remembered that there is often a true underlying problem initially causing the low back pain. Therefore, these patients need concurrent conservative chiropractic treatment and assessment for any psychological overlay (Swenson, 1999).

Based on the literature, it can be concluded that LBP has an impact on both physical and psychological aspect of high school children. It does not only impact on children, but also on their parents, families and service providers either psychologically, financially or socially.

2.5 Management strategies used in managing low back pain in children

Management of low back pain requires multi-dimension approaches and it is planned according to the phase of low back pain (acute, sub-acute or chronic) and according to the predisposing factors. Five pillars of management including referral, treatment, rehabilitation, prevention and health promotion should be taken into consideration (Bratton, 1999).

According to Bogduk (2003), Lower back pain may be classified by the duration of symptoms as acute when the duration is less than 4 weeks, sub-acute when the duration is 4–12 weeks, and chronic when it is more than 12 weeks. However, Clare, Adams and Maher (2004) defined acute LBP as pain which last less than 6 weeks, sub-acute when the duration is between 6-12 weeks, then chronic LBP when the duration is longer than 3 months. Several authors reported that there are numerous approaches used by health professionals in the treatment of low back pain which require multidisciplinary services from physiotherapists, doctors, pharmacologists and surgeons (Bratton, 1999; Deltto, Erchard, & Bowling, 1995). Meeker and Haldeman (2002) reported that conservative management may be effective without surgical intervention.



These authors put more emphasis on the use of chiropractic management which is a health care approach that focuses on the relationship between the body's structures mainly the spine and its functioning. Although, practitioners may use a variety of treatment approaches, they primarily perform adjustments to the spine or other parts of the body with the goal of correcting alignment problems and supporting the body's natural ability to heal itself. It has been noted that chiropractors may combine the use of spinal adjustments with several other treatments and approaches such as heat and ice, electrical stimulation, rest, rehabilitative exercise, counseling about diet, weight loss, and other lifestyle factors and dietary supplements (Meeker & Haldeman, 2002). However, success of treatment depends on the patient's understanding the disorder and his/her role in preventing recurrence (Patel & Ogle, 2000).

Therapy management would be helpful if the treatment provided decreases pain and subsequently reduces the patient's suffering (Clarke, 2000).

According to Pinnington (2001) physiotherapy plays an important role in the management of LBP than any other health care provider. They use various modalities and methods to relieve the discomfort, fear, anxiety and loss of function associated with LBP. These modalities include electro-physical agent such as cold, heat and modified electrical current, unfortunately the electrical apparatus are not found everywhere and the cost is not affordable for any institution which needs them. Exercise programs improve the quality of life for the patients suffering from LBP and they assist the patients to avoid recurrence of low back pain and reduce its severity (Sparkes, 2005; Patel & Ogle, 2000). Ullrich (2004) added that exercises help in distribution of nutrients into the disc spaces and surrounding soft tissues in the spine and the supplied nutrients assist in maintaining healthy discs, muscles, ligaments and joints of the spine. In addition, Schiple and Dinubile (1997) indicated that exercises help to strengthen and stabilize back and abdominal muscles.

Bratton (1999) reported that pharmacology management such as aspirin, paracetamol, Ibuprofen non-steroidal anti-inflammatory drugs and muscle relaxants (more useful on chronic low back pain with associated with muscle spasm) were found to be relatively effective in treatment of LBP. One year later, Patel and Ogle (2000) highlighted the use of acetaminophen such as Tylenol which has been proven to be a good pain reliever, but in case of inflammation non-steroidal anti-inflammatory drugs are more successful.

As noted by Malanga (1999) muscle relaxants are more effective in case of chronic low back pain associated with muscle spasm. The same author further stressed that in severe cases of low back pain some opioids such as morphine or codeine may be prescribed but these must be taken under careful supervision because of its side effects. In addition, anti-depressants can be effective drugs for treating pain because they block pain messages on their way to the brain and they can also help to increase the body's production of endorphins which is a natural pain killer (Malanga, 1999). The same researcher goes on to say that the severity and cause of the back pain determines the prescription for medications or injections. The doctor may suggest spinal injection such as epidural steroid injection which is one of the most common injections used in management of LBP because of its effectiveness. An epidural steroid injection sends steroids which are very strong anti-inflammatory right to the nerve root which is inflamed. Depending on the diagnosis the facet joint injection may be used to get stability of the back (Malanga, 1999).

Harding and Watson (2000) suggested that surgical interventions for patients with LBP may be used when other treatment options have been tried and failed. Glaser, Lee and Fehr (2005) added that radiculopathy with herniated lumbar disc shows good evidence that standard open discectomy and microdiscectomy are very effective in pain management and functional improvement comparatively to non-surgical therapy.

2.5.1 Management of acute and sub-acute low back pain

Self-care: For acute cases that are not debilitating, low back pain may be best treated with conservative self-care, including application of heat or cold (Chou, Qaseem & Snow, 2007; French, Cameron, Walker, Reggars & Esterman, 2006), and continued activity within the limits of the pain (Hagen, Hilde, Jamtvedt & Winnem, 2004). Firm mattresses have demonstrated less effectiveness than medium-firm mattresses (Atlas, 2010).

Activity: Engaging in physical activity within the limits of pain aids recovery. Prolonged bed rest (more than 2 days) is counter indicated (Kovacs, Abaira & Peña, 2003). Even with cases of severe pain, some activity is preferred to prolonged sitting or lying down excluding movements that would further strain the back. Structured exercise in acute low back pain has demonstrated neither improvement nor harm (Kovacs et al., 2003).

Physical therapy: Physical therapy can include heat, ice, massage, ultrasound, and electrical stimulation. Active therapies can consist of stretching, strengthening and aerobic exercises. Exercising to restore motion and strength to the lower back can be very helpful in relieving pain and preventing future episodes of low back pain (Koes & van Tulder, 2006).

Medications: Short term use of pain and anti-inflammatory medications, such as NSAIDs (Non-steroidal anti-inflammatory drugs) or acetaminophen may help relieve the symptoms of lower back pain (Kovacs et al., 2003).

Muscle relaxants for acute and chronic pain have some benefit (van Tulder & Koes, 2006), and are more effective in relieving pain and spasms when used in combination with NSAIDs (Atlas, 2010).

Spinal manipulation: A 2004 Cochrane review found that spinal manipulation (SM) was no more or less effective than other commonly used therapies such as pain medication, physical therapy, exercises, back school or the care given by a general practitioner (Malanga & Dunn, 2010). A 2010 systematic review found that most studies suggest SM achieves equal or superior improvement in pain and function when compared with other commonly used interventions for short, intermediate, and long-term follow-up (Assendelft, Morton, Yu, Suttorp & Shekelle, 2004). In 2007 the American College of Physicians and the American Pain Society jointly recommended that clinicians consider spinal manipulation for patients who do not improve with self-care options (Chou et al., 2007). Reviews published in 2008 and 2006 suggested that spinal manipulation for low back pain was equally effective as other commonly used interventions (Dagenais, Gay, Tricco, Freeman & Mayer, 2010; Bronfort, Haas, Evans, Kawchuk & Dagenais, 2008). A 2007 literature synthesis found good evidence supporting spinal manipulation and mobilization for low back pain (Murphy, Vanteijlingen & Gobbi, 2006). Of four systematic reviews published between 2000 and 2005, one recommended spinal manipulation and three stated that there was insufficient evidence to make recommendations (Meeker, Branson & Bronfort, 2007).

2.5.2 The role of physician in management of chronic low back pain

Recent studies have identified LBP management as one of the most common and important issues faced by primary care providers (Mitchinson, Kerr & Krein, 2008). Effective treatment and management of chronic low pain is, and will continue to be, an important function of primary care physicians. Although, professional organizations have published guidelines for the treatment of non-cancer chronic pain (The Management of Opioid Therapy for Chronic Pain Working Group, 2003; American Academy of Pain, 1997), there continues to be a great deal of variability in physicians' treatment decisions (Somerville, Hay & Lewis, 2008), and a lack of consensus about what constitutes the optimal treatment approach (Rosenblum, Marsch, Joseph & Portenoy, 2008).

In the 1990s, the use of opioids for chronic non-cancer pain increased (Olsen, Daumit & Ford, 2006; Yong, Bell, Workman & Gibson, 2003; Gilson & Joranson, 2001; Phillips, 2000; The use of opioids for the treatment of chronic pain, 1997; Moulin, Iezzi & Amireh, 1996) as regulatory boards and the clinical community became more supportive of their use (Federation of State Medical Boards of the United States, 2004), Gilson & Joranson, 2001; Phillips, 2000), compensation systems favored brief visits for medication management (Gallagher & Rosenthal, 2008), and opioids were aggressively marketed (Olsen et al., 2006). Recently, drawbacks of opioid use such as dependency, tolerance, side effects (Harden, 2008), and concerns about the long-term efficacy of opioid therapy (Martell, O'Connor & Kerns, 2007) have prompted a shift toward treatment models that incorporate alternatives to opioid medication.

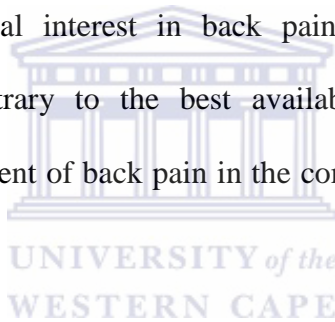
Since the end of the 1990's, there has been a leveling off of the rate of opioid prescriptions by primary care physicians (Olsen et al., 2006). Although support is growing for the biopsychosocial model of low back pain management, which focuses on somatic, environmental, and psychological contributors to pain (Gallagher & Rosenthal, 2008; Gallagher, 2007; Nicholas, Molloy & Brooker, 2006; Nielson & Weir, 2001), it is unclear whether this model has been adopted by primary care physicians, and if so, what factors may influence its adoption.

Physician and practice characteristics that have been shown to predict use of opioids include age, knowledge about treating LBP, beliefs and attitudes about opioids, type of medical training, resources available to treat chronic low pain, and fear of diversion, addiction, abuse, or regulatory scrutiny (Dobscha, Corson, Flores, Tansill & Gerrity, 2008; Glajchen, 2001; Turk, Brody & Okifuji, 1994; Cleeland, Cleeland, Dar & Rinehardt, 1986). Prior studies have primarily focused on examining the proportion of physicians who choose a specific treatment and/or predictors of treatment choice.

The latter research capitalizes on the strengths of latent class analysis (LCA) to examine constellations of treatment choices. In other words, physicians may take a number of actions, so classifying them in terms of the combinations they choose gives us a more sophisticated understanding of their pain treatment behavior (Hutchinson, Moreland, De C Williams, Weinman & Horne, 2007; Nwokeji, Rascati, Brown & Eisenberg, 2007; Potter, Schafer & Gonzalez-Mendez, 2001). However, several authors criticized physicians, by reporting that provider, and treatment used

for chronic low back pain are both very common and varied. Current treatment patterns are consistent with over-utilization of some medications and treatments, and under-utilization of exercise and depression treatment (Williams et al., 2010; Carey et al., 2009).

There may be distinct patterns in primary care physician's responses to patients with chronic pain. Relatively few physicians use the multimodal approach endorsed by proponents of the bio psychosocial model of pain treatment. Several physician and practice characteristics predict patterns of clinical action (Phelan, van Ryn, Wall & Burgess, 2009). A special interest in back pain is associated with back pain management beliefs contrary to the best available evidence. This has serious implications for management of back pain in the community (Buchbinder, Staples & Jolley, 2009).



Based on the literature, it can be concluded that management of low back pain has diverse multi- approaches as discussed by different researchers and authors. Also, the low back pain management improves with the time in all countries and includes both conservative and surgical treatment. In addition, a preventive measure through education about back care management is better than cure.

2.6 Contribution of physiotherapy in managing low back pain in children

Low back pain is responsible for huge personal and societal costs, and is a major cause of work disability (Carter & Birrell, 2000; Nachemson & Vingard, 2000; SBU, 2000). Contrary to traditional thinking, back pain is not a problem that always resolves itself. Recurrence is usual and its course is very variable (Burton, McClune, Clarke & Main, 2004; Hestbaek, Leboeuf Yde & Manniche, 2003; Hestbaek et al., 2003; Croft, Lewis & Papageorgiou, 2001; Cote, Cassidy & Carroll, 2000).

For intervention, physiotherapists are well placed to provide more intensive rehabilitation interventions such as exercise and manual therapy. In addition, physiotherapist should be able to identify patients with serious spinal pathology and refer them to the most appropriate specialist (Guillermo Pecci Saavedra, 2007). The overall aim for the physiotherapist will be to help patients return to fulfilling activities, including work where this is applicable (Guillermo Pecci Saavedra, 2007). Many researchers have tried to classify back pain and many different methods have been proposed (Aina, May & Clare, 2004; QTFSD, 1987).

The best and most widely accepted method of classification for low back pain is diagnostic triage, where patients are categorized as falling into one of three groups (Waddell, 1998): serious spinal pathology; neurological involvement; and non-specific low back pain. A stepped approach may be the most rational approach (Von Korff & Moore, 2001), offering simple, less intensive interventions early on. In the first instance, diagnostic triage, patient education and advice are likely to be the best approaches.

If this is unsuccessful and the problem is not improving after a few weeks, a short course of physiotherapy may be offered. Within a few weeks, it is expected that most patient's condition will be improving sufficiently to allow them to get back to usual activities, including school activities or work. The longer patients with back pain are off school or work, the greater the chances that they will never return to usual activities (Waddell & Burton, 2001). It is therefore important that the individual is encouraged to return to normal activity even if there is still some residual pain. For a small number of patients, more extensive and intensive rehabilitation programmes may be indicated.

The literature review in this paper is based mainly on systematic reviews, such as Cochrane reviews where they were available, and also draws information from individual randomized trials where appropriate, like in Milan University, School of Medicine (van Tulder, Esmail, Bombardier & Koes, 2005). The European Guidelines for the management of acute and chronic low back pain provided a substantial basis for the recommendations in this paper (European Commission, 2004). A diagnostic triage would be carried out by the physician, most commonly the general practitioner, prior to referral to the physiotherapist (Guillermo Pecci Saavedra, 2007). Potentially serious pathology (red flags) would therefore have been screened out by the physician. But, more commonly now, physiotherapists can expect to be the first line of contact (Guillermo Pecci Saavedra, 2007). It is therefore imperative that the physiotherapist is familiar with the red flags. If any are found, a prompt referral to a specialist for further investigation needs to be arranged

(Guillermo Pecci Saavedra, 2007). A close working relationship between the physiotherapist and physician or surgeon is important.

Some physiotherapists can refer patients for imaging, including plain X-rays and MRI (Guillermo Pecci Saavedra, 2007). There is some evidence for the use of MRIs (even in the absence of red flags) in the orthopaedic setting, slightly improving treatment outcomes (Guillermo Pecci Saavedra, 2007). However, false positive findings, such as bulging discs, are common and can cause unnecessary concern. Routine use of MRI for acute or chronic non-specific back pain is not recommended (Guillermo Pecci Saavedra, 2007). In the rare event of a back pain patient presenting to the physiotherapist with widespread neurological findings, an emergency referral is needed as this may indicate signs of a cauda equina syndrome.

Once any signs of potentially serious disease are excluded, the physiotherapist can confidently consider the condition to be non-specific back pain (Guillermo Pecci Saavedra, 2007). Physiotherapy management starts by History taking and the physical examination. The physiotherapist carries out a subjective assessment (history) followed by the physical examination. Active listening to the patient's concerns, not only about their pain and its localization but also about the consequences of pain and how it is dealt with, is essential to good diagnosis and management (Martin, Jahng, Golin & DiMatteo, 2003; SBU, 2000).

A physical examination should be based on the history of the problem rather than strictly following proforma. Judicious use of physical tests should be employed to clarify the nature of the patient's mechanical dysfunction (Martin et al., 2003).

Explanation of the condition to the patient is an important part of physiotherapy management. Once the history has been taken and the physical examination has been carried out, the physiotherapist needs to provide a careful explanation to reassure the patient that no serious disease or injury has been found (Cedraschi, Nordin, Nachemson & Vischer, 1998). This may be the most important and most challenging part of the treatment. Physiotherapists need to avoid reinforcing patients' fears about the threatening processes that might be going on in their spine. Psychosocial factors are at least as important and need to be addressed in back pain patients (European Commission, 2004; Jeffels & Foster, 2003; Philadelphia Panel, 2001). Encouraging an early return to usual activities is also carried out in physiotherapy service.

The physiotherapist has an important role in encouraging active self-management, and this is an essential component of treatment for all back pain patients (Roland et al., 1996). The primary aim is to help patients resume normal activities as far as possible, as soon as possible. This advice should be supported by offering a simple evidence-based educational booklet (Burton, Waddell, Tulletson & Summerton, 1999; Urton, McClune & Waddell, 2002).

This provides simple messages which can help to dispel maladaptive fears and misconceptions about their back pain (Waddell, Klaber-Moffett & Burton, 2004).

2.6.1 Back schools

One way of providing back care education to patients is through a group intervention sometimes referred to as a 'back school', which might be cost-effective, since theoretically it uses fewer resources per patient (van Tulder et al., 2005). This intervention consists of an education and skills programme, including exercises, in which all lessons are given to groups of patients and supervised by a paramedical therapist or medical specialist (van Tulder et al., 2005). The original Swedish back school, introduced in 1980, consisted of four sessions of 45 minutes (Forssell, 1990). Back schools vary greatly in their approach. The content, means and method of delivery are particularly important. Those that take place in a relevant setting encourage a return to usual activities and take account of psychosocial issues may be more effective than those which concentrate on biomechanical factors.

According to the most recent Cochrane Systematic Review (Heymans, van Tulder, Esmail, Bombardier & Koes, 2005), back schools, especially in the occupational setting, may be more effective in the short and intermediate term than exercises, manipulation, myofascial therapy, advice, placebo or waiting list controls for patients with chronic and recurrent low back pain (Kamwendo & Linton, 1991). Back schools can be effective at least in the short and intermediate term and should be available for chronic back pain patients particularly in an occupational setting (Kamwendo & Linton, 1991).

2.6.2 Physiotherapy interventions for patients who have not responded to self-management approach

2.5.2.1 Exercise therapy

Exercise therapy commonly forms part of the treatment offered by physiotherapists for patients with back pain. It can vary greatly in content and method of delivery (Bekkering, Hendriks & Koes, 2003). It has been defined as: ‘any programme in which, during the therapy sessions, the participants were required to carry out repeated voluntary dynamic movements or static muscular contractions in each case, either “whole-body” or “region-specific”; and either with or without external loading, where such exercises were intended as a treatment. The exercise was to have been supervised or prescribed (Bekkering et al., 2003).

2.6.2.2 Specific exercise programmes

Specific exercises are often provided by physiotherapists. The rationale is that once the back problem has been assessed by the physiotherapist, specific exercises can then be provided to deal with it (European Commission, 2004). The choice of exercise programme is likely to be influenced mainly by the physiotherapist's own training and experience. The European Guidelines do not recommend the use of any specific exercise programmes, such as stretching, strengthening, flexion or extension exercises for acute back pain (European Commission, 2004). For subacute and chronic back pain, there is limited evidence for the use of any specific exercise programmes and in most guidelines no one programme is recommended (Sarig-Bahat, 2003). The McKenzie approach is one of the most frequently used types of physiotherapy for back pain (Gracey, McDonough & Baxter, 2002; Foster,

Thompson, Baxter & Allen, 1999; Battie, Cherkin, Dunn, Ciol & Wheeler, 1994). It is based primarily on the identification of a directional preference for spinal movement and can form the basis for prescription of exercises (Long, Donelson & Fung, 2004). Improvement in symptoms is subsequently assessed in terms of 'centralization', a phenomenon that has been quite well documented (Aina et al., 2004). To date, there is limited evidence in terms of randomized trials to support the effectiveness of the McKenzie approach for back pain. One large trial of sub-acute and chronic back pain patients found that the McKenzie approach, when compared with intensive dynamic strengthening exercises, was slightly more effective at 2 months in improving function (Petersen, Kryger, Ekdahl, Olsen & Jacobsen, 2002) but the difference was not maintained in the longer term. A recent systematic review of six trials concluded that there is some evidence for the effectiveness of McKenzie approach for sub-acute and chronic back pain patients, at least in the short term (Clare et al., 2004). The McKenzie approach, especially for sub-acute and chronic back pain, has the potential advantage of encouraging self-help and there is some evidence for its effectiveness, at least in the short term (Clare et al., 2004).

2.6.2.3 General exercise programmes for back pain

Physiotherapists appear to use general exercise programmes more often now as part of their approach for managing patients with longer standing back pain. A very large number of trials on exercise therapy for back pain have been published. They vary greatly in quality and investigate a wide range of forms of delivering exercise (Hodges & Richardson, 1999).

The European Guidelines group concluded that exercise therapy can be recommended for chronic back pain patients, although no particular programme of exercises was singled out (Bekkering et al., 2003). A recent systematic review of exercise for chronic back pain concluded that individually designed supervised exercise programmes to include stretching and strengthening may relieve pain and improve function (Hayden, van Tulder & Tomlinson, 2005). 'Back to Fitness' programmes encourages a return to physical activities through an exercise class. They are based on sports medicine principles and incorporate a cognitive behavioural approach (Klamber-Moffett & Frost, 2000). There is some evidence that such a programme can be effective for both sub-acute and chronic patients in the longer term (Klamber-Moffett, Torgerson & Bell-Syer, 1999; Frost, Lamb, Klamber-Moffett, Fairbank & Moser, 1998), although it has been shown to be ineffective in lower socio-economic groups (Carr, Klamber-Moffett & Howarth, 2005). Multimodal treatment approaches that include the use of exercise therapy appear to be more effective than single treatments alone for the management of back pain (Bronfort, Haas, Evans & Bouter, 2004).

General exercise programmes appear to be an effective way of managing back pain that is not resolving on its own; however, patient motivation may be a key factor for the success of this type of intervention (Guillermo Pecci Saavedra, 2007). Exercise is a first-line approach that is recommended for back pain that is not resolved over a few weeks. Since no one form of exercise has been shown to be particularly effective, the choice of exercise will depend on the individual's preference (Guillermo Pecci Saavedra, 2007).

2.6.2.4 Passive treatments

a) Manual therapy (spinal manipulation and mobilization)

Manual therapy refers to any intervention that entails the use of the therapist's hands on the spine. Some consider it to be a core skill for physiotherapists. The term 'spinal manipulation' usually refers to a high-velocity, low-amplitude thrust and is more commonly used by specialist physiotherapists, chiropractors and osteopaths. Gentler and more conservative techniques, such as 'Maitland's mobilizations' (Maitland, 2004), are frequently used by physiotherapists (Long et al., 2004; Foster et al., 1999), applying pressure through the therapist's hands to move the vertebral joints passively through a given range. The conclusions from several systematic reviews have been somewhat unclear, mainly because of a dearth of high-quality trials (Assendelft, Morton, Yu, Suttorp & Shekelle, 2003). One large national study carried out in the UK recently found that primary care patients randomized to a spinal manipulation package, in addition to best-care general practice management, reported modest but significant benefits compared with patients who only received best-care general practice management. These differences were demonstrated at 6 and 12 months after a short course of treatment (UKBEAM, 2004). Based mainly on an examination of the most up-to-date systematic reviews of manipulation, the European Guidelines for both acute and chronic back pain concluded that short courses of spinal manipulation should be considered (European Commission, 2004).

b) Massage

This can be considered as part of manual therapy. It is an ancient form of treatment that is still very popular for patients with back, especially in European countries (Furlan, Brosseau, Welch & Wong, 2001). Its effectiveness is under-researched and it is usually not recommended in clinical guidelines. However, as a preliminary to more active forms of treatment, on pragmatic grounds its use should not be totally discounted (Guillermo Pecci Saavedra, 2007).

c) Physical modalities

A wide array of physical modalities is commonly included as a part of physiotherapeutic interventions for back pain. These include transcutaneous electrical nerve stimulation (TENS), heat/cold, traction, laser, ultrasound, short wave, interferential, corsets. There is limited evidence to suggest that electrotherapy (laser therapy, therapeutic ultrasound and TENS) is not effective for reducing back pain (Aker, Gross, Goldsmith & Peloso, 1996). However, the overall conclusions from systematic reviews is that there is too little evidence from good-quality studies to either support or refute the clinical use of physical medicine modalities for patients with back pain (European Commission, 2004, Aker et al., 1996). The placebo effects of passive modalities probably account for most of the benefits that are gained. This can be a powerful effect where both the therapist and the patient have faith in the treatment. However, dependency on physical modalities could encourage passivity, inactivity and disability behaviour (Verhagen, Scholten-Peeters, de Bie & Bierma-Zeinstra, 2004; Aker et al., 1996). They may sometimes have a role but only as an adjunct to a management approach that encourages a return to normal activities.

The use of these modalities as a sole treatment for acute or chronic back pain is not recommended in international guidelines (European Commission, 2004; Bigos, Bowyer & Braen, 1994).

In conclusion, the physiotherapist has a wide-ranging role at all stages of back pain. Early on, it is incumbent upon the physiotherapist to be able to identify patients with serious spinal pathology and refer them to the most appropriate specialist (Guillermo Pecci Saavedra, 2007). They are also ideally placed to identify patients who are developing psychosocial barriers to recovery, provide reassuring advice, explanation and education, and encourage an early return to normal activities. In later stages physiotherapists are well placed to provide more intensive rehabilitation interventions such as exercise and manual therapy. Using cognitive-behavioural techniques may maximize the benefit. Physical modalities should be used judiciously. The management of more persistent and disabling back pain is challenging and may need to focus on helping the patient to come to terms with their pain (Guillermo Pecci Saavedra, 2007). The best approach may be intensive bio psychosocial rehabilitation with functional restoration, in which physiotherapists will need to collaborate closely with other health disciplines, occupational health departments and social services (Guillermo Pecci Saavedra, 2007).

2.7 Prevention of low back pain among high school children

There is limited scope for preventing the incidence of low back pain and, overall, there is limited robust evidence for numerous aspects of prevention in low back pain. Nevertheless, there is evidence suggesting that prevention of various consequences of back pain is feasible (Burton, 2005).

However, for those interventions where there is acceptable evidence, the effect sizes are rather modest. The most promising approaches seem to involve physical activity/exercise and appropriate (biopsychosocial) education, starting by the young ages (Burton, 2005). Owing to its multidimensional nature, no single intervention is likely to be effective at preventing the overall problem of low back pain, although there is likely to be benefit from getting all the players onside (Burton, 2005).

2.7.1 Physical exercise/Physical activity

Two systematic reviews (Linton & van Tulder, 2001; Lahad, Malter, Berg & Deyo, 1994) and one primary care guideline (US Preventive Services Task Force, 2004) were found on exercise for prevention in the general population. All the authors's main conclusions were that physical exercise has a positive effect in the prevention of back pain, further episodes and work absence (Burton, 2005).

2.7.2 Information/education/training (back schools)

One systematic review (van Poppel, Koes, Smid & Bouter, 1997) found inconsistent results on the effect of information for prevention in low back pain. More recently, a controlled trial of a public health multimedia campaign found improved beliefs about

low back pain, a reduction in days off school activity/work and reduced use of the health care system (Buchbinder, Jolley & Wyatt, 2001).

2.7.3 Back schools/training

A recent Cochrane review (Heymans, van Tulder, Esmail & Bombardier, 2004) defined back school as a group intervention, conducted or supervised by a paramedical therapist or a medical specialist, which consisted of both an education/skills programme and exercises. The authors found that there was: (1) conflicting evidence on the effectiveness of back schools on further school activity/work loss; (2) limited evidence that back schools show no differences in long term recurrence rates of low back pain episodes. The authors concluded that back schools might be effective for patients with recurrent and chronic pain, with the most promising interventions being those with a high intensity (3–5-weeks stay in specialized centres) (Heymans et al., 2004).

2.7.4 Information/advice/instruction

Six reviews (Tveito, Hysing & Eriksen, 2004; Linton & van Tulder, 2001; Maher, 2000; van Poppel et al., 1997; Lahad et al., 1994) concluded that there is no effect of information, advice and instruction for preventing low back pain, episodes or costs. One review concluded that there are strong effects on recipient's knowledge of correct back posture and movements, and on knowledge of back school contents, yet the interventions had only small effects on health outcome variables and no effects on clinical variables (Maier-Riehle & Härter, 2001).

One review concluded that there was a modest relationship between training of school children and a decrease in the occurrence of low back pain or duration of school absence associated with back pain (Gebhardt, 1994). Two reviews (Linton & van Tulder, 2001; Tveito et al., 2004) noted a single, non-randomized trial that suggested that school place delivery of information targeting fear avoidance behaviour by promoting coping could shift beliefs and reduce low back pain and school/work absence (Symonds, Burton, Tillotson & Main, 1995). The most recent and comprehensive review concluded that there was limited evidence of no effect on episodes of LBP and no evidence of effect on both pain and school/work absenteeism (Tveito et al., 2004). There is contradictory evidence for the effects of educational interventions in the prevention of recurrence of low back pain (Leclaire, Esdaile & Suissa, 1996; Indahl, Haldorsen, Holm, Reikeras & Ursin, 1998; Verbeek, van derWeide & van Dijk, 2002). The educational interventions involved in those studies have a common theme; they promote the important “to stay active” message, but there is also substantial variation in the content of the interventions.

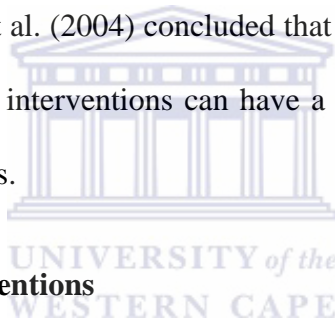
2.7.5 Physical ergonomics

Physical ergonomic interventions that include an organizational dimension, actively involving the school children and leading to substantial changes in exposure to the risk factors, might (in principle) be the most effective (Smedley, Trevelyan & Inskip, 2003; Fredriksson, Bildtc, Ha`gga & Kilboma, 2001). However, there is only limited supportive evidence from one systematic review (Westgaard & Winkel, 1997). In respect of reducing back injuries and occupational or compensable low back pain,

several studies (Owen, Keene & Olson, 2002; Brophy, Achimore & Moore-Dawson, 2001; Marras, Allread, Burr & Fathallah, 2000; Evanoff, Bohr & Wolf, 1999; Koda, Nakagiri, Yasuda & Ohara, 1997) report physical ergonomics interventions to be successful, although these studies are generally of low quality.

2.7.6 Multidimensional interventions

There is evidence from two systematic reviews (Tveito et al., 2004; Gatty, Turner, Buitendorp & Batman, 2003) that multidimensional interventions, some of which included an ergonomics component have a positive effect for prevention in low back pain. In addition, Tveito et al. (2004) concluded that comprehensive multidisciplinary and multimodal treatment interventions can have a positive effect for some, but not all low back pain outcomes.



2.7.7 School based interventions

Only five school-based intervention studies on back pain or its consequences could be located. The intervention programmes comprised a variable number of hours of education in back care principles. In a controlled trial, an independent health check 4 years after programme application tended to favour the intervention school learners, who required less medical treatment for LBP (Mendez & Gomez-Conesa, 2001). A controlled, before and after trial showed a positive short term effect of back education on back pain prevalence. This was sustained at 9 month follow-up (Cardon et al., 2002). Similarly, another controlled trial, involving a small sample of children, reported a positive effect on back pain (Feingold & Jacobs, 2002). By contrast, the educational intervention in another study did not have an effect on back pain after one

year of intervention (Storr-Paulsen, 2002). During the 3-year period analyzed in an uncontrolled intervention study, there was an overall reduction in prevalence of low back pain. Yet, recollection of participation in the prevention programme was associated with increased self-reported low back pain, although with significantly decreased utilization of medical care (Balague et al., 1996).

It can be concluded that prevention in low back pain is a societal as well as an individual concern. So, optimal progress on prevention in low back pain will likely require a cultural shift in the way low back pain is viewed, its relationship with activity and work, how it might best be tackled, and just what is reasonable to expect from preventive strategies. However, innovative studies are required to better understand the mechanisms and delivery of prevention in low back pain (Burton, 2005). Studies are needed to determine how and by whom interventions are best delivered to specific target groups.

More information is needed on what preventive interventions are currently used, and by whom, so that any disadvantageous practices may be corrected and any advantageous practices may be encouraged.

2.8 Summary of the chapter

From reviewing the literature, it is clear that LBP is a condition that is mainly caused by several factors. It affects the elderly, although it can affect people of all ages including school children. A clear picture is available of the extent of the condition as it affects populations globally. More epidemiological studies are however needed in Rwanda and other developing countries to ascertain the exact status of the disease in these countries. The main clinical features and risk factors for LBP have been well established in various studies. The literature is also clear about the positive effects of early and intensive management of low back pain patients.

Many authors recognize that the effect of LBP goes beyond the difficulties with daily activities, and they highlight that health care costs also become a big challenge. Furthermore, the preventive measures strategies to be used in prevention of low back pain among high school children are also discussed in this literature.

Chapter Three **Research methodology**

3.1 Introduction

In this chapter, the researcher provides a description of the study setting for both the quantitative and qualitative parts of the study. Research design, study population and sampling method, inclusion criteria, data collection methods, research instrument, reliability and validity, trustworthiness, data analysis, data collection procedure and ethical considerations are clearly explained in this chapter.

3.2 Research design

This study used a concurrent mixed method design of data collection utilizing both the quantitative and qualitative approaches. According to Domholdt (1993), concurrent mixed method is a multi-strand design in which both qualitative and quantitative data are collected and analyzed to answer a single type of research question either qualitatively or quantitatively. For the quantitative component, a cross-sectional descriptive study design was used in order to determine the prevalence, predisposing factors for low back pain and the management of low back pain. The descriptive study design was appropriate for describing the relationship of a phenomenon at one point in time. It is also economical and manageable within a limited time framework (Polit, Beck & Hungler, as Cited in Kamau, 2005; Domholdt, 1993). A self-completed structured questionnaire was used to collect information regarding the quantitative part of the study.

The qualitative paradigm was moreover suitable since it sought to search the individual's responsiveness and perceptions on the phenomenon under investigation. However, whereas qualitative research methodology has been criticized by many authors for the subjectivity inherent therein, it is this exceptional subjectivity that is the core focus of the study. The strength of qualitative research lies in the capacity thereof to access subjectivities and so express a sense of the individual within the participant (Parker, 1994). The qualitative method was found more appropriate for the fourth objective as qualitative research is grounded in a concern with the techniques used by health professionals in addressing low back pain; also it explores a need for education among high school children relating to health promotion to prevent low back pain (Hammell, Carpenter & Dyck, 2000). The use of qualitative methods provides participants with opportunities to tell their stories outside the boundaries of structured measurement scales, thus bringing depth and clarity to the understanding of low back pain management and need for health promotion in prevention of low back pain through education (Green & King, 2009). Semi-structured interviews were used in collection of the data for the qualitative part of the study.

3.3 Research setting

The study setting for the quantitative part of the study was the Nyamasheke district, while the study setting for the qualitative part was the Kibogora Hospital. The quantitative part of the study was conducted among high schools located in the Nyamasheke district which is one of the seven districts of the Western Province in Rwanda. It is composed of 15 sectors and each sector is divided into six cells.

The Nyamasheke district has an average number of 332 000 habitants and more than 90% of these people live of agriculture. According to a recent report from the department of Education in January 2011, Nyamasheke district has 24 high schools with an average number of 24 800 high school children. In addition, for more information from therapists, the qualitative part of the research was conducted at Kibogora hospital which is one of the two hospitals situated in Nyamasheke district. Kibogora hospital is a rural general hospital with 260 beds, serving about 200 000 people in the South West of the country and most of the patients in the Nyamesheke district are referred to this hospital.

This hospital has 216 health workers including 10 doctors and 3 physiotherapists. It has 4 main wards including Internal Medicine, Pediatrics, Maternity and Surgical wards. Also, it has other specialized department such as physiotherapy, dental, laboratory, radiology, ophthalmology, mental health, social support, nutrition department, pharmacy, VCT (Voluntary Counseling and testing) and administration. Only doctors, nurses and physiotherapists are currently involved in the management of low back pain. Kibogora Hospital is situated at 320 km away from Kigali, the capital city of Rwanda. It is on the border of lake Kivu which separates Rwanda and the country of DRC (Democratic Republic of Congo).

3.4 Study population and sampling

3.4.1 Study population

The study population consisted of all high school children registered in the Nyamasheke district high schools and all doctors and physiotherapists working at Kibogora Hospital in Rwanda.

3.4.2 Inclusion criteria

In order to be included in the study, participants had to be willing to participate, aged between 13-21 years old and registered in one of the Nyamasheke schools. In addition, all willing doctors and physiotherapists employed by Kibogora Hospital and who were involved in management of LBP were included in the study.

3.4.3 Sampling method for the quantitative part of the study

Nyamasheke district has 24 high schools with approximately 1033 children for each school. Simple random sampling was used to select ten high schools in which the study was conducted. Based on the location, four schools were selected from the nine urban schools and six schools were selected from the 15 rural schools. The ten high schools identified had 10 330 school learners. All high school children eligible to participate in the study were invited to participate. Using the Yamane formula, the study was supposed to have a target of 400 high school children aged between 13 and 21 years old (40 from each selected high school). However, in order to have sufficient representation in each age category (13, 14, 15,16,17,18, 19, 20 & 21 years old), the

study targeted a sample of 1000 high school learners (100 from each selected school) which was selected by a stratified random sampling method (age).

3.4.4 Sampling method for the qualitative part of the study

The qualitative part of this study was used to compliment the quantitative information and explored the service providers' views on the predisposing factors to low back pain, management and the need for possible health promotion strategies relating to low back pain prevention. The study sample was purposively selected from the 10 doctors and three physiotherapists employed by Kibogora Hospital. The final sample consisted of three purposively selected doctors and three physiotherapists. According to De Vos (2002), purposive sampling is based on the judgment of the researcher, in that a sample is composed of elements that contain the most characteristic, representative or typical attributes of the population. Characteristics that were considered for the purposive selection were firstly that, participants had to be involved in the management of LBP and the period of working experience was taken into consideration. These characteristics were found to be significantly related to positive or negative adjustment and development of the data (Stuifbergen & Rogers, 1997), and would contribute to a richer variation of the phenomena under study (Graneheim & Lundman, 2004).

3.5 Data collection method for quantitative study

The data among high school children was collected by means of a structured questionnaire which was aiming to determine the prevalence, predisposing factors,

need for back care education and low back pain management among high school children.

This questionnaire was designed based on the literature and expert advice and it was self-administered.

3.5.1 Research instrument for quantitative part of the study

A data gathering instrument (Appendix A) was used to collect information concerning demographic characteristics, possible predisposing factors, medical characteristics and prevention strategies used in prevention of low back pain. The questionnaire for the high school children consisted of four sections. Section one consisted of socio-demographic information such as age, gender, class, occurrence of low back pain and the period of studies in Nyamasheke district. The second section consisted of high school children's activities and institution characteristics including the predisposing factors for low back pain. The third section included questions about the treatment and back care management received for their low back pain from service providers. The last section included standardized psychophysical measures of physical stress including the impact of low back pain on their activities of daily living (ADL) and the body part discomfort index (Corlette & Bishop, 1976). In addition, this section consisted of questions regarding education about low back pain preventive measures. The questionnaire for the study was developed from the literature and questions which were used in similar studies were adopted and revised (Watson et al., 2002; Taimela et al., 1997). Questions that were relevant to the objectives of the current study were included and questions from the source

questionnaire that were not relevant to the objectives were excluded and open ended questions were changed into closed ended.

The face and content validity of the final questionnaire were tested by a panel of experts who work in the area of low back pain and work with children with low back pain. A pilot study was conducted within the study population to test the reliability of the questionnaire through a test and re-test. After reliability and validity has been established, the questionnaire was translated from English to Kinyarwanda (Appendix B) by an independent translator. It was then translated back from Kinyarwanda to English by a different independent translator to test if it was the same as the original.

3.5.2 Pilot study

The questionnaire was firstly piloted in English within the researcher's colleagues who could understand the English language. Once changes had been made, it was translated into Kinyarwanda and then assessed for clarity within the Rwandan school environment. The questionnaire was then piloted for face and content validity (clarity, understanding, and time to complete) and the reliability of the instrument. The pilot study was conducted in one high school on 100 high school children (equal representatives from all stratified ages 13-21 years old). They were selected depending on the availability and willingness, and they were excluded from the main study. They were asked orally whether the questions were clear. The time taken to complete the questionnaire was also measured and the average time was 20 minutes. Most of the questions were clearly understood, except for three questions (52, 54, & 55) which were considered to be too time-consuming.

As these questions were closed ended, the researcher had no other option. No change was done to reduce time-consuming.

Another problem was on question 29 regarding possible predisposing factors for their low back pain. They reported that the list was too short so that some important predisposing factors for them were not mentioned. Thereafter, the list was revised based on the literature.

Other problems were on questions 52, 53 and 54 where medical terms were used and some of them were difficult to understand even if they were in their language. Translation of these questions was revised by an independent translator who was good in medical terms from English to Kinyarwanda (this was a private doctor).

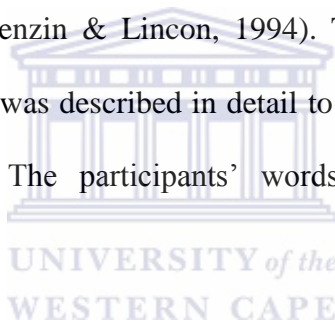
The reliability of the questionnaire was assessed by using the test-retest method. This test consists of the application of the questionnaire to the same subjects, under a similar condition, in two or more situations (LoBiondo- Wood & Haber, 1998; Polit & Hungler, 1995). It was tested with 100 students. The time interval between the two measurements was taken as two weeks (Rubin & Rubin, 2004; Kuorinka et al., 1987). The test-retest reliability was analyzed using Statistical Package for the Social Sciences (SPSS) version 19. The Cronbach's alpha was used to test for reliability. In the social sciences, a Cronbach's alpha of >0.70 is acceptable and good at >0.80 (Gliem & Gliem, 2003). The Cronbach's α for the questionnaire was 0.848 and during the time period 2, retest of the reliability was Cronbach's α 0.849 which means the consistency of the questionnaire was good.

3.6 Data collection method for qualitative part of the study

The data collection among service providers was done by means of a semi-structured interview. The semi-structured interviews was based on a loose structure consisting of open-ended questions focusing on the information that needed to be obtained initially and probing was used to pursue an idea in more detail.

3.6.1 Trustworthiness

To establish trustworthiness the concepts of credibility, transferability, dependability, and confirmability were considered as decisive factors for quality in qualitative part of this research study (Denzin & Lincon, 1994). To address the various areas of trustworthiness, the study was described in detail to convey the actual situations that have been investigated. The participants' words were interpreted and quoted verbatim.



3.6.1.1 Credibility

In order to achieve the credibility of the study, all participants (doctors and physiotherapists) were identified and described in the study in every respect (Brink, 1999). The data was triangulated through the use of field notes, transcripts, and the contribution of various participants in face to face interviews. Such a great variety of participants adequately contribute to the credibility of the findings. To enhance credibility of the qualitative data, the themes presented were illustrated with representative quotations from the transcribed texts (Graneheim & Lundman, 2004).

3.6.1.2 Transferability

To enhance transferability of the qualitative data, a clear and distinct description of the study setting, the selection and characteristics of participants, data collection and process of analysis was used (Graneheim & Lundman, 2004). According to Marshall and Rossman (1995) transferability is how the research findings can be generalized from the present representative sample to the large population and may be a source of dilemma in qualitative research. However, Polit and Hunger (1995) stated that the researcher needs to provide sufficient descriptive data so that other researchers can consider the applicability of the data to other settings.

The researcher emphasized and reinforced the transferability by ensuring that the decision trail of the research is unambiguous and comprehensive. The researcher has produced a precise description of the research methodology and data analysis process assisted by direct quotations from the interviews which is the criteria for transferability (Marshall & Rossman, 1995). The researcher provided the reader sufficient information (thick description). According to Lincoln and Guba (1985), generalization in qualitative research is the advantage of the reader because there is enough information so that the reader can make his/her own conclusions.

3.6.1.3 Dependability

A qualitative study that establishes credibility moreover establishes dependability (Polit & Hungler, 1995). In the current study, the researcher endeavored at all times to achieve this by providing satisfactory facts of participant's word for word citations to permit the reader to consider its dependability.

To address the dependability of the qualitative data, the researcher has used a code-recode procedure during data analysis as suggested by Krefting (1991).

3.6.1.4 Confirmability

To ensure confirmability of the qualitative data, a peer examination was used by the researcher discussing the research process and findings with colleagues and experts who have experience in qualitative research methods. For the same purpose, the study supervisor went through field notes and transcriptions, data reduction and analysis products (condensed notes), data reconstruction and synthesis products (thematic categories, interpretations) (Lincoln & Guba, 1985).

The aim of confirmability in qualitative research is to make the distinctiveness of the data. To achieve this aim in the current study, face to face interviews were employed in which evidence was obtained from participants about the phenomenon under investigation. Baumgartner, Strong and Hensley (2002) defined confirmability as referring to neutrality or impartiality of the data whereas Polit and Hunger (1995) defined confirmability as signifying that the data are sincere and reliable.

3.7 Data collection procedure

The initial procedure started by obtaining permission and ethical clearance from the UWC Research Grant and Leave Committee and UWC Higher Degrees Committee. Permission was then obtained from all concerned in Rwanda starting from the Ministry of Health through the Rwanda National Ethics Committee, the Ministry of Education, the director of Kibogora Hospital and all concerned directors of high

schools located in Nyamasheke district. After receiving the requested permission, three research assistants were recruited and trained by the principal researcher so that they could help in data collection. After the recruitment, the following data extraction strategies were used in order to avoid bias and increase inter- and intra- reliability. Firstly, the research assistants had enough training and practical sessions before starting data collection. During the training process, the researcher and the research assistants discussed the data elements as suggested by Banks (1998). Then, the data collection was done in two parts including quantitative and qualitative data collections.

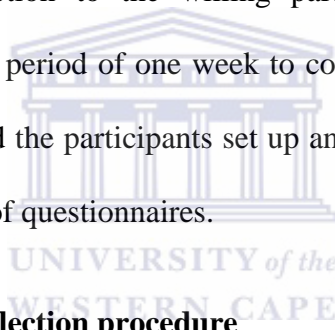
3.7.1 Quantitative data collection procedure

Before the research assistants could begin the collection of quantitative data for the study, they were involved in pilot study which was conducted in one of the high schools of Nyamasheke district, but this school was not included in the main study.

The researcher then checked to ensure that the data gathering instruments were completed correctly. The research assistants were advised at the beginning that their work will be checked for accuracy (Worster & Haines, 2004).

The first visit was done to each selected high school and hospital for making an appropriate appointment with the directors of schools and hospital. An appropriate room was requested and obtained from each institution for a period of the meeting so that the participants and the researchers can meet there. At the beginning of every meeting, the researcher introduced himself and the three research assistants.

The study was verbally explained to all participants and an information sheet with further details about the study was also given to the participants. Participants were assured about the confidentiality and anonymity of information received from them and they were assured that they have the right to withdraw from the study any time without any negative effect. The investigator requested the administration of high schools to inform the learners' parents/guardians about the study on behalf of the investigator, in order to obtain informed parental consent. Informed written consent was obtained from all participants. And then, the questionnaires were distributed and explained section by section to the willing participants. All participants were informed that they have a period of one week to complete the questionnaire. Before leaving, the researcher and the participants set up another appointment to meet at the same place for collection of questionnaires.



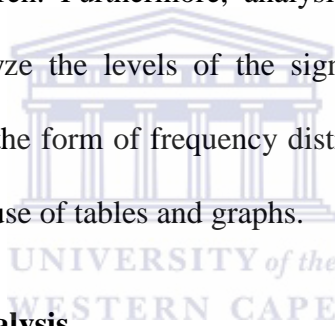
3.7.2 Qualitative data collection procedure

After signing an informed written consent form, semi-structured interviews were conducted with the willing participants from service providers at their convenient time and at an agreed venue. Each interview lasted at least 30 minutes. A predetermined semi-structured interview guide was used to direct the interviews. A probing technique was used to clarify the participant's responses and to obtain more information (Britten, 1995). The researcher facilitated the interview while notes were being taken by one trained research assistant whereas another research assistant was recoding using a tape-recorder. The interviews were conducted in Kinyarwanda and then translated in English by an independent translator.

3.8 Data analysis

3.8.1 Quantitative data analysis

For the quantitative data from high school children, the software SPSS version 19.0 for windows and the Microsoft Excel 2010 were used to analyze the data, where descriptive statistics were used to summarize the prevalence, predisposing factors, need for back care education and the treatment techniques used in low back pain management. In addition, inferential statistics such as chi-square test were used to examine the significant relationships between predisposing factors and low back pain among high school children. Furthermore, analysis using Logistic regression and Wald were used to analyze the levels of the significant predictor variables. The results were presented in the form of frequency distributions, percentages, mean and standard deviation by the use of tables and graphs.



3.8.2 Qualitative data analysis

Data obtained from the interviews were analyzed manually. After the interviews, the tape-recorded interviews in Kinyarwanda were transcribed in full by the researcher. The transcriptions were read and compared to audio tape recordings and field notes several times to verify accuracy (Neumann, 2000). A trained, multilingual translator translated the transcriptions into English and the researcher analyzed those transcriptions to identify the main patterns of responses and consistencies and divergences across participants (Jones, 1985). Another independent translator translated the transcriptions from English to Kinyarwanda in order to verify if it is

still the same as the original one. This process involved familiarization with the material on several readings.

Common concepts were coded as suggested by Miles and Huberman (1984), producing themes (Ritchie & Spencer, 1994) that were then classified into broader categories.

Two weeks after the initial coding, another separate coding was done and the generated themes and categories in the second coding were then compared with the initial coding. This led to further refinements, producing themes and categories that were interpreted for the meaning of the content. The use of code-recode procedure increases the trustworthiness of the results (Mays & Pope, 1995). After the themes and categories had been developed, a further trustworthiness check was made by searching the transcripts for content that could disprove the primary findings, as suggested by Phillips (1987) but no disproof was found. The participants have been coded to protect their anonymity.

3.9 Ethical considerations

Permission to conduct this study was obtained from the Higher Degree Committee and Ethical Clearance from the Research Grant and Study Leave Committee at the University of the Western Cape in South Africa (Appendix E). Then, the permission was obtained from the Ministry of Education (Appendix G) and the Ministry of Health through the National Ethics Committee in Rwanda (Appendix F), the director of Kibogora Hospital (Appendix H) and the directors of all high schools in which the

study was conducted in Nyamasheke district in Rwanda (Appendix I & J). Individual participants were also requested for their participation through information statement form which clarified about the study and its importance (Appendix M & O).

An information sheet for the Parents/guardians (Appendix K) and the participants (Appendix M & O) were translated in Kinyarwanda (Appendix L, N & P), the language used by participants and their parents/guardians. They were given to all parents/guardians and participants for them to read or to be read to them because some parents/guardians were illiterate. The investigator requested the directors of high schools to inform the participant's parents/guardians about the study on behalf of the investigator.

Willing participant school learners under the age of 21 years old were requested to confirm their voluntary participation by signing an assent form translated from English to Kinyarwanda (Appendix S & T). It was recommended by Rwanda National Ethics Committee that all children under 21 years old should be considered as minor children. Children aged of 21 years old and service providers confirmed their participation by signing a consent form also translated from English to Kinyarwanda (Appendix U & V). All participants were assured of their rights to withdraw at any stage of the study without any negative effect. They were assured of high confidentiality of the information obtained. They were requested to do not indicate their names or any identifying marks on the survey forms to ensure anonymity. The participants agreed to participate in the study and signed the participant consent or assent form depending on the participant's age.

The three research assistants also signed a confidentiality agreement form (Appendix W). The participants were assured that if anything happened to upset them, counseling services were available to them. Although, during the study no participant needed counseling.

The final version of the study results will be made available to the University of the Western Cape in South Africa, Ministry of Health, Ministry of Education and Kibogora Hospital in Rwanda. Also the school learners will get the feed-back of the study through the summary of conclusions and recommendations which will be made available to all high schools in which the study was conducted.

3.10 Summary of the chapter

In this chapter, the study setting including Nyamasheke District and Kibogora Hospital was described. The study population and sampling methods including inclusion criteria are clearly described in this chapter. The researcher highlighted the methods employed in both parts of the study.

The first part consisted of a quantitative approach by collecting data from high school children with a data gathering instrument developed (modification of an instrument used in the same study) by the researcher to get information regarding the prevalence and management of low back pain among high school children. The quantitative results were analyzed using descriptive and inferential statistics. The second part of the study consisted of a qualitative phenomenological approach using semi-structured interviews to explore the need of health promotion through education as low back

pain preventive measures among high school children. After the qualitative data collection from service providers of Kibogora Hospital, a thematic analysis was done. Finally, the ethical considerations pertaining to the current study are also included in this chapter.

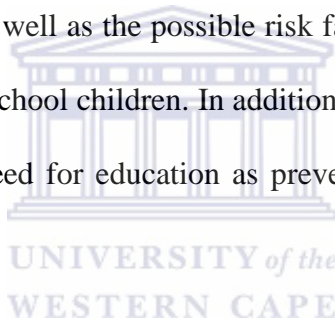


Chapter four

Quantitative data results

4.1 Introduction

In this chapter, both descriptive and inferential statistic results of the study are presented. The quantitative results of the socio-demographic characteristics of the study population are presented. This is followed by the inferential statistic results of the relationships and associations found between some of the demographic/background characteristics with the pain experienced for the most symptomatic low back pain. Then, back pain prevalence is presented across the age, year levels and gender, as well as the possible risk factors influencing the prevalence of back pain among high school children. In addition, impact of low back pain as well as its management and need for education as preventive measures are presented in this chapter.



4.2 Demographic characteristics of the participants

A total of 1000 questionnaires were distributed of which 962 were returned, yielding a response rate of 96.2%. The demographic data of the participants are presented in Table 4.1. The participants consisted of 498 males and 464 females with a mean age of 17 years (S.D = 2.4 years).

Table 4.1 Demographic data of participants (n = 962)

Variable	N	%
Gender		
Males	498	51.8
Females	464	48.2
Age group		
13-15	306	31.8
16-18	322	33.5
19-21	334	34.7
Localization		
Rural	581	60.4
Urban	381	39.6
Education level		
1st form	141	14.8
2nd form	135	14.0
3rd form	180	18.8
4th form	124	12.8
5th form	192	19.9
6th form	190	19.7



4.3 Levels of physical activity

Table 4.2 shows the levels of physical activity among high school children including walking, cycling and physical activity at/outside of the school including sport for competition or just for hobbies. Based on table 4.2 according to the various aspects to classify physical activity and physical inactivity, according to mode of transport 27% were inactive. In addition, according to participation in physical education 84% were inactive and participating in physical activities outside of school 79% were inactive.

Table 4.2 Levels of physical activity (n = 962)

Mode of transport (N = 962)	N	%
<i>Physically active (n=701)</i>	701	72.9
Walk all the days	480	68.5
Walk some of the days	221	31.5
<i>Physically inactive (n=261)</i>	261	27.1
Car	30	11.5
Taxi	117	44.8
Bicycle	28	10.7
Boat and other methods	86	33
Number of hours used for physical education at school/week		
<i>Physically inactive (n=805)</i>		
0 - 3 hours/week	805	83.7

<i>Physically active(n=157)</i>	157	26.3
4 - 6 hours/week	127	80.9
7 - 9 hours/week	30	19.1
Number of Sporting/physical activities outside school		
<i>Physically inactive (n=764)</i>	764	79.4
Never	200	26.2
1 - 2 days/week	564	73.8
<i>Physically active (n=198)</i>	198	20.6
3 - 4 days/week	168	84.8
5 - 7 days/week	30	15.2
Contribution to levels of activities		
<i>Number of hours spent on TV or on computer(n=962)</i>		
Less than 1hour/day	806	83.8
1 - 2 hours/day	136	14.1
3 - 4 hours/day	20	2.1
<i>Part-time job(n=962)</i>		
Have part-time job	37	3.8
Do not have part-time job	925	96.2

4.4 Levels of physical activity according to gender

Table 4.3 highlights a strong relationship between the various aspects of physical activity and gender. In addition, it was found that males were more active than females but high percentages in both genders were inactive.

Table 4.3 Levels of physical activity according to gender (n = 962)

Variables	Gender			
	Male (n=498)		Female (n=464)	
	N	%	N	%
Mode of transport (n = 962)(p=0.000)				
<i>Physically active (n=701)</i>	346	69.5	355	76.5
Walk all the days	240	48.2	240	51.7
Walk some of the days	106	21.3	115	24.8
<i>Physically inactive(n=261)</i>	152	30.5	109	23.5
Car	17	3.4	13	2.8
Taxi	80	16	37	8
Bicycle	12	2.4	16	3.4
Boat and other methods	43	8.6	43	9.3
Number of hours used for physical education at school/week (p = 0.000)				
<i>Physically inactive</i>				
1 - 3 hours/week	404	42.0	401	41.7

<i>Physically active (n=157)</i>	94	18.9	63	13.6
4 - 6 hours/week	76	15.2	51	11
7 - 9 hours/week	18	3.6	12	2.6

Number of hours used for Sporting/physical activities outside school (n=962) (p = 0.000)

<i>Physically inactive (n=764)</i>	367	73.7	397	85.6
Never	88	17.7	112	24.1
1 - 2 days/week	279	56	285	61.4

<i>Physically active (n=198)</i>	131	26.3	67	14.4
3 - 4 days/week	118	23.7	50	10.8
5 - 7 days/week	13	2.6	17	3.6

Total hours used for exercises (including sport at school and outside of school) (n = 935) (p=0.000)

<i>Physically inactive(n=465)</i>				
0 - 3 hours/ week	229	46	236	50.9
<i>Physically active (n=470)</i>	254	51	216	46.5
4 – 6 hours/ week	229	46	201	43.3
More than 6 hours/ week	25	5	15	3.2

Contribution to levels of activities

Number of hours spent on TV or on computer (n=962) (p=0.891)

Less than 1hour/day	419	84.1	387	83.4
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1 - 2 hours/day	65	13	71	15.3
3 - 4 hours/day	14	2.8	6	1.3
Part-time job (n = 962) (p= 0.001)				
Have part-time job	19	3.8	18	3.9
Do not have part-time job	479	96.1	446	96.1

4.5 Levels of physical activity according to age

Table 4.4 indicates levels of physical activity according to age group among high school children. In general results show that the level of physical activity is at a low level in all age groups. Only in walking more than 70% of children in all age groups are active because they have to walk to and from school.

Table 4.4 Levels of physical activity according to age (n = 962)

Mode of transport (n = 962) (p=0.004)	Age group					
	13 – 15 years(n=306)		16 – 18 years (n=322)		19 – 21 years (n=334)	
	N	%	N	%	N	%
Physically active (n=701)	217	70.9	230	71.4	254	76
Walk all the days	156	50.9	187	58.1	137	41
Walk some of the days	61	20	43	13.3	117	35
Physically inactive (n=261)	89	29.1	92	28.6	80	24
Car	10	3.3	10	3.1	10	3
Taxi	21	6.9	46	14.3	50	15

Bicycle	18	5.9	10	3.1	0	0.0
Boat and other methods	40	13.1	26	8.1	20	6

Number of hours used for physical education at school/week (n = 962) (p=0.001)

Physically inactive (n=805)

1 - 3 hours/week	282	92.2	299	92.8	224	67
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<i>Physically active (n=157)</i>	24	7.8	23	7.1	110	33
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4 - 6 hours/week	24	7.8	23	7.1	80	24
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7 - 9 hours/week	0	0.0	0	0.0	30	9
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Number of Sporting/physical activities outside school (n=962) (p=0.000)

<i>Physically inactive (n=764)</i>	286	93.5	293	91	185	55.4
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Never	80	26.1	90	28	30	9
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1 - 2 days/week	206	67.3	203	63	155	46.4
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<i>Physically active (n=198)</i>	20	6.5	29	9	149	44.6
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3 - 4 days/week	20	6.5	19	5.9	129	38.6
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5 - 7 days/week	0	0.0	10	3.1	20	6
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Total hours used for exercises (including sport at school and outside of school)

(n = 935) (p=0.000)

Physically inactive (n=465)

0 - 3 hours/ week	110	35.9	200	62.1	155	46.4
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<i>Physically active (n=370)</i>	181	59.2	110	34.2	179	53.6
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4 – 6 hours/ week	171	55.9	110	34.2	149	44.6
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More than 6 hours/ week	10	3.3	0	0.0	30	9
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Number of hours spent on TV or on computer (n=962) (p=0.719)

Less than 1hour/day	226	73.9	287	89.1	293	87.7
1 - 2 hours/day	70	22.9	35	10.9	31	9.3
3 - 4 hours/day	10	3.3	0	0.0	10	3

Part-time job (n = 962) (p=0.000)

Have part-time job	34	11.1	3	0.9	0	0.0
Do not have part-time job	272	88.9	319	99.1	334	100

4.6 Level of physical activity according to the localization of the school

Table 4.5 indicates levels of physical activity in relation to the localization of the school either in urban or rural region. From the current results levels of physical activity or inactivity is similar among children in the rural and urban areas.

Table 4.5 Level of physical activity according to the localization of the school (n=962)

Variables	Rural (n=581)		Urban (n=381)	
	N	%	N	%
Mode of transport (n = 962)				
(p=0.007)				
Physically active (n=701)	425	73.1	276	72.4
Walk all the days	297	51.1	183	48
Walk some of the days	128	22	93	24.4
Physically inactive (n=261)	156	26.9	105	27.6
Car	16	2.7	14	3.7
Taxi	68	11.7	49	12.9

Bicycle	16	2.7	12	3.1
Boat and other methods	56	9.6	30	7.9

Number of hours used for physical education at school/week (p=0.018)

Physically inactive

1 - 3 hours/week	485	83.5	320	84
<i>Physically active</i>	96	16.5	61	16
4 - 6 hours/week	79	13.6	48	12.6
7 - 9 hours/week	17	2.9	13	3.4

Number of Sporting/physical activities outside school (p=0.003)

<i>Physically inactive (n=764)</i>	458	78.9	306	80.3
Never	116	20	84	22
1 - 2 days/week	342	58.9	222	58.3
<i>Physically active (n=198)</i>	123	21.1	75	19.7
3 - 4 days/week	102	17.5	66	17.3
5 - 7 days/week	21	3.6	9	2.4

Total hours used for exercises (including sport at school and outside of school)

(n = 935) (p=0.000)

Physically inactive

0 - 3 hours/ week	288	45.6	177	46.4
<i>Physically active</i>	280	48.2	190	49.8
4 – 6 hours/ week	260	44.8	170	44.6
More than 6 hours/ week	20	3.4	20	5.2

Contribution to level of activity

Number of hours spent on TV or on computer (p= 0.000)

Less than 1hour/day	498	45.7	308	80.8
1 - 2 hours/day	72	12.4	64	16.8
3 - 4 hours/day	11	1.9	9	2.4

Part-time job (p=0.006)

Have part-time job	15	2.6	22	5.8
Do not have part-time job	566	97.4	359	94.2

4.7 Frequencies of low back pain among high school children

Table 4.6 indicates levels and localization of pain including low back pain. Other pain indicated were mostly headaches and pain all over the body. Most of the participants (73%) reported that within the past month have had some aches or pain which lasted for one day or longer. In addition, 66.1% reported that they have experienced low back pain. Within the past month, 99.8% (635/636) participants reported that they experienced LBP which lasted for one day or longer. Pain which spread down legs was reported by 21% and 12% usually take pain killers. Pain all over the body was reported by 9%.

Table 4.6 Levels and localization of pain

Variables	No		Yes	
	N	%	N	%
Aches/pains over the past month (n = 962)	251	26.1	702	73
Localization of pain (n = 962)				
Low back pain (n=962)	326	33.9	636	66.1
Headaches (n = 962)	688	71.5	274	28.5
Pain somewhere else (n = 962)	608	63.2	354	36.8
Pain all over the body (n = 962)	855	88.9	87	9.0
LBP for one day or longer in the past month (n = 636)	1	0.2	635	98.8
Pain spread down to legs (n = 636)	502	78.9	134	21.1
Usually take painkillers (n = 627)	552	88.0	75	12.0

4.8 Description of low back pain

Table 4.7 highlights the pattern of the occurrence of LBP amongst the participants. Approximately 81% have suffered from LBP for more than 3 months. 33% are aware of their pain throughout the day. Of those with LBP, 25% reported a year prevalence and approximately 14% reported a one month prevalence.

The majority of the high school children ($263/635 = 41.4\%$) who had LBP reported that the first onset started during the age group of 12-14 years old. The minimum age of the first occurrence of LBP was reported to be 9 years old and the maximum age was 19 years old giving the mean age of 14.5(SD = 2.28).

Table 4.7 Description of low back pain (n=636)

Onset of pain (n = 615)	N	%
Less than 3 months ago	115	18.7
More than 3 months ago	500	81.3
Missing	21	3.3
Description of Low back pain (n = 635)		
Aware of pain all through the day	210	33.1
Pain comes and goes through the day	272	42.8
Short spell of pain for few minutes	153	24.1
Missing	1	0.1
Days of LBP over the past month (n = 636)		
0 - 5 days	300	47.2
6 - 10 days	191	30.0
11 - 15 days	95	14.5
16 - 20 days	30	4.7
21 - 25 days	10	1.6
26 -31 days	10	1.6

Duration of LBP when it occurs (n = 636)

< than 12 hours	152	23.9
12 – 24 hours	163	25.6
1 – 7 days	214	33.6
>Than 1 week	107	16.8

Onset of the episode of LBP (n= 636)

< than 1 month ago	31	4.9
1 – 3 months	77	12.1
3 – 12 months	153	24.1
>1 year	375	59.0

Age of the first occurrence of LBP (n = 635)

9 – 11 years old	37	5.8
12 – 14 years old	263	41.4
15 – 17 years old	247	38.9
18 – 19 years old	88	13.9
Missing	1	0.1

One year prevalence (n=962)

245 25.4

One month prevalence (n=962)

132 13.7

4.9 Pain according to Visual Analogue Scale

Table 4.8 indicates the pain reported according to VAS and the comparison between mild, moderate and severe pain. Participants were asked to rate their pain on a scale of 0-10. Table 4.8 highlights that almost 18% and 14% of those who suffered from low back pain experienced severe pain rated 9 and 10 respectively.

Table 4.8 Pain according to Visual Analogue Scale

Pain scale	0	1	2	3	4	5	6	7	8	9	10	Total
Frequency	1	9	28	39	80	75	79	56	66	115	88	636
Percent	0.2	1.4	4.4	6.1	12.6	11.8	12.4	8.8	10.4	18.1	13.8	100

4.10 Low back pain according to gender, age, localization and education level

Table 4.9 indicates that participants experienced pain differently in relation to their categories including their gender, age, localization of the school and their level of education.

Results indicate that there is no association between low back pain and gender ($p=0.232$). However, males reported low back pain more than females with the percentage of 53.1% and 46.9% respectively. There is significant relationship between age group and low back pain ($p = 0.000$).

High school children with advanced age group (19-21 years old) were the most to report low back pain with the percentage of 44.8% compared to 24.4% of the age group 13 – 15 years old and 30.8% of middle age.

No association was observed between low back pain and localization of the school ($p=0.337$). However, high school children from the rural region reported low back pain much more than those from urban region with 61.5% against 38.5% respectively.

Considering the level of education in which they were, there is significant relationship between low back pain and level of education ($p = 0.000$). High school children of the 6th form were the most to report low back pain with 23.5% followed the 5th form with 22.8%.

Table 4.9 Low back pain according to gender, age, localization and education level (n=636)

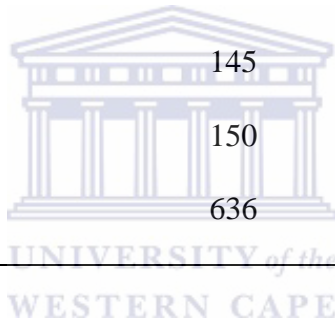
Low back pain	Yes	
	N	%
Gender (p = 0.232)		
Male	338	53.1
Female	298	46.9
Total	636	100
Age group (p = 0.000)		
13-15 years	155	24.4
16-18 years	196	30.8
19-21 years	285	44.8
Total	636	100

Localization (p = 0.337)

Rural	391	61.5
Urban	245	38.5
Total	636	100

Education level (p = 0.000)

1 st form	85	13.3
2 nd form	78	12.3
3 rd form	117	18.4
4 th form	61	9.6
5 th form	145	22.8
6 th form	150	23.5
Total	636	100



In summary, the present study indicates that the prevalence of low back pain among high school children in Nyamasheke district was high (66.1%) and the majority of them reported that they had experienced severe pain. No association was found between low back pain and gender. However, males reported low back pain much more than females. Although, high school children with advanced age group (19-21 years old) were the most to report low back pain and children of the 6th form reported a high percentage of low back pain compared to the others. Moreover, high school children from the rural region reported low back pain much more than those from urban region.

4.11 Low back pain and sport participation

Table 4.10 indicates the relationship between low back pain and the number of hours used per week for sport participation. It is highlighted that there is significant relationship between low back pain and sport participation ($p = 0.000$). The majority of participants (76.9%) who reported to have LBP were physically inactive in sport participation. Only, they never participate or use less than 3 hours/week in sport participation. Only, 23.1% of those with LBP are physical active in sport using the time of 4-9 hours/week.

It can be hypothesized that participation in sport may reduce the risk of getting low back pain. In summary, the present study shows that physical activity participation has an impact on low back pain among high school children.

4.12 Predisposing factors for low back pain

Table 4.10 below indicates the reported predisposing factors for low back pain among high school children including lifting/carrying heavy items, sporting activity participation, posture (sitting/ standing position, pack pack-related factors and psychological factors.

It is indicated that most of the participants reported more than one predisposing factor to be behind their low back pain. A strong relationship was found between low back pain and posture (sitting and standing position) ($p=0.000$) with 83.2% (529/636).

It is followed by back pack-related factors (79.4%) which is also strongly associated with low back pain ($p=0.000$). Then, physical activity such as lifting or carrying heavy items is also found to be in relationship with low back pain and it was reported

as predisposing factor at 70.9%. Also injury mostly falling down was reported at 67.9% as predisposing factors for and associated with low back pain ($p=0.000$).

There are other predisposing factors found to be significantly associated to low back pain ($p=0.000$) such as working after class, psychological factors, sporting activity participation and eating habits which include irregular meals and malnutrition.

In summary, the results indicated that there is a strong relationship between the predisposing factors and low back pain. These predisposing factors include factors related to physical activity, psychological factors or environmental factors.

Table 4.10 Predisposing factors for low back pain (n =636)

Predisposing factors	Yes		No		P
	N	%	N	%	
Lifting/carrying heavy items	451	70.9	185	29.1	0.000
Injury (falling down)	432	67.9	204	32.1	0.000
Sporting activity participation	232	36.5	404	63.5	0.000
Posture (sitting/ standing position)	529	83.2	107	16.8	0.000
Back pack-related factors	505	79.4	131	20.6	0.000
Sedentary activities (TV, Computer)	85	13.4	551	86.6	0.767
Working (after class hours)	418	65.7	218	34.3	0.000
Psychological factors	354	55.7	282	44.3	0.000
Smoking	45	7.1	591	92.9	0.000

Alcohol abuse	40	6.3	596	93.7	0.000
Eating habits (irregular meals, malnutrition)	112	17.6	524	82.4	0.000
Other factors	265	41.7	371	58.3	0.000

Further analysis using Logistic regression was used to analyze the levels of the significant predictor variables. As indicated in table 4.11 analyses were undertaken to determine which of the predictor variables (lifting/carrying heavy items, posture(sitting position), backpacks related, home work after class, psychological factors, smoking and alcohol abuse) best predicted low back pain. An examination of the Wald statistics revealed that lifting has a significant relationship with low back pain suggesting that increase in lifting heavy items would predict an increase in low back pain. This means that children involved in lifting the odd's ratio of having low back pain increase by 9.205 than those who are not involved in such activities. Furthermore, the results indicated that if individual is taking prolonged posture in sitting position, the odds of having low back pain was 10.475.

Table 4.11 Wald statistics of predisposing factors for low back pain

	B	S.E.	Wald	Sig.	Exp(B)	95% C.I. for EXP(B)	
						Lower	Upper
Lifting/carrying	2.220	0.518	18.346	0.000	9.205	3.333	25.418
Posture/sitting position	2.349	0.525	20.028	0.000	10.475	3.744	29.306
Backpack-related	0.929	0.376	6.093	0.000	2.532	1.211	5.296
Home work	-.971	0.262	13.736	0.000	0.379	0.227	0.633
Psychological factors	-1.565	0.228	46.988	0.000	0.209	0.134	0.327
Smoking	-1.149	0.254	20.515	0.000	0.317	0.193	0.521
Alchol abuse	-3.359	0.444	57.119	0.000	0.035	0.015	0.083
Gender(1)	-1.631	0.284	32.885	0.000	0.196	0.112	0.342

4.13 Impact of low back pain

The impact of low back pain include medical costs, missing class when attending medical services and difficult to perform normal usual activities.

4.13.1 Medical service attendance and medical costs (n=636)

Results indicated that nurses were the most to be visited by school learners with low back pain, followed by doctors and then physiotherapists. More than the half of the participants who had low back pain, 50.6% visited the doctor at least once during

the period of last year. Only, 35.4% participants had physiotherapy service for their low back pain.

Of the participants with back pain, 66.9% have visited nurses at least once in the last year for low back pain. In addition, 25% reported that they have been treated somewhere else mostly by traditional healers.

4.13.2 Missing school due to low back pain

Table 4.12 indicates the impact of low back pain on school attendance, including school activities such as lessons, physical education at school, sporting hobby and job or home activities.

Findings of the present study highlights that participation restriction is a major impact of low back pain on high school children. Five hundred and twenty six participants (82.7%) reported that during the last academic year they were absent from the class because of their low back pain. Then, 70.3% could not attend physical education at school at least once within the last year period. 63.7% were absent from a sporting hobby that they were supposed to attend. A percentage of 49.8% reported that they have been absent from their part-time job or from home activities because of their low back pain.

Table 4.12 Missed activities within the last year (n=636)

Activities	N	%
School activities	447	70.3
Physical education at school	526	82.7
Sport participation for hobbies	405	63.7
Part-time job/home activities	317	49.8
Other activities	278	43.7

4.13.3 Impact of low back pain on activities of daily living

Table 4.13 below indicates that low back pain has an impact on daily living activities of high school children either at school or at home. This impact can lead to activity limitations and participation restriction. At school some of the children with low back pain indicated that they experienced difficulty in reaching out to get a book from a high shelf, while others had problems to carry their school bags. It was also indicated that some of the learners had problems to clean their teeth over a wash basin at home. Findings indicate that there is a significant association between low back pain and activity limitations ($p=0.000$); difficult to sit on a chair for 45 minutes ($p=0.000$) was reported at 78.5%, to carry items such as school bags or other heavy items ($p=0.000$), difficult in sport activities ($p=0.000$), to run fast ($p=0.000$), to stand in a queue for 10 minutes ($p=0.000$), to clean teeth over a wash basin ($p=0.000$).

Table 4.13 Impact of low back pain on functional activities (n = 636)

Difficulties	Yes		NO		P
	N	%	N	%	
To reach out to get a book from a high shelf	162	25.5	474	74.5	0.000
To carry items such as school bags or other heavy bags	473	74.4	163	25.6	0.000
To clean teeth over a wash basin	424	66.7	212	33.3	0.000
Sit on a chair for 45 minutes	499	78.5	137	21.5	0.000
To stand in a queue for 10 minutes	405	63.7	231	36.3	0.000
To sit up from a lying position	240	37.7	396	62.3	0.000
To bend down to put socks on	409	64.3	227	35.7	0.000
To stand up from an armchair at home	279	43.9	357	56.1	0.000
To run fast to catch a taxi	398	62.6	238	37.4	0.000
Difficulty in sport activities	418	65.7	218	34.3	0.000

4.13.4 Impact of low back pain on sleeping

Table 4.14 indicates the impact of low back pain on sleeping of high school children either at school or at home.

The current study indicates that low back pain has impacts in different ways including sleeping problems. Only, 9.4% had no problem of falling asleep but others reported the problem, but at different extents.

Eighty seven (13.7%) had difficulty falling asleep a few times per year (seldom) and 41.2% reported to have that problem few times per month (sometimes). However, 16.4% had difficulty falling asleep several times a week (often) and 19.3% reported the same problem every day (always).

Table 4.14 Impact of low back pain on sleeping (n = 636)

Difficulties	Never		Seldom		Sometimes		Often		Always	
	N	%	N	%	N	%	N	%	N	%
Difficulty falling asleep	60	9.4	87	13.7	262	41.2	104	16.4	123	19.3
Difficulty waking up	79	12.4	58	9.1	233	36.6	172	27.0	94	14.8
Difficulty falling back to sleep	50	7.9	98	15.4	214	33.6	120	18.9	154	24.2
Nightmares	159	25.0	67	10.5	133	20.9	190	29.9	87	13.7
Not refreshed when wake up	96	15.1	95	14.9	188	29.6	153	24.1	104	16.4
Wake up too early	58	9.1	145	22.8	191	30.0	107	16.8	135	21.2
Disturbed sleep	137	21.5	59	9.3	136	21.4	209	32.9	95	14.9
Tired during studies	49	7.7	47	7.4	148	23.3	202	31.8	190	29.9

In summary the overall impact of low back pain on this study sample was observed in activity limitation and participation restriction. Activity limitation included activities of daily living such as cleaning teeth over a wash basin and bending down to put socks on. Participation restriction includes school attendance, school activities such as lessons, physical education at school, sporting hobby and job or home activities.

In addition, low back pain has an impact on sleeping of high school children either at school or at home. Finally, low back pain has an impact on financial status, eg. to pay medical services. It also has psychological impact.

4.14. Management of low back pain

4.14.1 Approaches used in management of low back pain

The table 4.15 indicates the techniques used in management of low back pain. In addition it indicates how those techniques are appreciated by the participants. Techniques used in management of low back pain are, medical treatment (medication), cortisone injection, physical therapy, muscle relaxation training, electrical modalities, supportive dialogue, and massage. Operations are not commonly used in management of low back pain. Some techniques are reported to be more useful for some participants but not as helpful for the others. Some of the participants reported that they had such treatment, but without improvement. Others indicated that there were improvement and for some with considerable improvement.

In summary, findings of the current study indicate that the majority of children with LBP did not receive any treatment.

Table 4.15 Different techniques used by service providers to address LBP (n = 636)

Management approaches	No such treatment		Yes, without improvement		Yes, with some improvement		Yes, with considerable improvement	
	N	%	N	%	N	%	N	%
	Medical treatment	197	31.0	168	26.4	262	41.2	9
Operation	636	100.0	0	0	0	0	0	0
Cortisone injection	559	87.9	59	9.3	9	1.4	9	1.4
Physical therapy	355	55.8	113	17.8	149	23.4	19	3.0
Relaxation training	353	55.5	153	24.1	112	17.6	18	2.8
Electrical modalities	489	76.9	37	5.8	91	14.3	19	3.0
Supportive dialogue	400	62.9	114	17.9	113	17.8	9	1.4
Massage	374	58.8	59	9.3	149	23.4	54	8.5
Other treatments	599	94.1	28	4.4	9	1.4	0	0

4.14.2 Drugs used in management of low back pain

The table 4.16 indicates that drugs such as analgesics, sedatives and antidepressants are sometimes used in management of low back pain.

Drugs to alleviate the pain are not commonly used. Sedatives and antidepressants are only used more seldom by 11.5% for each, whereas 17.9% have used analgesics more seldom. In addition, the majority of the participants, 72.2% reported that they have never taken antidepressant, 64.5% did not use sedative drugs and 34.3% could not take analgesic drugs.

Table 4.16 Drugs to alleviate the pain (n = 636)

How often	Not at all		Several times		Every day		Every other day		Some days a week		More seldom	
	N	%	N	%	N	%	N	%	N	%	N	%
Analgesics	218	34.3	105	16.5	87	13.7	27	4.2	76	11.9	123	17.9
Sedatives	410	64.5	77	12.1	38	6.0	18	2.8	20	3.1	73	11.5
Antidepressant	459	72.2	57	9.0	9	1.4	10	1.6	28	4.4	73	11.5

In summary, most of the participant reported that they have not attended any medical service for their low back pain. However, some of the participants reported that they have received some treatment including simple medication and physiotherapy.

Most of them did not receive any drugs for their low back pain and none of the participants has been operated.

4.15 Preventive measures for low back pain

The table 4.17 indicates the level of education given by service providers in prevention of low back pain among high school children.

Regarding the preventive measures used in prevention of low back pain, findings of the study highlight that education is still at low level. However, this is not surprising considering that no treatment was received by most of the school children with low back pain. If treatment is not affordable even education cannot be affordable. Only 49.1% reported that they have been educated about proper sitting position in prevention of low back whereas 50.9% have never been educated about proper sitting position.

Other preventive measures reported, are sitting with backs supported (36.8%), carrying backpacks over both shoulders (12.4%), advice on physical activities (35.8%), advice on muscle stretching exercises (18.5%), advice on muscle strengthening exercises (11%). Education on the use of health services, exercises and health lifestyle, causes, diagnosis and prognosis of low back were reported to be done at 8.8%, 7.9% and 5.3% respectively.

Table 4.17 Education given as preventive measures for LBP (n = 636)

Type of education	No		Yes	
	N	%	N	%
Proper sitting position	324	50.9	312	49.1
Sitting with backs supported	402	63.2	234	36.8
Back bags over both shoulders	557	87.6	79	12.4
Advice on physical activities	408	64.1	228	35.8
Advice on stretching exercises	518	81.5	118	18.5
Advice on strengthening exercises	566	89	70	11
Education on the use of health services	580	91.2	56	8.8
Education on exercises and health life style	586	92.1	50	7.9
Education on causes, diagnosis, prognosis of LBP	602	94.7	34	5.3

In conclusion, the level of education in health promotion as preventive measures of low back pain is still at low level.

4.16 Summary

The overall aim of this study was to determine the prevalence of, predisposing factors for and management of low back pain among high school children in Nyamasheke District in Rwanda. Furthermore, the study aimed at exploring if there is a need for education among high school children relating to health promotion strategies to prevent low back pain. According to the results, there is a high prevalence of low back pain. Statistical test however showed no significant relationship between low back pain and gender, localization of the school and sedentary activities. Nonetheless a significant relationship was found between low back pain and age and sport participation. Besides, physical activity was associated with the demographic characteristics to identify if there was any relationship. A strong relationship was highlighted between the various aspects of physical activity and gender and age. In addition, the most reported as a predisposing factor for low back pain was posture or sustained sitting position in class. The majority of the participants with low back pain reported that they have never received any treatment. Finally, the current study highlighted that education as preventive measures for low back pain is still at low level.

Chapter Five

Qualitative data result

5.1 Introduction

The qualitative phase of the study used semi-structured interviews to validate the data obtained from the quantitative part of the study. This chapter started with a description of the interview participants, then, the presentation and discussion of categories and themes that emerged. The challenges expressed by the participants are also reported and can be grouped into four main categories which are predisposing factors, management techniques, preventive measures used in prevention of low back pain and its impact on high school children. In presentation of the findings, verbatim quotations from interviews were used to illustrate response themes and categories. For purposes of anonymity and confidentiality, the transcribed quotations of data from the interviews were cited in the cryptogram P1 to P6 as found in table 5.3.

5.2 Description of the participants

Semi-structured interviews were conducted with six participants including three doctors and three physiotherapists involved in management of low back pain. Table 5.1 illustrates the characteristics that were considered in purposive selection of the participants: gender, current occupation, medical work experience period and being involved in management of low back pain.

Table 5.1 Information of the participants

Participant	Gender	Occupation	Working experience	Involved in management of LBP
P1	Male	Physiotherapist	3 years	Yes
P2	Male	Physiotherapist	1 year	Yes
P3	Male	Doctor	2 years	Yes
P4	Male	Doctor	5 years	Yes
P5	Male	Physiotherapist	6 years	Yes
P6	Male	Doctor	8 years	Yes

All six participants were males as there is no female physiotherapist at Kibogora Hospital and there is only one female doctor but she was not available during the period of interviews. All of the participants were involved in management of low back pain.

Based on the analysis of the data, four main themes emerged which included Predisposing factors for low back pain, Management techniques, Impact of low back pain and LBP preventive measures. Within each theme several categories and subcategories emerged as indicated by table 5.2.

Table 5.2 Themes and categories

	Themes	Categories	Subcategories
1	Predisposing factors for LBP	Positions/Posture	Sitting for long periods of time
			Sustained postures
		Psychological problems	Historical contribution
			Stress
2	Management techniques	Physical therapy	Physical modalities
			Electrical modalities
			Spinal mobilization
			Active therapies
		Medication	Simple medication
			Drugs
3	Impact of LBP	Financial impact	Medical expenses
			Transport expenses
			Medical insurance
			Living allowance
		Psychological impact	Psychological impact on the future
		Participation restriction	Sport and class absence
			School performance
Activity limitation			
4	LBP preventive measures	Education	Physical exercises
			Education about predisposing factors
			Family involvement

			Involvement of colleagues, teachers and school directors
		Strategies used in education	Verbal communication and group exercises
			Verbal communication, Pictures and individual exercises

Table 5.3 shows farther analysis of the results from qualitative part of the study by reporting the relationship between themes, categories, subcategories, participant's experiences and their quotes.



Table5. 3 Themes and categories developed from qualitative data analysis

Themes and categories developed from qualitative data analysis				
Themes	Categories	Subcategories	Participants experiences	Quotes
Predisposing factors for LBP	Positions/Posture	Sitting for long periods of time	Participants felt that the children were sitting for long periods in class and this could definitely impact on their LBP	<i>“.... can you imagine sitting in one position from morning 7:00am until 4:00pm?even myself, when I sit for more than 2 hours without standing for stretching I feel bad on my back that is why I think it may be one of the predisposing factors”(P4).</i>
		Sustained postures	Participants reported the incorrect postures adopted when writing contributed to the LBP	
	Psychological problems	Historical contribution	Genocide commemorations also contribute to LBP as most of them present physical or mental trauma	<i>...factors for low back pain because during the period of April each year when commemorating genocide of 1994 against Tutsis, the number of children with low back pain increases. This also happens when the period of exams is closer” (P3).</i>
		Stress	Participants felt that during stressful periods like exam time, there was an increase in LBP	
Management techniques	Physical therapy and Medication	Physical modalities	Participants reported that heat, ice, massage are commonly used in management of LBP	<i>.....However, the most techniques used in acute and sub-acute phase of low back pain are physical therapy which can include heat, ice, massage, ultrasound, and electrical stimulation such as TENS machine” (P1).</i>
		Electrical modalities	Participants reported that TENS, ultrasound, infrared & short wave diathermy are commonly used in addressing LBP	
		Spinal mobilization	Participants reported that spinal mobilization is commonly used to address LBP	

		Active therapies	Participants reported that exercises are used to restore motion and strength to the lower back but also they are very helpful in relieving pain and preventing future recurrence of low back pain.	<i>“Active therapies performed by the customer him/herself under my supervision are also used. This consists of stretching, strengthening and aerobic exercises”.P2 Those exercises can be specific or general exercise programmes and they are not only supposed to be done at physiotherapy department but also should be taken as home exercises”(P2).</i>
		Simple medication	Participants reported that medication mostly	<i>“After assessment of the patient and after identifying the severity of the pain I prescribe medication mostly anti-inflammatory. Depending on the condition of the patient sometimes analgesics, antidepressants and sedatives drugs are also used but very rarely” (P3).</i>
			inflammatory are commonly used in management of LBP	
		Drugs	Participants highlighted that drugs are used but rarely.	
Impact of LBP	Financial impact	Medical expenses	Participants reported that it is difficult to pay medical expenses for their LBP	<i>“impact of low back pain on financial status is a major concern because medical services are expensive and not easy to afford, especially for children who have to pay school fees and double medical insurance which is also expensive. In addition, when children are admitted in hospital, they need living allowance because most of the time their parents are far from the hospital” (P2.)</i>
		Transport expenses	Participants reported that transport is a big issue as most of the schools are located in rural area where there is no public transport only they use motorcycle which is expensive.	
		Medical insurance	Participants reported that high school children have to pay medical insurance twice at school and at home leading to financial status problems.	

		Living allowance	Participants highlighted that most of the children with LBP had eating and living problems when there are admitted in hospital located very far from their families.	<i>“Financially low back pain has impact not only on children but mostly on their parents because it is their concern to look for money and you know that our country is under development and people are living under a serious poverty”.(P4)</i>
	Psychological impact	Psychological impact on the future	Psychological impact was also reported as a problem affecting children with low back pain	<i>“Psychologically, a child with LBP cannot be stable or comfortable and it takes a long time to accept that condition. For instance, most of the children used to ask me; how it comes that I am suffering from low back pain at this young age? If I am like this at this age how will I be when I will be old? How can I get low back pain before my parents who are older than me? Do you think I will get a husband with this low back pain? All of these questions show me how LBP affects the child’s psychology”(P6)</i>
	Participation restriction	Sport and class absence	Participants reported that most of the time LBP impact on school and sport attendance	<i>“LBP has an impact on school or sport attendance because most of the time they have to attend medical services or just to have bed rest while others are in class .In addition, sometimes they can attend the class but not physical activities”(P1).</i>
		School performance	Participants reported that the performance of children with LBP becomes low because of absenteeism.	<i>“... low back pain has an impact on high school children, especially on their performance. For instance when these children attend medical services others are in class studying, they can’t stop and wait for them, the teachers goes on, so the performance automatically will be low comparatively to children without low back pain. For instance by this moment there is two</i>

				<i>girls admitted in internal medicine department for almost one month suffering for Low back pain, so how can you expect these children to perform well in class? Most of them repeat (double) the year because of low back pain” (P6).</i>
		Activity limitation	Participants reported that LBP has an impact on ADL and on sleeping modalities of children.	<i>...Some children with low back pain have difficult to wash themselves or to run fast when necessary. In addition, some children have sleeping problems because of low back pain”(P4).</i>
LBP preventive measures	Education	Physical exercises	Education about physical exercises was the most to be reported by the participants as strategies used.	<i>“...I know that physical exercises has a positive effect in the prevention of back pain that it is why I always encourage all school children who consulted me to be physically active and I explained the benefit of exercises”(P1). “...I prescribe medicine and depending on the severity I may refer the patient to the physiotherapists because I know that they are well placed about physical exercises”(P3). ” ... “To motivate my customers to participate in physical activities there are three sentences that I used to tell them most of the time: 1. If you do not use your body you will lose it, 2.if your body part is not used it becomes weak, atrophy and then disappear and lastly I tell them, try to move your body otherwise you will be removed”P2.</i>

		Education about predisposing factors	Most of the participants expressed their concern to explain on the predisposing factors for low back pain. The explanation about predisposing factors is important so that they can take care of their back.	<i>“I think education about possible predisposing factors for low back pain could minimize the number of patients with low back pain that we receive, I try my best on my level but because of a lot of work we have, education is not given as I want because I cannot take time for education after treatment while I see another queue of patients waiting outside on the door. I think it may be better if we can have time to go out in community either in schools or in village for sensitization about health promotion to prevent low back pain, otherwise to educate one customer when he/she is already affected does not really work on prevention of low back pain”</i> (P4).
		Family involvement	A number of participants reported that support from family members is important in management/prevention of low back pain.	<i>“I am sure that children with low back pain cannot enjoy the normal life if their parents are not concerned and educated about how to avoid low back pain and how to handle children when already affected by low back pain. Otherwise, parents will continue to stress their children by saying that low back pain is for adults not for children as they used to say”</i> .
		Involvement of colleagues, teachers and school directors	A few of participants described the importance of support from colleagues, teachers and school directors at school during an episode of low back	<i>“It is important to provide some information about low back pain to all learners and teachers but because of a limited time and insufficient number of health workers it is not possible, but also remember that there is no budget provided for that kind of education for instance transport to go to schools for health education”</i> P1. <i>“Most of the time when teachers are not</i>

				<i>aware about the problem of low back pain among school children there is a problem of misunderstanding between them and children especially when requesting the permission to attend medical services. Teachers used to say that children want to go to the hospital or health center just to relax as if they do not want to attend the class especially when there is a test or exam”P3.</i>
	Strategies used in education	Verbal communication and group exercises	Group intervention/education training was reported to be used especially in physiotherapy department but it is rarely used.	<i>“Depending on the number of patients with low back I have per day, sometimes I put them together on mat and then show them the exercise to perform at home and then supervising how they are doing. It is not common to be used because participants should be at least in the same generation, in the same social category and in the same classification of low back. So it is not common to have more than 2 patients in the same category of low back pain per day”P2.</i>
		Verbal communication, pictures and individual exercises	Participants reported that verbal communication and exercise demonstration are used in education for prevention of LBP.	<i>“I use verbal communication and pictures to educate children about low back pain prevention but sometimes I use to show some exercises to be performed at home for each child who consult me”P1.</i>

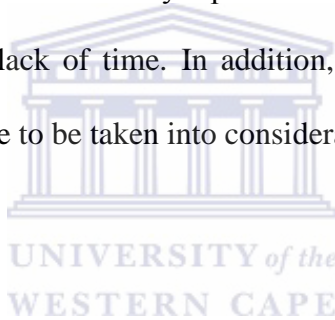
From the findings of the qualitative part of the study, it is indicated that at Kibogora hospital low back pain is managed in different services, either it is treated by doctors who prescribe medicine or the patient may go directly to the physiotherapy department. Doctors may also refer the patient to the physiotherapists (or vice versa) when necessary. From the findings of this interview, it can be concluded that prevention of low back pain in high school children is still at low level. It is clear that there is no plan to educate children about prevention, including predisposing factors before the occurrence of Low back pain, only little education is given when a child is already affected when attending medical services. It is shown that primary prevention has never been done about low back pain. It can also be concluded that only education is given to the concerned (the affected) child but about parents and teachers nothing is done. The reason reported is either lack of time or insufficient service providers or financial support for transport.

5.3 Summary

A qualitative study through semi structured interviews was conducted among service providers in order to compliment the results from a quantitative part of the study conducted among high school children by the use of self-administred questionnaires.

The findings of the interviews conducted among service providers, most of them reported that the main predisposing factors for low back pain could be posture/position in class and psychological factors. Posture include sustained posture and sitting for a long period of time whereas psychological factors include stress and historical contribution.

Management of low back pain includes medication and physical therapy. However, most of the children could not attend medical services mostly because they are not aware of the role of medical services towards low back pain. In addition, it is highlighted that low back pain has impact on school children, parents and on the community in general, either financially, psychologically or through participation restriction. Preventive measures used in health promotion as prevention of low back pain include verbal communication and education about the importance of physical exercises. Although, even if all participants reported that they knew the benefit of education in prevention of LBP but they reported that they don't have enough time to do it, mostly because of lack of time. In addition, all participants highlighted that education is still a big issue to be taken into consideration.



Chapter six Discussion

6.1 Introduction

The main objective of the current study was to determine the prevalence, predisposing factors and management of low back pain among high school children in Nyamasheke district in Rwanda. A self-administered questionnaire was used to collect the data. In addition, to complement the results from a quantitative part of the study, a need for education in preventive measures through health promotion was also revised in this study by the use of semi-structured interviews among service providers. The discussion presents the findings of both quantitative and qualitative parts of the current study in line with these objectives. The current study showed a good response rate of 96.2% and this therefore implies that there is a positive response and interests of school children towards low back pain prevalence and its preventive measures. This chapter thus discusses the final findings of this study in relation to other similar studies carried out before so as to be able to come up with a significant deduction. Finally, the impacts of low back pain, the challenges and accomplishments of the study are also outlined.

6.2 Prevalence of low back pain

Low back pain has been on the increase in developed countries over the past decades (Gilgil et al., 2005) but little is known in developing countries. Information from other studies on the epidemiology of low back pain is accumulating, but for the most part, studies are restricted to high-income countries.

This therefore means little is known about the epidemiology of low back pain in the rest of the world (Gilgil et al., 2005; Walker, 2000). The lack of information on the prevalence of low back pain among children in developing countries is therefore a significant shortcoming (Gilgil et al., 2005; Walker, 2000), particularly as it is predicted that the greatest increases in low back pain prevalence in the next decade will be in developing nations (WHO Scientific Group on the Burden of Musculoskeletal Conditions of the Start of the New Millennium, 2003).

The findings of the current study reported a high prevalence of low back pain among high school children. The relatively high prevalence rate (66%) shows that low back pain is not only a big issue among adults but also among children. In addition, one year prevalence was 25.4% whereas one month prevalence was found to be 13.7%. Amongst those who reported low back pain 64% have experienced severe low back pain rated >5 according to Visual Analogue Scale. These findings are similar to studies conducted in developed countries such as the United States of America (USA) and Australia, where low back pain prevalence ranges from 26.4% to 79.2% (Deyo et al., 2006; Walker et al., 2004). This study however, contradicts the statement of Gilgil et al. (2005) and Omokhodion and Sanya (2003) who reported a general assumption that low back pain prevalence in Africa is lower than that reported in the developed nations. It is in fact supporting the prediction of WHO Scientific Group on the Burden of Musculoskeletal Conditions of the Start of the New Millennium (2003).

Thus the findings of a systematic review by Louw et al. (2007) which indicated that the low back pain prevalence among the African population was between 14% and 72 % should be taken into consideration. In the same line, still in Africa, a prevalence of 50% one year low back pain for adults was reported and 33% for adolescents (Naude, Mudzi, Mamabolo & Becker, 2009). Across the developed countries, 60-80% low back pain prevalence was reported among the general population of Switzerland (Naude et al., 2009). Most of the findings in all the studies mentioned above are agreement with the results of the current study, although there are some minor differences. These differences could be explained by the inherent differences in the study settings.

The findings of the current study suggest that there was a high prevalence of low back pain amongst high school children. Although prevalence of low back pain among high school children in Africa has not been widely explored, evidence is emerging that low back pain may be emerging as a public health concern among young people in African countries such as Rwanda.

The present findings are in contradiction to an assumption that low back pain prevalence is lower in the developing world than developed societies, so, further studies are needed. This revelation supports the findings of the global burden of disease studies which predict that the greatest increases in low back pain prevalence will be in developing nations (WHO Scientific Group on the Burden of Musculoskeletal Conditions of the Start of the New Millennium, 2003). Although, it appears that the one-year prevalence estimated among Africans correlates with the

one-year low back pain prevalence in Western societies (Louw et al., 2007; Deyo et al., 2006; Walker et al., 2004). Comparable findings were however observed for lifetime prevalence estimates whereby African lifetime prevalence ranged from 28% to 74%, and lifetime prevalence in Western societies ranged from 30% to 80% (van Vuuren et al., 2005). These findings therefore further illustrates that low back pain among all Africans is of concern (van Vuuren et al., 2005).

Understanding prevalence and causality of low back pain in developing nations such as Africa may assist in the understanding more about global low back pain causes and management (Gilgil et al., 2005; Walker, 2000), and will determine whether the factors differ in socio-cultural backgrounds (Gilgil et al., 2005).

In conclusion, low back pain has been indicated to be the most prevalent problem across different countries in both the developed and developing world. Although, the results of the present study on low back pain among high school children are slightly high, they are however in line with other studies conducted in both developed and developing countries. Since, prevalence of low back pain among high school children in Africa has not been widely explored a comparison with results of the few available studies show that a prevalence of 66% is high. In addition, it can be concluded that back pain should be seen as an issue for all ages and all sectors of society in all countries. The results of the current study will therefore contribute to the scanty information available in Africa.

6.3 Factors associated with low back pain

Based on the available literature, various factors related to low back pain have been mentioned which include social demographic variables, physical activities, smoking, relative body mass and physical fitness (Gilgil et al., 2005). However, the only factors associated with low back pain evaluated in this study are socio-demographic characteristics (such as age, gender and localization of the school) and physical activity levels of school children. Moreover, the aim of the current study was to identify if there is any relationship between low back pain and socio-demographic characteristics and physical activity among school children.

6.3.1 Low back pain and gender

The present study found no statistically significant association between low back pain and gender ($p=0.232$). However, Males reported low back pain more than females with the percentages of 53.1% and 46.9% respectively. These differences could be related to physical activity and sport participation or gender differences in reporting symptoms. The findings of the current study were in agreement with the study by Burton et al. (1996) who found no relationship between low back pain and gender ($p = 0.111$). In addition, the same author reported that the prevalence of low back pain was similar 11 years old females and males but at the age of age 15 years became subsequently higher in males (52.6%) than females (34.3%). Burton et al. (1996) proposed that the findings were possibly due to boys having a higher exposure than girls to more strenuous (and potentially hazardous) sporting activities which may be the case in Rwanda as well.

In contrast to the findings of the current study, more frequent reporting by females compared to males was observed in several other studies (Watison et al., 2002; Grimmer and Williams, 2000; Herreby et al., 1999; Kujala et al., 1999; Burton et al., 1996; Balagué et al., 1995, 1988; Brattberg, 1994; Troussier et al., 1994; Saliminen et al., 1992). Several other studies however did not find any difference between the gender reporting patterns of back pain (Olsen et al., 2006; Wedderkopp et al., 2003; Taimela et al., 1997; Herreby et al., 1996)

6.3.2 Low back pain and age

The participants' ages ranged between 13 and 21 years. This is the average high school age in Rwanda. A significant relationship was found between age group and low back pain ($p=0.000$). The findings of the current study highlighted that children with older children (19-21 years old) were the most to report low back pain with 44.8%. It is in agreement with what was reported in the literature that low back pain increases with age (Olsen et al., 2006; Wedderkopp et al., 2003; Watison et al., 2002; Grimmer and Williams, 2000; Kujala et al., 1999; Leboeuf-Yde and Kyvik, 1998; Taimela et al., 1997; Burton et al., 1996; Brattberg, 1994; Troussier et al., 1994; Balagué et al., 1988; Saliminen et al., 1984). The findings of the current study are similar to other studies, showing an increase in back pain after the age of 12 years, possibly reflecting pubertal growth and increased stress and strain on the back (Troussier et al., 1994).

6.3.3 Low back pain and localization of the school

In the current study, high school children from the rural region had a high prevalence of low back pain than those from urban regions with 62% and 39% respectively. In Rwanda, children from an agricultural setting might participate in more physical and strenuous activities, and this may affect the condition of their muscles and joints, leaving them more susceptible to low back pain as suggested by Prendeville and Dockrell (1998).

The findings of the present study is similar to the findings of Prendeville and Dockrell (1998) who cited that a higher percentage of the rural school children reported low back pain than the urban school children. Salminen (1984) suggested that the economic structure of a region may influence results. However, a study by Prista, Balagué, Nordin and Skovron (2004) found low prevalence of low back pain among young adolescents from the rural periphery, whereas those from urban center reported a higher prevalence of low back pain.

6.3.4 Low back pain and physical activity

A significant relationship between low back pain and sport participation among high school children ($p = 0.000$) was found in the current study. In the present study, among 636 participants who had low back pain, 76.9% were not participating in physical and sporting activities. Based on the findings of this study it can be hypothesized that low level of physical activity and sport participation can be a risk factor to low back pain.

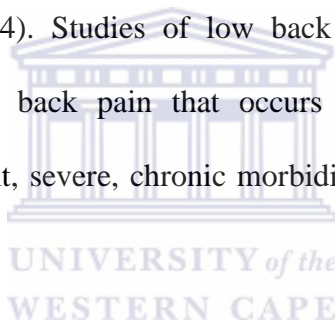
However, in contrast with the findings of the current study, Salminen (1984) did not find a relationship between back pain and sports activity, while Taimela et al. (1997) described inconclusive findings. Results of the present study are also in contrast with several studies which have reported that low back pain appeared to increase in relation to sport activities (Grimmer and Williams, 2000; Herreby et al., 1999; Kujala et al., 1999; Burton et al., 1996; Troussier et al., 1994; Balagué et al., 1995, 1994; 1988; Salminen et al., 1992). In a prospective study of children aged 7-17years, Balagué et al., (1998) found a significant positive correlation between low back pain and competitive sport ($p<0.01$). Furthermore, the same author reported that children involved in competitive sports reported low back pain ($p<0.01$) more often than those who participated in sport on an irregular or regular basis. In a cross-sectional study undertaken in Finland involving children aged 10-17 years, Kujala et al., (1999) found that musculoskeletal pains ($p=0.013$) were found more often in subjects participating in large amounts of physical activity. Based on the findings of the current study and based on the literature, it can be concluded that more research is needed to be conducted in African countries in order to confirm or negate the assumption that low back pain increases with the level of sport participation.

In summary, the findings of the current study show no relationship between gender, sedentary activity and low back pain. However, a strong relationship was highlighted between age, physical activity, sport participation and low back pain.

Based on both findings from the current study and those from the previous studies, it can be concluded that some results are in agreement whereas others are in contradiction, implicating the need of further research to be conducted in the future.

6.4 Predisposing factors

Research on risk factors for back pain in school children and adolescents has been minimal as low back pain disorder in this age group was previously thought to be rare (Negrini & Carabalona, 2002). Research to date has been primarily on adult populations and studies have focused on occupations that involve manual handling (Cardon & Balague, 2004). Studies of low back pain in this age group are of particular importance, as back pain that occurs initially during this time may foreshadow the subsequent, severe, chronic morbidity seen in adulthood (Lippincott & Wilkins, 2011).



The following modifiable risk factors were evaluated in the literature: body mass index (BMI), mobility and flexibility of muscles and joints, muscular strength, sports participation, physical activity and physical fitness, backpack-related factors, sitting posture and sedentary activity, working, psychosocial factors, smoking and other factors (Gilgil et al., 2005; Watison et al., 2002; Kujala et al., 1999). In the current study, only physical activity and sport participation, backpack related factors, sitting posture, psychological factors, work at home after class, smoking and alcohol abuse were evaluated.

The current study indicates that most of the participants reported more than one predisposing factor resulting in low back pain. These factors include lifting/carrying heavy items, sporting activity participation, posture (sitting/ standing position, pack pack-related factors, psychological factors, smoking and alcohol abuse.

6.4.1 Sustained sitting posture

A significant association was found between low back pain and sitting position as well as prolonged sitting posture in class ($p=0.000$). Sitting posture was reported as predisposing factor by 83.2% of the participants with low back pain. Both participants (children and service providers) reported that children had to sit in class for the whole day from morning to evening. These findings are in agreement with a previous study. Burton and Tillotson (1991) found the same results and suggested that increase in stress on the back with longer duration of sitting position at school seemed to be the predisposing factor for low back pain. Symptoms associated with stress to the structures of the lower back during sitting depend on the actual sitting position and also on the design features of the desk and chair. Mandal (1984) reported that incorrect sitting posture of school children was a sizeable contributor to low back pain. In Rwanda, many schools still contain furniture that was designed and made to be durable rather than ergonomically sound.

In addition, service providers in qualitative part of the study highlighted that children were sitting for long periods in class and this could definitely impact on their low back pain. Moreover, service providers added that the incorrect postures adopted when writing contributed to the low back pain.

Therefore, installation of new school furnitures which are ergonomically appropriate may reduce the risk of low back pain. In addition, a short break for stretching can help to reduce the risk of developing low back pain.

6.4.2 Psychological factors

It was found in the present study that low back pain is highly associated with psychological factors ($p=0.000$). A proportion of 55.7% of the participants who had low back pain reported that psychological factors could be one of the predisposing factors for their low back pain. This was supported by services providers during interviews. One of the participant reported: *”Psychological problems may be considered as predisposing factors for low back pain because during the period of April each year when commemorating genocide of 1994 against Tutsis, a number of children with low back pain increases”* (P3). Genocide commemoration contributes to low back pain as most of them present physical or mental trauma.

Along the same line, the review by Ebbelohj et al. (2002) points out that psychosocial factors are important risk factors for low back pain. Moreover, in another study by Watson et al. (2003), it was suggested that psychosocial factors are more important than mechanical factors in low back pain occurring in young populations. Similarly, Szpalski et al. (2002) found that lower scores for happiness, sleep quality and health perception were associated with higher back pain reports in 12-19 year-olds.

In line with these findings, numerous studies in school children have reported an association between back pain and psychological factors, such as morning tiredness

and parental support (Kristjansdottir & Rhee, 2002). Poor well-being and in particular poor self-perceived fitness were also reported in the study by Sjolie (2002). Other psychological factors found in Literature are a higher degree of somatising, diminished self-esteem and augmented negative affect (Staes, Stappaerts, Lesaffre & Vertommen, 2003), dislike of going to school (Storr-Paulsen, 2002), psychosomatic factors (van Gent et al., 2003), life quality (Hereby et al., 1999) and poor mental health (Feldman et al., 2001). Furthermore, according to the prospective study by Jones et al. (2003) high levels of adverse psychosocial exposure, presence of behaviour problems such as anger, disobedience and violence, and high levels of hyperactivity were associated with an increased risk of developing low back pain in adolescents.

Based on both findings of the current study and the literature, it can be concluded that there is moderate evidence that psychosocial factors are significantly related to back pain reports in school children. In addition, it can be concluded that psychological factors may play a role in the experience of back pain in children in a similar way to what has been reported in adults. However, there is no evidence that modification of psychological factors may have a preventive effect on low back pain in school children.

6.4.3 Physical activity and sport participation

In the narrative reviews of Ebbehoj, Hansen, Harreby and Lassen (2002) and Duggleby and Kumar (1997), it was reported that inactivity and intensive sports exposure are both important risk factors for low back pain in school children.

Increased level of physical activity and sport participation, were found to be associated factors with low back pain in the present study ($p=0.000$), A proportion of 36.5% of the participants accused high level of physical and sporting activities to be one of the predisposing factors to low back pain. It was in agreement with findings of Balague et al. (1995) and Troussier et al. (1994) who found a strong correlation between high level of physical or sporting activities and low back pain. Some studies showed that sports can play a favorable role whereas others showed no clear effect (Hertzberg, 1985). According to the review of Balague et al. (1999), competitive sports activities and a high level of physical activity are associated with an increased risk of low back pain, particularly among young athletes. The risk depends on the type of sport, the level of competition, the intensity of physical training and acute spinal trauma (Balague et al., 1999). Ogon et al. (2001) reported an increased risk of low back pain in school children and adolescents who participate in elite sports under high performance training. The present study found that competitive sports activities are associated with increased low back pain among high school children. During competition, children may not be able to limit their movement or control their position putting them on high risk of developing low back pain. Therefore, recruitment of a qualified coach in all schools may be of greater importance.

6.4.4 Backpack-related factors

The findings of the present study shows that low back pain was significantly associated with the backpack-related factors and the method of carrying school materials ($p=0.000$). A proportion of the participants (79.4%) accused backpack-related factors to be the risk factor for their low back pain. The majority of children walk all days with their bags on the back and most of the time they are very heavy. The present study supports the findings of a previous study which showed that the backpacks and the method of carrying school materials were associated with back pain (Miller, Schmatz & Schultz, 1988). However, various studies have reported no association between backpack-related factors and back pain at young age. In one of the most carefully designed surveys, including 1446 school children, Watson et al. (2003), demonstrated the lack of significant association between low back pain and either the type of school bag, the method of carrying or the percentage of body weight carried. Shehab and Al-Jarallah (2005) did not find any correlation between backpacks and low back pain. The differences in findings may result from different research settings, differences in weight of the backpacks but also from the methods used to carry backpacks. Therefore, further research if needed to be carried out in order to confirm or negate the correlation between backpacks-related factors and low back pain.

6.4.5 Smoking and alcohol abuse

According to the systematic review by Goldberg, Scott and Mayo (2000), data of studies in adults are fairly consistent as to the idea that smoking is associated with non-specific back pain. However, little direct data exists regarding the pathologic origin of back pain in adolescents.

Smoking and alcohol abuse were other associated factors with reported low back pain among school children ($p=0.000$), although it was reported at low level (7.1% and 6.3% respectively). The findings of the current study were in agreement with the study by Balague et al. (1988) who found a strong correlation between smoking and low back pain. In contrast, Kovacs et al. (2003) found no association between low back pain and cigarette smoking. According to Harreby et al. (1999), smoking habits in school children may indirectly reflect psychosocial and social problems as the main causes in developing low back pain. It can be concluded that anti-smoking campaigns will have a preventive effect in low back pain. Although, as more adverse reactions to smoking are discovered and publicized, there is hoped that the appeal of smoking will be diminished in young people. Therefore, there may be reduction of low back pain problems.

In contrast to the present study, a cross-sectional study by Kovacs et al. (2003) found no association between low back pain and alcohol intake, in a large sample of school children. However, as reported by the authors, the risk of underreporting of alcohol intake cannot completely be ruled out (Cardon & Balague, 2004).

6.4.6 Eating habits

In the current study, a strong correlation was found between eating habits and low back pain. A proportion of 17.6% reported that their low back pain may be related to eating habits including irregular meals and malnutrition. The findings of the current study are in agreement with Kristjandottir and Rhee (2002) who identified a strong positive relationship between back pain and eating habits, namely, irregular meals.

Further analysis using Logistic regression was used to analyze the levels of the significant predictor variables. Analyses were undertaken to determine which of the predictor variables (lifting/carrying heavy items, posture(sitting position), backpacks related, home work after class, psychological factors, smoking and alcohol abuse) best predicted low back pain. An examination of the Wald statistics revealed that lifting has a significant relationship with low back pain suggesting that increase in lifting heavy items would predict an increase in low back pain. This means that children involved in lifting the odd's ratio of having low back pain increase by 9.205 than those who are not involved in such activities. Therefore, if an individual participated in lifting activities, the possibility of having low back pain increased. Furthermore, the results indicated that if an individual is taking prolonged sitting posture, the odds of having low back pain was 10.475 times higher than a participant who was not involved in a prolonged sitting posture. In addition, a participant who used the backpacks all days had the odds of 2.532 times higher than those who did not carry their heavy bags on their back.

Furthermore, an examination of the Wald statistics revealed that home work after class and psychological factors were positively correlated, suggesting that an increase in home work or psychological stress would predict an increase in low back pain. Furthermore, the odd's ratio value for home work and psychological factors indicated a positive relationship with low back pain. This means that if a child participates in home work or has psychological problems, the odds of having LBP increases by 0.379 and 0.209 respectively. Thus, a child participating in heavy homework or having psychological problem, has an increased probability of developing low back pain. If children are psychologically stressed, they are likely to be minded absent when they perform task, therefore putting them at high risk.

In conclusion, the findings of the present study are in agreement with other studies with regards to factors that predispose children to low back pain. For school children and adolescents, several factors including physical, Psychological, social and lifestyle factors are significantly predictable to a higher prevalence of low back pain. In addition, most of these predisposing factors are modifiable or preventable either through education or through modification of some infrastructures and implementation of the use of ergonomical materials.

6.5 Management strategies used in managing low back pain in children

There are numerous approaches used by health professionals in the treatment of low back pain which require multidisciplinary services from physiotherapists, doctors, pharmacologists and surgeons (Bratton, 1999; Deltto, Erchard & Bowling, 1995). Meeker and Haldeman (2002) reported that conservative management may be effective without surgical intervention.

The main findings of the current study indicated that many of the participants did not get treatment for their low back pain. However, for few of them who received medical services, the current study highlighted that the management of low back pain among high school children at Kibogora Hospital requires multi-dimension approaches. It is planned according to the phase of low back pain (acute, sub-acute or chronic) and according to the predisposing factors as indicated by the participants in qualitative phase of the present study. In addition, during interviews, service providers indicated that five pillars of management including referral, treatment, rehabilitation, prevention and health promotion (Balague et al., 1995) are taken into consideration. Some complicated cases of low back pain are referred to Kigali University Hospital for better management.

The findings of the current study are in line with several authors' findings who reported that there are numerous approaches used by health professionals in the treatment of low back pain which require multidisciplinary services from physiotherapists, doctors, nurses, pharmacologists and surgeons (Bratton, 1999; Deltto et al., 1995).

It has been noted in the current study that physiotherapists combined the use of spinal mobilization with several other treatments and approaches such as heat and ice, electrical stimulation, rest, rehabilitative exercise, counseling about diet, weight loss, and other lifestyle factors and also dietary supplements as cited by Meeker and Haldeman (2002). However, 55.8% of the participants reported that they had never received such physiotherapy services. It was either because of ignorance, lack of information on the use of health services, or because of referral system that could not allow them to attend physiotherapy services. They reported that most of the time, they were discharged from the health centers before they attend the the hospital.

According to Clarke (2000), management of low back pain would be helpful if the treatment provided, decreases pain and subsequently reduces the patient's suffering and increases functional abilities. This however may not be the case among high school children in Rwanda as most of the participants reported that they did not receive any treatment, leading to chronic and recurrence of low back pain. On the other hand, success of treatment depends on the patient's understanding of the disorder and his/her role in preventing recurrence (Patel & Ogle, 2000). Although, education about the use of health services or as preventive measures for low back pain is still at low level as indicated by the findings of the current in both qualitative and quantitative parts. According to Pinnington (2001) physiotherapy plays a more important role in the management of low back pain than any other health care management programme. This is the case at Kibogora Hospital where most of the patients with low back pain are referred to the Physiotherapy department.

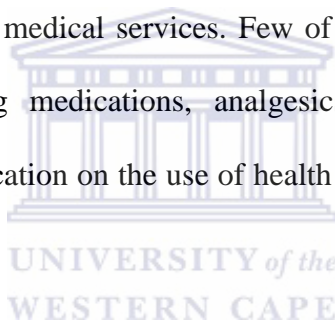
Physiotherapists use various modalities and methods to relieve the discomfort, fear, anxiety and loss of function associated with low back pain. These modalities include electro-physical agents such as cold, heat and modified electrical current and therapeutic exercises.

In agreement with other authors the present study also noted the use of medications, analgesics and drugs in management of low back pain. The study however showed that drugs are not as widely used as ordinary medications. This was also highlighted by one of the service providers during interviews. P3 cited: *“After assessment of the patient and after identifying the severity of the pain I prescribe medication mostly anti-inflammatory. Depending on the condition of the patient sometimes analgesics, antidepressants and sedatives drugs are also used but very rarely”*.

Bratton (1999) reported that pharmacology management such as the use of aspirin, paracetamol, Ibuprofen non-steroidal anti-inflammatory drugs and muscle relaxants (more useful on chronic low back pain with associated with muscle spasm) were found to be relatively effective in treatment of low back pain. One year later, Patel and Ogle (2000) highlighted the use of acetaminophen such as Tylenol which has been proven to be a good pain reliever, but in case of inflammation, non-steroidal anti-inflammatory drugs were however reported to be more successful. As noted by Malanga (1999), muscle relaxants are more effective in case of chronic low back pain associated with muscle spasm. The same author further stressed that in severe cases of low back pain some opioids, such as morphine or codeine may be prescribed but these must be taken under careful supervision because of its side effects.

In addition, analgesics and anti-depressants can be effective drugs for treating pain because they block pain messages on their way to the brain and they can also help to increase the body's production of endorphins which is a natural pain killer (Malanga, 1999). The same researcher goes on to say that the severity and cause of the back pain determines the prescription for medications or injections. The doctor may suggest spinal injection such as epidural steroid injection which is one of the most common injections used in management of low back pain because of its effectiveness.

In conclusion, the findings of the present study highlighted that the majority of the participants do not attend medical services. Few of them receive treatment for their low back pain including medications, analgesics, drugs and physical therapy modalities. Therefore education on the use of health services is highly needed among school children.



6.6 Impact of low back pain among high school children

The problem of low back pain has an impact on both school children and their parents because most of the time children are absent from school in order to attend clinics or are on being admitted to hospital. Low back pain thus not only gives rise to medical expenses but also impacts on the functional activity of the school children with regards to participation in functional activities and sport.

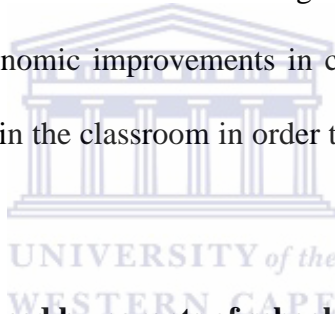
6.6.1 Challenges experienced by high school children with low back pain

The challenges that are experienced by high school children with low back pain can be classified within the framework of the International Classification of Functioning (ICF) as activity limitations, participation restrictions and environmental barriers (WHO, 2001).

Activity limitations are difficulties an individual might have in activities of daily living (ADLs) (WHO, 2001). Within the ICF framework, ADLs refer to mobility, self-care and domestic life (WHO, 2001). Mobility activities refer to lifting and carrying objects and walking (WHO, 2001). The current study highlighted that activity limitations which were experienced by school children with low back pain were mostly difficulty in sitting in class for an hour, difficulty with bending down to tie shoelaces, difficulty in running, etc. The findings of the current study indicates that there is a significant association between low back pain and activity limitations among high school children ($p=0.000$).

Participation refers to the ability of the person to manage the role they were previously fulfilling (WHO, 2001). The participation restrictions that are experienced by high school children are an inability to attend class as before, as well as limited involvement in recreational and social activities. These findings are in agreement with the study conducted by Waddell (1999). The same author reported that children became socially inactive after being affected by low back pain. Some environmental factors affect ADLs and social participation after the occurrence of low back pain. Rather than helping, these factors can hinder the accomplishment of daily activities

and social roles (Department of Health and Children website, 2007), and hence being regarded as barriers (Vlaeyen & Linton, 2006). The literature concerning environmental barriers experienced by low back pain patients is limited. However, the current study found that symptoms associated with stress to the structures of the lower back during sitting depend on the actual sitting position and also on the design features of the desk and chair. This is in agreement with Mandal (1986) who concluded that incorrect sitting posture of school children was a sizeable contributor to low back pain. Many schools in Nyamasheke district still have furniture that was designed and made to be durable rather than ergonomically sound. More attention needs to be given to ergonomic improvements in chair and desk design and to the sitting posture of children in the classroom in order to minimize the risks of low back pain.



6.6.2 Challenges experienced by parents of school children with low back pain

In addition to school fees, parents are concerned about medical costs for treatment of their children. Most of the time, they are absent from their own work in order to attend hospital as caregivers of their children when they are admitted to hospital. In addition, participants reported that transport is a big issue as most of the schools are located in rural area where there is no public transport, only they use motorcycle which is expensive. Otherwise, they have to use a local Rwandan ambulance carried by four persons and it requires more people to rotate during transport because of a long way to go to the hospital. Moreover, Participants reported that high school children have to pay medical insurance twice at school and at home leading to

financial status problems. One of the participants cited: *“impact of low back pain on financial status is a major concern because medical services are expensive and not easy to afford, especially for children who have to pay school fees and double medical insurance which is also expensive. In addition, when children are admitted in hospital, they need living allowance because most of the time their parents are far from the hospital”* (P2).

A team of Duke University Medical Center researchers has found that patients suffering from back pain require more than \$90 billion annually in health-care expenses, with approximately \$26 billion of that amount directly attributable to treating the back pain (Durham, 2004).

Based on the literature, it can be concluded that low back pain has an impact on both physical and psychological aspect of high school children. It does not only impact on children, but also on their parents, families and service providers either psychologically, financially or socially. Therefore, low back pain serious preventive measures should be taken into consideration and should involve all categories of people including children, parents, family members, teachers and the whole community in general.

6.7 Needs for education in health promotion to prevent low back pain

The findings of the current study show that there is a need for education among high school children relating to health promotion strategies to prevent low back pain.

It is highlighted from the present study that education campaigns about low back pain prevention are still at low levels.

However, this is not surprising considering that no treatment was received by most of the school children with low back pain. Only 44% reported that they have been educated about proper sitting position in prevention of low back whereas 56% had never been educated about the proper sitting position. Other preventive measures reported, were sitting with back supported (32.2%), carrying backpacks over both shoulders (10.3%), advice on physical activities (24.6%), advice on muscle stretching exercises (13.3%), advice on muscle strengthening exercises (8.2%), education on the use of health services, education on exercises and health life style and other no specified kind of education was reported at 7.1%.

6.7.1 Health education needs

Although some of the participants (35.4%) had attended several physiotherapy sessions during which health education dissemination took place, expressions in lack of knowledge on several aspects of low back pain was common. The findings suggest that, the health education that was offered was not enough or may have been incongruent with the participants' needs. Perhaps present health education programmes were planned and implemented without taking into consideration views from the individuals with low back pain and on what the individuals perceived as their health education needs.

6.7.2 Lack of knowledge

Findings of the present study indicated that 92.9% of the participants have never been educated about the causes, predisposing factors, diagnosis and prognosis of low back pain. However, lack of more educational empowerment on a number of aspects regarding low back pain should be considered as their health education needs. These needs further overlapped, elaborated on, and added to dimensions commonly mentioned as affecting health education in most health care set-ups (Glenton, 2002; Borkan, Reis, Hermoni & Biderman, 1995; Deyo & Diehl, 1986).

In seeking an explanation to establish a specific predisposing factor of a health problem, a significant need that was reported in the current study, was the distinctive responses to the uncertainty experienced by the participants due to the lack of knowledge on the predisposing factors for their low back pain in pathoanatomical terms. Moreover, participants' responses were in line with the Medical Model of health education, which may have influenced them to view the cause of low back pain in pathoanatomical dimensions thus the need for explanation in those terms. The expressed needs were typically the universal needs among individuals with any medical condition and could raise some anxiety among such individuals when not met especially for a condition such as low back pain (Harland & Lavalley, 2003).

Lack of knowledge on the cause of a low back pain, diagnosis and a clear prognosis were the most common reason for frequent medical re-visits among patients. Furthermore, patients consult health practitioners with the hope of getting an explanation about the cause and the diagnosis of their health problem before an

appropriate management could be undertaken (Osborn & Smith, 1998; McPhillips-Tangum, Cherkin & Rhodes, 1998). The lack of knowledge on the mentioned aspects among individuals with low back pain was not strange. According to Foster et al. (2003), it is never known with precision why people with low back pain decide to self-manage or consult a health-care professional. It was well known that, patients relied more on the health-care professionals to understand the given condition, the diagnosis to suggest management plans based on the symptoms and signs. Then, thereafter, to be explained the process of treatment as well as the prognosis. However, in the majority of health problems, the cause of the problem converges on the diagnosis, yet in most low back pain, the cause is never known with precision (Spitzer, 1987). Consequently, lack of precise diagnosis in the majority of low back cases suggests that, most individuals will in no way get sufficient explanation on the cause thereof. Therefore there is the expressed need to be explained on the cause and the diagnosis of their low back pain among the participants in the present study. Sullivan, Turner & Romano (1991) suggests that, when the cause, diagnosis and the prognosis cannot be arrived at, as will be the case with most low back pain, physiotherapists should switch from a curative to Rehabilitative Model of pain explanation and management.

Treatment goals are altered from the identification and eradication of the cause of low back pain to the improvement in patient functioning and lessening of suffering. Health education then may include explaining what is and what is not causing the patient's pain, educating that the pain is particularly expected to get better on a

realistic time course. Harland & Lavalley (2003) further recommend that, explanation must be given in the prevailing circumstances, about the treatment procedures in the layman's language to promote self-management in the face of the lack of understanding the source of pain. It is also prudent that, before any information is specified to the individual, the physiotherapist must try to find out what the patient already knows and what they feel they may be lacking towards achieving their desired health goals so that the clinician could address them.

In summary, based on the findings from the study, most of the school children wanted to be educated on the cause, predisposing factors, diagnosis, prognosis and management of their low back pain. However, since in most low back pain cases, the cause, predisposing factors, the diagnosis and the prognostic estimates are rarely known, it would be advisable to incorporate a Rehabilitative Model of pain explanation to the individuals with low back pain during health education sessions.

6.7.3 Lack of education

A key health education need that also emerged from the participants was the lack of education on some aspects during an episode of low back pain. There was a diversity of needs that were revealed on the lack of education. The dimensions ranged from, lack of education on exercises and healthy lifestyles, lack of education on the appropriate utilization of health services along with the lack of education regarding alternative therapies for low back pain.

6.7.3.1 Lack of Education on Exercise and Healthy Lifestyles

Overall, the findings show that, there were deficiencies in education on the aspect of exercises. 92.1% of the participants indicated that they had never been educated on exercises and healthy lifestyles. Lack of education regarding aspects on exercises may have created negative influence among the participants leading to increase in low back pain with regrettable treatment outcomes. Exercise constitutes the core component of the physiotherapy profession. Therefore participants' reports could be assumed to indicate that; there was need for better exercise explanation methods for the individuals with low back pain. Participants further expressed a need to be educated on the purpose for the exercises performed prior to commencement of the exercise sessions.

It is expected that, with increased education on the aspect would increase understanding over the aim of the exercises leading to better adherence and could result in better treatment outcomes. However, perhaps due to the busy schedules on the part of the physiotherapists resulting from high patient volumes (out and admitted patients for only 3 physiotherapists) with different conditions, there could be lack of adequate time for detailed explanations on exercises to the patients.

The lack of time may have been complicated by the diversity of the patient population, resulting from the high preference for the health facility by most patients. The Kibogora Hospital enjoys the status of a premier health care referral facility within the West Country region and other regions of DRC and Burundi where those in need of high quality health care services prefer.

It is therefore not surprising that patients' numbers will at times be high resulting in possible lack of adequate time among the physiotherapists to explain to their patients in detail the specific aims of the exercises prescribed.

Nevertheless, patients deserve to receive clear explanations about the purpose of the exercises before embarking on any exercise with a view to increase compliance (Klaber-Moffett, 2002). In situations where time pressures among the medical professionals may prevail, the same author advises, the programme could be written down and illustrated for the patients to read during their own time so as to improve the level of adherence. In view of this recommendation therefore, better methods of education regarding the expressed aspects on exercises require to be established based on the individuals' established needs. An essential technique that could overcome the expressed need with regard to the aim of the exercises could be through conducting education sessions in small groups for the first time patients prior to engaging on the actual therapy (Faas, 1999). The individuals could be educated individually or in small groups, allowing sufficient time to address any pertinent questions on the exercises that may arise from the patients. Further follow-up could then be done by use of written pamphlets as advocated in the literature.

In summary, the findings of the present study expressed that children need education on exercises and health lifestyle in order to prevent or to manage their low back pain. Therefore, implementation of an outreach programme can be of big benefits through which children can be educated about physical exercises and the use of health services when they are affected by low back pain.

6.7.3.2 Lack of Education on use of Health Services

Regarding the use of health services, it is expressed that participants need to be educated on the existence of health services offered for low back pain such as physiotherapy and other medical approaches. Findings indicated that 91.2% have never been educated on the use of health services. Most of the participants reported that, they were not informed about the existence of most health services such as physiotherapy and the role the discipline played in low back pain management. In addition, they wanted to be educated on who they should have consulted for low back pain management.

In view of the lack of education over the existence of the health services, some participants were compelled to consult a variety of medical professionals. They also consulted traditional healers for their low back pain. The consultations exposed some of the participants to conflicting health education from the variety of the medical professionals consulted or to some extent led to a delay in seeking for health service (Fritz & George, 2002; Lee, Arozullahb & Choc, 2004). Participants were also likely to consult inappropriately, receive contradicting health information leading to a delay in the appropriate management.

The findings from the present study are similar to the findings by Fritz & George (2002) who implicated lack of education on available health services as capable of hindering individuals from accessing health-care services including physiotherapy. One type of health education therefore, is one that aims at providing patients with information about the health services and the sensible use of those health resources

available to their advantage (Pitt-Brooke, Reid, Lockwood & Kerr, 1998). Once familiar with the health services, the authors further explained, the medical professionals should encourage the individuals to correctly and timely make use of the health resources when necessary so as to assist in minimizing delay in seeking for the health service.

There is also some evidence that, lack of biomedical diagnosis in most low back pain cases as consistent to increased disability coupled by less perceived control over pain which could lead to maladaptive coping strategies (Geisser & Roth, 1998). With time, the maladaptive coping strategies may build up into a desire to seek for alternative therapies. Some patients in the process could decide to consult complementary medical practitioners such as herbalists and other unconventional healers as a result of lack of any positive expectations and distrust for the medical professionals. Such patients will need to be encouraged and assisted in adhering to the prescribed health education programmes through a number of ways. The ways of encouraging such patients could include counseling, offering psychological support and appropriate explanation over their health problem as well as to why the problem may have persisted despite the management.

The aim would not only be aimed at improving on the patients' coping strategies, but also in educating them on appropriate health care services available for them and to encourage them to seek for the services whenever required.

The findings of the study are in line with the findings by Glenton (2002) who established comparable needs for education on the availability of alternative therapies among participants in a study on information needs among low back pain sufferers in Norway. In her study, participants wanted to be educated on the role physiotherapy played on low back pain management as well as alternative treatments available for low back pain sufferers who had their low back pain delegitimized by the medical professionals. In summary, the findings of the current study highlighted that high school children need to be educated about the use of health services because they don't know where to go and who to consult when they have low back pain problems.

According to the findings of the current study, it can be concluded that the level of education about the preventive measures, diagnosis and prognosis and the use of health services for low back pain is still at low level. Therefore health promotion programme in relation to low back pain prevention among high school children should be implemented.

6.8 Summary

This chapter discussed the main findings of the study in accordance with the objectives. The discussion further involved comparing results of the current study with other relevant studies that were conducted in Africa as well as in industrialized nations, and a similarity was found for most studies. One of the main findings of the study is that the prevalence of low back pain among high school children was high. However, most of them did not get any medical aid for their low back pain.

The main predisposing factor for low back pain was found to be prolonged sitting posture. Moreover, low back pain impacts both children and their parents. In addition, the level of education as low back pain preventive measures was still at low level as indicated in both qualitative and quantitative parts of the study. Therefore, improvement in health promotion through education is highly recommended.



Chapter seven

Summary, conclusion and Recommendations

7.1 Introduction

This chapter constitutes of a summary and conclusion of the study. The basic findings are outlined and finally, at the end of the chapter, recommendations are made based on the findings of the study.

7.2 Summary and conclusions

The aim of the study was to determine the prevalence and the predisposing factors to low back pain among high school children in Nyamasheke district in Rwanda. Furthermore, the study sought to identify impacts of low back pain and the management techniques used by service providers to address low back pain. Finally, the study also explores if there is a need for education among high school children relating to health promotion strategies to prevent low back pain.

A number of studies have proven that low back pain is a major problem among school children worldwide, including Rwanda. Besides, various studies have indicated that sitting for a long time, poor posture and lack of exercises are significant predisposing factors causing low back pain among high school children. Moreover, physical fitness is not only a protective means against low back pain but also recommended by World Health Organisation as a healthy lifestyle benefit to individuals. No previous study has been done in Rwanda concerning low back pain among high school children and they are thought to be also exposed to high

predisposing factors. Early interventions are needed to identify some of those risks or predisposing factors and probably possible measures to be taken.

The study setting was Nyamasheke district in Rwanda and the study population involved all high school children and service providers (doctors and physiotherapists) who were involved in management of low back at Kibogora District Hospital. A concurrent mixed study design was used where a descriptive, quantitative study design and a qualitative study were used. Nine hundred and six two high school children (962) composed of 51.8% female and 48.2% males, voluntarily participated in the study. Then, six willing service providers including doctors (50%) and physiotherapists (50%) participated in the study. A self-administered questionnaire was used to collect data from school learners whereas a semi structure interview was used among service providers. Descriptive statistics was used to summarise demographic data and low back pain characteristics among high school learners. Data from service providers was analysed manually. Chi-square test was used to determine the relationship between low back pain and demographic variables as well as predisposing factors and other variables. All tests were done at significance level of $p < 0.05$.

The results of the current study demonstrated that the prevalence of low back pain among high school children in Rwanda was high (66.1%). One year low back pain was found to be 25.4% whereas one month prevalence was 13.7%. There was a significant association between physical activity and low back pain. The results showed that the highest physical activity performance was observed at school and the

lowest was leisure time physical activity at home. This partly confirmed that high school children engage less or do not engage themselves at all in leisure-time physical activities.

Furthermore, the present study demonstrated that demographic factors such as gender was not in relationship with low back pain ($p=0.232$) but age and localization were significantly related to low back pain among ($p=0.000$). Moreover, analysis was done to determine if demographic factors are associated with physical activity. Age ($p=0.004$) and gender ($p=0.000$) and school localisation ($p=0.000$) were found to be associated with physical activity levels of school children. However, the researcher realised that other factors other than demographic characteristics and physical activity levels could also be potential determinants of low back pain among high school children. Such factors are: psychosocial factors (school related stress or personal related stress, emotional behaviours and cultural constraints), biological and environmental factors (biomechanics of the body, financial constraints and infrastructure). The current study highlighted that low back pain has an impact on both physical and psychological aspect of high school children. In addition, it does not only impact on children, but also on their parents, families and service providers either psychologically, financially or socially.

The findings of the present study indicated that the majority of the participants do not receive medical services; only a few of them receive treatment for their low back pain including medications, analgesics, drugs and physical therapy modalities.

According to the findings of the current study, it was concluded that the level of education about the preventive measures, diagnosis and prognosis and the use of health services for low back pain is still at low level. The study provides significant information about the prevalence and risk factors of low back pain as well as physical activity levels of the high school learners. The results are limited to the participants of one district in Rwanda. Therefore, extensive generalization cannot be made.

7.3 Significance of the study

The findings of this study are important for clinicians, researchers and policy makers. Clinically, this study provides medical doctors, physiotherapists and other health professionals with information about demographic status, prevalence, impacts of low back pain, predisposing factors and need for health promotion as low back pain preventive measures. This information could be used by these health-care professionals to develop appropriate prevention and rehabilitation strategies for this specific group of patients, not only during the hospital admission, but also after discharge and before admission through the outreach programmes. Such a study In Nyamasheke district provides reliable data for referencing, especially by researchers and policy makers. Subsequently, it is a contribution to the knowledge about low back pain in Rwanda.

7.4 Recommendation

Recommendations are given based on the results.

The results of this study need to be made available to all high school children, directors, teachers, and service providers, through workshops, to give additional clarifications.

The ministry of health in Rwanda should make an effort to take action into preventing low back pain in high school children by implementing preventive measures using a multidimensional approach since low back pain risk factors are multifactorial. Findings of this study may not be generalized to the whole population; however they are not limited only to the high school children. The ministry of health may therefore use findings from this study to develop preventive measures of school related musculo-skeletal disorders, especially low back pain among high school children in Rwanda.

The ministry of education in Rwanda should elaborate a program which facilitates high school children to participate in physical activities and should incorporate a stretching break after each period of lesson as preventive measures for low back pain.

The directors of high schools should provide infrastructures (chairs, beds...) which are ergonomically safe rather than using the economical materials because prevention is better than cure. More attention needs to be given to ergonomic improvements in chair and desk design and to the sitting posture of children in the classroom.

The directors of high schools are requested to allow children to visit health services before low back pain becomes chronic.

Kibogora hospital management may use findings from this study to evaluate the risk of low back pain among high school children as well as to design interventions aimed at reducing its prevalence.

Administration of Kibogora Hospital is requested to provide a sufficient number of qualified health personnel, including physiotherapists and doctors in order to provide a good quality of management of low back pain and other conditions in general.

Service providers of Kibogora Hospital should include education as preventive measure in their management techniques when addressing low back pain. In addition they should make an effort to move outside of the hospital for an outreach programme to provide education in schools where they can meet several high school children at the same time for sensitization about low back pain prevention.

Physiotherapists are requested to take into consideration that low back pain is a problem for all age group including adults and adolescents. Therefore improving health services related to low back pain should start as early as possible to prevent chronic low back pain or any disability which may occur in later stage.

High school children should be responsible for their own health by taking into account preventive measures and coping strategies against school activity-related injuries such as low back pain which was found very prevalent among them.

Based on the literature regarding physical fitness, the researcher highly recommends high school children to maintain a healthy life style in terms of physical fitness which also contribute to their mental wellbeing.

Finally, further research should be done to identify ways of improving healthy, safe and conducive school conditions of high school children in general. Since high school children have been pointed out to be exposed to predisposing factors, this would probably minimize the risks.

7.5 Strength and Limitations of the study

7.5.1 Strength of the study

The strength of the study is that there was a high response rate of 96.2%. This shows that the high school children were most willing to contribute to the study. The additional strength is enough sample size (1000) in quantitative data and 13 service providers in qualitative part of the study.

7.5.2 Limitations of the study

In quantitative part of the study, a recall bias may have occurred especially on their experienced low back pain as participants were asked to report if they had any low back pain during the last year, last month and last week. In the same context, there could have been a bias also when participants had to recall the actual time in minutes or hours that they spent doing physical activities.

Time was a strong limiting factor in this study. Cross-sectional method was used due to limited time. It was rather found not be appropriate method to study the

relationship between different risk factors and low back pain due to the fact that it collects the data at once and does not provide time to follow up predisposed children. Prospective study should be considered and used in the future.

As it was recommended by Rwanda National Ethics Committee, the researcher revised the ethical considerations. The recommendation indicated that in Rwanda all children under the age of 21 years old are considered as minor children. Moreover, those children should not sign a consent form but an assent form. However, during the data collection, most of the children older than 18 years complained that they were mature enough to sign a consent form rather than signing an assent form. In addition, they complained that it was not necessary to ask their parents to sign a consent form for them. Fortunately, the researcher tried to explain and to convince them and finally they agreed to sign an assent form as it was recommended. Then after, they participated in the study without any hesitation.

7.6 Summary of the chapter

This final chapter summarized and outlined the relevant points of the current study. It gave some recommendations for future plan and implementation including the development of health promotion and preventive measures for low back pain among high school children.

References

Adams, M., Mannion, A., & Dolan, P. (1999). Personal risk factors for first-time low back pain. *Spine*, 24: 2497-2505.

Aina, A., May, S., & Clare, H. (2004). The centralization phenomenon of spinal symptoms: A Systematic Review. *Manual Therapy*, 9:134–143.

Aker, P., Gross, A., Goldsmith, C., & Peloso, P. (1996). Conservative management of mechanical back and neck pain: systematic overview and meta-analysis. *Biomedical Journal*, 313:1291–1296.

American Academy of Pain. (1997). Medicine and the American Pain Society: The use of opioids for the treatment of chronic pain: A consensus statement. *Clinical Journal of Pain*, 13:6–8.

Ariens, G.A., Bongers, P.M., Hoogerdoorn, W.E., Houtman, I.L., & Van Der Wal, G. (2001). High quantitative job demands and low coworker support as risk factors for neck pain: Results of a prospective cohort study. *Spine*, 26: 1896-1901.

Assendelft, W.J.J., Morton, S.C., Yu, E.I., Suttorp, M.J., & Shekelle, P.G. (2004). Spinal manipulative therapy for low back pain. *Cochrane Database of Systematic Reviews*, 11: 68-72.

Assendelft-Willem, J.J., Morton, S.C., Yu, E.I., Suttorp, M.J., & Shekelle, P.G. (2003). Spinal manipulative therapy for low back pain. A meta-analysis of effectiveness relative to other therapies. *Annals of Internal Medicine*, 138:871–881.

Atlas, S.J. (2010). Nonpharmacological treatment for low back pain. *Journal of Musculoskeletal Medicine*, 27 (1): 20–27.

Balague, F., Troussier, B., & Salminen, J.J. (1999). Non-specific low back pain in children and adolescents: risk factors. *European Spine Journal*, 8:429-438.

Balague, F., Dutoit, G., & Waldburger, M. (1998). Low back pain in school children. An epidemiological study. *Scandinavian Journal of Rehabilitation Medicine*, 316(7139): 1196–1200.

Balague, F., Nordin, M., Dutoit, G., & Waldburger, M. (1996). Primary prevention, education and low back pain among school children. *Bulletin of the Hospital for Joint Diseases*, 55: 130–134.

Balague, F., Skovron, M.L., Nordin, M., Dutoit, G., Pol, L.R., & Waldburger, M. (1995). Low back pain in schoolchildren . A study of familial and psychological factors. *Spine*, 20:1265-1270.

Balague, F., Nordin, M., Skovron, M.L., Dutoit, G., Yee, A., & Waldburger, M. (1994). Non-specific low back pain among schoolchildren: A field survey with analysis of some associated factors. *Journal of Spinal Disorders*, 7(5): 369-459.

Balague, F., Dutoit, G., & Waldburger, M. (1988). Low-back pain in school children. An epidemiological study. *Scandinavian Journal of Rehabilitation Medicine*, 20:175–179.

Banks, N. J. (1998). Designing medical record abstraction forms. *International Journal for Quality in Health Care*, 10(2): 163-167.

Bartlett, E.E. (1985). At last a definition (Editorial). *Patient Education and Counseling*, 7: 323-324.

Battie, M., Cherkin, D., Dunn, D., Ciol, M., & Wheeler, K. (1994). Managing low back pain: attitudes and treatment preferences of physical therapists. *Physiotherapy*, 74:219–226.

Baumgartner, T.A., Strong, C.H. & Hensley, L.D. (2002). *Conducting and Reading Research in Human and Performance* (3rd ed). Boston: WCB McGraw Hill.

Bekkering, G., Hendriks, H., & Koes, B. (2003). Dutch physiotherapy guidelines for low back pain. *Physiotherapy*, 89:82–96.

Bekkering, G.E., Hendriks, H.J.M., Koes, B.W., Oostendorp, R.A.B., Ostelo, R.W.J.G., Thomassen, J.M.C., & Van Tulder, M.W. (2003). Factors associated to low back pain. *Physiotherapy*, 29(12): 72-86.

Bigos, S.J., Bowyer, O.R., & Braen, G.R. (1994). *Clinical practice guidelines. Public Health Service* (14th Edition). US Department of Health and Human Services: Rockville.

Bogduk, M. (2003). Management of chronic low back pain. *Medical Journal of Australia*, 180 (2): 79–83.

Borkan, J., Reis, S., Hermoni, D. & Biderman, A. (1995). Talking about the pain: a patient-centred study of low back pain in primary care. *Social Science & Medicine*, 40: 977-988.

Brattberg, G. (1994). The incidence of back pain and headache among Swedish school children. *Quality of Life Research*, 3: 27-31.

Bratton, L.R. (1999). *Assessment and management of acute low back pain*. *The American Academy of Family Physician*. Retrieved March 20, 2010, from <http://www.aafp.org/afp/991115ap/2299.html>

Brink, H.I (1999). *Fundamentals of Research Methodology for Health Care Professionals*(2nd ed). Cape Town: Juta.

Britten, N. (1995). Qualitative Research: Qualitative interviews in medical research. *British Medical Journal*, 311(2): 251-252.

Bronfort, G., Haas, M., Evans, R., Kawchuk, G., & Dagenais, S. (2008). Evidence-informed management of chronic low back pain with spinal manipulation and mobilization. *The Spine Journal*, 8 (1): 213–225.

Bronfort, G., Haas, M., Evans, R., & Bouter, L. (2004). Efficacy of spinal manipulation and mobilization for low back pain and neck pain: a systematic review and best evidence synthesis. *The Spine Journal*, 4:335–356.

Brophy, M.O., Achimore, L., & Moore-Dawson, J. (2001). Reducing incidence of low-back injuries reduces costs. *British medical journal*, 62: 508–511.

Buchbinder, R., Staples, M., & Jolley, D. (2009). Doctors with a special interest in back pain have poorer knowledge about how to treat back pain. *Spine*, 34(11):1218-1226.

Buchbinder, R., Jolley, D., & Wyatt, M. (2001). Population based intervention to change back pain beliefs and disability: Three part evaluation. *Biomedical Journal*, 322: 1516–1520.

Burton, K. (2005). How to prevent low back pain. *Best Practice & Research in Clinical Rheumatology*, 19(4): 541–555.

Burton, A.K., McClune, T., Clarke, R., & Main, C. (2004). Long-term follow-up of patients with low back pain attending for manipulative care: Outcomes and Predictors. *Manual Therapy*, 9:30–35.

Burton, A.K., Waddell, G., Tulletson, M., & Summerton, N. (1999). A randomised controlled trial of novel education booklet in primary care. *Spine*, 24:2488–2491.

Burton, A.K., Clarke, R.D., McClune, T.D., & Tillotson, K.M. (1996). The natural history of low back pain in adolescents. *Spine*, 21:2323-2328.

Burton, A.K., & Tillotson, K.M. (1991). Does leisure sports activity influence lumbar mobility or the risk of low back trouble? *Journal of Spinal Disorders*, 4:329 –336.

Cardon, G., & Balague, F. (2004). Backpacks and spinal disorders in school children. *Europa Medicophysica*, 40:15-21.

Cardon, G., & Balague, F. (2004). Low back pain prevention's effects in schoolchildren. What is the evidence? *European Spine Journal*, 13: 663-679.

Cardon, G., De Bourdeaudhuij, I., De Clercq, D., Philippaerts, R., Verstraete, S., & Geldhof, E. (2004). The significance of physical fitness and physical activity for self-reported back and neck pain in elementary schoolchildren. *Pediatric Exercise Sciences*, 16:1-11.

Cardon, G.M., De Clercq, D.L.R., & De Bourdeaudhuij, I.M.M. (2002). Back education efficacy in elementary schoolchildren: a 1-year follow-up study. *Spine*, 27: 299–305.

Cardon, G., De Bourdeaudhuij, I., & De Clercq, D. (2002). Back education in elementary school: knowledge and perceptions of pupils, parents and teachers. *Journal of School Health*, 72:100-106

Cardon, G., De Bourdeaudhuij, I.D. & Clercq, D.D. (2001). Generalization of back education principles by elementary school children: evaluation with a practical test and a candid camera observation. *Acta Paediatrica*, 90, 143–150.

Carey, T.S., Freburger, J.K., Holmes, G.M., Castel, L., Darter, J., Agans, R., Kalsbeek, W., & Jackman, A. (2009). A long way to go: practice patterns and evidence in chronic low back pain care. *Spine*, 34(7):718-724.

Carr, J., Klaber-Moffett, J., & Howarth, E. (2005). A randomised trial comparing a group exercise programme for back pain patients with individual physiotherapy in a severely deprived area. *Disability and Rehabilitation*, 27:929–937.

Carter, J., & Birrell, L. (2000). *Occupational health guidelines for the management of low back pain at work-principal recommendations*. London: Faculty of Occupational Medicine.

Cedraschi, C., Nordin, M., Nachemson, A.L., & Vischer, T.L. (1998). Health care providers should use a common language in relation to low back pain patients. *Baillieres Clinical Rheumatology*, 12:1–15.

Cherkin, D.C. (1998). Primary care research on low back pain. *Spine*, 23: 1997-2002.

Chiu, T.W., Lau, K.T., Ho, C.W., Ma, M.C., & Yeung, F.T. (2006). A study on the prevalence of and risk factors for neck pain in secondary school teachers. *Public Health*, 120: 563-565.

Chometon, E., Braize, C., & Levy, A. (1999). *A primary educational prevention program for low back pain in Saint- Etienne primary schools*. In: Troussier, B.P., X (eds) *Le dos de l'enfant et de l'adolescent et la prevention des lombalgies (The backs of children and teenagers and the prevention of backache)*. Paris: Actes Masson, pp 242-245.

Chou, R., Qaseem, A., & Snow, V. (2007). Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Annals of Internal Medicine*, 147 (7): 478–491.

Clairborne, N., Vandenburg, H., Krause, T.M., & Leung, P. (2002). Measuring quality of life changes in individuals with chronic low back pain conditions: A back education programme evaluation. *Evaluation Programme Planning*, 25: 61-70.

Clare, H.A., Adams, R., & Maher, C.G. (2004). A systematic review of efficacy of McKenzie therapy for spinal pain. *Australian Journal of Physiotherapy*, 50:209–216.

Clarke, B.M. (2000). The impact of suffering in Physiotherapy practice: cost containment issues. *Physiotherapy Canada*, 52 (1): 28-31.

Cleeland, C.S., Cleeland, L.M., Dar, R., & Rinehardt, L.C. (1986). Factors influencing physician management of cancer pain. *Cancer*, 58(3):796–800.

Corlett, E. N. & Bishop, R. P. (1976). A technique for measuring postural discomfort. *Ergonomics*, 9(5): 175-182.

Cote, P., Cassidy, D., & Carroll, L. (2000). The factors associated with neck pain and its related disability in the Saskatchewan population. *Spine*, 25:1109–1117.

Croft, P., Lewis, M., & Papageorgiou, A. (2001). Risk factors for neck pain: a longitudinal study in the general population. *Pain*, 93:317–325.

Currie, C., Hurrelmann, K., Settertobulte, W., Smith, R., & Todd, J. (2000). *Health and Health Behaviour among Young People. WHO Policy Series: Health Policy for Children and Adolescents*. Copenhagen: WHO.

Dagenais, S., Gay, R.E., Tricco, A.C., Freeman, M.D., & Mayer, J.M. (2010). NASS Contemporary Concepts in Spine Care: spinal manipulation therapy for acute low back pain. *The Spine Journal: Official Journal of the North American Spine Society*, 10 (10): 918–940.

Deltto, A., Erchard, R.E., & Bowling, R.W. (1995). A treatment-based classification approach to low back pain syndrome: Identifying and staging patients for conservative treatment. *Physical Therapy*, 75 (6): 21-39.

Denzin, N.K. & Lincoln, Y.S. (1994). *Handbook of Qualitative Research* (3rd ed.). Sage, Thousand Oaks, CA: Sage Publications.

Department of Health and Children website. (2007). *Management of orthopaedic conditions*. Retrieved on 8th March, 2011, from <http://www.doh.ie>

Deyo, R., Mirza, S., & Martin, B. (2006). Back pain prevalence and visit rates: estimates from US National surveys of 2002. *Spine*, 31:2724–2727.

Deyo, R.A. & Diehl, A.K. (1986). Patient satisfaction with medical care for low-back pain. *Spine*. 11(1): 28-30.

De Vos, A. (2002). *Research and grassroots level for the social sciences and human services professionals* (2nd ed.). Pretoria: Van Schaik Publishers.

Dobscha, S.K., Corson, K., Flores, J.A., Tansill, E.C, & Gerrity, M.S. (2008). Veterans affairs primary care clinicians' attitudes toward chronic pain and correlates of opioid prescribing rates. *Pain Medicine*, 9(5):564–571.

Domholdt, E. (1993). *Physical therapy Research: Principles and applications*. Toronto, USA: WB. Saunders Publishers.

Duggleby, T., & Kumar, S. (1997). Epidemiology of juvenile low back pain: a review. *Disability and Rehabilitation*, 19:505-512.

Durham, N.C. (2004). Economic Impact of Back Pain Substantial. *Science Daily*, 24: 148-159.

Ebbehoj, N.E., Hansen, F.R., Harreby, M.S., & Lassen, C.F. (2002). Low back pain in children and adolescents. Prevalence, risk factors and prevention. *Ugeskr Laeger*, 164:755-758.

European Commission. (2004). *European guidelines for the management of acute low back pain*. Research Directorate General, European Commission, COST Action B13. Retrieved on March, 20th 2011, from www.backpaineurope.org

Evanoff, B.A., Bohr, P.C., & Wolf, L.D. (1999). Effects of a participatory ergonomics team among hospital orderlies. *American Journal of Industrial Medicine*, 35: 358–365.

Faas, A. (1999). Exercises: Which ones are worth trying, for which patients, and when? *Spine*, 21(24): 2874-2883.

Fabunmi, A.A., Aba, S.O., & Odunaiya, N.A. (2005). Prevalence of low back pain among peasant farmers in a rural community in South West Nigeria. *African Journal of Medicine and Medical Sciences*, 34(3):259-62

Federation of State Medical Boards of the United States. (2004). *Model policy for the use of controlled substances for the treatment of pain*. Retrieved on the 12th, March 2011, from: [http://www.fsmb.org/pdf/2004_grpol Controlled Substances.pdf](http://www.fsmb.org/pdf/2004_grpol_Controlled_Substances.pdf)

Feingold, A.J., & Jacobs, K. (2002). The effect of education on backpack wearing and posture in a middle school population. *Work*, 18: 287–294.

Feldman, D.E., Shrier, I., Rossignol, M., & Abenhaim, L. (2002). Work is a risk factor for adolescent musculoskeletal pain. *Journal of Occupational and Environmental Medicine*, 44:956-961.

Feldman, D.E., Shrier, I., Rossignol, M., & Abenhaim, L. (2001). Risk factors for the development of low back pain in adolescence. *American Journal of Epidemiology*, 154: 30-36.

Feldman, D.E., Rossignol, M., Shrier, L., Abenhaim, L. (1999). Smoking: a risk factor for development of low back pain in adolescents. *Spine*, 24:2492- 2496.

Forssell, M.Z. (1990). The Swedish back school. *Physiotherapy*, 66:112–114.

Foster, N.E., Pincus, T., Underwood, M., Vogel, S., Breen, A. & Harding, G. (2003). Treatment and the process of care in musculoskeletal conditions, A Multidisciplinary perspective and integration. *Orthopaedic Clinics of North America*, 34: 239-244.

Foster, N.E., Thompson, K.A., Baxter, G.D., & Allen, J.M. (1999). Management of nonspecific low back pain by physiotherapists in Britain and Ireland. A descriptive questionnaire of current clinical practice. *Spine*, 24:1332–1342.

Fredriksson, K., Bildtc, C., Ha¨gga, G., & Kilboma, A. (2001). The impact on musculoskeletal disorders of changing physical and psychosocial work environment conditions in the automobile industry. *International Journal for Industrial Ergonomics*, 28: 31–45.

French, S.D., Cameron, M., Walker, B.F., Reggars, J.W., & Esterman, A.J. (2006). Superficial heat or cold for low back pain. *Cochrane database of systematic review*, 12:75-79.

Fritz, J.M. & George, S.Z. (2002). Identifying Psychosocial Variables in patients with acute work-related low back pain: The importance of fear- avoidance beliefs. *Physical Therapy*, 82: 973-983.

Frost, H., Lamb, S., Klaber-Moffett, J., Fairbank. J., & Moser, J. (1998). A fitness programme for patients with chronic low back pain: 2 year follow-up of a randomised controlled trial. *Pain*, 75:273–279.

Furlan, A., Brosseau, L., Welch, V., & Wong, J. (2001). *Massage for low back pain*. Cochrane Review: Cochrane Library.

Gallagher, R.M., & Rosenthal, L.J. (2008). Chronic pain and opiates: Balancing pain control and risks in long-term opioid treatment. *Archives of Physical Medicine and Rehabilitation*, 89(3):77–82.

Gallagher, R.M. (2007). Selective, tailored, biopsychosocial pain treatment: Our past is our future. *Pain Medicine*, 8(6):471–472.

Gatty, C.M., Turner, M., Buitendorp, D.J., & Batman, H. (2003). The effectiveness of back pain and injury prevention programs in the workplace. *Work*, 2003, 20(3): 257-267

Gebhardt, W.A. (1994). Effectiveness of training to prevent job-related back pain: a meta-analysis. *British Journal of Clinical Psychology*, 33(571): 574.

Geisser, M.E. & Roth, R.S. (1998). Knowledge of and agreement with chronic pain diagnosis: relation to affective distress, pain beliefs and coping, pain intensity and disability. *Journal of Occupational Rehabilitation*, 8: 73-88.

Gilgil, E., Kaçar, C., Bütün, B., Tuncer, T., Urhan, S., Yildirim, C., Sünbülöglü, G., Arikan, V., Tekeoğlu, I., Öksüz, M., & Dündar, U. (2005). Prevalence of low back pain in a developing urban setting. *Spine*, 30:1093–1098.

Gilson, A.M., & Joranson, D.E. (2001). Controlled substances and pain management: Changes in knowledge and attitudes of state medical regulators. *Journal of Pain and Symptoms Management*, 21(3):227–237.

Glajchen, M. (2001). Chronic pain: Treatment barriers and strategies for clinical practice. *The Journal of the American Board of Family Practice*, 14(3):211–218.

Glaser, J.A, Lee, S.S., & Fehr, N. (2005). *Low back pain*. Retrieved March 17, 2010, from

http://orthoinfo.aaos.org/brochure/thr_report.cfm?Thread_ID=10&topcategory=Spine

Glenton, C. (2002). Developing patient-centred information for back pain sufferers. *Blackwell Science, Health Expectations*. 5: 1-11.

Glenton, C. (2002). *Tropical Issues in Pain* (2nd ed), Falmouth: No1 Press.

Gliem, J.A., & Gliem, R.R. (2003). Calculating, Interpreting, and Reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales (2nd ed.). The Ohio State University: Columbus.

Goldberg, M.S., Scott, S.C., & Mayo, N.E. (2000). A review of the association between cigarette smoking and the development of non-specific back pain and related outcomes. *Spine* 25:995-1014.

Goodgold, S., Corcoran, M., Gamache, D., Gillis, J., Guerin, J., & Coyle, J.Q. (2002). Backpack use in children. *Pediatric Physical Therapy*, 14:122-131.

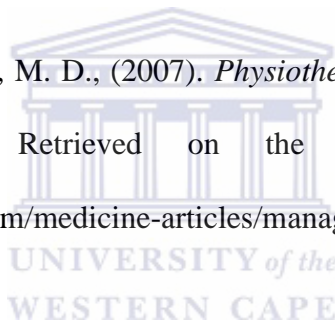
Gracey, J., McDonough, S., & Baxter, G. (2002). Physiotherapy management of low back pain. *Spine*, 27:406–411.

Graneheim, U., & Lundman, B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24(2), 105–112.

Green, T. L., & King, K. M. (2009). Experiences of male patients and wife-caregivers in the first year post-discharge following minor stroke: A descriptive qualitative study. *International Journal of Nursing Studies*, 46(9), 1194-1200.

Grimmer, K., & Williams, M. (2000). Gender-age environmental associates of adolescent low back pain. *Applied Ergonomics*, 31:343-360.

Guillermo Pecci Saavedra, M. D., (2007). *Physiotherapy in the management of non-specific back pain*. Retrieved on the 11th, March 2011, from <http://www.articlesbase.com/medicine-articles/management-of-nonspecific-back-pain-192492.html>



Gunzburg, R., Balague, F., Nordin, M., Szpalski, M., Duyck, D., Bull, D., & Melot, C. (1999). Low back pain in a population of school children. *European Spine Journal*, 8:439- 443.

Hagen, K.B., Hilde, G., Jamtvedt, G., & Winnem, M. (2004). Bed rest for acute low-back pain and sciatica. *Cochrane Database Systemic Review*, 4: 48-52.

Hakala, P., Rimpela, A., Salminen, J.J., Virtanen, S.M., & Rimpela, M. (2002). Back, neck and shoulder pain in Finnish Adolescents: national cross sectional surveys. *British Medical Journal*, 325: 743–747.

Hammel, K., Carpenter, C., & Dyck, I. (2000). *Using Qualitative Research. A Practical Introduction for Occupational and Physical Therapists*. London: Churchill Livingstone.

Harden, R.N. (2008). Chronic pain and opiates: A call for moderation. *Archives of Physical Medicine and Rehabilitation*, 89(3):72–76.

Harding, V., & Watson, P.J. (2000). Increasing activity and improving function in chronic pain management. *Physiotherapy*, 86 (12): 621-623.

Harland, N., & Lavalley, D. (2003). Biopsychosocial management of chronic low back pain patients with psychological assessment and management tools. *Physiotherapy*, 89(5): 305-312.

Harreby, M., Nygaard, B., Jessen, T., Larsen, E., Storr-Paulsen, A., Lindahl, A., Fisker, I., & Laegaard, E. (1999). Risk factors for low back pain in a cohort of 1389 Danish school children: an epidemiologic study. *European Spine Journal*, 8:444-450.

Harreby, M., Neergaard, K., Hesselsoe, G. & Kjer, J. (1995). Are radiological changes in the thoracic and lumbar spine of adolescents risk factors for low back pain in adults? A 25-year prospective cohort study of 640 school children. *Spine*, 20: 2298–2302.

Hayden, J.A., van Tulder, M.W., & Tomlinson, G. (2005). Systematic review: strategies for using exercise therapy to improve outcomes in chronic low back pain. *Annals of Internal Medicine*, 142:776–785.

Hertzberg, A. (1985). Prediction of cervical and low-back pain based on routine school health examinations. A nine-to twelve-year follow-up study. *Scandinavian Journal for Primary Health Care*, 3:247–253.

Hestbaek, L., Leboeuf-Yde, C., Engberg, M., Lauritzen, T., Bruun, N.H., & Manniche, C. (2003). The course of low back pain in a general population. Results from a 5-year prospective study. *Journal of Manipulative Physiotherapy*, 26:213–219.

Hestbaek, L., Leboeuf-Yde, C., & Manniche, C. (2003). Low back pain: what is the long-term course? A review of studies of general patient populations. *European Spine Journal*, 12:149–165.

Heymans, M.W., van Tulder, M.W., Esmail, R., Bombardier, C., & Koes, B.W. (2005). Back schools for non-specific low back pain: a systematic review within the framework of the Cochrane Collaboration Back Review Group. *Spine*, 30:2153–63.

Heymans, M.W., van Tulder, M.W., Esmail, R., & Bombardier, C. (2004). *Back schools for non-specific low back pain (Cochrane Review)*, *The Cochrane Library*. Chichester: Wiley.

Hodges, P.W., & Richardson, C.A. (1999). Altered trunk muscle recruitment in people with low back pain with upper limb movement at different speeds. *Archives of Physical Medicine and Rehabilitation*, 80:1005–1012.

Hutchinson, K., Moreland, A.M., De C Williams, A.C., Weinman, J., & Horne, R. (2007). Exploring beliefs and practice of opioid prescribing for persistent non-cancer pain by general practitioners. *European Journal for Pain*, 11(1):93–98.

Hutchinson, M.R. (1999). Low back pain in elite rhythmic gymnasts. *Medicine Science and Sports Exercises*, 31:1686-1688.

Indahl, A., Haldersen, E., Holm, S., Reikeras, O., & Ursin, H. (1998). Five-year follow-up study of a controlled trial using light mobilisation and an informative approach to low back pain. *Spine*, 23:2625–2630.

Iyer, S.R. (2001). Schoolchildren and backpacks. *Journal of School Health*, 71:88.

Jeffels, K., & Foster, N. (2003). Can aspects of physiotherapist communication influence patients' pain experiences? A systematic review. *Physiotherapy Review*, 8:197–210.

Jones, G.T., Watson, K.D., Silman, A.J., Symmons, D.P.M., & Macfarlane, G.J. (2003). Predictors of low back pain in British schoolchildren: a population-based prospective cohort study. *Pediatrics*, 111:822-828.

Jones, S. (1985). *The analysis of depth interviews*, In R. Walker (ed.), *Applied Qualitative Research* (pp. 56-70). Aldershot, UK: Gower Publishing.

Jordaan, R., Kruger, M., Stewart, A.V., & Becker, P.J. (2005). The association between low back pain, gender and age in adolescent. *South African Journal of Physiotherapy*, 61(3): 17-21.

Kamau, P. (2005). *Patient's satisfaction with physical therapy services at selected hospitals in Kenya*. Unpublished master's thesis, UWC, Cape Town, South Africa.

Kamwendo, K., & Linton, S. (1991). A controlled study of the effects of neck school in medical secretaries. *Scandinavian Journal of Rehabilitation and Medicine*, 23:143-52.

Kirkay-Willis, W. (1992). *Managing low back pain* (3rd ed). New York: Churchill Livingstone

Klauer-Moffett, J. (2002). Back pain: encouraging self-management approach. *Physiotherapy Theory and Practice*, 18: 205-212.

Klauer-Moffett, J., & Frost, H. (2000). Back to fitness programme. The manual for physiotherapists to set up the classes. *Physiotherapy*, 86:295-305.

Klauer-Moffett, J., Torgerson, D., & Bell-Syer, S. (1999). Randomised controlled trial of exercise for low back pain: clinical outcomes, costs, and preferences. *Biomedical Journal*, 319:279-83.

Knusel, O., & Jelk, W. (1994). Pezzi-balls and ergonomic furniture in the classroom. Results of a prospective longitudinal study. *Schweiz Rundsch Med Prax journal*, 83:407-413

Koda, S., Nakagiri, S., Yasuda, N., & Ohara, H. (1997). A follow-up study of preventive effects on low back pain at worksites by providing a participatory occupational safety and health program. *Industrial Health*, 35: 243–248.

Koes, B., & van Tulder, M. (2006). Acute low back pain. *Clinical Evidence* (15): 1619–33.

Kohl, H.W., Fulton, J.E., & Caspersen, C.J. (2000). Assessment of physical activity among children and adolescents: a review and synthesis. *American journal of Preventive Medicine*, 31:54-76.

Korovessis, P., Koureas, G.K., & Papazisis, Z. (2004). Correlation between backpack weight and way of carrying, sagittal and frontal spinal curvatures, athletic activity, and dorsal and low back pain in schoolchildren and adolescents. *Journal of Spinal Disorders & Techniques*, 17:33-40.

Kuorinka, I., Johnson, B., Kilbom, A., Vinterberg, H., & Biering-Sorenson, F. (1987). Standardised Nordic Questionnaires for analysis of musculoskeletal symptoms. *Applied Ergonomics*, 18: 233-237.

Kovacs, F.M., Abaira, V., & Pena, A. (2003). Effect of firmness of mattress on chronic non-specific low-back pain: randomised, double-blind, controlled, multicentre trial. *Lancet*, 362: 1599–1604.

Kovacs, F.M., Gestoso, M., del Real, M.T.G., Lopez, J., Mufraggi, N., & Mendez, M. (2003). Risk factors for non-specific low back pain in schoolchildren and their parents: a population based study. *Pain*, 103: 259-268.

Krefting, L. (1991). Rigor in Qualitative Research: The Assessment of Trustworthiness. *The American Journal of Occupational Therapy*, 45(3), 214-222.

Kristjansdottir, G., & Rhee, H. (2002). Risk factors of back pain frequency in schoolchildren: a search for explanations to a public health problem. *Acta Paediatrica*, 91:849-854.

Kristjansdottir, G. (1996). Prevalence of self-reported back pain in school children: a study of sociodemographic differences. *European Journal of Pediatrics*, 155:984-986.

Kujala, U.M., Taimela, S., Erkintalo, M., Salminen, J.J., & Kaprio, J. (1996). Low back pain in adolescent athletes. *Medical Sciences and Sports Exercises*, 28:165-170.

Kujala, U.M., Taimela, S., Viljanen, T. (1999). Leisure physical activity and various pain symptoms among adolescents. *British Journal of Sports Medicine*, 33:325-328.

Lahad, A., Malter, A., Berg, A.O., & Deyo, R. (1994). The effectiveness of four interventions for the prevention of low back pain. *Journal of American Medical Association*, 272: 1286–1291.

La Dou, J. (1994). *Occupational health and safety* (2nd ed). Itasca, Illinois: National Safety council (NSC).

Lebkowski, W.J. (1997). Back pain in teenagers and young adults (abstract). *Pol Merkuriusz Lek*, 2(8):111-112.

Leboeuf, Y., & Kyvik, K.O. (1998). At what age does low back pain become a common problem? A study of 29,424 individuals aged 12–41 years. *Spine*, 23: 228–234.

Leclaire, R., Esdaile, J.M., & Suissa, S. (1996). Back school in a first episode of compensated acute low back pain: a clinical trial to assess efficacy and prevent relapse. *Archives of Physical Medicine and Rehabilitation*, 77: 673–679.

Lee, S.Y.D., Arozullah, A.M., & Choc, I.K. (2004). Health literacy, social support, and health: a research agenda. *Social Science and Medicine*. 58(7): 1309-1321.

Lincoln, Y. S., & Guba, E. A. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage.

Linton, S.J., & van Tulder, M.W. (2001). Preventive interventions for back and neck pain problems: what is the evidence? *Spine*, 26: 778–787.

Lippincott, W., & Wilkins, I. (2011). A Cross-Sectional Survey of Nonspecific Low Back Pain Among 2083 school children. *Spine*: 36(22): 1885–1890.

LoBiondo-Wood, G., & Haber, J. (1998). *Nursing research: methods, critical appraisal, and utilization* (4thed.). Mosby: Mosby publisher

Long, A., Donelson, R., & Fung, T. (2004). Does it matter which exercise? A randomised control trial of exercise for low back pain. *Spine*, 29:2593–2602.

Louw, Q.A., Morris, L.D. & Grimmer-Somers, K. (2007). The Prevalence of low back pain in Africa: A systematic review. *BMC Musculoskeletal Disorders*, 24: 12-17

Mackenzie, W.G., Sampath, J.S, Kruse, R.W., & Sheir-Neiss, G.J. (2003). Backpacks in children. *Clinical Orthopaedics*, 409:78-84.

Maher, C.G. (2000). A systematic review of workplace interventions to prevent low back pain. *Australian Journal of Physiotherapy*, 46: 259–269.

Maier-Riehle, B., & Harter, M. (2001). The effects of back schools: A meta-analysis. *International Journal of Rehabilitation Research*, 24: 199– 206.

Maitland, G.D. (2004). *Maitland's Vertebral manipulation*. Butterworth Heinemann: Boston.

Malanga, G.A., & Dunn, K.R. (2010). Low back pain management: approaches to treatment. *The Journal of Musculoskel Medicine*, 27:305-315.

Malanga, G.A. (1999). *Pharmacologic Treatment of Low Back Pain, Physical Medicine and Rehabilitation State of the Art Review*. Philadelphia: Hanley and Belfus

Mandal, L. (1986). The correct height of school furniture. *Physiotherapy*, 70: 48-53.

Marras, W.S., Allread, W.G., Burr, D.L., & Fathallah, F.A. (2000). Prospective validation of a low-back disorder risk model and assessment of ergonomic interventions associated with manual materials handling tasks. *Ergonomics*, 43: 1866–1886.

Marshall, C. & Rossman, G.B. (1999). *Designing qualitative research* (3rd ed.) London: Sage Publications.

Martell, B.A., O'Connor, P.G., & Kerns, R.D. (2007). Systematic review: Opioid treatment for chronic back pain: Prevalence, efficacy, and association with addiction. *Annals of Internal Medicine*, 146(2):116–127.

Martin, L.R., Jahng, K.H., Golin, C.E., & DiMatteo, M.R. (2003). Physician facilitation of patient involvement in care: correspondence between patient and observer reports. *Behavioral Medicine*, 28:159–64.

Mays, N., & Pope, C. (1995). Qualitative Research Rigour and qualitative research. *British Medical Journal*, 311(6997), 109-112.

McKeon, M., Albert, W.J., & Neary, J.P. (2006). Assessment of neuromuscular and hemodynamic activity in individuals with and without chronic low back pain. *Dynamic Medicine*, 5: 6.

McMeeken, J., Tully, E., Stillman, B., Nattrass, C., Bygott, I.L., & Story, I. (2001). The experience of back pain in young Australians. *Manual Therapy*, 6:213-220.

McPhillips-Tangum, C.A., Cherkin, D.C. & Rhodes, L.A. (1998). Reasons for repeated medical visits among patients with chronic back pain. *Journal of General Internal Medicine*, 13: 289-295.

Meeker, W., Branson, R., & Bronfort, G. (2007). *Chiropractic management of low back pain and low back related leg complaints: Council on Chiropractic Guidelines and Practice Parameters*. Retrieved on March 24th, 2011, from <http://www.ccgpp.org/lowbackliterature.pdf>.

Meeker, W.C., & Haldeman, S. (2002). Chiropractic: A profession at the crossroads of mainstream and alternative medicine. *Annals of Internal Medicine*, 136(3): 216–227.

Mendez, F.J., & Gomez-Conesa, A. (2001). Postural hygiene program to prevent low back pain. *Spine*, 26: 1280–1286.

Merati, G., Negrini, S., Sarchi, P., Mauro, F., & Veicsteinas, A. (2001). Cardio-respiratory adjustments and cost of locomotion in school children during backpack walking (the Italian backpack study). *European Journal of Applied Physiology*, 85:41-48.

Miles, M. B., & Huberman, A. M. (1984). *Qualitative data analysis: A sourcebook of new methods*. Beverly Hills, CA: Sage.

Miller, J.A., Schmatz, C., & Schultz, A.B. (1988). Lumbar disc degeneration: Correlation with age, sex and spine level in 600 autopsy specimens. *Spine*, 13: 173–178.

Mitchinson, A.R., Kerr, E.A., Krein, S.L. (2008). Management of chronic noncancer pain by VA primary care providers: When is pain control a priority? *American Journal of Management Care*, 14(2):77–84.

Moulin, D.E., Iezzi, A., & Amireh, R. (1996). Randomised trial of oral morphine for chronic non-cancer pain. *Lancet*, 347(8995):143–147.

Murphy, A., Vanteijlingen, E., & Gobbi, M. (2006). Inconsistent Grading of Evidence Across Countries: A Review of Low Back Pain Guidelines. *Journal of Manipulative and Physiological Therapeutics*, 29 (7): 576–81.

Nachemson, A.L., & Vingard, E. (2000). *Assessment of patients with neck and back pain: a best evidence synthesis*. In: Nachemson A, Jonsson E, eds. *Neck and back pain: the scientific evidence of causes, Diagnosis and treatment*. Philadelphia: Lippincott and Wilkins publishers

National Institute for Occupational Safety and Health (NIHOSH). (2001). *Preventing Injuries and Deaths of Workers Who Operate or Work Near Forklifts*. NIHOSH Publications and products. Publication number 2001 – 109.

Naude, B., Mudzi, W., Mamabolo, M.V., & Becker (2009). Physiotherapy modalities used in the management of chronic low back pain. *Occupational health*, 15(3): 78-82

Negrini, S., & Carabalona, R. (2002). Backpacks on Schoolchildren's perceptions of load, associations with back pain and factors determining the load. *Spine*, 27:187-195.

Neumann, W. (2000). *Social Research Methods. Qualitative and Quantitative Methods*. Boston: Ally and Bacon Publishers.

Newcomer, K., & Sinaki, M. (1996). Low back pain and its relationship to back strength and physical activity in children. *Acta Paediatrica*, 85:1433-1439.

Nicholas, M.K., Molloy, A.R., & Brooker, C. (2006). Using opioids with persisting noncancer pain: A biopsychosocial perspective. *Clinical Journal for Pain*, 22(2):137–146.

Nielson, W.R., & Weir, R. (2001). Biopsychosocial approaches to the treatment of chronic pain. *Clinical Journal for Pain*, 17(4):114–127.

Nwokeji, E.D., Rascati, K.L., Brown, C.M., & Eisenberg, A. (2007). Influences of attitudes on family physicians' willingness to prescribe long-acting opioid analgesics for patients with chronic nonmalignant pain. *Clinical Therapy*, 2(2):589–602.

Ogon, M., Riedl-Huter, C., Sterzinger, W., Krismer, M., Spratt, K.F., & Wimmer, C. (2001). Radiologic abnormalities and low back pain in elite skiers. *Clinical Orthopaedics*, 151-162.

Olsen, Y., Daumit, G.L., & Ford, D.E. (2006). Opioid prescriptions by U.S. primary care physicians from 1992 to 2001. *Journal of Pain*, 7(4):225–235.

O'Mara, J.W.J., & Wiesel, S.W. (1997). History and physical examination remain cornerstones: initial diagnosis of low back pain. *Journal of Musculoskeletal Medicine*, 14(10): 10-12, 15-18, 27.

Omokhodion, F., & Sanya, A. (2003). Risk factors for low back pain among office workers in Ibadan, Southwest Nigeria. *Occupational Medicine*, 53:287–289.

Osborn, M. & Smith, J.A. (1998). The personal experience of chronic benign lower back pain: an interpretive phenomenological analysis. *British Journal of Health Psychology*, 3: 65-83.

Owen, B.D., Keene, K., & Olson, S. (2002). An ergonomic approach to reducing back/shoulder stress in hospital nursing personnel: a five year follow up. *International Journal of Nursing Studies*, 39: 295–302.

Parker, I. (1994). *Discourse analysis*. In Banister, P., Burman, E., Parker, I., Taylor, M. and Tindall, C. (Eds.), *Qualitative Method in Psychology*. Milton Keynes: Open University Press

Patel, A.T., & Ogle, A.A. (2000). Diagnosis and management of acute low back pain. *American Academy of Family Physicians*, 61:1779-1786, 1789-1790.

Payton, O.D., Nelson, C.E., & Hobbs, M.S.C. (1998). Physical therapy patient's perceptions of their relationships with health care professionals. *Physiotherapy Theory and Practice*, 14(4): 216-220.

Pellisé, F., Balagué, F., Rajmil, L., Cedraschi, C., Aguirre, M., Fontecha, C.G., Pasarín, M., & Ferrer, M. (2009). Prevalence of low back pain and its effect on health-related quality of life in adolescents. *Spine Unit, Hospital Universitari de Traumatologia I Rehabilitació Vall d'Hebron, Passeig Vall d'Hebron*, 163(1): 65-71.

Petersen, T., Kryger, P., Ekdahl, C., Olsen, S., & Jacobsen, S. (2002). The effect of McKenzie therapy as compared with that of intensive strengthening training for the treatment of patients with subacute or chronic low back pain: a randomized controlled trial. *Spine*, 27:1702–1709.

Phelan, S.M., van Ryn, M., Wall, M., & Burgess, D. (2009). Understanding primary care physicians' treatment of chronic low back pain: the role of physician and practice factors. *Pain Medicine*, 10(7):1270-9.

Phelip, X. (1999). Why the back of the child? *European Spine Journal*, 8:426-428.

Philadelphia Panel. (2001). Evidence-based clinical practice guidelines on selected rehabilitation interventions for neck pain. *Physiotherapy*, 81:1701–1717.

Phillips, D.M. (2000). *Joint Commission on Accreditation of Healthcare Organizations*. Pain management standards are unveiled. (JCAHO) Joint Commission on Accreditation of Healthcare Organizations. *The Journal of the American Medical Association*, 284(4):428–429.

Phillips, D. C. (1987). Validity in qualitative research: Why the worry about warrant will not wane. *Education and Urban Society*, 20(1), 9-24.

Pinnington, M.A. (2001). Why are we finding it so hard to change our approach to low back pain? *Physiotherapy*, 87(2): 59.

Pitt-Brooke, J., Reid, H., Lockwood, R., & Kerr, K. (1998). *Rehabilitation of Movement, The Basis of Clinical Practice, Health Education & Communication*. London: WB Saunders.

Polit, D.F., & Hunger, P. (1995). *Nursing Research: principles and Methods* (6th ed). Philadelphia: Lippincott Company.

Potter, M., Schafer, S., & Gonzalez-Mendez, E. (2001). Opioids for chronic nonmalignant pain. Attitudes and practices of primary care physicians in the UCSF/Stanford Collaborative Research Network. University of California, San Francisco. *Journal of Family Practice*, 50(2):145–151.

Prendeville, K., & Dockrell, S. (1998). A pilot survey to investigate the incidence of low back pain in school children. *Physiotherapy in Ireland*, 19(1):24-25.

Prista, A., Balagué, F., Nordin, M., & Skovron, M.L. (2004). Low back pain in Mozambican adolescents. *European Spine Journal*, 13(4):341-345.

Quebec Task Force on Spinal Disorders (QTFSD).(1987). Scientific approach to the assessment and management of activity-related spinal disorders: a monograph for clinicians. *Spine*, 12(7):1–54.

Ritchie, J., & Spencer, L. (1994). *Qualitative data analysis for applied policy research*. In A. Bryman & R. G. Burgess (Eds), *Analyzing qualitative data* (pp. 172-194). London: Routledge.

Robertson, H.C., & Lee, V. (1990). Effects of back care lessons on sitting and lifting by primary students. *Austrarian Journal for Physiotherapy*, 36:245-248.

Roland, M., Waddell, G., Klaber-Moffett, J., Burton, K., Main, C., & Cantrell, E. (1996). *The back book*. London: Stationery Office.

Rosenblum, A., Marsch, L.A., Joseph, H., & Portenoy, R.K. (2008). Opioids and the treatment of chronic pain: Controversies, current status, and future directions. *Expermental and Clinical Psychopharmacology*, 16(5):405–16.

Rozenberg, S., Bourgeois, P. (1999). Are children also fated to develop back pain? *Revue Rhumatisme*, 66:365-366.

Rubin, H.J., & Rubin, L.J (2004). *Qualitative interviewing: The art of hearing data* (2nded.). Thousand Oaks, CA: Sage Publications.

Salminen, J.J., Erkintalo, M.O., Pentti, J., Oksanen, A., & Kormano, M.J. (1999). Recurrent low back pain and early disc degeneration in the young. *Spine*, 24, 1316–1321.

Salminen, J.J., Erkintalo, M., Laine, M., & Pentti, J. (1995). Low back pain in the young. A prospective 3-year follow-up study of subjects with and without low back pain. *Spine*, 20:2101-2108.

Salminen, J.J. (1994). The adolescent back. A field survey of 370 Finnish schoolchildren. *Acta Paediatrica Scandinavian Supplement*, 315:1–122.

Salminen, J.J., Pentti, J., & Terho, P. (1992). Low back pain and disability in 14-year-old schoolchildren. *Acta Paediatrica*, 81, 1035–1039.

Salminen, J.J. (1984). Back pain in Finish school children. *Acta paediatrica Scandinavica Supplement*, 13: 121-129.

Sarig-Bahat, H. (2003). Evidence for exercise therapy in mechanical neck disorders. *Manual Therapy*, 8:10–20.

Strategic Busness Unit (SBU). (2000). *Back pain and neck pain: an evidence based review*. Stockholm: Swedish Council on Technology Assessment in Health Care.

Schiple, B., & Dinubile, N.A. (1997). *Relieving low back pain with exercises*. Retrieved, March 15, 2010, from <http://www.physsportsmed.com/issues/1997/08aug/shiplepa.html>

Shehab, D.K., & Al-Jarallah, K.F. (2005). Nonspecific low-back pain in Kuwaiti children and adolescents: associated factors. *Journal of Adolescent Health*, 36: 32–35.

Shehab, D., Al-Jarallah, K., Moussa, M.A., & Adham, N. (2003). Prevalence of low back pain among school children in Kuwait. *Medical Principles and Practice*, 12(4):224-230.

Sheir-Neiss, G.I., Kruse, R.W., Rahman, T., Jacobson, L.P., & Pelli, J.A. (2003). The association of backpack use and back pain in adolescents. *Spine*, 28:922-930.

Sheldon, M.R. (1994). Lifting instruction to children in an elementary school. *Journal of Orthopedic, Sports and Physical Therapy*, 19:105-110.

Sjolie, A.N. (2002). Psychosocial correlates of low-back pain in adolescents. *European Spine Journal*, 5: 582-588.

Smedley, J., Trevelyan, F., & Inskip, H. (2003). Impact of ergonomic intervention on back pain among nurses. *Scandinavian Journal of Work, Environment and Health*, 29: 117–123.

Somerville, S., Hay, E., & Lewis, M. (2008). Content and outcome of usual primary care for back pain: A systematic review. *The British Journal of General Practice*, 58(556):790–797.

Sparkes, V. (2005). Treatment of low back pain: Monitoring clinical practice, through audit. *Physiotherapy*, 91:171-175.

Spence, S.M., Jensen, G.M., & Shepard, K.F. (1984). Comparison of methods of teaching children proper lifting techniques. *Physiotherapy*, 64:1055-1061.

Spitzer, W.O. (1987). Scientific approach to the assessment and management of activity-related spinal disorders: A monograph for clinicians. Report of the Quebec Taskforce on Spinal Disorders. *Spine*, 12(7): 1- 52.

Staes, F., Stappaerts, K., Lesaffre, E., & Vertommen, H. (2003). Low back pain in Flemish adolescents and the role of perceived social support and effect on the perception of back pain. *Acta Paediatrica*, 92:444- 451.

Storr-Paulsen, A. (2002). The bodyconsciousness in school: A back pain school. *Ugeskr Laeger*, 165:37-41.

Stuifbergen, A., & Rogers, S. (1997). Health promotion: An essential component of rehabilitation for persons with chronic disabling conditions. *Advanced Nursing Science*, 19(4), 1-20.

Sullivan, M.D., Turner, J.A., & Romano, J. (1991). Chronic pain in primary care: Identification and management of psychosocial factors. *Journal of Family Practice*, 32: 193-198.

Swenson, R. (1999). Differential diagnosis: a reasonable clinical approach. *Neurologenic Clinics*, 17(1): 43-63.

Symonds, T.L., Burton, A.K., Tillotson, K.M., & Main, C.J. (1995). Absence resulting from low back trouble can be reduced by psychosocial intervention at the work place. *Spine*, 20: 2738–2745.

Szpalski, M., Gunzburg, R., Balague, F., Nordin, M., & Melot, C. (2002). A 2-year prospective longitudinal study on low back pain in primary school children. *European Spine Journal*, 11:459-464.

Taimela, S., Kujala, U.M., Salminen, J.J., & Viljanen, T. (1997). The prevalence of low-back pain among children and adolescents. A nationwide, cohortbased questionnaire survey in Finland. *Spine*, 22:1132–1136.

Tavafian, S.S., Jamshidi, A., Mohammad, K., & Montazeri, A. (2007). Low back pain education and short term quality of life: A randomized trial. *MBC Musculoskeletal Disorders*, 8: 21.

Terti, M.O., Salminen, J.J., Paajanen, H.E., Terho, P.H., & Kormano, M.J. (1991). Low-back pain and disk degeneration in children: a case-control MR imaging study. *Radiology*, 18(2):503-507.

The Management of Opioid Therapy for Chronic Pain Working Group. (2003). *Clinical practice guideline for the management of opioid therapy for chronic pain*. VA Employee Education System.

The use of opioids for the treatment of chronic pain. (1997). A consensus statement from the American Academy of Pain Medicine and the American Pain Society. *Clinical Journal for Pain*, 13(1):6–8.

Thornquist, E. (1994). Profession and life: separate worlds. *Social science medicine*. 39: 701-713.

Tinning, R. (2001). Physical education and back health: negotiating instrumental aims and holistic bodywork practices. *European Physical Education Reviews*, 7: 191–205.

Troussier, B., Davoine, P., & de Gaudemaris, R. (1994). Back pain in school children: A study among 1178 pupils. *Scandinavian Journal of Rehabilitation Medicine*, 26:143– 146.

Tsuboi, H., Takeuchi, K., Watanabe, M., Hori, R., & Kobayashi, F. (2002). Psychosocial factors related to low back pain among school personnel in Nagoya, Japan. *Individual Health*, 40: 266-271.

Turk, D.C., Brody, M.C., & Okifuji, E.A. (1994). Physicians' attitudes and practices regarding the long-term prescribing of opioids for non-cancer pain. *Pain*, 59(2):201–208.

Tveito, T.H., Hysing, M., & Eriksen, H.R. (2004). Low back pain interventions at the workplace: a systematic literature review. *Occupational Medicine*, 54: 3–13.

UKBEAM team. (2004). United Kingdom back pain exercise and manipulation (UK BEAM) randomised trial: effectiveness of physical treatments for back pain in primary care. *Biomedical Journal*, 329:1377–1385.

Ulrich, P.F. (2004). *Back pain exercises and physical therapy*. Retrieved on March 18, 2010, from <http://www.spinehealth.com/topics/conserv/overview/physical/physical01.html>

Urton, A., McClune, T., & Waddell, G. (2002). *The whiplash book*. London: Stationery Office.

US Preventive Services Task Force. (2004). Primary Care Interventions to Prevent Low Back Pain in Adults: Recommendation Statement. Rockville, MD: Agency for Healthcare Research and Quality.

van Gent, C., Dols, J., de Rover, C., Sing, R., & de Vet, H. (2003). The weight of school bags and the occurrence of neck, shoulder and back pain in young adolescents. *Spine*, 28:916-921.

van Poppel, M.N., Koes, B.W., Smid, T., & Bouter, L.M. (1997). A systematic review of controlled clinical trials on the prevention of back pain in industry. *Occupational and Environmental Medicine*; 54: 841–847.

van Tulder, M., & Koes, B. (2006). Chronic low back pain. *Clinical evidence*, 15: 1634–53.

van Tulder, M., Esmail, R., Bombardier, C., & Koes, B. (2005). *Back schools for non-specific low back pain*. Cochrane Review: Cochrane Library.

van Vuuren, B., Zinzen, E., van Heerden, H.J., Becker, P., & Meeusen, R. (2005). Psychosocial factors related to lower back problems in a South African manganese industry. *Journal of Occupational Rehabilitation*, 15(2):215-225.

Verbeek, J.H., van derWeide, W.E., & van Dijk, F.J. (2002). Early occupational health management of patients with back pain: a randomized controlled trial. *Spine*, 27: 1844–1851.

Verhagen, A.P., Scholten-Peeters, G.G., de Bie, R.A., & Bierma-Zeinstra, S.M. (2004). Conservative treatments for whiplash. *Cochrane Database of Systematic Review*, 11:123-128.

Vicas-Kunse, P. (1992). Educating our children: the pilot school program. *Occupational Medicine*, 7:173-177.

Vikat, A., Rimpela, M., Salminen, J.J., Rimpela, A., Savolainen, A., & Virtanen, S.M. (2000). Neck or shoulder pain and low back pain in Finnish adolescents. *Scandinavian Journal of Public Health*, 28: 164–173.

Viry, P., Creveuil, C., & Marcelli, C. (1999). Non-specific back pain in children: A search for associated factors in 14-year-old schoolchildren. *Revue du Rhumatisme (English Edition)*, 66:381– 388.

Vlaeyen, J.W., & Linton, S.J. (2006). Are we fear-avoidant. *Pain*, 124:240–241.

Von Korff, M., & Moore, J. (2001). Stepped care for back pain: activating approaches for primary care. *Annals of Internal Medicine*, 134:911–7.

Waddell, G., Klaber-Moffett, J., & Burton, A. (2004). *The neck book*. London: Stationery Office.

Waddell, G., & Burton, A. (2001). Occupational health guidelines for the management of low back pain at work: evidence review. *Occupational Medicine*, 51:124–35.

Waddell, G. (1999). *The Back Pain Revolution*. London: Churchill Livingstone.

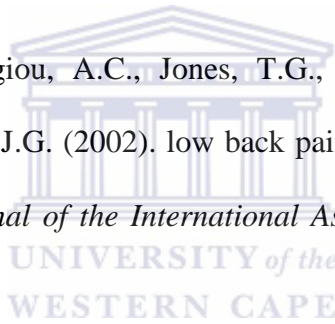
Waddell, G. (1998). *The back pain revolution*. Edinburgh: Churchill Livingstone

Walker, B., Muller, R., & Grant, W. (2004). Low back pain in Australian adults: Prevalence and associated disability. *Journal of Manipulative and Physiological Therapeutics*, 27:238–244.

Walker, B. (2000). The Prevalence of Low Back Pain: A Systematic Review of the Literature from 1966 to 1998. *Journal of Spinal Disorders*, 13:205–217.

Watson, K.D., Papageorgiou, A.C., Jones, G.T., Taylor, S., Symmons, D.P., Silman, A.J., & Macfarlane, G.J. (2003). Low back pain in schoolchildren: the role of mechanical and psychosocial factors. *Archives of Disease in Childhood*, 88:12-17.

Watson, D.K., Papageorgiou, A.C., Jones, T.G., Taylor, S., Symmons, D.P.M., Silman, J.A., Macfarlane, J.G. (2002). low back pain in school children: Occurrence and characteristics. *Journal of the International Association for the Study of Pain*, 97(1): 87-92.



Wedderkopp, N., Leboeuf-Yde, Andersen, L.B., Froberg, K., & Hansen, H.S. (2003). Back pain in children: No association with objectively measured level of physical activity. *Spine*, 28:2019-2024.

Westgaard, R.H., & Winkel, J. (1997). Ergonomic intervention research for improved musculoskeletal health: a critical review. *Occupational and Environmental Medicine*, 20: 463–500.

WHO Scientific Group on the Burden of Musculoskeletal Conditions of the Start of the New Millennium. (2003). *The burden of musculoskeletal conditions at the start of*

the new millennium. World Health Organization Technical Report Series: Geneva, Switzerland: WHO

Widhe, T. (2001). Spine: posture, mobility and pain. A longitudinal study from childhood to adolescence. *European Spine Journal*, 10:118-123.

Williams, C.M., Maher, C.G., Hancock, M.J., McAuley, J.H., McLachlan, A.J., Britt, H., Fahridin, S., Harrison, C., & Latimer, J. (2010). Low back pain and best practice care: a survey of general practice physicians. *Archives of Internal Medicine*, 170(3):271-277.

World Health Organization. (2001). International Classification of Functioning, Disability and Health (ICF). Geneva, Switzerland: WHO.

World Health Organization. (1996). *Promoting Health through Schools: a summary and recommendations of WHO's Expert Committee on Comprehensive School Health Education and Promotion*. WHO Technical Report Series. Geneva, Switzerland: WHO.

Worster, A., & Haines, T. (2004). Advanced Statistics: Understanding Medical Record Review (MRR) Studies. *Academic Emergency Medicine*, 11(2), 187-192.

Yong, H.H., Bell, R., Workman, B., & Gibson, S.J. (2003). Psychometric properties of the Pain Attitudes Questionnaire (revised) in adult patients with chronic pain. *Pain*, 104(3):673-681.

Appendices



UNIVERSITY *of the*
WESTERN CAPE

APPENDIX A: Data gathering instrument in English**First of all we are going to ask you some questions about your school life in general**

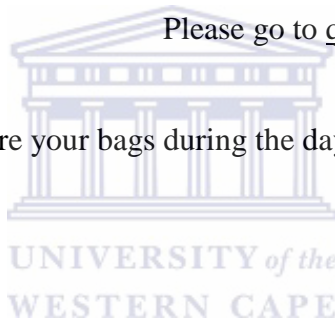
1. How old are you? Years old
2. What is your gender? Male Female
3. What year and class are you in at school? Year Class
4. Do you have anywhere at school to store your bags, such as locker?

1. Yes
2. No

Please continue with question 5Please go to question 6

5. Do you use this place to store your bags during the day?

1. Yes
0. No



6. How do you usually travel to and from school?
(You may tick more than one box, if necessary)

- | | | |
|---|--------------------------|--|
| 1 | <input type="checkbox"/> | Walk the whole day |
| 2 | <input type="checkbox"/> | Walk some of the day |
| 3 | <input type="checkbox"/> | Car |
| 4 | <input type="checkbox"/> | Taxi |
| 5 | <input type="checkbox"/> | Bicycle |
| 6 | <input type="checkbox"/> | Boat |
| 7 | <input type="checkbox"/> | Other |
| 8 | <input type="checkbox"/> | None of the above I'm a boarding student |

7. How long does it usually take you to get to school? Minutes

8. How many SPORTS, GAMES, or Physical Education lessons do you have in a normal school week?

(Please include things like soccer training after school or rugby at the weekend, etc)

Lessons

Now, we are going to ask you some questions about your activities outside school

9. How often do you perform sporting/ physical activities outside school, such as dancing lessons or as a member of football club, etc?

- | | | | |
|----|----------------------|-------------------|---------------------------------|
| 1. | <input type="text"/> | Never | Please go to <u>Question 11</u> |
| 2. | <input type="text"/> | 1 – 2 days a week | |
| 3. | <input type="text"/> | 3 – 4 days a week | |
| 4. | <input type="text"/> | 5 – 7 days a week | |

10. Please estimate the number of hours you exercise in average a week

Hours

11. On average how many hours do you usually spend either watching television, playing computer games, or on the internet on a weekend?

- | | | |
|----|----------------------|-----------------------------------|
| 1. | <input type="text"/> | Never/ Less than 1 hour per a day |
| 2. | <input type="text"/> | 1 – 2 hours per a day |
| 3. | <input type="text"/> | 2 – 4 hours per a day |
| 4. | <input type="text"/> | More than 4 hours per a day |

12. Do you have a part-time job, or a job out of school hours for which you get paid?

- | | | | |
|----|--------------------------|-----|----------------------------------|
| 1. | <input type="checkbox"/> | Yes | Please continue with Question 13 |
| 2. | <input type="checkbox"/> | No | Please go to question 16 |

13. Which one of the boxes below best describes your jobs (You may tick more than one box, if necessary)

- | | | |
|----|--------------------------|-------------------------------|
| 1. | <input type="checkbox"/> | Shop/ market work |
| 2. | <input type="checkbox"/> | Baby sitting or child-minding |
| 3. | <input type="checkbox"/> | Gardening |
| 4. | <input type="checkbox"/> | Restaurent/Bar work |
| 5. | <input type="checkbox"/> | Other Please say what |

14. How many hours per a week do you work in this job?

15. Does your job involve lifting and carrying heavy items?

- | | | | |
|----|--------------------------|-----|-----------------------|
| 1. | <input type="checkbox"/> | Yes | Please say what |
| 0. | <input type="checkbox"/> | No | |

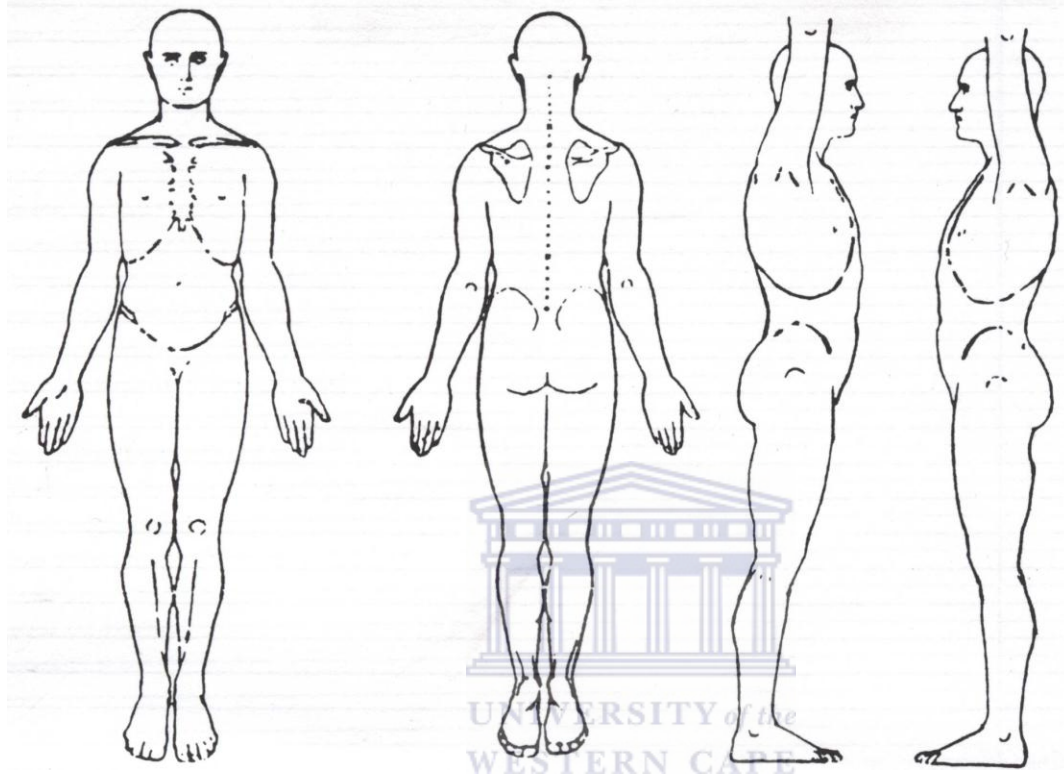
We would now like to tell us about the different ways that you feel about life in general.

Please indicate how much you agree with the following statements:

16. Thinking back OVER THE PAST MONTH, have you had any aches or pains which have lasted for one day or longer?

- | | | | |
|----|--------------------------|-----|---|
| 1. | <input type="checkbox"/> | Yes | Please continue with <u>question 17</u> |
| 0. | <input type="checkbox"/> | No | Please go to <u>Question 19</u> |

17. If you answered YES to question 16, please shade in the diagrammes below where you feel, or have felt these aches and pain



18. When did this pain start?

- | | | |
|----|--|------------------------|
| 1. | | Less than 3 months ago |
| 0. | | More than 3 months ago |

19. Do you have pain all over your body?

- | | | |
|----|--|-----|
| 1. | | Yes |
| 0. | | No |

20. Thinking back over the PAST MONTH, have you had any pain which has lasted for ONE DAY or LONGER, in your low back?

1. Yes, Please continue with Question 21
0. No, Please go to Question 22

21. If you answered YES to Question 20, please tell us about this pain in the low back area.

Which box best describes the pain?

1. I am aware of my pain all through the day as it is there all the time
2. My pain comes and goes throughout the day
3. I have short spell of pain which lasts for a few minutes only.

22. Thinking back over the PAST MONTH, have you had any low back pain which lasted for ONE DAY or LONGER?

2. Yes, Please continue with Question 23
0. go to Question 24

23. Thinking back over the PAST MONTH, for how many days have you had low back pain?

24. On the scale below, please mark with a cross how bad this pain was at its worst during the past month:

No pain at all Worst pain you can imagine

0 1 2 3 4 5 6 7 8 9 10

25. When you get low back pain how long does it usually last?

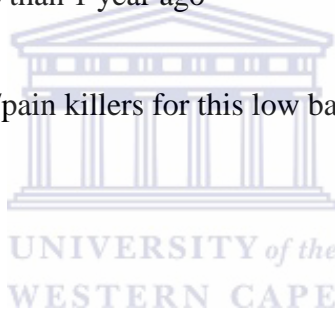
- | | | |
|----|--------------------------|--------------------|
| 1. | <input type="checkbox"/> | Less than 12 hours |
| 2. | <input type="checkbox"/> | 12 – 24 hours |
| 3. | <input type="checkbox"/> | 1 – 7 days |
| 4. | <input type="checkbox"/> | More than 1 week |

26. When did this episode of low back pain start?

- | | | |
|----|--------------------------|-----------------------|
| 2. | <input type="checkbox"/> | Less than 1 month ago |
| 3. | <input type="checkbox"/> | 1 – 3 months ago |
| 4. | <input type="checkbox"/> | 3 – 12 months ago |
| 5. | <input type="checkbox"/> | More than 1 year ago |

27. Do you usually take tablets/pain killers for this low back pain?

- | | | |
|----|--------------------------|-----|
| 2. | <input type="checkbox"/> | Yes |
| 0. | <input type="checkbox"/> | No |



28. Does this pain spread down to your leg?

- | | | |
|----|--------------------------|-----|
| 1. | <input type="checkbox"/> | Yes |
| 0. | <input type="checkbox"/> | No |

29. What do you think causes you to have this low back pain?

	Yes 1	No 0
Lifting / carrying heavy items	<input type="checkbox"/>	<input type="checkbox"/>
Injury	<input type="checkbox"/>	<input type="checkbox"/>
Sporting activity	<input type="checkbox"/>	<input type="checkbox"/>
Posture (the way you stand/sit)	<input type="checkbox"/>	<input type="checkbox"/>
Period pain	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>

Please say what

.....



30. How old were you when you first had low back pain?

Years old

31. Have you been to see any of the following during the PAST YEAR for low back pain?

	Yes 1	No 0
Doctor	<input type="checkbox"/>	<input type="checkbox"/>
Physiotherapist	<input type="checkbox"/>	<input type="checkbox"/>
School nurse	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>

Please say who

Do these pains and aches in your low back make any of the following daily activities difficult?

(Please tick one box for each question)

	Yes 1	No 0
32. Reaching up to get a book from a high shelf	<input type="checkbox"/>	<input type="checkbox"/>
33. Carrying items such as a school bag or other heavy bag	<input type="checkbox"/>	<input type="checkbox"/>
34. Cleaning your teeth over the wash basin	<input type="checkbox"/>	<input type="checkbox"/>
35. Sitting on a chair for 45 minute(eg: one school lesson)	<input type="checkbox"/>	<input type="checkbox"/>
36. Standing in a queue for 10 minutes	<input type="checkbox"/>	<input type="checkbox"/>
37. Sitting up in bed from a lying position	<input type="checkbox"/>	<input type="checkbox"/>
38. Bending down to put your socks on	<input type="checkbox"/>	<input type="checkbox"/>
39. Standing up from an armchair at home	<input type="checkbox"/>	<input type="checkbox"/>
40. Running fast to catch a taxi	<input type="checkbox"/>	<input type="checkbox"/>
41. Sport activities	<input type="checkbox"/>	<input type="checkbox"/>



42. During the PAST YEAR, has your low back pain made you miss any of the following?

	Yes 1	No 0
School	<input type="checkbox"/>	<input type="checkbox"/>
PE and school	<input type="checkbox"/>	<input type="checkbox"/>
Sporting hobby	<input type="checkbox"/>	<input type="checkbox"/>
Job (or part-time job)	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>

Please say what

.....

.....

43. Have you got back pain today?

- | | | |
|----|--------------------------|-----|
| 1. | <input type="checkbox"/> | Yes |
| 0. | <input type="checkbox"/> | No |

44. Thinking back over the PAST MONTH, on how many days have you had a troublesome headache?

- | | | |
|----|--------------------------|-------------------------------|
| 1. | <input type="checkbox"/> | None please go to Question 52 |
| 2. | <input type="checkbox"/> | 1 – 2 days |
| 3. | <input type="checkbox"/> | 3 – 7 days |
| 4. | <input type="checkbox"/> | 8 – 14 days |
| 5. | <input type="checkbox"/> | 15 – 21 days |
| 6. | <input type="checkbox"/> | More than 21 days |



45. For how long have you been getting these headaches?

- | | | |
|----|--------------------------|-------------------|
| 1. | <input type="checkbox"/> | Less than 1 month |
| 2. | <input type="checkbox"/> | 1 – 3 months |
| 3. | <input type="checkbox"/> | 3- 12 months |
| 4. | <input type="checkbox"/> | More than 1 year |

46. When you have headaches, how often is the pain severe?

- | | | |
|----|--------------------------|------------|
| 1. | <input type="checkbox"/> | Never |
| 2. | <input type="checkbox"/> | Rarely |
| 3. | <input type="checkbox"/> | Sometimes |
| 4. | <input type="checkbox"/> | Very often |
| 5. | <input type="checkbox"/> | Always |

47. How often do headaches limit your ability to do usual daily activities including household work, work, school, college, or social activities?

- | | | |
|----|--------------------------|------------|
| 1. | <input type="checkbox"/> | Never |
| 2. | <input type="checkbox"/> | Rarely |
| 3. | <input type="checkbox"/> | Sometimes |
| 4. | <input type="checkbox"/> | Very often |
| 5. | <input type="checkbox"/> | Always |

48. When you have a headache, how often do you wish you could lie down?

- | | | |
|----|--------------------------|------------|
| 1. | <input type="checkbox"/> | Never |
| 2. | <input type="checkbox"/> | Rarely |
| 3. | <input type="checkbox"/> | Sometimes |
| 4. | <input type="checkbox"/> | Very often |
| 5. | <input type="checkbox"/> | Always |



49. In the past four weeks, how often have you felt too tired to do work or daily activities because of your headaches?

- | | | |
|----|--------------------------|------------|
| 1. | <input type="checkbox"/> | Never |
| 2. | <input type="checkbox"/> | Rarely |
| 3. | <input type="checkbox"/> | Sometimes |
| 4. | <input type="checkbox"/> | Very often |
| 5. | <input type="checkbox"/> | Always |

50. In the past four weeks, how often have you felt fed up or irritated because of your headaches?

- | | | |
|----|--------------------------|------------|
| 1. | <input type="checkbox"/> | Never |
| 2. | <input type="checkbox"/> | Rarely |
| 3. | <input type="checkbox"/> | Sometimes |
| 4. | <input type="checkbox"/> | Very often |
| 5. | <input type="checkbox"/> | Always |

51. In the past four weeks, how often did headaches limit your ability to concentrate on work or daily activities?

- | | | |
|----|--------------------------|------------|
| 1. | <input type="checkbox"/> | Never |
| 2. | <input type="checkbox"/> | Rarely |
| 3. | <input type="checkbox"/> | Sometimes |
| 4. | <input type="checkbox"/> | Very often |
| 5. | <input type="checkbox"/> | Always |



54. How are you satisfied with the treatment you have got?

1 = Very dissatisfied

3 = Rather dissatisfied

5 = satisfied

2 = Dissatisfied

4 = Rather satisfied

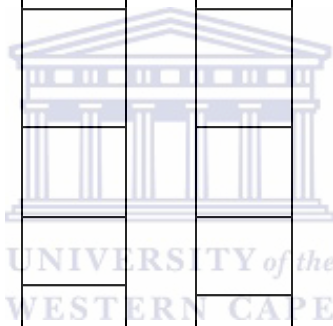
6 = Very satisfied

	1	2	3	4	5	6
1. Medical treatment						
e.g. medication						
2. Operation						
3. Cortisone injections						
4. Physical therapy						
5. Relaxation training						
6. Electrical stimulation						
7. Supportive dialogue						
8. Massage						
9. Other treatment						
10. Analgesics						
11. Sedatives						
12. Antidepressants						



55. How do you sleep? Have you had the following symptoms because of LBP?

	Never	seldom (Few times/ Year)	sometimes (few times/ month)	often (several times/week)	always (every day)
	1	2	3	4	5
1. Difficult falling asleep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Difficulties walking up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Difficulties falling back to sleep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Nightmares	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Not refreshed when I wake up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I wake up to early	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Disturbed sleep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Tired during studies Or leisure time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Informations about education on low back pain prevention

56. What kind of education did you get from therapists for LBP prevention?

	Yes 1	No 0
1. Proper sitting position	<input type="checkbox"/>	<input type="checkbox"/>
2. Sitting with back supported	<input type="checkbox"/>	<input type="checkbox"/>
3. Carrying back bags on both shoulders	<input type="checkbox"/>	<input type="checkbox"/>
4. Advice on physical activities	<input type="checkbox"/>	<input type="checkbox"/>
5. Advice on stretching exercises	<input type="checkbox"/>	<input type="checkbox"/>
6. Advice on muscle strengthening exercises	<input type="checkbox"/>	<input type="checkbox"/>
7. Others	<input type="checkbox"/>	<input type="checkbox"/>

If yes, please specify



End of questions.

THANK YOU FOR YOUR PARTICIPATION

APPENDIX B: Data gathering instrument translated in Kinyarwanda

Ibibazo ku buzima bwawe bwo ku ishuri muri rusange

1. ufite imyaka ingahe?

2. Igitsina:

Gabo

Gore

3. Wiga mu mwaka wa kangahe?

4. Ku ishuri mufite aho mubika ibikapu byanyu, urugero nko mu kabati?

1.

Yego

Komeza ku kibazo cya 5

0.

Oya

Komeza ku kibazo cya 6

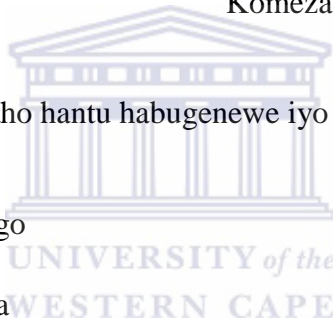
5. Ujya ubika ibikapu byawe aho hantu habugenewe iyo uri ku ishuri ku manywa?

1.

Yego

0.

Oya



6. Iyo ujya ku ishuri cyangwa uva ku ishuri ugenda ute?

(Ushobora guhitamo igisubizo kirenze kimwe niba ubona ari ngomwa)

1

Iminsi yose ngenda n'amaguru

2

Ngenda n'amaguru rimwe na rimwe

3.

Ngenda n'imodoka

4

Ngenda na Taxi

5

Ngenda n'igare

6

Ngenda n'ubwato

7

Ubundi buryo

8

Nta gisubizo na kimwe kirimo

7. Ukoresha igihe kingana iki ujya ku ishuri?

Iminota

8. Mu cyumweru ugira amasaha angahe ya siporo cyangwa imikino ngororamubili ?

(Ongeraho n'amasaha ukina umupira w'amaguru cyangwa Rugby muri weekend)

Amasaha

Ibibazo bijyanye n'imirimo ukora nyuma y'amasomo

9. Ni kangahe ukora siporo cyangwa indi mirimo ngororangingo nyuma y'amasomo, urugero nko kubyina cyangwa umupira w'amaguru n'ibindi?

1	<input type="text"/>	Nta narimwe	Jya ku <u>kibazo cya 11</u>
2	<input type="text"/>	Umunsi 1 – 2 mu cyumweru	
3	<input type="text"/>	iminsi 3 – 4 mu cyumweru	
4	<input type="text"/>	iminsi 5– 7 mu cyumweru	

10. Gereranya amasaha ukora imyitozo ngororamubili mu cyumweru

Amasaha

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11. Ugereranije umara amasaha angahe ku munsi ureba televiziyo, ukoresha mudasobwa cyangwa ukoresha internet?

1	<input type="text"/>	Nta narimwe/ munsi y'isaha imwe ku munsi
2	<input type="text"/>	Amasaha 1– 2 ku munsi
3	<input type="text"/>	Amasaha 2 – 4 ku munsi
4	<input type="text"/>	Amasaha arenze 4 ku munsi

12. Hari akazi ugira uhemberwa ukora mu masaha ya nyuma y'amasomo?

1	<input type="text"/>	Yego	Komeza ku <u>kibazo cya 13</u>
2	<input type="text"/>	No	Jya ku <u>kibazo cya 16</u>

13. Ni uwuhe murimo ukora muri iyi ikurikira?

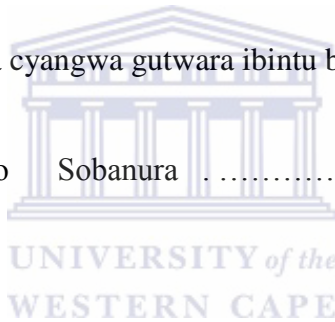
(Ushobora guhitamo ikirenze kimwe niba ari ngombwa)

1	<input type="checkbox"/>	Mu iduka/ umurimo wo gucuruza
2	<input type="checkbox"/>	Kurera abana
3	<input type="checkbox"/>	Gukora mu busitani
4	<input type="checkbox"/>	Muri Restaurent/ Mu kabari
5	<input type="checkbox"/>	Ahandi Sobanura

14. Ako kazi ugakora amasaha angahe mu cyumweru?

15. Ako kazi kagusaba gutwara cyangwa gutwara ibintu biremereye?

1	<input type="checkbox"/>	Yego Sobanura
0	<input type="checkbox"/>	Oya

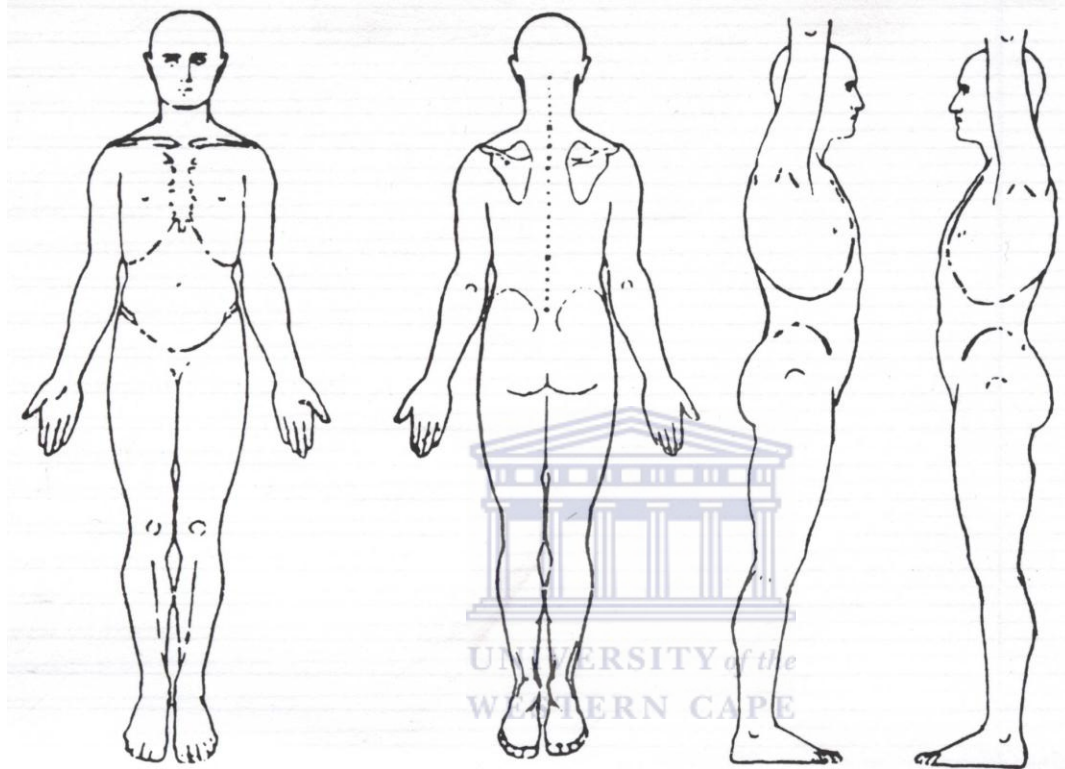


Ibibazo ku buzima bwawe muri rusange.

16. Mu kwezi gushize waba warigeze ugira ububabare bwamaze umunsi umwe cyangwa igihe kirenze umunsi umwe?

1	<input type="checkbox"/>	Yego	Komeza ku kibazo cya <u>17</u>
0	<input type="checkbox"/>	Oya	Komeza ku kibazo cya <u>19</u>

17. Niba uvuze yego ku kibazo cya 16, erekana ku gishushanyo kiri hasi aho wumva cyangwa wumvaga ububabare:



18. Ubwo bubabare bwatangiye ryari?

- | | | |
|---|--|--------------------------------------|
| 1 | | Hashize igihe kitageze ku mezi atatu |
| 0 | | Hashize igihe kirenze amezi atatu |

19. Ugira ububabare umubili wose?

- | | | |
|---|--|------|
| 1 | | Yego |
| 0 | | Oya |

20. Mu kwezi gushize, wigeze ugira ububabare bwamaze cyangwa bwarengeje umunsi umwe mugice cyo hasi (hepfo) cy'umugongo?

- | | | | |
|---|----------------------|------|--------------------------------|
| 1 | <input type="text"/> | Yego | Komeza ku kibazo cya <u>21</u> |
| 0 | <input type="text"/> | No | Komeza ku kibazo cya <u>22</u> |

21. Niba ushubije yego ku kibazo cya 20, vuga ku bijyanye n'ubwo bubabare mug ice cyo hepfo cy'umugongo. Shyira akamenyetso X mu kazu gasobanura neza ububabare bwawe.

- | | | |
|---|----------------------|---|
| 1 | <input type="text"/> | Nditwararika kuko ngira ububabare mporana igihe cyose |
| 2 | <input type="text"/> | Mu munsi ububabare bange bugenda buza bukongera bukagenda |
| 3 | <input type="text"/> | Ngira ububabare buke kandi bumara iminota mike gusa. |

22. Mu kwezi gushize, wigeze urwara umugongo wamaze cyangwa ukarenza umunsi umwe?

- | | | | |
|---|----------------------|------|--------------------------------|
| 2 | <input type="text"/> | Yego | Komeza ku kibazo cya <u>23</u> |
| 0 | <input type="text"/> | Oya | Komeza ku kibazo cya <u>44</u> |

23. Mu kwezi gushize warwaye umugongo iminsi ingaha?

Iminsi

24. Shyira akamenyetso mu kazu kamwe hasi, ukurikije uko ububabare wagize mu kwezi gushize bwari bumeze:

Nta bubabare

--	--	--	--	--	--	--	--	--	--	--

 Ububabare bwinshi cyane bukabije

0 1 2 3 4 5 6 7 8 9 10

25. Iyo urwaye umugongo, igice cyo hasi umara igihe kingana iki?

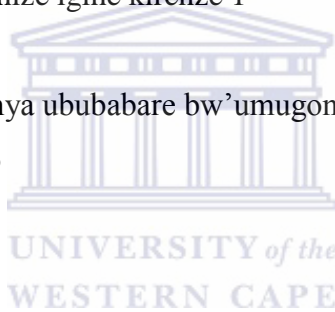
- | | | |
|---|----------------------|---------------------------|
| 1 | <input type="text"/> | Munsi y'amasaha 12 |
| 2 | <input type="text"/> | hagati y'amasaha 12 – 24 |
| 3 | <input type="text"/> | hagati y'iminsi 1 – 7 |
| 4 | <input type="text"/> | igihe kirenze icyumweru 1 |

26. Ubwo bubabare bw'umugongo bwatangiye ryari?

- | | | |
|---|----------------------|-----------------------------------|
| 2 | <input type="text"/> | Hashize igihe kiri munsi y'ukwezi |
| 3 | <input type="text"/> | Hashize amezi 1 – 3 |
| 4 | <input type="text"/> | Hashize amezi 3 – 12 |
| 5 | <input type="text"/> | Hashize igihe kirenze 1 |

27. Buri gihe ufata imiti yo kugabanya ububabare bw'umugongo?

- | | | |
|---|----------------------|------|
| 2 | <input type="text"/> | Yego |
| 0 | <input type="text"/> | Oya |

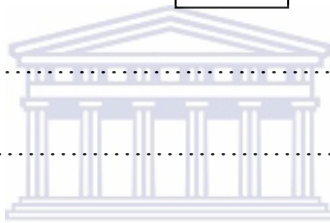


28. Ubwo bubabare bujya bumanuka bujya no mu maguru?

- | | | |
|---|----------------------|------|
| 1 | <input type="text"/> | yego |
| 0 | <input type="text"/> | Oya |

29. Utekereza ko ububabare bw'umugongo ubuterwa n'iki?

	Yego	Oya
	1	0
Guterura/kwikorera ibiremereye	<input type="checkbox"/>	<input type="checkbox"/>
Kuvunika/imvune	<input type="checkbox"/>	<input type="checkbox"/>
Sporo/imikino ngororamubili	<input type="checkbox"/>	<input type="checkbox"/>
Uburyo wicara/uhagarara	<input type="checkbox"/>	<input type="checkbox"/>
Igihe cy'ububabare	<input type="checkbox"/>	<input type="checkbox"/>
Izindi mpamvu	<input type="checkbox"/>	
Sobanura izo mpamvu		



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30. watangiye kurwara umugongo ufite imyaka ingahe?

Imyaka

31. Mu mwaka ushize wigeze wivuza umugongo ku baganga bakurikira?

	Yego	Oya
	1	0
Dogiteri	<input type="checkbox"/>	<input type="checkbox"/>
Muganga ugorora ingingo	<input type="checkbox"/>	<input type="checkbox"/>
Umuforomo wo ku ishuri	<input type="checkbox"/>	<input type="checkbox"/>
Abandi	<input type="checkbox"/>	
Bavuge		

Ububabare bw'umugongo bujya butuma imirimo imwe n'imwe ya buri munsu ikunanira?

(Shyira akamenyetso X mu kazu kamwe kuri buri kibazo)

	Yego 2	Oya 0
32. Kumanura igitabo hejuru kuri etageri	<input type="checkbox"/>	<input type="checkbox"/>
33. Gutwara ibintu nk'igikapu kirimo ibitabo / ibindi bintu	<input type="checkbox"/>	<input type="checkbox"/>
34. Koza amenyo ufata amazi mu ibase	<input type="checkbox"/>	<input type="checkbox"/>
35. Kwicara ku ntebe imiinota 45(urugero: mu isomo ku ishuri)	<input type="checkbox"/>	<input type="checkbox"/>
36. Guhagarara iminota 10 ku murongo	<input type="checkbox"/>	<input type="checkbox"/>
37. Kubyuka ukuicara ku gitanda	<input type="checkbox"/>	<input type="checkbox"/>
38. Kunama wambara amasogisi	<input type="checkbox"/>	<input type="checkbox"/>
39. Guhaguruka ku ntebe	<input type="checkbox"/>	<input type="checkbox"/>
40. Kwiruka cyane	<input type="checkbox"/>	<input type="checkbox"/>
41. Sporo/imirimo ngororangingo	<input type="checkbox"/>	<input type="checkbox"/>



42. Mu mwaka ushize, indwara y'umugongo yigeze ituma usiba mu bikora bikurikira?

	Yego 2	Oya 0
Amasomo ku ishuri	<input type="checkbox"/>	<input type="checkbox"/>
Imyitozo ngororangingo	<input type="checkbox"/>	<input type="checkbox"/>
Sporo yo kwishimisha	<input type="checkbox"/>	<input type="checkbox"/>
Akazi	<input type="checkbox"/>	<input type="checkbox"/>
Ibindi	<input type="checkbox"/>	<input type="checkbox"/>

Bivuge

.....

.....

43. None ufite ububabare bw'umugongo igice cyo hasi?

1	<input type="checkbox"/>	Yego
0	<input type="checkbox"/>	oya

44. Mu kwezi gushize, ni iminsi ingahe warwaye umutwe?

1.	<input type="checkbox"/>	Ntarimwe	Komeza ku kibazo cya 52
2.	<input type="checkbox"/>	Iminsi 1 – 2	
3.	<input type="checkbox"/>	Iminsi 3 – 7	
4.	<input type="checkbox"/>	Iminsi 8 – 14	
5.	<input type="checkbox"/>	Iminsi 15 – 21	
6.	<input type="checkbox"/>	Iminsi irenze 21	

45. Icyo gihe urwaye umutwe wawumaranye igihe kingana iki?

1.	<input type="checkbox"/>	Munsi y'ukwezi 1
2.	<input type="checkbox"/>	Amezi 1 – 3
3.	<input type="checkbox"/>	Amezi 3- 12
4.	<input type="checkbox"/>	Igihe kirenze ukwezi 1


46. Igihe wari urwaye umutwe ni kangahe wumvise ububabare bukabije?

1.	<input type="checkbox"/>	Nta narimwe
2.	<input type="checkbox"/>	gake cyane
3.	<input type="checkbox"/>	Rimwe na rimwe
4.	<input type="checkbox"/>	Kenshi (inshuro nyinshi)
5.	<input type="checkbox"/>	Buri gihe

47. Ni kangahe umutwe wakubujije gukora imirimo yawe ya buri muni(imirimo yo mu rugo, imirimo yo kwishuri, imirimo rusange)?

- | | | |
|----|----------------------|-------------------------|
| 1. | <input type="text"/> | Ntanarimwe |
| 2. | <input type="text"/> | Gake cyane |
| 3. | <input type="text"/> | Rimwe na rimwe |
| 4. | <input type="text"/> | Kenshi(inshuro nyinshi) |
| 5. | <input type="text"/> | Buri gihe |

48. Iyo urwaye umutwe ni kangahe wumva wakwiryamira gusa?

- | | | |
|----|----------------------|----------------|
| 3. | <input type="text"/> | Ntanarimwe |
| 4. | <input type="text"/> | Gake cyane |
| 3. | <input type="text"/> | Rimwe na rimwe |
| 4. | <input type="text"/> | Kenshi |
| 5. | <input type="text"/> | Buri gihe |
- 
- UNIVERSITY of the
WESTERN CAPE

49. Mu kwezi gishize, ni kangahe wumvise unaniwe cyane kubera ububabare bw'umutwe bigatuma udakora imirimo yawe ya buri muni?

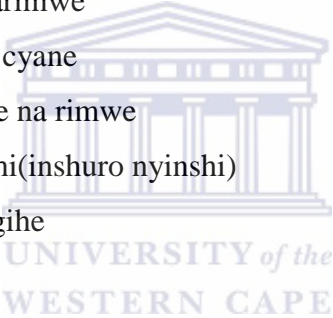
- | | | |
|----|----------------------|-------------------------|
| 1. | <input type="text"/> | Ntanarimwe |
| 2. | <input type="text"/> | Gake cyane |
| 3. | <input type="text"/> | Rimwe na rimwe |
| 4. | <input type="text"/> | Kenshi(inshuro nyinshi) |
| 5. | <input type="text"/> | Buri gihe |

50. Mu kwezi gushize ni kangahe wumvise utaye umutwe kubera ububabare bw'umutwe?

1	<input type="text"/>	Ntanarimwe
2	<input type="text"/>	Gake cyane
3	<input type="text"/>	Rimwe na rimwe
4	<input type="text"/>	Kenshi(inshuro nyishhi)
5	<input type="text"/>	Buri gihe

51. Mu kwezi gushize, ni kangahe byakunaniye gukorana umwete ku kazi kawe kubera ububabare bw'umutwe?

1	<input type="text"/>	Ntanarimwe
2	<input type="text"/>	Gake cyane
3	<input type="text"/>	rimwe na rimwe
4	<input type="text"/>	Kenshi(inshuro nyinshi)
5	<input type="text"/>	Buri gihe



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WESTERN CAPE

54. Wishimira ute ubuvuzi wahawe?

1 = Nta nagato 3 = Byambabaje gahoro 5 = Biranshimishije
 2 = Ntibyanshimishije 4 = Binshimishije gahoro 6 = Biranshimishije cyane

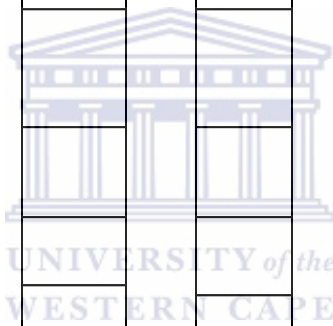
	1	2	3	4	5	6
1. Imiti e.g. medication						
2. Kubagwa						
3. Urushinge rwa Cortisone						
4. Ubugororangingo						
5. Imyitozo yo koroshya						
6. Imashini z'amashanyazi						
7. Ubujyanama						
8. Massage						
9. ubundi buvuzi						
10. imiti igabanya ubabare						
11. Imiti ituma usinzira neza						
12. Imiti igabanya ubabare						



55. Usinzira ute? Wigize ugira ibi bimenyetso bitewe n'ububabare bw'umugongo?

Ntanarimwe Gake cyane Rimwe na rimwe kenshi Buri munsi
 mu mwaka mu kwezi mu cyumweru

	1	2	3	4	5
1. Kubura ibitotsi					
2. Ingorane mu kugenda					
3. Kutongera gusinzira iyo ukangutse					
4. Kurota nabi ni joro					
5. Gutinda gufata imbaraga Iyo ubyutse					
6. Gukanguka kare cyane					
7. Gusinzira nabi					
8. Kunanirwa mu masomo Cg mu myidagaduro					



Ibibazo ku nyigisho wahawe n’abaganga ku bijyanye no kwirinda indwara y’umugongo

56. Ni izihe nyigisho wahawe ku bijyanye no kwirinda indwara y’umugongo?

	Yego 1	Oya 0
1.Kwicara neza ugororotse	<input type="checkbox"/>	<input type="checkbox"/>
2.Kwicara ku ntebe yegamirwa	<input type="checkbox"/>	<input type="checkbox"/>
3.Gutwara igikapu ku ntugu zombi	<input type="checkbox"/>	<input type="checkbox"/>
4.Inama ku myitozo n’imirimo ngororango	<input type="checkbox"/>	<input type="checkbox"/>
5.Inama ku myitozo yo kurambura imitsi	<input type="checkbox"/>	<input type="checkbox"/>
6.Inama ku myitozo yo gukomeza imitsi	<input type="checkbox"/>	<input type="checkbox"/>
7.Izindi nyigisho	<input type="checkbox"/>	<input type="checkbox"/>

Niba hari izindi nyigisho, zivuge



Iherezo ry’ibibazo.

MURAKOZE CYANE

Appendix C

GUIDELINE FOR SEMI-STRUCTURED INTERVIEWS FOR SERVICE PROVIDERS

1. What do you think the predisposing factors for Low back pain among high school children are?

Prompt: Why

2. What management techniques do you use to address Low back pain?

Prompt: How often?

3. What are the preventive measures used in prevention of Low back pain among high school children?

Prompt: Is it only in the practice

4. What impact do you think low back pain has on high school children?

5. What is the average number of high school children with LBP that you see per month?

Thank you

APPENDIX D

Bimwe mu bizo bigize ikiganiro umushakashatsi yagiranye n'abaganga

1. Utekereza ko indwara y'umugongo mu bana bo mu mashuri yisumbuye iterwa n'iki?

Kubera iki?

2. Ni ubuhe buryo mukoresha mu kuvura abo bana indwara y'umugongo?

Bikorwa kangahe?

3. Ni ubuhe buryo mukoresha mugukumira indwara y'umugongo mu bana abo mu mashuri yisumbuye?

Mubereka uko bikorwa gusa muri mu kazi?

4. Ni izihe ngaruka indwara y'umugongo itera muri abo bana b'abanyeshuri?

5. Mu kwezi mwakira abana bangahe barwaye umugongo?

Murakoze

Appendix E

OFFICE OF THE DEAN DEPARTMENT OF RESEARCH DEVELOPMENT

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

27 October 2010


MINISTRY OF EDUCATION
B.P 623 KIGALI

To Whom It May Concern

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

Research Project: The prevalence and management of low back pain among high school children in Nyamasheke District, Rwanda

Registration no: 10/9/27


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



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WESTERN CAPE

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

Appendix F: Permission to conduct the study from the National Ethics Committee of
Rwanda

REPUBLIC OF RWANDA/REPUBLIQUE DU RWANDA



NATIONAL ETHICS COMMITTEE / COMITE NATIONAL D'ETHIQUE

Telephone: (250) 55 10 78 84

E-mail: r nec@moh.gov.rw

Web site: www.r nec.moh.gov.rw

FWA Assurance No. 00001973
IRB 00001497 of IORG0001100

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

February 02, 2011
No. 22/ RNEC /2011

Paul NDAHIMANA
Master's Student
University of the Western Cape

Your Project title: "THE PREVALENCE AND MANAGEMENT OF LOW BACK PAIN AMONG HIGH SCHOOL CHILDREN IN NYAMASHEKE DISTRICT RWANDA"; has been evaluated by the Rwanda national ethics committee.

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

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

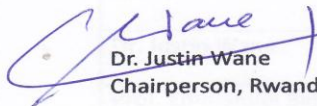
After reviewing your protocol during the RNEC meeting of 22 January 2011, where the quorum was met, and revisions made on the advice of the RNEC submitted on 02 February 2011, we hereby provide approval for the above mentioned protocol.

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

You are responsible for fulfilling the following requirements:

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

Sincerely,


Dr. Justin Wane

Chairperson, Rwanda National Ethics Committee.



Date of Approval: February 02, 2011

Expiration date: February 01,, 2012

C.C.

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

Appendix G: Permission to conduct the study from the Ministry of education in Rwanda

REPUBLIC OF RWANDA

Kigali, 04/02/2011
N°...../12.00/2011
287



**MINISTRY OF EDUCATION
B.P 622 KIGALI**

Mr. Paul Ndahimana
c/o University of the Western Cape
Private Bag X17, Bellville 7535,
South Africa.

Re : Approval to conduct research on 'The Prevalence and Management of Low Back Pain Among High School Children in Nyamasheke District, Rwanda'

Dear Mr. Ndahimana,

I am pleased to attach a copy of the research clearance which has been granted to you to conduct research on the above subject.

I wish to draw your attention to the clause in the research permit which requests the citation of the research permit number in your report and confirm that the research is carried out under the affiliation to the Kibogora District Hospital in Western Province in Nyamasheke District. I also confirm that we will require the final report to be given to the Ministry of Education.

I wish you success in your research activities.

Yours sincerely,

MINISTRY OF EDUCATION
GASINGIRWA Marie-Christine, PhD
Director General of Science,
Technology & Research



Dr. Marie Christine Gasingirwa
Director General Science, Technology and Research
Ministry of Education

Cc :

- Minister of Education
- Minister of Health
- Minister of State in charge of Primary and Secondary Education
- Permanent Secretary, Ministry of Education
- Director Kibogora Hospital

REPUBLIC OF RWANDA

Kigali, 04-02-2011.

N° 288/12.00/2011



MINISTRY OF EDUCATION

B.P 622 KIGALI



Permission to Research in Rwanda

NO: MINEDUC/S&T/0017/2011

Permission is hereby granted to **Mr. Paul Ndahimana**, a Masters Degree Student in Physiotherapy in the University of Western Cape, in South Africa, to carry out research on **'The Prevalence and Management of Low Back Pain among high school children in Nyamasheke District, Rwanda'**

This research is for a period of two months starting 1st January to 28th February 2011

The reference number of this letter shall be cited in the final report as follows:

The research was conducted under permission **NO: MINEDUC/S&T/0017/2011**

Please allow him any help and support to conduct this research in High Schools of Nyamasheke District.

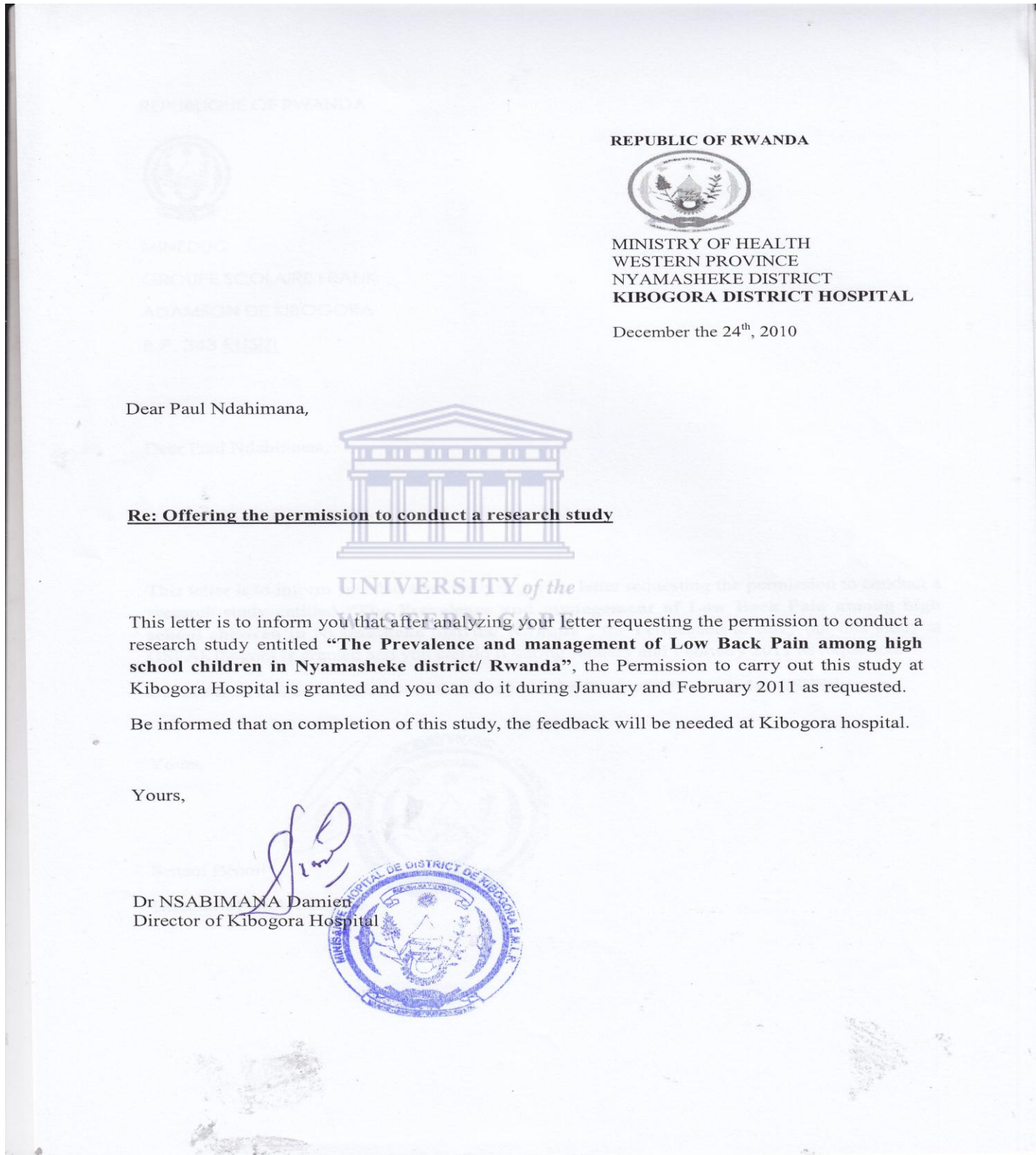
Yours sincerely,

MINISTRE DE L'EDUCATION
GASINGIRWA Marie-Christine, PhD
*Director General of Science,
Technology & Research*



Dr. Marie Christine Gasingirwa
Director General Science, Technology and Research
Ministry of Education

Appendix H: Permission to conduct the study from the Director of Kibogora



REPUBLIC OF RWANDA



MINISTRY OF HEALTH
WESTERN PROVINCE
NYAMASHEKE DISTRICT
KIBOGORA DISTRICT HOSPITAL

December the 24th, 2010

Dear Paul Ndahimana,

Re: Offering the permission to conduct a research study

This letter is to inform you that after analyzing your letter requesting the permission to conduct a research study entitled **“The Prevalence and management of Low Back Pain among high school children in Nyamasheke district/ Rwanda”**, the Permission to carry out this study at Kibogora Hospital is granted and you can do it during January and February 2011 as requested.

Be informed that on completion of this study, the feedback will be needed at Kibogora hospital.

Yours,

Dr NSABIMANA Damien
Director of Kibogora Hospital



OFFICE OF THE DEAN
DEPARTMENT OF RESEARCH
DEVELOPMENT

REPUBLIC OF RWANDA



MINISTRY OF HEALTH
WESTERN PROVINCE
NYAMASHEKE DISTRICT
KIBOGORA DISTRICT HOSPITAL

December the 24th, 2010

To NDAHIMANA Paul

RE: The acceptance of affiliation for Research study

Dear;

This letter is to inform you that we have seen and understood your research proposal with the title'' **The prevalence and management of low back pain among high school children in Nyamasheke district, Rwanda''**.

As your study will be conducted in our local area including high schools and our hospital, we are interested in that research study and we accept you to be affiliated to Kibogora hospital and we agree that we will give you the follow up needed to accomplish your research study, hoping that it will help to improve the prevention and management of Low back pain among high school children.

We wish you all the best with your research study and do not hesitate to contact the administration of Kibogora hospital for any help you need.

Yours sincerely,


Doctor Damien NSABIMANA
Kibogora Hospital Director



Appendix I: Permission to conduct a study from the director of IJWKibogora

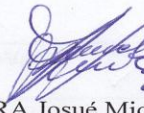
**Free Methodist Church in Rwanda
(FMCR)
John Wesley Institute of KIBOGORA
(I J W KIBOGORA)
P.O Box 31 RUSIZI
E-mail: ijwkibogora@yahoo.fr
Tel:0788804261**

Mr Paul NDAHIMANA
UNIVERSITY OF THE WESTERN CAPE
MASTERS STUDENT

Re:Research study in IJW Kibogora.

Reference to your letter , December 28,2010, that asks to conduct a research study in IJW Kibogora, I hereby inform you that your request is responded positively. And you ought to respect educational norms.

Sincerely


NTAGANIRA Josué Michel
Headmaster of IJW Kibogora



		Involvement in the decision		
		No (Reason)		
		Yes	Abstain	Withdrawn - Rest the proceeding
Dr. Emmanuel Ndayindigwe	Dr. Emmanuel Ndayindigwe, National University of Rwanda, Faculty of Medicine	X		
Dr. Dorcas Mukamusoni	Director of Nyamata Hospital	X		
Dr. Juvet Nshubani	King Faisal Hospital, Kigali AG, Chief Executive Officer	X		

Appendix J: Permission to conduct a study from the director of GSFAKibogora

REPUBLIQUE OF RWANDA



MINEDUC

GROUPE SCOLAIRE FRANK

ADAMSON DE KIBOGORA

B.P. 343 RUSIZI

Mr Paul NDAHIMANA
UNIVERSITY OF THE WESTERN
MASTERS STUDENT

Dear Paul Ndahimana,

Re: Offering the permission to conduct a research study

This letter is to inform you that after analyzing your letter requesting the permission to conduct a research study entitled **“The Prevalence and management of Low Back Pain among high school children in Nyamasheke district/ Rwanda”**, the Permission to carry out this study at GSFAKibogora is granted and you can do it during January and February 2011 as requested.

Be informed that on completion of this study, the feedback will be needed at GSFKibogora.

Yours,

Senani Benoît

Director of GSAKibogora



Free Methodist Church in Rwanda
(FMCR)
John Wesley Institute of KIBOGORA
(J.W. KIBOGORA)
P.O. Box 34 RUSIZI
E-mail: jw.kibogora@fmcw.rw
Tel: 0788904281

Appendix K

INFORMATION SHEET FOR PARENTS/GUARDIANS OF MINOR CHILDREN

Project Title: The prevalence and management of low back pain among high school children in Nyamasheke district/Rwanda

What is this study about?

This is a research project being conducted by Paul Ndahimana, a Master student at the University of the Western Cape. We are inviting your child to participate in this research project because she/he is one of the high school children of Nyamasheke district in which the study is taking place. The purpose of this research project is to determine the prevalence, predisposing factors and management of low back pain offered by service providers in Nyamasheke district.

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

Your child will be asked to complete a questionnaire which consists of four sections: Section one consists of socio-demographic information such as age, gender, institution, class, occurrence of LBP and the period of studies in Nyamasheke district. The second section consists of high school children's activities and institution characteristics including the predisposing factors for Low Back Pain. The third section includes questions about the treatment and back care management received for his/her low back pain from Kibogora Hospital. The last section will include standardized psychophysical measures of physical stress including the body part discomfort index. In addition, this section consists of questions regarding education about LBP preventive measures.

For any difficult which will arise when completing the questionnaires, the researcher and/or research assistants will be available and ready to provide the necessary information.

Would my child's participation in this study be kept confidential?

We will do our best to keep your personal information confidential. To help protect your confidentiality, you will not be requested to write down your name on the questionnaire. 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 possible.

What are the risks of this research?

There are no known risks associated with participating in this research project. However if he/she experience the problems to be traumatic, he/she will be referred to a counsellor for management.

What are the benefits of this research?

This research is not designed to help your child personally, but the results may help the investigator learn more about prevalence, predisposing factors and management of low back pain among high school children in Nyamasheke district/Rwanda. We hope that, in the future, other people might benefit from this study through improved understanding of aspect that should be included in health promotion programmes for high school children.

Does he/she have to be in this research and may he/she stop participating at any time?

Your child's 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 your child from participating at any time.

If you decide not to participate in this study or if you stop him/her participating at any time, your child will not be penalized or lose any benefits to which he/she otherwise qualify.

What if I have questions?

This research is being conducted by Paul Ndahimana from Physiotherapy department at the University of the Western Cape. If you have any questions about the research study itself, please contact: **Mr Paul Ndahimana , University of the Western Cape, Department of Physiotherapy, Cell: +27 078 046 9048 / 0025 078 844 2011 , E-mail: ndahapierrine@yahoo.fr**

If you have any question about your right as a participant, please contact: **Prof. Justin Wane** at **0788500499** (Chairperson of Rwanda National Ethics Committee) or **Dr. Emmanuel Nkeramihigo** at **0788557273** (Secretary of Rwanda National Ethics Committee) or **Prof. José Frantz** at **+27 21 959 2542**(Study coordinator at the University of The Western Cape in South Africa).

This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee. **The reaseacher: Paul Ndahimana**

Appendix L

IBISOBANURO KU BUSHAKASHATSI BIGENEWE ABABYEYI N'ABAREZI B'ABANA B'ABANYESHURI MU MASHURI YISUMBUYE

Umutwe w'ubushakashatsi: Indwara y'umugongo igice cyo hasi mu banyeshuri bo mu mashuri yisumbuye mu Karere ka Nyamasheke mu Rwanda ndetse n'ubuvuzi bw'iyi ndwara.

Ubu bushakashatsi bugamije iki?

Ubu ni ubushakashatsi buri gukorwa na **Paul Ndahimana**, umunyeshuri mu kiciro cya gatatu cy'amashuri makuru kuri kaminuza ya Western Cape muri Afrika y'epfo. Turatumira umwana wawe kugira uruhare muri ubu bushakashatsi kubera ko ari umwe mu banyeshuri bo mu mashuri yisumbuye yo mu karere ka Nyamasheke aho ubushakashatsi buri gukorerwa. Intego y'ubu bushakashatsi ni ukureba ikigereranyocy'abanyeshuri barwaye umugongo, impamvu zitera umugongo ndetse n'ubuvuzi butangwa n'abaganga mu kuvura indwara y'umugongo igice cyo hasi mu karere ka Nyamasheke.

Umwana wange azasabwa gukora iki niba nemeye ko agira uruhare muri ubu bushakashatsi?

Umwana wawe azasabwa gusubiza urutonde rw'ibibazo rugizwe n'ibice bine: Igice cya mbere kigizwe n'ibibazo birebana n'ibiranga umwana ni ukuvuga imyaka, igitsina, ikigo yigaho, umwaka yigamo, igihe amaze yiga mu karere ka Nyamasheke n'igihe amaze arwara umugongo. Igice cya kabili kigizwe n'ibibazo birebana n'imirimu ikorerwa ku ishuri ndetse n'impamvu zaba zitera umugongo. Igice cya gatatu kigizwe n'ibibazo birebana n'ubuvuzi ndetse n'inama zitangwa n'abaganga bo ku bitaro bya Kibogora mu kwirinda no kuvura indwara y'umugongo. Igice cya kane kigizwe n'ibibazo birebana n'ingaruka z'uburwayi bw'umugongo. Iki gice kandi kigizwe n'ibibazo birebana n'inyigisho zitangwa mu rwego rwo kwirinda indwara y'umugongo. Ku ngorane mwagira mu gihe cyo gusubiza ibibazo umushakashatsi ndetse n'abafasha be bazaba bahari kugira ngo batange ibisobanuro bya ngombwa

Ese umwana wange nagira uruhare muri ubu bushakashatsi bizaba ibanga?

Tuzakora ibishoboka byose kugira ngo amakuru muduhaye abe ibanga. Kugira ngo ibyo mutubwiye bibe ibanga kandi hatamenyekana uwabivuze turabasaba kutandika amazina yanyu ku rupapuro rw'ibibazo,

kandi ukora ubushakashatsi ku giti cye niwe uzafata impapuro z'ibisubizo kandi azibike neza ahantu hafite umutekano hafunze. Nituramuka dukoze raporo cyangwa tugatangaza ubu bushakashatsi mu binyamakuru tuzakora ibishoboka byose kugira ngo amazina yanyu ndetse n'ibibaranga bitagaragara.

Ni izihe ngaruka zaterwa n'ubu bushakashatsi?

Nta ngaruka zizwi zishobora guterwa n'ubu bushakashatsi ariko aramutse agize ikibazo cy'ihungabana yahita ajanywa ku bajyanama babishinzwe kugira ngo bamufashe kumuvura.

Ni izihe nyungu uzagira kuri ubu bushakashatsi?

Ubu bushakashatsi ntabwo bugamije gufasha umwana wawe gusa, ariko ibizavamo bizafasha umushakashatsi, abashinzwe amashuri yisumbuye ku rwego rw'igihugu ndetse n'abavuzi kumenya neza ikigereranyo cy'uburwayi bw'umugongo mu banyeshuri bo mu mashuri yisumbuye, impamvu zitera umugongo ndetse n'ubuvuzi butangwa n'abaganga. Ibizavamo bizafasha kwiga birushijeho ingamba zafatwa kugirango hakumirwe icyorezo cy'indwara y'umugongo mu mashuri y'isumbuye mu Rwanda Turizera ko mu gihe kizaza, abandi bantu bazagira inyungu ziturutse kuri ubu bushakashatsi bitewe no kuzahura imyumvire ndetse no kuzahura imibereho y'abanyeshuri mu rwego rwo kurinda indwara y'umugongo mu banyeshuri bo mu mashuri yisumbuye kuko impamvu zose zitera umugongo zizaba zagaragajwe hagafatwa n'ingamba zihamye zo kwirinda.

Ese mfite uburenganzira bwo kuba ndetse no kureka kugira uruhare muri ubu bushakashatsi igihe cyose mbishakiye?

Kugira uruhare muri ubu bushakashatsi ni ubushake bwawe busesuye. Ushobora guhitamo kutabugiramo uruhare na gato. Niba wemeye kubugiramo uruhare ashobora kubireka igihe cyose wabishakira. Niba uhisemo kutagira uruhare muri ubu bushakashatsi cyangwa kubihagarika igihe cyose ushakiye nta ngaruka uzagira cyangwa ngo igire izindi nyungu ubura wari uzifitiho uburenganzira.

Bizagenda bite ningira ikibazo?

Ubu bushakashatsi buri gukorwa na **Paul Ndahimana** wo mu ishami ry'ubugorangingo kuri kaminuza ya Western Cape muri Afrika y'epfo. Nugira ikibazo gifitanye isano n'ubushakashatsi bwite uzahamagare:

Bwana Paul Ndahimana, University of the Western Cape, Department of Physiotherapy

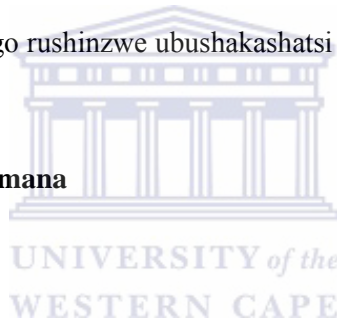
Cell: +27 078 046 9048 / 0025 078 844 2011, E-mail: ndahapierrine@yahoo.fr

Ugize ikibazo kirebana n'uburenganzira bwawe bwahungabanye kubera ubu bushakashatsi wabimenyesha:

Umuyobozi mukuru wa Komite ishinzwe kurengera abakorerwaho ubushakashatsi mu Rwanda: **Prof Wane Justin** kuri **0788500499** cyangwa umunyamabanga w'iyo Komite: **Dr Emmanuel Nkeramihigo** kuri **0788557273**. Ushobora no kubimenyesha Umuhuzabikorwa w'ubushakashatsi: **Professor José Frantz**, Kaminuza ya Western Cape, muri Afurika Yepfo, Private Bag X17, Belville 7535, Cell: (021) 959 2542 / Fax: (021) 959 1217, Email: jfrantz@uwc.ac.za

Ubu bushakashatsi bwemewe n'urwego rushinzwe ubushakashatsi muri Kaminuza ya Western Cape muri afrika y'epfo.

Ukora ubushakashatsi: Paul Ndahimana



Appendix M

INFORMATION SHEET FOR HIGH SCHOOL CHILDREN

Project Title: The prevalence and management of low back pain among high school children in Nyamasheke district/Rwanda

What is this study about?

This is a research project being conducted by **Paul Ndahimana**, a Master student at the University of the Western Cape. We are inviting you to participate in this research project because you are one of the high school children of Nyamasheke district in which the study is taking place. The purpose of this research project is to determine the prevalence, predisposing factors, how often low back pain occurs and what cause it and the management of low back pain offered by service providers in Nyamasheke district.

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

You will be asked to complete a questionnaire which requires information about yourself and your low back pain.

Would my participation in this study be kept confidential?

We will do our best to keep your personal information confidential. To help protect your confidentiality, you will not be requested to write down your name on the questionnaire. 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 possible.

What are the risks of this research?

There are no known risks associated with participating in this research project. However if you experience the problems to be traumatic, you will be referred to a counsellor for management.

What are the benefits of this research?

This research is not designed to help you personally, but the results may help the investigator learn more about the prevalence, predisposing factors and management of low back pain among high school children in Nyamasheke district/Rwanda. We hope that, in the future, other people might benefit from this study through improved understanding of aspect that should be included in health promotion programmes for high school children.

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

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time.

If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

What if I have questions?

This research is being conducted by Paul Ndahimana from Physiotherapy department at the University of the Western Cape. If you have any questions about the research study itself, please contact: **Paul Ndahimana**, University of the Western Cape, Department of Physiotherapy, Cell: 0027 078 046 9048 / 00250788442011, E-mail: ndahapierrine@yahoo.fr

If you have any question about your right as a participant, please contact **Prof. Justin Wane** at 0788500499 (Chairperson of Rwanda National Ethics Committee) or **Dr. Emmanuel Nkeramihigo** at 0788557273 (Secretary of Rwanda National Ethics Committee) or **Prof. José Frantz** at +27 21 959 2542 (Study coordinator at the University of The Western Cape in South Africa). This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee.

Researcher: Paul Ndahimana

Appendix N

IBISOBANURO KU BUSHAKASHATSI BIGENEWE ABANYESHURI

Umutwe w'ubushakashatsi: Indwara y'umugongo igice cyo hasi mu banyeshuri bo mu mashuri yisumbuye mu Karere ka Nyamasheke mu Rwanda ndetse n'ubuvuzi bw'iyi ndwara.

Ubu bushakashatsi bugamije iki?

Ubu ni ubushakashatsi buri gukorwa na **Paul Ndahimana**, umunyshuri mu kiciro cya gatatu cy'amashuri makuru kuri kaminuza ya Western Cape muri Afrika y'epfo. Turatumira umwana wawe kugira uruhare muri ubu bushakashatsi kubera ko ari umwe mu banyeshuri bo mu mashuri yisumbuye yo mu karere ka Nyamasheke aho ubushakashatsi buri gukorerwa. Intego y'ubu bushakashatsi ni ukureba ikigereranyocy'abanyeshuri barwaye umugongo, impamvu zitera umugongo ndetse n'ubuvuzi butangwa n'abaganga mu kuvura indwara y'umugongo igice cyo hasi mu karere ka Nyamasheke.

Nzasabwa gukora iki niba nemeye kugira uruhare muri ubu bushakashatsi?

Uzasabwa gusubiza urutonde rw'ibibazo rugizwe n'ibice bine; Igice cya mbere kigizwe n'ibibazo birebana n'ibiranga umwana ni ukuvuga imyaka, igitsina, ikigo yigaho, umwaka yigamo, igihe amaze yiga mu karere ka Nyamasheke n'igihe amaze arwara umugongo. Igice cya kabili kigizwe n'ibibazo birebana n'imirimu ikorerwa ku ishuri ndetse n'impamvu zaba zitera umugongo. Igice cya gatatu kigizwe n'ibibazo birebana n'ubuvuzi ndetse n'inama zitangwa n'abaganga bo ku bitaro bya Kibogora mu kwirinda no kuvura indwara y'umugongo. Igice cya kane kigizwe n'ibibazo birebana n'ingaruka z'uburwayi bw'umugongo. Iki gice kandi kigizwe n'ibibazo birebana n'inyigisho zitangwa mu rwego rwo kwirinda indwara y'umugongo. Ku ngorane mwagira mu gihe cyo gusubiza ibibazo umushakashatsi ndetse n'abafasha be bazaba bahari kugira ngo batange ibisobanuro bya ngombwa

Ningira uruhare muri ubu bushakashatsi bizaba ibanga?

Tuzakora ibishoboka byose kugira ngo amakuru muduhaye abe ibanga. Kugira ngo ibyo mutubwiye bibe ibanga kandi hatamenyekana uwabivuze turabasaba kutandika amazina yanyu ku rupapuro rw'ibibazo, kandi ukora ubushakashatsi ku giti cye niwe uzafata impapuro z'ibisubizo kandi azibike neza ahantu

hafite umutekano hafunze. Nituramuka dukoze raporo cyangwa tugatangaza ubu bushakashatsi mu binyamakuru tuzakora ibishoboka byose kugira ngo amazina yanyu ndetse n'ibibaranga bitagaragara.

Ni izihe ngaruka zaterwa n'ubu bushakashatsi?

Nta ngaruka zizwi zishobora guterwa n'ubu bushakashatsi ariko uramutse ugize ikibazo cy'ihungabana wahita ujyanywa ku bajyanama babishinze kugira ngo bagufashe kuvurwa.

Ni izihe nyungu uzagira kuri ubu bushakashatsi?

Ubu bushakashatsi ntabwo bugamije gufasha wowe gusa, ariko ibizavamo bizafasha umushakashatsi, abashinze amashuri yisumbuye ku rwego rw'igihugu ndetse n'abavuzi kumenya neza ikigereranyo cy'uburwayi bw'umugongo mu banyeshuri bo mu mashuri yisumbuye, impamvu zitera umugongo ndetse n'ubuvuzi butangwa n'abaganga. Ibizavamo bizafasha kwiga birushijeho ingamba zafatwa kugirango hakumirwe icyorezo cy'indwara y'umugongo mu mashuri y'isumbuye mu Rwanda Turizera ko mu gihe kizaza, abandi bantu bazagira inyungu ziturutse kuri ubu bushakashatsi bitewe no kuzahura imyumvire ndetse no kuzahura imibereho y'abanyeshuri mu rwego rwo kurinda indwara y'umugongo mu banyeshuri bo mu mashuri yisumbuye kuko impamvu zose zitera umugongo zizaba zagaragajwe hagafatwa n'ingamba zihamye zo kwirinda.

Ese mfite uburenganzira bwo kuba ndetse no kureka kugira uruhare muri ubu bushakashatsi igihe cyose mbishakiye?

Kugira uruhare muri ubu bushakashatsi ni ubushake bwawe busesuye. Ushobora guhitamo kutabugiramo uruhare na gato. Niba wemeye kubugiramo uruhare ashobora kubireka igihe cyose wabishakira. Niba uhisemo kutagira uruhare muri ubu bushakashatsi cyangwa kubihagarika igihe cyose ushakiye nta ngaruka uzagira cyangwa ngo igire izindi nyungu ubura wari uzifitiho uburenganzira.

Bizagenda bite ningira ikibazo?

Ubu bushakashatsi buri gukorwa na **Paul Ndahimana** wo mu ishami ry'ubugorangingo kuri kaminuza ya Western Cape muri Afrika y'epfo. Nugira ikibazo gifitanye isano n'ubushakashatsi bwite uzahamagare:

Bwana Paul Ndahimana, University of the Western Cape, Department of Physiotherapy

Cell: +27 078 046 9048 / 0025 078 844 2011, E-mail: ndahapierrine@yahoo.fr

Ugize ikibazo kirebana n'uburenganzira bwawe bwahungabanye kubera ubu bushakashatsi wabimenyesha: Umuyobozi mukuru wa Komite ishinzwe kurengera abakorerwaho ubushakashatsi mu Rwanda: **Prof Wane Justin** kuri **0788500499** cyangwa umunyamabanga w'iyi Komite: **Dr Emmanuel Nkeramihigo** kuri **0788557273**.

Ushobora no kubimenyesha Umuhuzabikorwa w'ubushakashatsi: **Professor José Frantz**, Kaminuza ya Western Cape, muri Afurika Yepfo, Private Bag X17, Belville 7535, Cell: (021) 959 2542 / Fax: (021) 959 1217, Email: jfrantz@uwc.ac.za

Ubu bushakashatsi bwemewe n'urwego rushinzwe ubushakashatsi muri Kaminuza ya Western Cape muri afrika y'epfo.

Ukora ubushakashatsi: Paul Ndahimana



Appendix O

INFORMATION SHEET FOR SERVICE PROVIDERS

Project Title: The prevalence and management of low back pain among high school children in Nyamasheke district/Rwanda

What is this study about?

This is a research project being conducted by **Paul Ndahimana**, a Master student at the University of the Western Cape. We are inviting you to participate in this research project because you are one of the service providers of Nyamasheke district in which the study is taking place. The purpose of this research project is to determine the prevalence, predisposing factors, how often low back pain occurs and what cause it and the management of low back pain offered by service providers in Nyamasheke district.

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

You will be asked to participate in semi-structured interview which requires information about low back pain among high school children in Nyamasheke District.

Would my participation in this study be kept confidential?

We will do our best to keep your personal information confidential. To help protect your confidentiality, you will not be requested to write down your name on the questionnaire. 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 possible.

What are the risks of this research?

There are no known risks associated with participating in this research project. However, if you experience the problems to be traumatic, you will be referred to a counsellor for management.

What are the benefits of this research?

This research is not designed to help you personally, but the results may help the investigator learn more about the prevalence, predisposing factors and management of low back pain among high school children in Nyamasheke district/Rwanda. We hope that, in the future, other people might benefit from this study through improved understanding of aspect that should be included in health promotion programmes for high school children.

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

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time.

If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

What if I have questions?

This research is being conducted by Paul Ndahimana from Physiotherapy department at the University of the Western Cape. If you have any questions about the research study itself, please contact: **Paul Ndahimana, University of the Western Cape, Department of Physiotherapy, Cell: 0027 078 046 9048 / 0788442011, E-mail: ndahapierrine@yahoo.fr**

If you have any question about your right as a participant, please contact **Prof. Justin Wane** at **0788500499** (Chairperson of Rwanda National Ethics Committee) or **Dr. Emmanuel Nkeramihigo** at **0788557273** (Secretary of Rwanda National Ethics Committee) or **Prof. José Frantz** at **+27 21 959 2542**(Study coordinator at the University of The Western Cape in South Africa). This research has been approved by the University of the Western Cape's Senate Research Committee and Ethics Committee.

Researcher: Paul Ndahimana

Appendix P

IBISOBANURO KU BUSHAKASHATSI BIGENEWE ABAVUZI

Umutwe w’ubushakashatsi: Indwara y’umugongo igice cyo hasi mu banyeshuri bo mu mashuri yisumbuye mu Karere ka Nyamasheke mu Rwanda ndetse n’ubuvuzi bw’iyo ndwara.

Ubu bushakashatsi bugamije iki?

Ubu ni ubushakashatsi buri gukorwa na **Paul Ndahimana**, umunyshuri mu kiciro cya gatatu cy’amashuri makuru kuri kaminuza ya Western Cape muri Afrika y’epfo. Turagutumira kugira uruhare muri ubu bushakashatsi kubera ko uri umwe mu bavuzi bo ku bitaro bya Kibogora mu karere ka Nyamasheke aho ubushakashatsi buri gukorerwa. Intego y’ubu bushakashatsi ni ukureba ikigereranyocy’abanyeshuri barwaye umugongo, impamvu zitera umugongo ndetse n’ubuvuzi butangwa n’abaganga mu kuvura indwara y’umugongo igice cyo hasi mu karere ka Nyamasheke.

Umwana wange azasabwa gukora iki niba nemeye ko agira uruhare muri ubu bushakashatsi?

Uzasabwa gusubiza urutonde rw’ibibazo mu buryo bw’ikiganiro, ibibazo bifitanye isano n’indwara y’umugongo. Ni ukuvuga impamvu mubona zaba zitera indwara y’umugongo mu banyeshuri, ingaruka z’iyo ndwara, ubuvuzi bukorerwa abo banyeshuri mu rwego rwo kuvura iyo ndwara ndetse n’inama n’inyigisho zihabwa abo banyeshuri mu rwego rwo kwirinda iyo ndwara y’umugongo.

Ku ngorane mwagira mu gihe cyo gusubiza ibibazo umushakashatsi ndetse n’abafasha be bazaba bahari kugira ngo batange ibisobanuro bya ngombwa.

Ese ningira uruhare muri ubu bushakashatsi bizaba ibanga?

Tuzakora ibishoboka byose kugira ngo amakuru muduhaye abe ibanga. Kugira ngo ibyo mutubwiye bibe ibanga kandi hatamenyekana uwabivuze turabasaba kutandika amazina yanyu ku rupapuro rw'ibibazo, kandi ukora ubushakashatsi ku giti cye niwe uzafata impapuro z'ibisubizo kandi azibike neza ahantu hafite umutekano hafunze. Nituramuka dukoze raporo cyangwa tugatangaza ubu bushakashatsi mu binyamakuru tuzakora ibishoboka byose kugira ngo amazina yanyu ndetse n'ibibaranga bitagaragara.

Ni izihe ngaruka zaterwa n'ubu bushakashatsi?

Nta ngaruka zizwi zishobora guterwa n'ubu bushakashatsi ariko uramutse ugize ikibazo cy'ihungabana wahita ujyanywa ku bajyanama babishinzwe kugira ngo bagufashe kuvurwa.

Ni izihe nyungu nzagira kuri ubu bushakashatsi?

Ubu bushakashatsi ntabwo bugamije gufasha wowe gusa, ariko ibizavamo bizafasha umushakashatsi, abashinzwe amashuri yisumbuye ku rwego rw'igihugu ndetse n'abavuzi kumenya neza ikigereranyo cy'uburwayi bw'umugongo mu banyeshuri bo mu mashuri yisumbuye, impamvu zitera umugongo ndetse n'ubuvuzi butangwa n'abaganga. Ibizavamo bizafasha kwiga birushijeho ingamba zafatwa kugirango hakumirwe icyorezo cy'indwara y'umugongo mu mashuri y'isumbuye mu Rwanda Turizera ko mu gihe kizaza, abandi bantu bazagira inyungu ziturutse kuri ubu bushakashatsi bitewe no kuzahura imyumvire ndetse no kuzahura imibereho y'abanyeshuri mu rwego rwo kurinda indwara y'umugongo mu banyeshuri bo mu mashuri yisumbuye kuko impamvu zose zitera umugongo zizaba zagaragajwe hagafatwa n'ingamba zihamye zo kwirinda.

Ese mfite uburenganzira bwo kuba ndetse no kureka kugira uruhare muri ubu bushakashatsi igihe cyose mbishakiye?

Kugira uruhare muri ubu bushakashatsi ni ubushake bwawe busesuye. Ushobora guhitamo kutabugiramo uruhare na gato. Niba wemeye kubugiramo uruhare ashobora kubireka igihe cyose wabishakira. Niba uhisemo kutagira uruhare muri ubu bushakashatsi cyangwa kubihagarika igihe cyose ushakiye nta ngaruka uzagira cyangwa ngo igire izindi nyungu ubura wari uzifitiho uburenganzira.

Bizagenda bite ningira ikibazo?

Ubu bushakashatsi buri gukorwa na **Paul Ndahimana** wo mu ishami ry'ubugorangingo kuri kaminuza ya Western Cape muri Afrika y'epfo. Nugira ikibazo gifitanye isano n'ubushakashatsi bwite uzahamagare:

Bwana Paul Ndahimana, University of the Western Cape, Department of Physiotherapy

Cell: +27 078 046 9048 / 0025 078 844 2011, E-mail: ndahapierrine@yahoo.fr

Ugize ikibazo kirebana n'uburenganzira bwawe bwahungabanye kubera ubu bushakashatsi wabimenyesha: Umuyobozi mukuru wa Komite ishinzwe kurengera abakorerwaho ubushakashatsi mu Rwanda: **Prof Wane Justin** kuri **0788500499** cyangwa umunyamabanga w'iyo Komite: **Dr Emmanuel Nkeramihigo** kuri **0788557273**.

Ushobora no kubimenyesha Umuhuzabikorwa w'ubushakashatsi: **Professor José Frantz**, Kaminuza ya Western Cape, muri Afurika Yepfo, Private Bag X17, Belville 7535, Cell: (021) 959 2542 / Fax: (021) 959 1217, Email: jfrantz@uwc.ac.za

Ubu bushakashatsi bwemewe n'urwego rushinzwe ubushakashatsi muri Kaminuza ya Western Cape muri afrika y'epfo. **Ukora ubushakashatsi: Paul Ndahimana**

Appendix Q

CONSENT FORM FOR PARENTS/GUARDIANS OF MINOR CHILDREN

Title of Research Project: *The prevalence and management of low back pain among high school children in Nyamasheke district/Rwanda*

The study has been described to me in a language that I understand and I freely and voluntarily agree the participation of my child. My questions about the study have been answered. I understand that my child’s identity will not be disclosed and that my child may withdraw from the study without giving a reason at any time and this will not negatively affect me nor my child in any way.

Parent/Guardian’s name.....

Parent/Guardian’s signature.....

Witness.....

Witness’s signature.....

Date.....

If you have any question about your right as a participant, please contact **Prof Justin Wane** at **0788500499** (Chairperson of Rwanda National Ethics Committee) or **Dr. Emmanuel Nkeramihigo** at **0788557273** (Secretary of Rwanda National Ethics Committee) or **Prof José Frantz** at **+27 21 959 2542/ Fax: (021) 959 1217, Email: jfrantz@uwc.ac.za** (Study coordinator at the University of The Western Cape in South Africa).



Appendix R

UBWUMVIKANE N'ABABYEYI

Umutwe w'ubushakashatsi: *Indwara y'umugongo igice cyo hasi mu banyeshuri bo mu mashuri yisumbuye mu Karere ka Nyamasheke mu Rwanda ndetse n'ubuvuzi bw'iyi ndwara.*

Ndemeza ko nasobanuriwe neza iby'ubu bushakashatsi mu rurimi numva neza kandi k'ubushake bwange nta gahato nkaba nemeye ko umwana wange agira uruhare muri ubwo bushakashatsi. Ibibazo byose nari mfite bijyanye n'ubu bushakashatsi byashubijwe. Numvise neza ko amazina y'umwana wanjye atazagaragazwa kandi ko ashobora kureka kugira uruhare muri ubu bushakashatsi igihe cyose nabishakira ntagombye gutanga ibisobanuro kandi ko nta ngaruka n'imwe byagira ku mwana wange cyangwa kuri jye.

Amazina y'umubyeyi

Umukono w'umubyeyi

Umuhamya

Umukono w'umuhamya

Itariki

Ugize ikibazo kirebana n'uburenganzira bwawe bwahungabanye kubera ubu bushakashatsi wabimenyeshya: Umuyobozi mukuru w'urwego rushinzwe kurengera abakorerwaho ubushakashatsi: **Prof. Wane Justin** kuri **0788500499** cyangwa umunyamabanga w'urwo rwego:

Dr Emmanuel Nkeramihigo kuri **0788557273**.

Ushobora no kubimenyeshya Umuhuzabikorwa w'ubushakashatsi: **Professor José Frantz**, Kaminuza ya Western Cape, muri Afurika Yepfo, Private Bag X17, Belville 7535, **Cell: +27 21 959 2542** / Fax: (021) 959 1217, **Email: jfrantz@uwc.ac.za**

Appendix S

ASSENT FORM FOR MINOR CHILDREN

Title of Research Project: *The prevalence and management of low back pain among high school children in Nyamasheke district/Rwanda*

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

Participant’s name.....

Participant’s signature.....

Witness.....

Witness’s signature.....

Date.....



If you have any question about your right as a participant, please contact **Prof Justin Wane** at **0788500499** (Chairperson of Rwanda National Ethics Committee) or **Dr. Emmanuel Nkeramihigo** at **0788557273** (Secretary of Rwanda National Ethics Committee) or **Prof José Frantz** at **+27 21 959 2542**/ Fax: (021) 959 1217, **Email: jfrantz@uwc.ac.za** (Study coordinator at the University of The Western Cape in South Africa).

Appendix T

UBWUMVIKANE N'ABANA BATARAGIRA IMYAKA 21

Umutwe w'ubushakashatsi: *Indwara y'umugongo igice cyo hasi mu banyeshuri bo mu mashuri yisumbuye mu Karere ka Nyamasheke mu Rwanda ndetse n'ubuvuzi bw'iyo ndwara.*

Ndemeza ko nasobanuriwe neza iby'ubu bushakashatsi mu rurimi numva neza kandi k'ubushake bwange nta gahato nkaba nemeye kugira uruhare muri ubwo bushakashatsi. Ibibazo byose nari mfite bijyanye n'ubu bushakashatsi byashubijwe. Numvise neza ko amazina yanjye atazagaragazwa kandi ko nshobora kureka kugira uruhare muri ubu bushakashatsi igihe cyose nabishakira ntagombye gutanga ibisobanuro kandi ko nta ngaruka n'imwe byangiraho.

Amazina

Umukono

Umuhamya

Umukono w'umuhamya

Itariki

Ugize ikibazo kirebana n'uburenganzira bwawe bwahungabanye kubera ubu bushakashatsi wabimenyesha:

Umuyobozi mukuru w'urwego rushinzwe kurengera abkorerwaho ubushakashatsi: **Prof. Wane Justin** kuri **0788500499** cyangwa umunyamabanga w'urwo rwego: **Dr Emmanuel Nkeramihigo** kuri **0788557273**.

Ushobora no kubimenyesha Umuhuzabikorwa w'ubushakashatsi: **Professor José Frantz**, Kaminuza ya Western Cape, muri Afurika Yepfo, Private Bag X17, Belville 7535, **Cell: +27 21 959 2542**/ Fax: (021) 959 1217, Email: jfrantz@uwc.ac.za

Appendix U

CONSENT FORM FOR PARTICIPANTS

Title of Research Project: *The prevalence and management of low back pain among high school children in Nyamasheke district/Rwanda*

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

Participant’s name.....

Participant’s signature.....

Witness.....

Witness’s signature.....

Date.....



If you have any question about your right as a participant, please contact **Prof Justin Wane** at **0788500499** (Chairperson of Rwanda National Ethics Committee) or **Dr. Emmanuel Nkeramihigo** at **0788557273** (Secretary of Rwanda National Ethics Committee) or **Prof José Frantz** at **+27 21 959 2542**(Study coordinator at the University of The Western Cape in South Africa).

Appendix V

UBWUMVIKANE BWO KWEMERA KUGIRA URUHARE MU BUSHAKASHATSI

Umutwe w'ubushakashatsi: *Indwara y'umugongo igice cyo hasi mu banyeshuri bo mu mashuri yisumbuye mu Karere ka Nyamasheke mu Rwanda ndetse n'ubuvuzi bw'iyi ndwara.*

Ndemeza ko nasobanuriwe neza iby'ubu bushakashatsi mu rurimi numva neza kandi k'ubushake bwange nta gahato nkaba nemeye kugira uruhare muri ubwo bushakashatsi. Ibibazo byose nari mfite bijyanye n'ubu bushakashatsi byashubijwe. Numvise neza ko amazina yanjye atazagaragazwa kandi ko nshobora kureka kugira uruhare muri ubu bushakashatsi igihe cyose nabishakira ntagombye gutanga ibisobanuro kandi ko nta ngaruka n'imwe byangiraho.

Amazina

Umukono

Umuhamya

Umukono w'umuhamya

Itariki

Ugize ikibazo kirebana n'uburenganzira bwawe bwahungabanye kubera ubu bushakashatsi wabimenyesha:

Umuyobozi mukuru w'urwego rushinzwe kurengera abakorerwaho ubushakashatsi mu Rwanda:

Prof. Wane Justin kuri **0788500499** cyangwa umunyamabanga w'urwo rwego: **Dr Emmanuel Nkeramihigo** kuri **0788557273**.

Ushobora no kubimenyesha Umuhuzabikorwa w'ubushakashatsi: **Professor José Frantz**, Kaminuza ya Western Cape, muri Afurika Yepfo, Private Bag X17, Belville 7535, **Cell: +27 21 959 2542** / Fax: (021) 959 1217, Email: jfrantz@uwc.ac.za

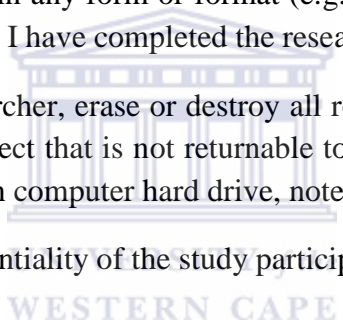
Appendix W

RESEARCH ASSISTANT CONFIDENTIALITY AGREEMENT FORM

Title of Research Project: **The prevalence and management of low back pain among high school children in nyamasheke district, Rwanda**

I,....., the research assistant, have been hired to assist the Researcher to collect data from medical records and take notes during the interview with the research participants. I agree to:

1. Keep all the research information shared with me confidential by not discussing or sharing the research information in any form or format (e.g. including but not limited to tapes, transcripts) with anyone other than the Researcher.
2. Return all research information in any form or format (e.g. including but not limited to tapes, transcripts) to the Researcher when I have completed the research tasks.
3. After consulting with the Researcher, erase or destroy all research information in any form or format regarding this research project that is not returnable to the Researcher (e.g. including but not limited to information stored on computer hard drive, note books).
4. Maintain anonymity and confidentiality of the study participants.



.....

(Name) (Signature) (Date)

Research Assistant

.....

(Name) (Signature) (Date)

Researcher

Appendix Y

The Interview schedule

Date	Time	Participant to be interviewed	Place of interview
15/2/2011	9:00 am	Physiotherapist (P1)	Meeting room of Kibogora hospital
	11:00 am	Physiotherapist (P2)	Meetingroom of Kibogora hospital
	3:00 pm	Physiotherapist (P5)	Meeting room of Kibogora hospital
17/2/2011	9:00 am	Doctor (P3)	Meeting room of Kibogora hospital
	11:00 am	Doctor (P4)	Meeting room of Kibogora hospital
	3:00 pm	Doctor (P6)	Meeting room of Kibogora hospital

UNIVERSITY of the
WESTERN CAPE

The researcher Paul Ndahimana

Masters student at the University of the Western Cape

South Africa