

**THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY  
AND LOW BACK PAIN AMONG NURSES IN KANOMBE  
MILITARY HOSPITAL**

By

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A thesis submitted in partial fulfilment of the requirements for the degree of

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The logo of the University of the Western Cape, featuring a classical building facade with columns and a pediment, with the text "UNIVERSITY of the WESTERN CAPE" below it.

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## ABSTRACT

Low back pain has been found to be the most prevailing musculoskeletal condition as well as a common cause of disability in high and low income countries, with 85% prevalence. Studies further report that low back pain is common and accounts for a large number of reported disabilities among nurses who also happen to have one of the highest levels of back injury in all occupation groups. World Health Organisation generally recommends physical activity as an essential need for our health and well-being. The aim of the current study was to determine the relationship between low back pain and physical activity levels among nurses in Kanombe Military Hospital (KMH), as well as other confounding factors leading to low back pain. A quantitative, cross-sectional and descriptive design was used to conduct the study. The study population and sample included all clinical nurses in all the departments/wards at KMH (excluding three nurses doing administrative work only and the four who participated in the pilot study). A total of 133 nurses participated in the study and data was collected using three self administered questionnaires. The first one requested socio-demographic data, followed by the International Physical Activity Questionnaire (IPAQ) which examined the physical activity levels of nurses, and lastly the Nordic Musculoskeletal Disorder Questionnaire which examined low back pain prevalence. A response rate of 122 (92%) was obtained. Data was analysed using the Statistical Package for the Social Sciences (SPSS) version 17.0. Descriptive statistics were employed to summarize the demographic data of the study sample, which were presented using frequency tables and expressed as percentages, means and standard deviations. Chi-square test was used to determine if any associations exist between low back pain and physical activity as well as the socio-demographic variables. All tests were done at the level of significance  $P \leq 0.05$ . Logistic regression was used to determine the correlation between low back pain and the related factors. The one-year low back pain prevalence (78%) was higher than the one-week low back pain prevalence (53%). Females reported higher prevalence of low back pain (84%) than males

(50%). Overall, there was no significant association between low back pain and physical activity according to the chi-square test. On the other hand considering the four physical activity domains of nurses, only job-related physical activity domain reported a higher percentage of physically active nurses (84%), while the leisure-time physical activity domain showed the least percentage of physically active nurses (5%). None the less, chi-square test revealed no significant associations between the different domains of physical activity and low back pain. However still, some of the demographic characteristics were found to be significantly associated with nurses' levels of physical activity: age ( $P=0.033$ ), marital status ( $P=0.001$ ) & working experience ( $P=0.026$ ). Finally, the current study only reveals a relationship between the demographic characteristics of nurses and physical activity as well as low back pain but not physical activity and low back pain. Results of this study also reveal a high prevalence of job-related physical activity among KMH nurses, which might be harmful to them as it is not controlled. However, although this study showed no significant relationship between low back pain and physical activity, participation in leisure-time physical activities should be promoted among KMH nurses and the rest of the staff as they would greatly benefit from them.

## DECLARATION

I hereby declare that “**The Relationship between physical activity and Low back pain among Nurses in Kanombe Military Hospital**” is my own work, that it has not been submitted for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

**Mukaruzima Lela**

**Signature.....**

**November 2010**

**Witness: Prof José FRANTZ**



## DEDICATION

I dedicate this piece of work to my Lord and saviour Jesus Christ, the source of my all. “I can do all things through Him who gives me strength” *Phil’ 4:13*.

To mama and papa, Mr & Mrs. Rutwaza. Thank you for never ceasing to believe in me and grooming me to be who I am today, I could never ask for more.

To my beloved brothers and sisters, Bob, Nazir, Nasser, Gloria, Shafigah & Sherinah, you are my daily encouragement.



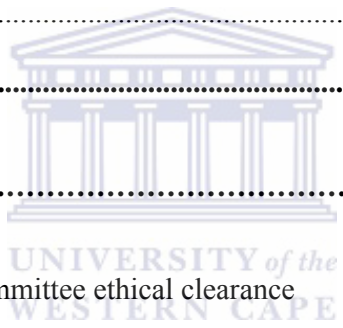
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# CHAPTER 1

## INTRODUCTION

This chapter gives the background of the study which is about low back pain being among the possible health risk disorders that result from physical inactivity. World Health Organization (WHO) reports that physical inactivity has both health and economic constraints on individuals and nations worldwide and thus argues that physical activity is a strong means for prevention of diseases for an individual and for nations, as well as a cost-effective method to improve public health across the population. The chapter further highlights the results of low back pain prevalence and physical activity levels in general and among nurses from different countries worldwide as well as in Rwanda. The problem statement, aim, objectives & significance of the study as well as definition of terms are also outlined in this chapter.

### 1.1 BACKGROUND

Low back pain is not only considered to be the most common reason for functional disability worldwide, but also estimated to affect almost 90% of the universal population (Brennan, Shafat, MacDonncha & Vekins, 2007). Moreover, low back pain is said to be among the leading musculoskeletal disorders that predominantly affect the working population in developed as well as in developing countries (Roffey, Wai, Bishop, Kwon & Dagenais, 2010; Cilliers, 2007; Burdorf & Jansen, 2006; Sanya & Ogwumike, 2005; Omokhodion & Sanya, 2003; Gardner, 2002; Waddell & Burton, 2001; Johanning, 2000). Furthermore, low back pain has been found to be a global health dilemma affecting the global economic, societal, and public health sectors, thus increasing and incurring billions of dollars in medical expenditures each year (Luw, Morris & Sommers, 2007). Moreover, low back pain is said to be the most prevalent musculoskeletal occupational hazard with a life time prevalence of about 90% according to Roffey et al. (2010a) and 60-85% according to Burdorf & Jansen (2006). A decade ago, in

America it was said that low back pain was one of the leading occupational hazards, disabling 5.4 million Americans per year (Johanning, 2000). According to (Roffey, et al., 2010b) the economic burden of low back pain in America is said to be on the rise. Similarly, in the United Kingdom (UK), low back pain is declared to be a particular health issue that affects the working population and considered the leading causes of disability (Osborne & Smith, 2006; Gardner, 2002). In addition, Gardner further reports that about 1% of the adult population in the UK are permanently left disabled as a result of low back pain. However, although back pain is not life threatening, it has significantly increased the epidemiological and economic crisis in the United Kingdom despite improvements in diagnosis and therapy (Maniadakis & Gray, 2000). Furthermore, in as much as low back pain is a global health issue, its aetiology has not been clearly understood (Heneweer, et al, 2008; Cole & Grimshaw, 2003). On the other hand, Waddell & Burton (2001) argue that back pain could be attributed to normal every day activities rather than to occupational activities alone. The authors further reveal that individuals who have greater physically demanding jobs were found to experience similar low back pain as those with lighter physically demanding jobs or even those who are not working. But again, Waddell & Burton support that individuals who are exposed to greater physical demands present increased symptoms of back pain. Therefore, it may be assumed that normal daily activities of living (ADL) tend to aggravate back pain symptoms based on the arguments, firstly, to individuals who are already exposed to higher physically demanding jobs and secondly, by deteriorating the condition of those already having a history of low back pain. As reported by Hicks, Fritz, Delitto & Stuart (2005), low back pain can also be triggered by spinal instability which occurs as a result of mechanical overloading of the back, the authors further suggest that stabilization exercises can be helpful in cases of chronic low back pain.

Omokhodion & Sanya (2003) reported that very little information is available relating to low back pain in the general population of the low income countries. However, a general assumption has been made that low back pain in Africa is lower than in the developed countries, although it has been predicted to be on the rise in the next decade (Louw et al., 2007). In South Africa, research results indicate that low back pain has also been identified as a common problem. About 30,000 of the South African population experience back and neck pain every day. And of those, 10% experience pain that lingers on for more than 3- 6 months. Moreover, an estimated cost of about 20 million USD was spent on low back pain cases in South Africa as compensation in the year 2000 (Vuuren, Zinzen, Heerden, Becker & Meeusen, 2007). Cilliers (2007) also reports that 80% of the South African work force suffers from severe discomfort and disability due to low back pain at some point in their working life. Consequently, Cilliers states that low back pain is among the main reasons for individuals missing work, as well as one of the most common conditions treated by health professionals. Similarly, Rwanda faces the same dilemma of low back pain as other countries and it is said to be one of the disabling and costly conditions in the country (Mutimura, Murego, Murenzi & Nyaruhirira, 2003). Furthermore, the authors report that an estimated cost of US \$ 975000 was spent on low back pain patients, who were transferred outside Rwanda for further treatment between the years 2000 and 2001 (Mutimura et al., 2003). Twagirayezu (2005) further adds that chronic low back pain was indicated to be the main musculoskeletal disorder treated by physiotherapists in government hospitals in Rwanda. Likewise, Galukande, Muwazi & Mugisa (2006) in their study which was conducted in Uganda, suggest that low back pain is as a major cause of disability and absenteeism at work in the Western world as it is in the low income countries. They further add that low back pain particularly affects the dynamic middle years of adult life which in one way or another further impacts negatively on the social economic status of the employee, employer as well as the

society at large. On the whole, low back pain may be considered to be a general health issue that is equally faced in both low and high income settings.

Furthermore, the cause of low back pain is poorly understood and evidence of the contribution of physical activity to the prevalence, prevention and management of low back pain is still inconclusive and poorly documented (Heneweer, et al, 2008). However, Skoffer & Foldspang (2008) suggest that physical activity may be hypothesized to possess a potential for preventing low back pain, which could be dependent on the amount and intensity of physical activity done. Similarly, literature results from some randomized trials reveal that exercise interventions help prevent low back pain in at-risk populations and that leisure time physical activity is beneficial in preventing low back pain (Hurwitz, Morgenstern & Chiao, 2005). However, another randomized controlled trial by Hayden, Tulder, Malmivaara & Koes (2005) concludes that while exercise therapy is generally effective in managing low back pain, it might not be appropriate to everyone suffering from low back pain. And the authors thus suggest that further investigations should be done to identify the specific exercise interventions in well defined populations of patients with low back pain.

Nurses have been reported to have one of the highest levels of back work-related injuries in all occupational groups. The great amount of physical work such as patient handling and transfers as well as psychological stress related to their type of work, are said to increase the prevalence of low back pain among nurses (Vieira, Kumar, Coury & Narayan, 2006; Yip, 2004; Johanning, 2000). Likewise, of all the health related occupations the nursing staffs were indicated as the most workers that are highly exposed to back disorders due to the manual handling involved in their profession such as lifting and transferring of patients. Consequently, biomechanical investigations reported that such movements result into high spinal stresses (Tate, Yassi &

Cooper, 1999; Smedley, Egger, Cooper & Coggon, 1995). In addition, low back pain was said to be as a particular problem among nurses in Great Britain leading to costs for lost manpower, litigation and compensation for the British National Health Service (Smedley, Trevelyan, Inskip, Buckle, Cooper, & Coggon, 2003). According to Naidoo & Coopoo (2007), nurses in America are said to be among the most exposed workers to job-related injuries in the United States of America (USA), as well as experiencing low back pain as a major problem. Comparatively, there are some studies that show the prevalence of low back pain among nurses in a few African countries. A study that was conducted in Tunisia among hospital workers reveals that low back pain is related to the nature of professional activities especially the physical work load in about 75% of cases of low back pain (Bejia, et al., 2004). Similarly, another study carried out in one of the major hospitals in Tanzania demonstrated a high prevalence of low back pain among nurses with 74% (Mwilila, 2008). These findings are in line with results from a Nigerian study which also reports a high prevalence of low back pain (69%), among nurses in one of the rural hospitals there (Omokhodion, Umar & Ogunnowo, 2000). Overall, nurses are without doubt among the professional workers that are exposed to low back pain of all occupations according to studies done worldwide. In most studies, the common factors mentioned that are thought to cause low back pain among the nurses are related to their kind of job and these are manual handling of patients as well as psychosocial factors. However, less attention has been given to lifestyle factors such as leisure-time physical activities, besides smoking.

The World Health Organization (WHO, 2003) suggests that physical activity is an essential requirement for our health and well-being. For an individual, it was found to be a strong means for prevention of diseases and for nations, a cost-effective method to improve public health across the population. It was also found to improve musculoskeletal health such as low back pain, control body weight and reduce symptoms of depression. The World Health Organization

(WHO, 2009; 2003), describes physical activity as any bodily movement produced by skeletal muscles that require energy expenditure. It further suggests that for individuals to gain much, they should engage themselves in regular physical activities such as walking, climbing stairs, cycling, dancing, gardening as well as a variety of leisure and recreational sports for at least 30 minutes every day. Similarly, Yip (2004) suggests that 30 cumulative minutes or more of moderately intense physical activity on most days of the week may prevent low back pain. Moreover, Heneweer, Vanhees & Picavet (2008) agree that physical activity is a significant measure of low back pain management which is generally accepted, and thus highly recommend individuals to be physically active. This is further supported by an Irish study which states that physiotherapists recognize the value of advice and exercises in the management of low back pain (Liddle, Baxter & Gracy, 2008). Besides, physical activity is not only beneficial in preventing low back pain but also other musculoskeletal disorders. As suggested by Woolf & Pfleger (2003), sedentary lifestyle of less or no participation of physical activities predisposes the body to musculoskeletal disorders such as low back pain, osteoarthritis, rheumatoid arthritis and osteoporosis. In addition, Osteras & Hammer (2006) in their study strongly agree that physical activity contributes to the health benefits of individuals such as physical (musculoskeletal fitness) and mental health, however, although musculoskeletal fitness is a vital health benefit, it is not considered much by individuals.

## **1.2. PROBLEM STATEMENT**

Nurses and nurse aids have been found to be more vulnerable to low back pain as compared to other medical personnel in a hospital setting, due to the nature of their job which is physically demanding. Their daily work routine include common activities such as heavy manual transferring of patients as well as frequent twisting and bending which have been identified as important risk factors for low back pain (Yip, 2004). Furthermore, it has been reported that



individuals with low back pain often have more physically demanding jobs and engage in lower leisure time physical activity. People, especially women with low back pain, were reported to have lower leisure time physical activity as compared to those without low back pain (Bjorck-van Dijken, Fjellman-Wiklund & Hildingsson 2008). Nonetheless, the authors further report that very little is published about the relationship between physical activity and low back pain in the general population. Reason being that the description of physical activity in terms of type, intensity, frequency and duration has not been defined in studies (Bjorck-van Dijken, et al., 2008). However, an experimental study suggests that intensive exercise programs that combine aerobic conditioning with specific strengthening of the back and legs can reduce the frequency of recurrence of low back pain and improve function in patients with chronic low back pain (Deyo & Weinstein, 2001). Therefore this implies that there is a possibility that low back pain can be managed by use of well controlled physical activity/exercise programs. After all, the relationship between low back pain and physical activity among nurses has not been explored in Rwanda, and with that the researcher found it necessary to conduct a study in this area specifically among the nurses in Kanombe Military Hospital.

### **1.3 AIM OF THE STUDY**

The aim of the study was to determine the relationship between low back pain and physical activity levels among nurses in Kanombe Military Hospital (KMH).

### **1.4 OBJECTIVES OF THE STUDY**

- To identify the prevalence of low back pain among nurses in Kanombe Military Hospital Kigali City, Rwanda.

- To determine the level, type and intensity of physical activity among nurses in Kanombe Military Hospital, Kigali City, Rwanda.
- To determine whether factors such as age, gender, physical activity levels and occupational factors are associated with low back pain.
- To determine whether a relationship exists between low back pain and physical activity among nurses in Kanombe Military Hospital, Kigali City, Rwanda.

### **1.5. THE SIGNIFICANCE OF THE STUDY**

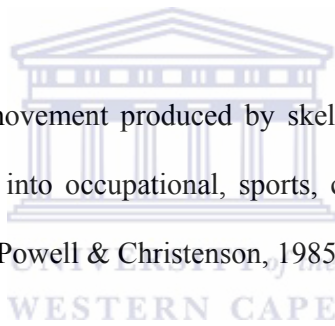
Low back pain is among the disabling musculoskeletal disorders that has a negative impact to an individual as well as to a nation both in the high and low income countries (Galukande, et al., 2006). Rwanda, in this case was not an exception. A study carried out by Mutimura et al., (2003) found that low back pain was among the disabling conditions among the Rwandans and hence needed to be addressed. The results of this study will therefore help to identify the prevalence of low back pain among nurses in a particular hospital in Rwanda as well as the possible predisposing factors. Furthermore, the level of physical activity among nurses in KMH will be identified and if it is related to low back pain. Consequently, the outcomes will be relevant to the ministry of health in Rwanda to address the preventive measures of low back pain among nurses as well as other employees working in similar conditions. Moreover, the ministry of health may well benefit from the results of the study to implement health policies that would help improve the quality of life and working conditions of nurses and other related employees, thus improving their functional output. Also, the results of this study may be used to promote physical activity practice among clinical nurses in Rwanda as well as other employees with similar working conditions. This is in respect to previous studies that have concluded that physical activity is an important necessity in one's daily life (WHO, 2003), as well as a potential for preventing low

back pain (Skoffer & Foldspang, 2008; Hurwitz et al., 2005). This way, not only low back pain will be prevented but individuals will generally gain from the physical activity health benefits which include; general physical fitness and psycho-social well being (WHO, 2003; Sherwood & Jeffery, 2000).

## 1.6. DEFINITION OF TERMS

**Low back pain:** it has been defined as the discomfort felt in the spinal area, between the lower costal margins of the 12<sup>th</sup> rib and the gluteal folds with or without radiations to the lower limb (Yip, 2004).

**Physical activity:** is any bodily movement produced by skeletal muscles that require energy expenditure. It can be categorized into occupational, sports, conditioning, household or other activities (WHO, 2009; Caspersen, Powell & Christenson, 1985).



**Physical fitness:** refers to a physiologic state of health of an individual that enables him/her to cope with the daily living demands (Warburton, Nicol & Bredin, 2006).

**Exercise:** a subset of physical activity that is designed, controlled, and repetitive and has as an ultimate or an intermediate objective (Caspersen, Powell & Christenson, 1985).

**Activities of Daily Living (ADL):** ADLs are the regular day to day activities performed by individuals, that involve functional mobility and personal care such as bathing, dressing, toileting, meal preparation, homemaking, work and leisure (Web medical dictionary, 2010).

## **CHAPTER 2**

### **LITERATURE REVIEW**

This chapter outlines a brief review of literature about low back pain globally and its common predisposing factors. In addition, physical activity and its benefits in respect to low back pain will be reviewed. However, more emphasis will specifically be on the prevalence of low back pain among the nurses and how it has been associated to physical activity and vice versa.

#### **2.1. Global Prevalence of low back pain**

Low back pain is said to be a worldwide disabling occupational hazard (MacDonald, Moseley & Hodges, 2008; Vuuren, Heerden, Becker, Zinzen & Meeusen, 2007; Galukande, Muwazi & Mugisa, 2006; Maul, Laubli, Klipstein & Krueger, 2006; Burdorf & Jansen, 2005; Omokhodion & Sanya, 2003; Omokhodion, 2000; Lahad, Malter, Berg & Deyo, 1994). MacDonald, et al. (2008) indicated that a prevalence of 60-90% of individuals experience low back pain during the course of their lives worldwide, while Burton et al. (2006) also reported a lifetime prevalence of low back pain to be more than 70% in developed countries. Furthermore, Roupa et al. (2008) suggest that low back pain is the main source of temporary disability affecting populations aged below 45 years in America. They continue to say that low back pain and the use of analgesic drugs have also become part and parcel of individuals suffering from low back pain which normally goes on all the way through from the third decade of their lives. This could however be of added disadvantage to the body's immune system as it becomes a chronic condition. In addition, literature results show that low back pain in the United Kingdom (UK) accounts for 40% prevalence in the general working population and 50% in the healthcare workers (Naidoo & Coopoo, 2007). Also, a Germany study found a one year low back pain prevalence to be 58.9% in the general population (Schneider, Schiltenswolf, Zoller & Schmitt, 2005).

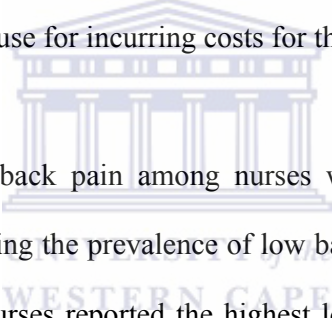
In Africa, the findings are not so different from those in developed countries. Results from a systematic review study done on low back pain in Africa concluded that it was equally a disabling problem and on a rise in Africa with a one-year prevalence of 72% and lifetime prevalence of 74% (Louw, Morris & Sommers, 2007). However, according to Omokhodion (2002), low back pain prevalence is thought to be still less in the low income countries, although this might not be the case. The author further argues that it is the degree at which low back pain is readily addressed in both settings that may determine its prevalence. Considering the major health issues faced in the low income countries, low back pain may rather not be seen as a priority as it might be the case in the developed countries. Therefore, the researcher is led to believe that low back pain could be as high in the low income countries as it is in the developed countries or even much higher. However, the level perception could be different considering the fact that life style patterns and the perception of pain also differ in both backgrounds. In response to this concept, Schneider et al. (2005) concluded that most individuals who reported low back pain were the less privileged as far as income, profession, and education are concerned and therefore were living an unfavourable lifestyle.

In the low income countries, it is possible that priority concern is mainly biased towards communicable diseases such as malaria, tuberculosis, HIV/AIDS, polio and the like, and therefore less focus put on low back pain. This is supported by Nugent (2008) who suggests that communicable diseases are basically dominant in both low and middle income countries than in the high income countries.

### **2.1.1. Prevalence of low back pain among nurses**

A number of studies have been done worldwide concerning occupational low back pain and nursing was indicated to be among the most vulnerable occupations as far as low back pain is

concerned (Mitchell et al., 2008; Naidoo & Coopoo, 2007; Schenk, Laubli, Hodler & Klipstein, 2007; Vieira et al., 2006; Bejia et al., 2004). Maul et al. (2003) in their study report that there is a higher prevalence of low back pain among nurses (56% - 90%) as compared to 60% - 80% low back pain prevalence in the general population. Factors such as physical as well as psychosocial stressors at work are generally indicated to be among the causes of low back pain among nurses (Mitchell et al., 2008; Schenk, Laubli, Hodler & Klipstein, 2007). Furthermore, various studies have shown that low back pain is a particular problem among nurses in industrialized countries (Naidoo & Coopoo, 2007; Maul et al., 2003; Smedley et al., 2003). Nurses in America are said to be the most exposed employees to occupational injuries especially low back pain (Naidoo & Coopoo, 2007). Likewise, in Great Britain low back pain was found to be a common health problem among nurses as well as cause for incurring costs for the nation (Smedley et al., 2003).



Relative findings concerning low back pain among nurses were reported in a few African countries. A study aimed at examining the prevalence of low back pain among hospital staffs in a Nigerian hospital revealed that nurses reported the highest low back pain occurrence (69%). Still in Nigeria, another study revealed a one year prevalence of 78% of work related musculo-skeletal disorders being experienced by nurses and of those, 44.1% were related to low back pain (Tinubu, Mbada, Oyeyemi & Fabunmi (2010). Similarly, Mwilila (2008) in her Tanzanian study reported a high prevalence of low back pain among nurses (74%). In South Africa, nurses are also considered to be the most exposed employees to low back pain than other hospital staff and a prevalence of 58.65% was reported (Naude, Mudzi, Mamabolo & Becker, 2009). In 2007, a one year low back pain prevalence of 84% was reported among nurses in one of South Africa's hospitals (Cilliers, 2007). In Rwanda, currently there is scanty or no information recorded about low back pain among nurses. However, although not so many studies have been carried out in Africa concerning low back pain among nurses, the available findings are comparable to

findings from developed countries. It is therefore obvious that low back pain may be considered a common complaint among nurses worldwide.

## **2.2. Common predisposing factors of Low back pain**

Results from most of the literature around low back pain have not managed to identify the cause of low back pain but rather its characteristics (Jones & Macfarlane, 2005). Work settings that are associated with increased work-related pressures among health workers have been attributed to the development of lumbar pains as well as other muscular pains in the body, fatigue as well as disrupted sleeping patterns to the employees (Roupa et al., 2008). Bejia et al. (2005) found that 69.9% of nurses who suffered low back pain were exposed to heavy manual workloads. Mwilila (2008) in her study, also learnt that among the perceived causes of low back pain reported by nurses was the working environment where by nurses mentioned that they are expected to do more work when the patients are many. Moreover, a number of scholars have concluded that the definite causes of low back pain may not be well known or rather have not been well documented. However, there are some frequently reported risk factors which are related to both working and non-working individuals. These factors include: type of work such as heavy manual work, repetitive bending, twisting, lifting, pulling & pushing, forceful movements, static postures like prolonged sitting and awkward postures (Roffey, et al., 2010b; Sikiru & Hanifa, 2010; Vuuren et al., 2007; Kwon et al., 2006; Burton, et al., 2004). Yip, 2004 on the other hand added that being new on the ward was a strong risk factor of nurses suffering low back pain due to the increased physical work load encountered. However, Waddell & Burton (2001) suggest that back pain could be more linked to normal every day activities than to occupational activities alone, meaning that the activities of daily living of individuals might be the major predisposing factors of low back pain. Similarly, Yip (2002) reports a 30-50% of self-reported low back pain among nurses in Hong Kong that was associated with housework and this consequently led to daily activity limitation, sleeping and walking interruptions included. Roffey, et al. (2010b)

suggest that low back pain could be due to injury of the neuro-musculo-skeletal system of the lumbar spine such as muscles, ligaments, nerves, discs as well as the vertebrae. Bejia et al., (2005) in their study also add that advanced age was a risk factor of low back pain occurrence due to the possibility of degenerative processes in the spine that accompany old age. Further literature findings suggests that a number of diseases develop as a result of old age thus making the elder employees less productive as far as physically demanding work is concerned (Aittomaki, Lahelma, Roos, Leino-Arjas & Martikainen., 2005).

On the other hand, Silveri & Spinasanta (2003) reported that poor muscle strength and flexibility can lead to poor posture, which may further lead to dysfunction of the respective muscles and joints in the back resulting into back pain. In addition, studies have suggested other common low back pain causes that are physiological and are associated with various factors. They include soft tissue injury in the spine such as; sprain or strain on the muscles due to overload, ligaments and joints due to poor postures of the spine and prolapsed disc due to improper lifting as well as poor postures of the back. In addition, injury to the above mentioned structures may further cause impingement on the spinal nerves which innervate the legs and spine thus causing low back pain. Besides, low back pain may also be caused by fractures of the vertebral bodies that occur as a result of weakening of the bones due to osteoporosis, rheumatoid arthritis and osteoarthritis which is sometimes also secondary to kidney disease (Vitente, 2010; Light, 2009).

However, the above low back pain causes and predisposing factors may not be generalized. Firstly, due to the difference in the biomechanics of the back and anatomical make up of different individuals that could act as a risk factor or a protective factor. Secondly, individuals from the different milieu of the world are exposed to different environmental factors that may also increase or reduce their risks of suffering low back pain. Thirdly, people's experience or

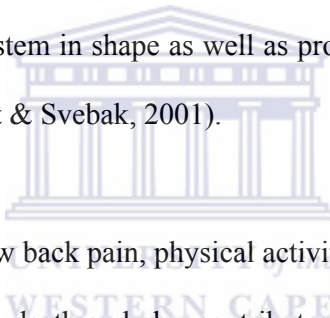


perception of pain is different and this could also be another factor that contributes to the complexity of identifying low back pain causes.

### **2.3. Physical activity and its benefits in respect to low back pain.**

World Health Organization (WHO, 2009; 2003) declares that physical activity is an essential basic need for individuals and generally recommends individuals to engage themselves in regular physical activities such as walking, climbing stairs, cycling, dancing, gardening as well as a variety of leisure and recreational sports for at least 30 minutes every day so as to improve on their health. Furthermore, studies have shown that physical activity is an effective and widely recognized measure of preventing and managing low back pain as well as improving function in adults with chronic low back pain (Hayden, Tulder, & Tomlinson, 2005; Burton, et al., 2004; WHO, 2003; Deyo & Weinstein, 2001). In addition, Deyo & Weinstein specifically suggest that by engaging in an intensive exercise program combined with aerobic conditioning and specific strengthening of the back and legs muscles, the risk of low back pain occurrence can be minimized. Equally, Silveri & Spinasanta (2003) support the fact that low back pain can be prevented if the leg, back and hip muscles are flexible and strong. In the same context, results from research studies suggest that regular performance of exercise may directly reduce back pain intensity, thereby preventing back pain related disability (Rainvaill, Hartigan, Martinez, Limke, Jouve, & Finno, 2004). Also, a German study found physical inactivity to be a cause of impaired physical capability of individuals which further affects the normal functional ability of their backs as well. It is therefore suggested that leisure time physical activity is a protective measure both physically and mentally, as power, endurance and flexibility are gained directly from physical activity. Improved moods, social contacts, and lower pain thresholds are also enhanced by physical activity (Schneider, Schmitt, Zoller & Schiltewolf, 2005). It has also been reported that physical activity indirectly lowers levels of stress and anxiety, thus contributing to positive health of the participants (Simonski, 1991). Additionally, moderate leisure time physical activity

in particular is said to have various health benefits besides maintaining normal muscle strength, joint function, and physical functioning. However, the definite intensity and length of activity that is beneficial may vary (Leino-Arjas, Solovieva, Riihimaki, Kirjonen & Telama, 2004). Likewise, Bejia et al. (2005) suggest that sports activity is a protective factor for low back pain, and although there are contradictory literature results, physicians report that regular sports practice reduce the risk of low back pain prevalence. Also, Osteras & Hammer (2006) in their study strongly suggest that individuals can benefit from physical activity in terms of their physical/musculoskeletal fitness and mental health. They continue to say that musculoskeletal fitness is less considered although it is a vital health benefit. In addition, good physical activity participation has been found to improve job related fatigue and muscle pain by increasing and maintaining the musculoskeletal system in shape as well as promoting psychological well-being of individuals (Oldervoll, Ro, Zwart & Svebak, 2001).



Moreover, apart from preventing low back pain, physical activity in general is said to be a means of minimizing the risk of premature death and also contributes in reversing the diseases process of cardiovascular ailments (Warburton, Nicol & Bredin, 2006). On the other hand however, studies have highlighted that increased family responsibilities which are in most cases taken care of by women, affect their participation in leisure- time physical activity but rather expose them to more domestic physical activity as compared to their male counterparts (Arjas, et al., 2004; Eyler et al., 2002). Furthermore, Arjas et al. (2004) argue that domestic or job-related physical activity differs from leisure time physical activity in a sense that the one type is controlled by the participant in terms of type, time and intensity while the others are not. Therefore, individuals in such situations have high chances of suffering low back pain as well as other health related disorders that occur as a result of lack of leisure time physical activity. Moreover, Lankenau, Solari & Pratt (2004), found an estimated 60% and more adults in almost all the developed

countries and in the more urban areas of the developing world to be sedentary thus posing a health risk to their lives. This therefore further signifies that physical activity participation is of paramount importance to everyone due to its positive health benefits.

However, as much as physical activity is recommended for the prevention of low back pain, it may at the same time be a risk factor as both extremes of physical activity and inactivity were found to be associated with a high prevalence of low back pain (Heneweer, Vanhees & Picavet, 2008). It is in this perspective that Bjorck-van Dijken, et al. (2008) argues that very little is published about the relationship between physical activity and low back pain in the general population. This being due to the fact that physical activity has not been well defined as far as its type, intensity, frequency and duration is concerned.

Nonetheless, it is evident from all the previous studies that low back pain remains to be a tremendous global challenge with increasing prevalence regardless of all the efforts that have been done to prevent it. There may possibly be a missing element that particularly needs to be addressed in the future research surveys.

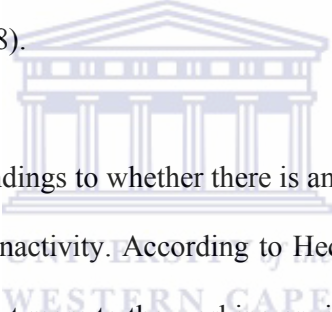
#### **2.4. Low back pain in relation to physical activity among nurses.**

Low back pain is said to be prevalent in the hospital settings and a cause of concern, but more particularly among nurses (Naidoo & Coopoo, 2007; Bejia, et al., 2005). Bejia and the colleagues in their study that was conducted in a hospital setting in Tunisia, further specify that about 75% of the low back pain cases are most likely due to the physical work load carried out daily as part of their jobs. The above information however gives a general view for all hospital workers and not only nurses. However still, nurses have been reported to have one of the highest

levels of work related back injuries in all occupational groups, which occur as a result of the nature of their work such as patient handling and transfers as well as psychological stress (Vieira, Kumar, Coury & Narayan, 2006; Yip, 2004; Johannig, 2000; Tate, Yassi & Cooper, 1999). Similarly, an Australian survey carried out by Mitchell et al. (2008) suggests that low back pain is a significant problem amongst nurses which is also prevalent before they commence employment. In addition, the authors thought that life style factors such as physical inactivity as well as high levels of vigorous physical activity may be associated with low back pain among nurses. In this context, the current study may relate nurses' low back pain to the high rate of job-related physical activity (83.6%) as well as very low leisure-time physical activity (4.9%) that was noted among nurses as shown in table 4.5. Additionally, research reports show that there is positive evidence that low back pain may be due to nurses' less or no participation in physical activity (Naidoo & Coopoo, 2007; Hedge, 2006). On the other hand, Yip (2001) suggests that low back pain can be prevented by increasing strength and stability of the back muscles which can be achieved through sports activities. Unlike job-related or domestic related physical activities, sports activities are programmed and designed in terms of frequency and intensity to so that they may positively benefit individuals' health (Caspersen, Powell & Christenson, 1985).

In Great Britain, low back pain was also indicated to be a particular problem among nurses, which further results into negative socio-economic effects such as costs for lost manpower, litigation and compensation (Smedley, Trevelyan, Inskip, Buckle, Cooper & Coggon, 2003). Moreover, a study carried out in one of the largest hospitals in Switzerland revealed that lumbar pain posed a persistent problem among nurses, with an annual prevalence ranging from 73% to 76% (Maul, Laubli, Klipstein & Krueger, 2003). Similarly, Kai (2001) suggests that low back pain is an occupational problem among nursing staff and once it occurs it is easily prolonged and may become chronic. Kai further reports that nurses are vulnerable to fatigue which may affect

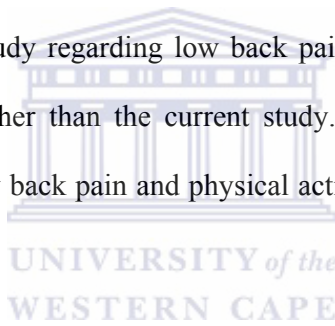
both their body and mind, and therefore suggests that it is important to properly educate nurses about low back pain and how to prevent it before it occurs. In addition, there is evidence that physically active nurses presented with less symptoms of low back pain and a better psychosocial behavior (Roupa, et al., 2008). Similarly, Karahan & Bayraktar (2004), in their study discovered that the majority of nurses do not exercise regularly and this may expose them to low back pain which occurs as a result of musculoskeletal system disturbance. Besides, they pointed out that nurses would benefit from regular exercising which contributes to increasing muscle and bone strength, improving blood circulation as well as reducing stress. Also, results from another study suggest that physical strength and endurance which is achieved through physical activity participation would lower the risk of low back pain among nurses (Svensson, Stroyer, Ebbehøj & Mortensen, 2008).



However, there are contradictory findings to whether there is an association between nurses' low back pain and physical activity or inactivity. According to Hedge (2006), nurses' back injuries are not related to physical activity but more to the working environment and working conditions. Moreover, it has been concluded from different studies that less or no motivational support from nurses' leaders at work which results into psychological stress, also increases their risk of experiencing low back pain (Eriksen, Bruusgaard & Knardahl, 2004). Furthermore, Waddell & Burton (2001) also suggest that back pain could be more attributed to normal every day activities as much as to occupational activities. And the authors continue to say that individuals who have greater physically demanding jobs suffer similar low back pain as those with lighter physically demanding jobs or even those who do not have jobs. In terms of cultural backgrounds therefore, this may imply that women in developing countries are likely to be more exposed to low back pain than men as it may be generally familiar that mainly women in low income countries are the ones who are more involved in performing the daily domestic chores even after their jobs

than most men. World Health Organization (WHO, 2003) confirms this by saying that women in the developing countries were at higher risks of low back pain exposure due to their frequent involvement in activities of daily living. Likewise, in their study conducted in Uganda, Galukande et al. (2005) found a higher incidence of low back pain in women than in men. However, they posed a question as to whether women in that region were more vulnerable to low back pain or if it was because they readily sought medical attention. Similarly, results from the current study show a high low back pain prevalence in female nurses than in male nurses, revealing 84% low back pain prevalence of all the female nurses and 50% low back pain prevalence in male nurses.

Nonetheless, to date, less or no study regarding low back pain and physical activity has been done among nurses in Rwanda other than the current study. It is thus important to identify whether the situation regarding low back pain and physical activity is similar in Rwanda as it is in developed countries.



## **CHAPTER 3**

### **METHODOLOGY**

In this chapter, the study design & population, sampling method and instrument used to obtain data are described. Also, an outline of data collection and method of data analysis will also be explained, and finally ethical issues that were respected are discussed.

#### **3.1. RESEARCH SETTING**

The study was conducted at Kanombe Military Hospital (KMH), Rwanda. The hospital is one of the referral hospitals in Kigali City and is situated approximately 15km away from the city centre. KMH has 362 beds and offers both in and outpatient services to both military and civilian patients. Although KMH is a military hospital, both military and civilian medical personnel are employed. The hospital consists of the following departments: Internal Medicine, Paediatrics, Pharmacy, Orthopaedics & Surgery, Radiography (X-rays & Ultrasound), Laboratory, Emergency & Central Records, Obstetrics & Gynaecology, Physiotherapy, Ear, Nose and Throat (ENT), Dermatology, Ophthalmology, Laboratory, Dentistry, Physiotherapy, Voluntary counseling and testing (VCT) and Administration. The hospital specializes more in Orthopaedics & Surgery, and therefore receives more orthopaedics and surgical cases.

#### **3.2. STUDY DESIGN**

This study used a quantitative, cross-sectional, descriptive design. According to Endacott (2007), a quantitative design is appropriate for research studies that intend to determine the relationship between two or more variables. Similarly, Walker (2005) indicates that a descriptive design describes what exists, as well as determines the importance or significance and the frequency with which something occurs. In respect to the current study, the aim was to investigate whether

a relationship exists between low back pain in nurses and their participation in physical activity or other related confounding factors.

### **3.3. STUDY POPULATION AND SAMPLING**

The **study population and sample** included all clinical nurses currently working with patients in all the departments/wards at KMH. There are 159 clinical nurses currently working at KMH. Three of the 159 nurses are doing administrative work only, and were thus not included in the study population. The clinical nurses rotate every 3 months to a different department, therefore experience the same kind of workload over a period of time. A total of 185 nurses are employed at KMH, however, only 159 were considered for the study as 26 of them have been deployed to other working places other than KMH. Of the 159, 15 were not willing to participate in the study even after consistently contacting them. Considering the ethical measures, participation in the study was voluntary so participants had a choice to be part of the study or refrain without giving any reason. Three (3) nurses were on their annual leave, one (1) nurse was on maternity leave and the three (3) other nurses were doing administrative work while four (4) others participated in the pilot study. Finally, a total of 133 nurses participated in the study and every nurse had an equal chance of participating in the study.

### **3.4. METHODS OF DATA COLLECTION**

#### **3.4.1 The instrument**

Three self administered questionnaires were used to collect data. The first questionnaire requested for socio-demographic information, followed by the long version of the International Physical Activity Questionnaire (IPAQ), and lastly, the Nordic Musculoskeletal Disorder



Questionnaire. The questionnaires were translated from English to Kinyarwanda and back translated to English by two independent professional translators. To ensure validity of the translated questionnaires in Kinyarwanda, a different independent professional translator examined it and the translated version was found to be similar to the original one. To further ensure the validity, clarity and reliability of the instrument, it was used in a pilot study on five nurses who were not part of the study before being used for data collection and it was found to be clear and understandable.

The first questionnaire assessed the following socio-demographic characteristics of the nurses: gender, age, marital status, working experience, department currently working in and level of education. The second questionnaire assessed the physical activity level of the participants. The long-version of IPAQ consists of 5 activity domains: job-related physical activity, transportation physical activity, housework, house maintenance and caring for family, recreation, sport and leisure-time physical activity as well as time spent sitting. The questionnaire consists of 27 questions that mainly assess frequency in days and duration in minutes spent on each one of the activities in all the five activity domains as mentioned above. The third and last questionnaire, the Nordic Musculoskeletal Disorder Questionnaire was completed to evaluate the prevalence of low back pain of the participants.

### **3.4.2. Validity and Reliability of the Instrument**

The instruments used in the study had been found to be valid. The IPAQ demonstrated criterion validity correlation with values ranging from 0.14 - 0.53. Additionally, an extensive reliability and validity of the questionnaire was done in 14 centres across 12 countries, South Africa inclusive, during the year 2000 (Craig et al., 2003). The IPAQ instrument also demonstrated

reliability correlations ranging from 0.96-0.46. Besides, the IPAQ has been tested across different settings in both developed and developing countries, whereby it was satisfactorily proved reliable and valid (Craig et al., 2003).

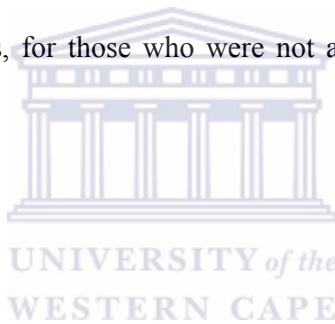
The Nordic Musculoskeletal Disorder Questionnaire has demonstrated reliability results with Kappa values ranging from 0.88 to 1, and it is said to be internationally validated and respected, having been used in the assessment of musculoskeletal symptoms worldwide (Barros & Alexandre, 2003). It has also been used to assess the prevalence and risk factors for musculoskeletal complaints among hospital nurses in China (Smith, Wei, Zhao & Wang, 2004).

Furthermore, the questionnaires were piloted on four (4) nurses from KMH before the final version that was adopted for use in the study. This was done to assess the content validity and applicability of all the items for the nursing population, its level of understandability and the time it takes to be completed. Later, a group discussion with the participants of the pilot study was done following the completion of the questionnaire to test content validity of the instrument and to see whether it was necessary to rephrase or change any of the questions. After the pilot study, the questionnaires were found to be clear and therefore there was no need of changing or rephrasing any of the questions.

### **3.5. PROCEDURE**

The procedure of collecting data involved first of all seeking Ethical clearance which was granted from the Senate Research Grant and Study Leave Committee of the University of the Western Cape (UWC) to conduct the study (Appendix A). Secondly, permission to conduct the study at Kanombe military hospital was sought and was granted from the director of medical services in the ministry of defense (Appendix B), as well as from the directorate of Kanombe

Military Hospital (Appendix C). Thereafter, two research assistants (physiotherapists) from the same research setting were met and enlightened on how the whole data collection process was going to be conducted. Specific times were then arranged with the ward matrons as well as the participating nurses to complete the questionnaire at work as this would maximize participation rate and minimize errors when completing the questionnaires. The study was then explained to the participants and an information letter (Appendices F & H) was given and informed consent obtained (Appendices D & E) before distributing the questionnaires. Besides, detailed instructions on how to complete the questionnaire were given and nurses were asked to work individually, honestly and as quickly as possible. All questionnaires were completed in the presence of the researcher and/or research assistants. Most of the completed questionnaires were collected immediately while others, for those who were not able to finish, were collected the following day.



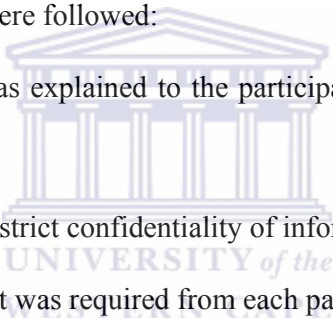
### **3.6. DATA ANALYSIS**

Completed data was captured on a spreadsheet using the Word Excel programme in preparation for analysis. The data will be recoded from question responses into meaningful prevalence variables. Double data entering was done to ensure data quality. Thereafter data was transferred into the Statistical Package for the Social Sciences (SPSS) version 17.0. Descriptive statistics was employed to summarize the demographic data of the study sample. The demographic data was presented using frequency tables and expressed as percentages, means and standard deviations. Chi-square test was used to determine if any associations existed between low back pain and physical activity as well as the socio-demographic variables. All tests were done at the level of significance  $P \leq 0.05$ . The choice of this model is based on the fact that the dependent and independent variables are categorical. According to Maben (2010), the chi-square test is used to identify any significant difference between the expected frequencies and the observed

frequencies in one or more categories. However, logistic regression was used to determine the correlation between low back pain and the related factors which have binary responses such as yes and no.

### **3.7. ETHICAL CONSIDERATIONS**

Permission was obtained from the Senate Research Grant and Study Leave Committee of the University of the Western Cape (UWC) to conduct the study. Thereafter, permission was also obtained from the director of medical services (DMS), Ministry of Defense, director of Kanombe Military Hospital and from the head of department of the nursing staff, KMH. In addition, the following guidelines were followed:

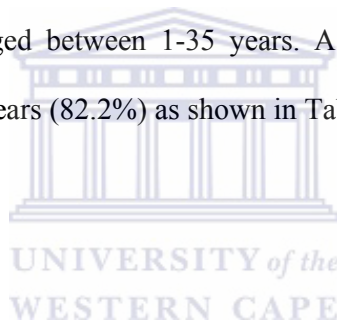
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- The purpose of the study was explained to the participants by means of an information sheet.
  - Participants were assured of strict confidentiality of information they provided.
  - An informed, written consent was required from each participant.
  - Participation in the study was voluntary and the participant was free to withdraw from the study at any time without incurring any penalties.
  - All participants were treated with respect and dignity.
  - Questionnaires were available in English and Kinyarwanda as these are the official languages of Rwanda.
  - Anonymity was assured by using codes for identification instead of names.
  - Completed questionnaires were locked away in a secure facility.
  - The participants were informed that findings will be made available to Kanombe Military Hospital's human resource department.

## CHAPTER 4

### RESULTS

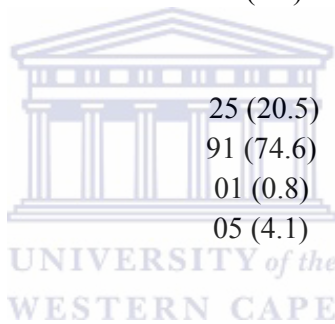
#### 4.1. Description of the study population & sample

A total of 133 questionnaires were distributed among clinical nurses from KMH, and 122 were fully completed and returned, yielding a response rate of 92%. Of the 122 nurses, 82% (n=100) were females and 18% (n=22) males. The participants' ages ranged from 24 to 54 years, with a mean age of 34.5 years (SD=6.8). The ages were later recoded into six different age groups with a range of five years, ranging from 20 to 55 years. Most of the nurses (74.6%) were married, aged between 26-43 years, (84.4%) and had secondary level of education (A2), (63.9%). Additionally, the working experience of nurses in years was also grouped into six groups with a range of five years and they ranged between 1-35 years. A larger number of nurses had a working experience between 6-23years (82.2%) as shown in Table 4.1 below.



**Table 4.1 The Percentage Distribution of Socio-demographic characteristics (N=122)**

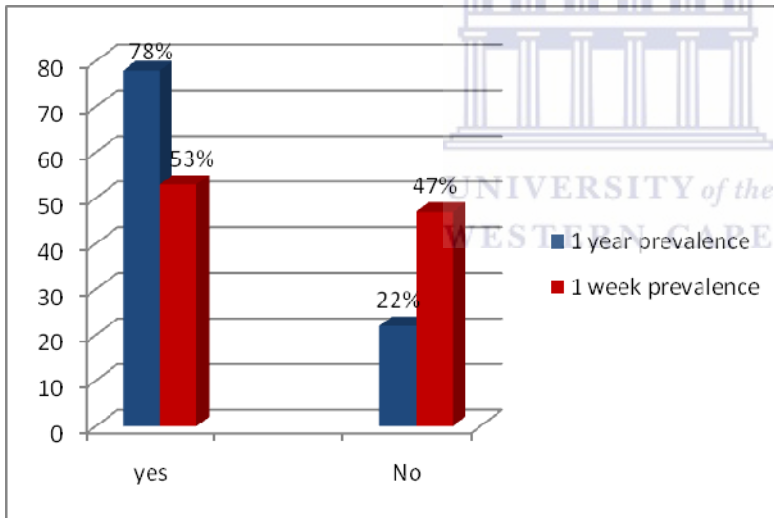
Variables	Frequency (%)
<b>Gender</b>	
Males	22 (18)
Females	100 (82)
<b>Age</b>	
20-30 years	42 (34)
31-40 years	59 (48)
41-50 years	18 (15)
51-60 years	03 (3)
<b>Level of Education</b>	
Secondary certificate (A2)	78 (64)
Advanced diploma (A1)	43 (35.2)
Degree (A0)	01 (0.8)
<b>Marital status</b>	
Single	25 (20.5)
Married	91 (74.6)
Divorced	01 (0.8)
Widow	05 (4.1)
<b>Current Department of work</b>	
Orthopaedics & Surgery	32 (26.2)
Internal Medicine	17 (13.9)
Private ward	0 8 (6.6)
Maternity & Paediatric	26 (21.3)
OPD (Emergency & Records)	13 (10.7)
Special Clinics	19 (15.6)
Pharmacy	07 (5.7)
<b>Work experience</b>	
1-5 years	11 (9.0)
6-11 years	59 (48.4)
12-17 years	25 (20.5)
18- 23 years	17 (13.9)
24- 29 years	8 (6.6)
30-35 years	2 (1.6)



#### 4.2. Prevalence of low back pain among the nurses in relation to their demographic characteristics

Nurses' low back pain was the dependent variable in this study and it was simply measured by nurses answering yes and no to having low back pain. Nurses who experienced any discomfort in the lumbar region/lower back during the last 12 months as well as in the last 7 days answered yes and those who did not experience any discomfort answered no. The current study demonstrated high one year low back pain prevalence among nurses (78%) as compared to the one week low back pain prevalence (53%) as shown in Figure 4.1 below.

**Figure 4.1. One year & one week prevalence of LBP among nurses**



**Figure 4.2 Nurses' low back pain prevalence in relation to gender**

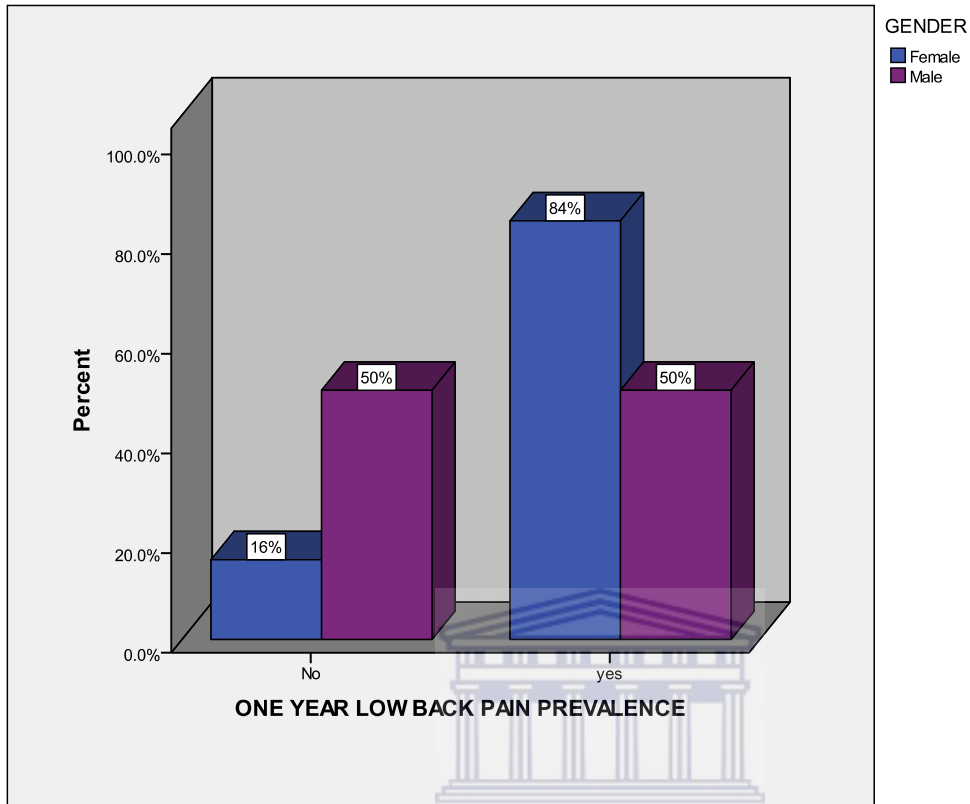
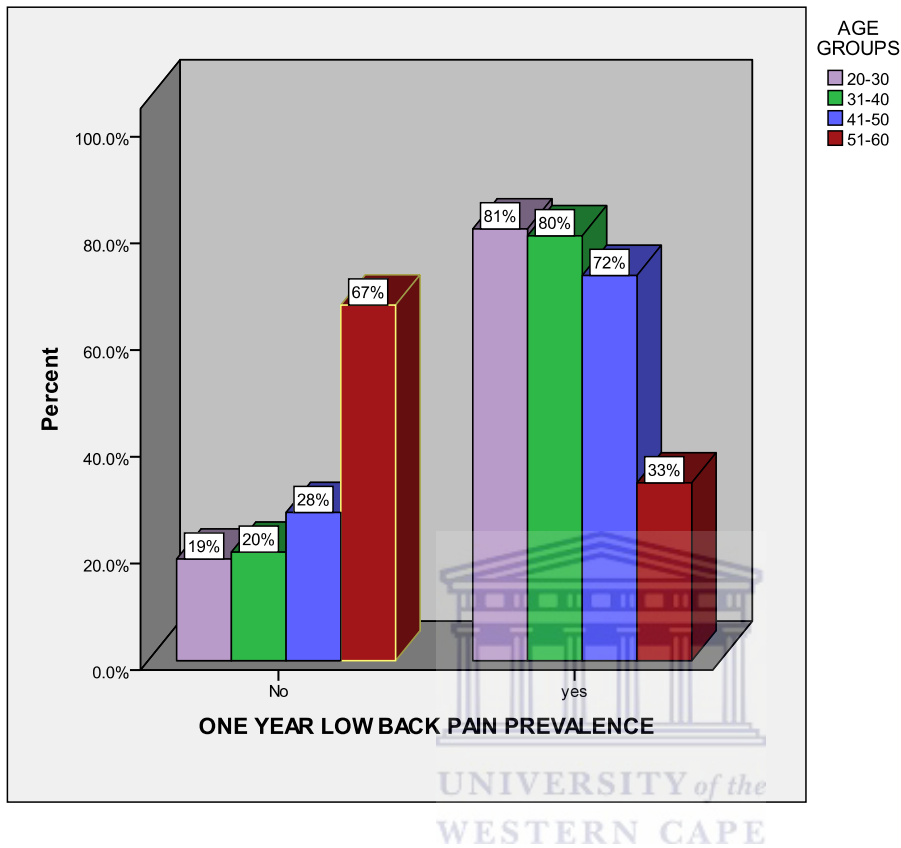


Figure 4.2 above illustrates that the majority of female nurses reported a high prevalence of low back pain with 84% as compared to their male counter parts with 50%. Chi-square test revealed a significant relationship between low back pain and gender among nurses ( $P=0.001$ ).

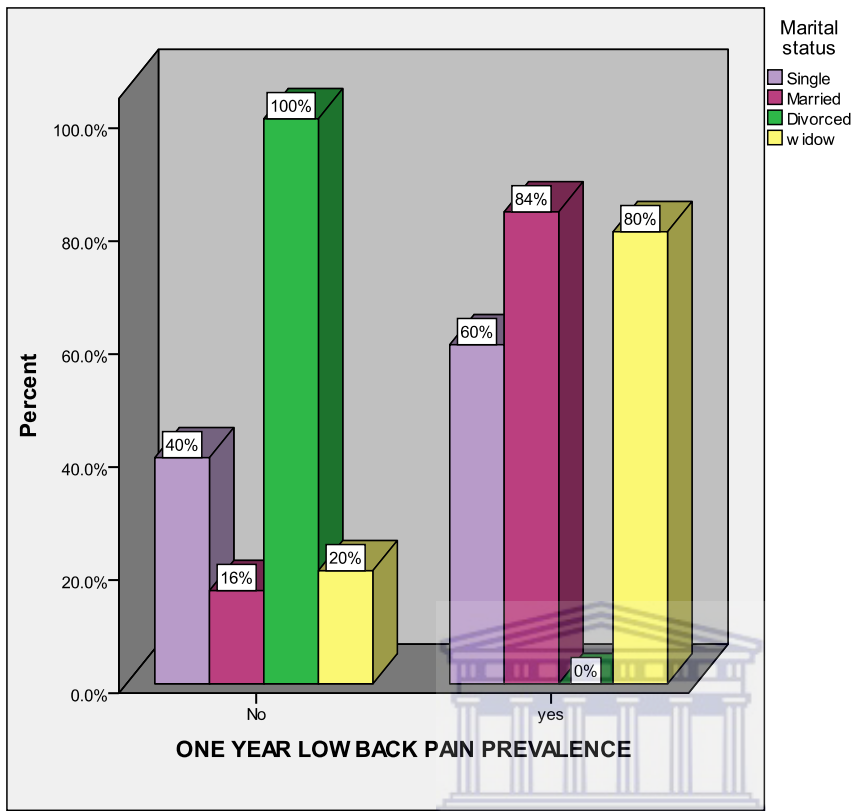


**Figure 4.3 Nurses' low back pain in relation to age group**



As shown in figure 4.3 above, the trend of low back pain prevalence declines with advancing age. High prevalence of low back pain is noted among nurses aged between 20-30 years (81%), followed by nurses aged between 31-40 years (80%), then those aged between 41-50 years (72%). Lastly, the lowest prevalence of low back pain is noted among nurses aged between 51-60 years (33%). However, chi-square test demonstrated no significant association between age and low back pain prevalence ( $P=0.077$ ).

**Figure 4.4: Nurses' Low back pain in relation to marital status**

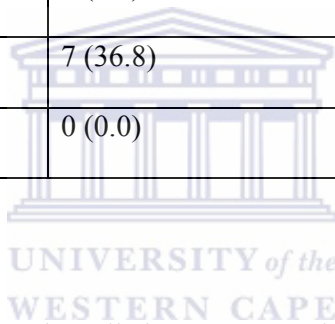


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The current study demonstrated a significant relationship between low back pain and marital status ( $P=0.020$ ). The majority of nurses in this study were married (74.6%), and they as well reported a higher prevalence of low back pain (84%). The widowed nurses were the second group with high prevalence of low back pain (80%), followed by the single nurses with 60% low back pain prevalence. None of the divorced nurses in the present study experienced low back pain.

**Table 4.2: Nurses' one year low back pain prevalence in respect to current work departments (N=122)**

<b>Departments</b>	<b>No (n=27)</b>	<b>LBP Prevalence (%)</b>	<b>Yes (n=95)</b>
Orthopaedics & Surgery	6 (19)		26 (81)
Internal Medicine	2 (11.8)		15 (88.2)
Private Ward	1 (12.5)		7 (87.5)
Maternity & Paediatrics	10 (38.5)		16 (61.5)
OPD (Emergency & Records)	1 (7.7)		12 (92.3)
Special Clinics	7 (36.8)		12 (63.2)
Pharmacy	0 (0.0)		7 (100)



The results in the table above show that all the nurses working in the pharmacy department experienced low back pain (100%). These were followed by 92.3% of the nurses working in the outpatient department, then 88.2% from the internal medicine ward. Nurses in the private ward also presented with a high prevalence of low back pain, 87.5%, followed by nurses working in orthopaedics & surgery department with 81%. Finally, 63.2% are the nurses who experienced low back pain in the special clinics, while 61.5% experienced low back pain among nurses working in maternity & paediatrics. However, there was lack of significant association between nurses' current department of work and low back pain (P=0.070).

**Table 4.3: One year low back pain prevalence in relation to working experience (N=122)**

Work Experience in years	Nurses' LBP prevalence (%)	
	No n=27	Yes n=95
1-5	3 (27.3)	8 (72.7)
6-11	10 (17)	49 (83)
12-17	5 (20)	20 (80)
18-23	5 (29.4)	12 (70.6)
24-29	3 (37.5)	5 (62.5)
30-35	1 (50)	1 (50)

The results in table 4.3 above shows that nurses with a working experience between 6-11 years had the highest low back pain prevalence (83%). The second highest prevalence of low back pain was recorded among nurses who had a working experience of 12-17 years (80%). Nurses who had a working experience of 1-5 years followed with 72.7% low back pain prevalence, then nurses with 18-23years of working experience reported 70.6% low back pain. Finally, 62.5% of nurses with low back pain had a working experience of 24-29 years, and lastly 50% low back pain prevalence was reported among nurses with the highest working experience, which is 30-35 years. Chi-square test revealed a lack of significant relationship between nurses' working experience and low back pain (P=0.597).

**Table 4.4 The significant relationship between Low back pain and the demographic variables**

<b>Characteristics</b>	<b>Had LBP (78%) n= 95</b>	<b>No LPB (22%) n= 27</b>	<b>Chi-square (p-value)</b>
<b>Gender</b>			<b>12.096 (p=0.001)*</b>
Males	50	50	
Females	84	16	
<b>Age</b>			<b>9.949 (p=0.077)</b>
20-25 years	75	25	
26-31 years	81	19	
32-37 years	86.5	13.5	
38-43 years	52.6	47.4	
44-49 years	90	11	
50-55 years	66.7	33.3	
<b>Level of education</b>			<b>0.321 (p=0.852)</b>
Secondary certificate (A2)	78	22	
Advanced diploma (A1)	76.7	23.3	
Degree (A0)	100	0	
<b>Marital status</b>			<b>9.848 (p=0.020)*</b>
Single	60	40	
Married	83.5	16.5	
Divorced	0.0	100	
Widow	80	20	
<b>Current department of work</b>			<b>11.675 (p=0.070)</b>
Orthopedics & Surgery	81	19	
Internal medicine	83.5	16.5	
Private ward	87.5	12.5	
Maternity & Pediatrics	61.5	38.5	
OPD (Emergency & Records)	92.3	7.7	
Special clinics	63.2	36.8	
Pharmacy	0.0	100	
<b>Work experience</b>			<b>3.675 (p=0.597)</b>
1-5 years	72.7	27.3	
6-11 years	83	17	
12-17 years	80	20	
18-23 years	70.6	29.4	
24-29 years	62.5	37.5	
30-35 years	50	50	

\* Significant value at 5% level

The above table 4.4 gives a summary of significant associations between demographic characteristics and low back pain among nurses. Chi-square significance test was conducted and only gender ( $P=0.001$ ) and marital status ( $P=0.020$ ) were found to be significantly associated with low back pain among nurses. As for the rest of the demographic variables, chi-square test revealed no significant association with low back pain.

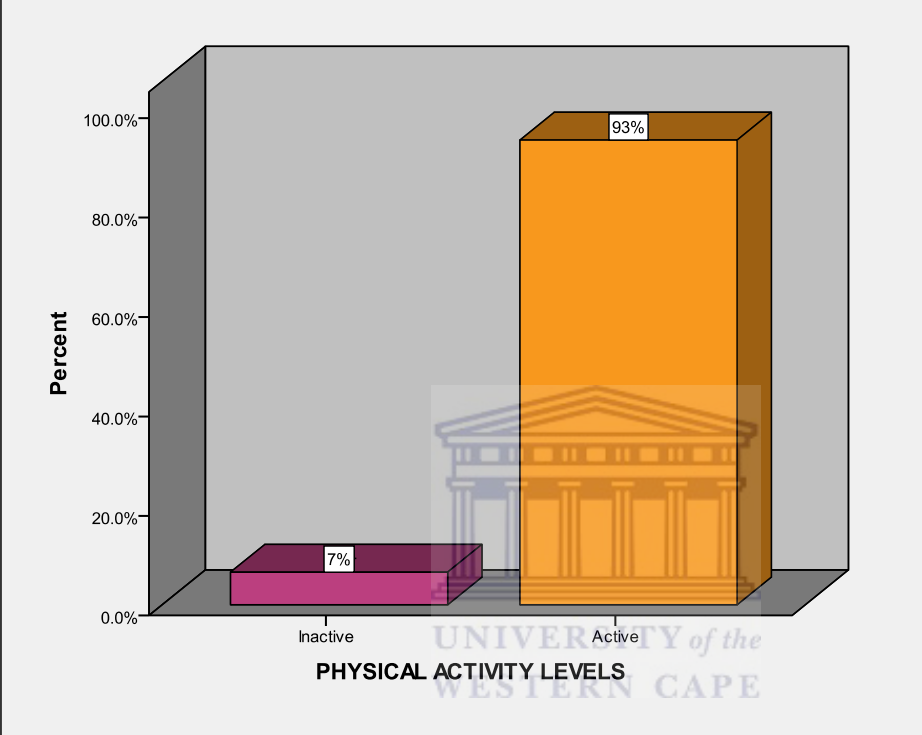
### **4.3 Physical activity levels of the participants**

The key independent variable in this study was physical activity participation of nurses, and it was measured by the International Physical Activity questionnaire (IPAQ). Three levels of physical activity, low, moderate and high were achieved according to the MET-minutes/week values that nurses accumulated in all the physical activity domains as shown in Figure 4.5. According to IPAQ, physical activity levels are categorised into: Low (0-599 MET-minutes/week score), moderate (600-2999 MET-minutes/week score) and high (over 3000 MET-minutes-week score) (Craig et al., 2003). Furthermore, the IPAQ measures physical activity according to four different types of domains, namely: job related activity, transport, domestic & yard (housework, house maintenance and caring for family) and leisure-time physical activity (recreation & sport). Participants were requested to report the time they spent doing physical activity for at least 10 minutes and more during the last 7 days in all the four physical activity domains to determine their levels of physical activity.

Finally, physical activity levels were further classified into two categories for precision, namely: active and inactive/sedentary. Nurses who scored less than 599 MET-minutes/weeks were considered inactive while those who scored 600 and above MET-minutes/week, were considered active (Craig et al., 2003). As demonstrated in Figure 4.5 below, majority of the nurses (93%)

generally demonstrated a high physical activity level, irrespective of the four physical activity domains.

**Figure 4.5: Nurses' general physical activity levels**



**TABLE 4.5 Nurses' physical activity levels in relation to the four physical activity domains (N=122)**

Physical activity domains	Frequency(N=122)	Percentage (%)
<b>Job-related</b>		
Active	102	83.6
Inactive	20	16.4
<b>Domestic-related</b>		
Active	35	28.7
Inactive	87	71.3
<b>Transport-related</b>		
Active	18	14.8
Inactive	104	85.2
<b>Leisure-time physical activity</b>		
Active	6	4.9
Inactive	116	95.1

According to the results in the table above, nurses demonstrated a high prevalence of physical activity level in job-related physical activity domain (83.6%) thus accumulated more than 600 MET-minutes/week. The majority of nurses demonstrated lower levels of physical activity in the rest of the physical activity domains other than job-related, meaning that most of them accumulated less than 600 MET-minutes/week. In the domestic-related physical activity domain, only 28.7% were active, transport-related physical activity domain, only 14.8% were active and finally 4.9% active in the leisure-time physical activity and the rest inactive.



**Table 4.6 Significant relationship of nurses' low back pain and the different physical activity domains**

<b>Physical Activity Domains</b>	<b>No LBP (%)</b>	<b>Had LBP (%)</b>	<b>Pearson Chi-square</b>
<b>Job-related</b>			<b>2.299 (P=0.129)</b>
Active	20	80	
Inactive	35	65	
<b>Domestic-related</b>			<b>0.366 (P=0.545)</b>
Active	26	74	
Inactive	21	79	
<b>Transport-related</b>			<b>0.391 (P=0.532)</b>
Active	28	72	
Inactive	21	79	
<b>Leisure-time-related</b>			<b>2.844 (0.092)</b>
Active	50	50	
Inactive	21	79	

The table above illustrates the relationship between low back pain and the different physical activity domains and their corresponding p-values. Of all the active nurses in the job-related physical activity domain, 80% experienced low back pain and of all the inactive, 65% had suffered low back pain. These were followed by domestic-related physical activity domain where 74% of all the active nurses reported low back pain and 79% of all the inactive nurses had suffered low back pain. In the transport-related physical activity domain, 72% of the total number of nurses who were active had experienced low back pain while 79% of all the nurses who were inactive are the ones who had experienced pain. Lastly, low back pain was recorded in 50% of the total number of nurses who were considered active in the leisure-time related physical activity, while a higher prevalence of low back pain (79%) was recorded among nurses who were considered inactive in the same domain. The chi-square test for all associations showed low P-values at 5% level of significance. Therefore, there was lack of significant relationship between low back pain and any of the physical activity domains.

**Table 4.7 Nurses' physical activity levels in relation to their demographic characteristics**

<b>Characteristics</b>	<b>Inactive (%)</b>	<b>Active (%)</b>	<b>Chi-Square (P-value)</b>
<b>Gender</b>			<b>0.281 (P=0.596)</b>
Female	6.0	94.0	
Male	9.1	90.9	
<b>Age</b>			<b>12.161 (P=0.033)*</b>
20-25	0.00	100	
26-31	2.10	97.9	
32-37	5.40	94.6	
38-43	15.8	84.2	
44-49	0.00	100	
50-55	33.3	66.7	
<b>Level of education</b>			<b>0.085 (0.958)</b>
Secondary level (A2)	6.4	93.6	
Advanced level (A1)	7.0	93.0	
Degree (A0)	0.0	100	
<b>Marital status</b>			<b>15.657 (P=0.001)*</b>
Single	16	84.0	
Married	2.2	97.8	
Divorced	0.0	100	
Widow	40	60.0	
<b>Working experience</b>			<b>12.692 (P=0.026) *</b>
1-5 years	9.1	90.9	
6-11 years	1.7	98.3	
12-17 years	4.0	96.0	
18-23 years	17.6	82.4	
24-29 years	12.5	87.5	
30-35 years	50.0	50.0	
<b>Current Department</b>			<b>9.661 (P=0.140)</b>
Orthopaedics & Surgery	12.5	87.5	
Internal medicine	0	100	
Private ward	0	100	
Maternity & pediatrics	0	100	
OPD	0	100	
Special clinics	15.8	84.2	
Pharmacy	14.3	85.7	

\* Significant value at 5% level.

#### **4.4 Physical activity levels among nurses in relation to demographic variables**

The results in table 4.7 above shows that there was a significant association between physical activity and age ( $p=0.033$ ), marital status ( $p=0.001$ ) and nurses' working experience ( $p=0.026$ ). The rest of the variables were not significantly associated with physical activity as shown in the table 4.7 above. The results further show that in general, most of the nurses were physically active. Females showed slightly higher prevalence of physical activity than males, with 94% for females and 90.9% for males. All the nurses who were aged between 20-25 years were physically active as well as those aged between 44-49 years (100%). The rest of the age groups were in the same range with high physical activity namely, 26-31years (97.9%), 32-37years (94.6%), 38-43years (84.2%) and the least active of all age groups were nurses aged between 50-55years (66.7%). Almost all nurses were physically active regardless of their level of education, degree holders (100%), Secondary level (93.6%) and advanced level (93%). All divorced nurses were physically active (100%), followed by married nurses (97.8%), then singles (84%) and lastly widows (60%). Nurses with a working experience of 6-11years had the highest level of physical activity (98.3%), followed by those with 12-17 years (96%) and 1-5 years (90.9%). The other groups had almost the same level of physical activity, 18-23 years (82.4%) and 24-29 years (87.5%). The least physically active as compared to the rest were nurses with the highest working experience, 30-35 years (50%). Almost all the nurses in their respective departments demonstrated high levels of physical activity.

#### **4.5 Factors related to prevalence low back pain among the participants**

Low back pain prevalence and its associated factors were assessed by the NORDIC questionnaire which is composed of binary response such as yes and no. It assessed the one year and one week low back pain prevalence, as well as the effect of low back pain on the

participants' functional activities and whether participants sought medical care for their low back pain. Table 4.8 below summarises the results.

**Table 4.8 Factors related to low back pain prevalence**

Characteristics	Yes (%)	No (%)
One year LBP prevalence	78	22
Functional Limitation	42.6	57.4
Seen a physician for LBP	34.4	65.6
One week LBP prevalence	53.3	46.7

**LBP: Low back pain**

Results in Table 4.8 indicate high one year low back pain prevalence (78%) as compared to the one week prevalence (53.3%). Furthermore, the effect of low back pain on the nurses' functional activities was investigated and 57.4% of them reported no effect of which may be due to their routine work they embark upon that has become part of them. Also, an investigation into the attitude of the nurses to seek medical advice or attention was carried out and results revealed that a large number of them do not seek medical care for their low back pain as depicted by the high value of 65.6%. Furthermore, chi-square test was done for the two variables which then revealed a significant association between low back pain and functional activity limitation ( $p=0.000$ ). The same applied for seeking medical care regarding low back pain and chi-square test shows that there is a significant relation between low back pain and seeking medical care ( $p=0.000$ ). A binary logistic regression was then conducted to investigate the odds ratio (OR) for related low back pain factors found significant, which are, functional activity limitation as well as seeking medical care. On analysis the effect of low back pain on functional activity showed that they were 4 times affected ( $OR=4.329$ ) and 3 times for medical care consultation ( $OR=2.601$ ).

#### **4.6. Summary**

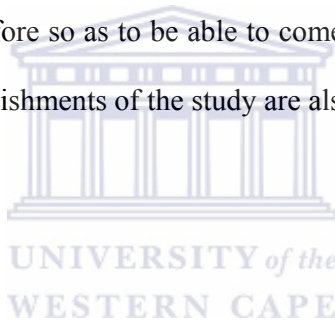
The aim of the current study was to identify if a relationship exists between low back pain of the nurses at Kanombe military hospital and physical activity as well as other confounding factors. Firstly, according to the results, majority of the nurses in Kanombe military hospital had a high prevalence of low back pain and are highly active particularly in the job-related physical activity domain. Statistical test however showed no significant relationship between low back pain and nurses' physical activity levels. Nonetheless, some of the demographic characteristics like marital status and gender showed a significant relationship with low back pain prevalence. Besides, physical activity was associated with the demographic characteristics to identify if there was any relationship. Three variables; age, marital status & working experience demonstrated a significant relationship with physical activity.



## CHAPTER 5 DISCUSSION

### Introduction

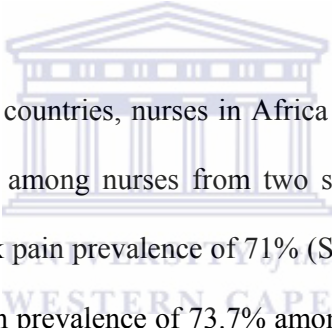
The aim of the current study was to identify if there is relationship between low back pain and physical activity among nurses at Kanombe military hospital in Rwanda. Furthermore, the study aimed at exploring if there is any relationship between the demographic characteristics of the nurses at Kanombe hospital and low back pain, as well as physical activity participation. Besides, the current study showed a good response rate of 92% and this therefore implies that there is a positive response and interest of nurses 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 challenges and accomplishments of the study are also outlined.



### 5.1. Prevalence of low back pain

Low back pain in the current study was measured for both one-year and one-week prevalence. The current study shows a high prevalence low back pain among nurses in Kanombe hospital with a one year prevalence of (78%) and one week prevalence (53%). These findings are similar to findings from other studies carried out in Africa as well as in high income countries particularly among nurses and in the general population. Louw et al. (2007) carried out a systematic review about low back pain prevalence in Africa and their results showed that a one year prevalence of low back pain was between 14% to 72% and 16% to 59% point prevalence among adults. 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). On the other hand however, Galukande et al. (2005) found a lower point prevalence of low back pain (20%) among patients in the main referral hospital in Uganda. Sanya & Ogwumike (2005) also reported

a point prevalence of 59.7% and a one year prevalence of 59.5% low back pain among industrial workers in selected parts of Nigeria. Across the developed countries, 60-80% low back pain prevalence was reported among the general population of Switzerland (Maul et al., 2003). Schneider et al. (2004) concluded that low back pain is increasingly affecting the general population in the western countries and that it is associated with overall health care costs, reduced manpower at work as well as early retirements. The authors further revealed a one week low back prevalence of 36%, and a one year low back pain prevalence of 59%. Most of the findings in all the studies mentioned above are slightly lower than the results of the current study. However, it may not be fair to compare these results as study populations and settings differ.

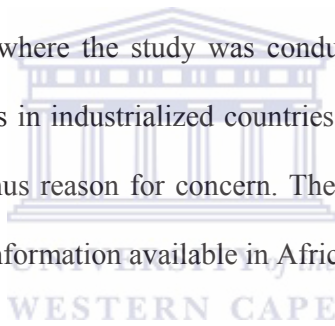


It was found that like in developed countries, nurses in Africa are equally faced with low back pain problems. A study conducted among nurses from two selected hospitals in Nigeria and Ethiopia revealed one year low back pain prevalence of 71% (Sikiru & Shmaila, 2009). Mwilila, (2008) also reported a low back pain prevalence of 73.7% among nurses from one of Tanzania's major hospitals. Although these results are slightly lower than the current study results (78%), they may be comparable. In the same context, a survey conducted to determine the prevalence of occupational low back pain among hospital workers and the general population in one of Nigeria's districts, nurses reported a higher prevalence of low back pain (69%) over secretaries and administrative workers (Omokhodion, 2002). Similarly, Tinubu, Mbada, Oyeyemi & Fabunmi (2010) in their study carried out among nurses in Nigeria conclude that low back pain is common among health care workers, and nurses who make almost 33% of all hospital staff were found to have greater chances of work related injuries (60%).

Still, a number of proponent scholars found low back pain prevalence to be high among nurses in the developed nations. Results from a study carried out in Switzerland reveal that nurses have a lifetime low back pain frequency of 56% to 90% (Maul et al., 2003). The findings in this study are in accordance with results of the current study. Karahan et al. (2009); Roupa et al. (2008) reported that nurses have the highest risk of low back pain occurrence among all hospital staff. A Chinese study also highlighted that nurses were vulnerable to low back pain with 56% twelve-month prevalence (Smith, Wei, Zhao & Wang, 2004). Similarly, comparable findings were reported among hospital nurses in France in 1990 with 57% annual prevalence of low back pain, as quoted by Vieira et al. (2006). In Canada, the percentages were a little higher. Vieira et al. (2006) reported a 65% lifetime and 70% point prevalence for low back pain among nurses working in the orthopaedic unit as well as 58% lifetime and 75% point prevalence of low back pain for those working in the intensive care unit (ICU). In the same context, Vieira (2007) concludes that nurses are among the highly exposed employees to work-related low back pain. Vieira continues to say that low back pain is a multifactorial disorder therefore requires proper assessment and modification of risk factors to determine the cause. Additionally, a recent study by Mitchell et al. (2009) conclude that low back pain is a major problem in the nursing profession reporting that 30% and more nurses experienced low back pain during the course of one year. Furthermore, the fact that 90% of all low back pain cases are idiopathic, it is said that they are more likely to reoccur (Corbett, Foster & Ong, 2007; Galukande et al., 2005). Consequently, individuals with low back pain have to learn to live with their pain and the fact that it interferes with their everyday lives (Corbett et al., 2007). This simply means that if the source of a problem cannot be identified, then solving it would also be a mystery. In that case therefore, a holistic approach of management would probably well suit. Burton (2005) also suggests that since low back pain is multidimensional, its management would be a broad approach.



In conclusion, low back pain has been indicated to be the most prevalent occupation-related problem across different countries in both the developed and developing world. And, the results of the present study on low back pain among nurses are slightly higher but in line with other studies conducted in both developed and developing countries. Although prevalence of low back pain among nurses in Africa has not been widely explored, results of the few available studies including the current results (78%) show that it is high. However, the researcher argues that although the prevalence of nurses' low back pain is comparable in both developed and underdeveloped countries, the working conditions in both settings might not be comparable. Nurses in the developed world may be working under improved working conditions, which is most likely not the case under which nurses in most African countries practice. Therefore, nurses in Africa, particularly in Rwanda where the study was conducted, might be at higher risk of suffering low back pain than nurses in industrialized countries. This being due to the increased risk of work related injuries and thus reason for concern. The results of the current study will hopefully contribute to the scanty information available in Africa.



## **5.2. Factors associated with low back pain**

According to literature results, various factors related to low back pain have been mentioned and some of which are; socio-demographic variables, existing chronic diseases, smoking, relative body mass, and physical fitness (Leino-Arjas, et al., 2004). However, in the present study only demographic characteristics and physical activity levels of nurses were assessed. Moreover, the main aim of the current study was to identify if there is a relationship between low back pain and physical activity among Kanombe hospital nurses. However, statistical analysis showed no significant relationship between the two variables ( $p=0.118$ ). Further analysis was done to identify if there was any association between demographic variables and low back pain, and significant association was found for gender ( $p=0.001$ ) and marital status ( $p=0.020$ ).

Additionally, low back pain prevalence was found to be significantly associated with functional limitation among nurses ( $p=0.000$ ), as well as their willingness to seek medical advice ( $p=0.000$ ). The binary logistic regression showed that the odds ratio for low back pain affecting functional activity was four times ( $OR=4.329$ ), and three times for seeking medical care ( $OR=2.601$ ). There is positive evidence that nurses are reluctant to seek medical care and instead opt to live with it (Yip, 2004). The researcher further stated that nurses dismissed the idea of seeking medical help due to fear for loss of their job, fear of being stigmatized by their peers, as well as fear of being regarded as increasing their colleagues' workload when taking sick leave (Yip, 2002).

### **5.2.1. Low back pain and gender**

More than three quarters of the whole study population were female nurses (82%) the rest, 18% being male nurses. The overall one year low back pain prevalence was 78%, and of those, 69% were females, 9% were males. This generally indicates that the majority of nurses in the current study were females who also have high low back pain prevalence. Besides, the results of this study revealed a significant association between low back pain and gender ( $p=0.001$ ). Similar findings have been reported in other studies. A study carried out to determine the prevalence and factors of low back pain among hospital staff in Tunisia, found that being a female nurse was significantly associated to low back pain occurrence (Bejia et al., 2005). Mwilila (2008), in her study carried out in one of Tanzania's hospitals also reported that 83.6% of the total study population was made up of female nurses who also had the highest low back pain prevalence as compared to their male colleagues. Likewise, Naude, Mudzi, Mamabolo & Becker (2009) in their study about low back pain among one of the South African hospital staff found that nurses had the highest low back pain prevalence with 58.65%. Their results equally revealed that there was a significant relationship between low back pain and female gender. Moreover, similar

findings were reported among hospital staff in Nigeria where a higher prevalence of low back pain was noted among females than males (Sikiru & Hanifa, 2010; Omokhodion et al., 2000). Also, findings from a study conducted among nurses in both Nigeria and Ethiopia show that low back pain prevalence was more predominant among the female nurses 67.5% than in males 32.5% (Sikiru & Hanifa, 2009). Furthermore, a Canadian study carried out by Vieira, et al. (2006) in one Canadian teaching hospital found that female nurses outnumbered their male counterparts in two departments namely; orthopaedic 87% and 96% ICU. Also, (Evans & Steptoe, 2002) report that approximately a decade ago, 90% of nurses in the UK were females. The authors further conclude that nursing is a female dominated profession. This is in agreement with Yang, Gau, Shiau, Hu & Shih (2004) who carried out a survey among Taiwanese male nurses and found that the number of male nurses in Taiwan was still low due to a number of hindrances they encountered, some of which are cultural setbacks and male nurses were stigmatized by patients and the public. The authors continue to say that the same happens in Europe where by the modern image of an ideal nurse is assumed to be a female. This is evident from most studies concerning nurses, that the nursing profession is more of a female occupation than it is a male. This is proved by the higher percentage of female nurses over male nurses in hospitals. More to that, not only female nurses dominate the male nurses, they also experience higher prevalence of low back pain although this could be biased since they outnumber the male nurses. Generally, low back pain seems to affect more females than males. According to Kamau (2005), a higher prevalence of low back pain was recorded among females (60.2%) than males (39.2%) in Kenya. A Ugandan study done by Galukande et al. (2005) also noted that women had higher incident of low back pain than men. However, the authors were not sure whether the women in that region were more vulnerable to low back pain or if it was because they readily sought medical attention more than men did. Likewise, World Health Organization (WHO, 2003) reported that women in the developing countries are more exposed to low back pain due to

their frequent involvement in activities of daily living. This is further supported by a German study in which the authors discovered that females were at a higher risk of having low back pain than males in relation to the U-shaped curve which simply means that too much or too little physical activity is a risk factor of low back pain. However the authors lack a significant explanation for that, but rather suggest that further research be done as far as that is concerned (Heneweer, et al., 2009). Similarly another Germany study reported that females had a higher incidence of low back pain than males. The authors continue to say that the higher prevalence of low back pain in females may be accredited to physiological factors such as hormonal differences in both sexes and psychological traits, such as sensitivity and attention to symptom (Schneider et al., 2005). It is thus apparent from the literature reviewed that low back pain affects more females than males



### **5.2.2. Low back pain and marital status**

The present study reveals that the majority of participants were married (74.6%). What is more, the results demonstrate a high prevalence of low back pain among married participants (62.3%) as compared to singles, divorced and widows. Besides, the study found a significant association between low back pain and marital status ( $p=0.020$ ). Similarly, Bejia et al. (2005) demonstrated a significant relationship between low back pain and marital status. The authors continue to say that particularly married people with an extensive family, especially with a number of young children, are more exposed to low back pain. Roupa et al. (2008) also support that child care and house work activities increase stress to nurses which was also found to be among the risk factors of low back pain in nurses. Also, a report by the World Health Organization (WHO, 2003) suggested that women in the developing countries are at higher risks of experiencing low back pain due to their frequent involvement in activities of daily living. Overall, a combination of domestic work and job activities may for that matter increase the risk of low back pain among

married female nurses. Due to cultural beliefs in most African countries including Rwanda, women especially married women are exposed to strenuous activities such as the daily and night routine domestic tasks that involve taking care of their families besides their job-related activities. These consequently increase their risk of suffering low back pain. The researcher may therefore conclude that relevant research on preventive measures may be of great benefit to the nurses as well as to the general population especially females.

### **5.3. Physical activity levels & participation among nurses**

Physical activity is generally regarded as an important aspect of life in prevention of injuries and various diseases and it should be also considered as a vital sign (Pate, Yancey & Kraus (2010)). In the present study, nurses were mainly categorized in two different physical activity levels namely; active & inactive. Those who accumulated a total of 600 and above MET-minutes/week of physical activity participation were considered active and those who had a total value of 0-599 MET-minutes/week of physical activity, considered inactive. Physical activity participation of nurses were assessed in four physical activity domains and these included; job, active transport, domestic & yard as well as sport & leisure- time related physical activities (Craig et al., 2003). According to the results of the current study, most of the nurses were found to be more highly active at their jobs (61.5%) than in any other physical activity domain. On the other hand however, almost none of the nurses participated in leisure-time physical activity, as the majority of them (95.1%) in this particular domain were considered to have low physical activity. None the less, the current study found no significant relationship between physical activity and low back pain ( $p=0.118$ ). However, according to a recent systematic review, only two of the twelve studies used in their review showed that physical activity is significantly related to low back pain but the remaining ten studies revealed no significant relationship between the two variables (Hendrick et al., 2010). Furthermore, studies have shown that nurses

are more reluctant in engaging themselves in leisure-time physical activity. Naidoo & Coopoo (2007) in their study found that nurses' low back pain in one of South Africa's public hospitals was related to poor physical fitness and health, in other words nurses in this hospital were considered sedentary and had high low back pain prevalence. Karahan & Bayraktar (2004) also in their study learnt that a number of nurses do not exercise regularly, again, they point out that many low back pain cases result from imbalance of muscoskeletal system. As far as nurses are concerned therefore, they need to engage themselves in regular exercises so as to reduce the risk of suffering low back pain. Moreover, Kamwendo (2000) in a comparative study discovered that nursing students were the group that exercised less and experienced more low back pain as compared to the Physiotherapists and Occupational therapists. One can therefore conclude that if nurses do not show interest in exercising while they are still students, chances are less that they will do so in the future when they start working full time. After all, nurses in this study proved to engage more in work-related physical activities and probably at the end of the day they are simply too tired to engage in any kind of sport & leisure time physical activity. However, engaging more in job or domestic-related physical activity may be more detrimental for their health as such activities are likely to be more strenuous and uncontrolled and as a result predispose them to low back pain. More to that, results from different surveys suggest that for physical activity to be beneficial to the involved persons, it is important and much safer putting into consideration the amount and intensity of physical activity they intend to do (Skoffer & Foldspang, 2008; Hayden, Tulder & Tomlinson, 2005; Hayden, Tulder, Malmivaara & Koes, 2005).

#### **5.4. Factors associated with physical activity**

Results of the current study revealed that physical activity is significantly associated with only some of the demographic variables of nurses as discussed further below. These include; age ( $p=0.033$ ), marital status ( $p=0.001$ ) and working experience (0.026).

##### **5.4.1. Physical activity and age**

According to some studies, physical activity participation was found to decline with advancing age (Bauman et al., 2009; Leino-Arjas, et al., 2004). This could be probably due to the fact that as people get older, their muscle strength as well as their agility start to diminish. This is in accordance to studies which found that human muscle strength reaches its peak during the second and third decades of one's life and at the age of 50 years, muscle strength begins to decrease at a rate of about 12% to 15% per decade (Macaluso & DeVito, 2004). Trost, Owen, Bauman, Sallis & Brown (2002) also found in their study that physical activity is inversely related to age and gender, meaning that the older people get, the lesser they engage in physical activity and this was more prominent in females. Similarly, findings have shown that older women are more reluctant to participate in leisure-time physical activity but however do participate more in the daily domestic chores (Azevedo et al., 2007; Eyler, et al., 2002). The present study shows that the trend of physical activity level declines with advancing age, with more physically active nurses aged between 26 years and 37 years (66.4%). Also, chi-square test showed that there was a correlation between age and physical activity ( $P=0.033$ ). Besides, literature results highlighted that older people are more vulnerable to various health risks which affect their participation in physical activity. And with this, they suggest that it is of paramount importance that older people be encouraged to engage more in physical activity (Bergman, et al., 2008). Likewise, Aittomaki et al., 2005 support that advanced age is related to diminished physical activity and increased medical pathologies.

#### **5.4.2. Physical activity and marital status**

As regards marital status, there are different findings according to the various surveys done. Some research results have highlighted that married individuals or those living with their partners, particularly women, showed low levels of physical activity as compared to those who were singles (Bergman, et al., 2008). Kaplan, Newsom, McFarland & Lu (2001) also found in their study that married women were found to be less active as compared to singles, widows and divorced. Eyler, et al. (2002) in their study highlighted that married persons engaged more in household activities than in leisure-time exercise. The study further reveals that in terms of ethnicity, white women who were never married were found to be more physically active than the married ones. On the contrary, results from a Rwandan study done by Kabanda (2008) revealed that married individuals were more active as compared to the singles. These findings are comparable to the results of the current study where the majority of nurses who were categorized as active were the married ones (97.8%). Besides, chi-square test demonstrated a correlation between marital status and physical activity ( $P=0.001$ ). Since female nurses who reported low back pain outnumber their male counterparts, an assumption could be made in accordance to the available literature that married women are exposed to more physical activity as they are implicated with household activities even after work. However this could have some negative impact on their health as it has been highlighted in literature that uncontrolled strenuous physical activity can be harmful to health (Leino-Arjas, et al., 2004). In accordance to this, scholars have highlighted the need to identify possible health risks associated with particular types of physical activities among individuals in order to minimize the related risks (Eyler, et al., 2002). In this case therefore, for individuals to achieve the health benefits and rather not the hazards of high physical activity, they need to be guided and advised on how to balance their physical activity participation.



### **5.4.3. Physical activity and working experience**

The current study demonstrated a significant association between physical activity and working experience of nurses ( $p=0.026$ ). Results of this study showed that physical activity level was high among nurses who had a working experience between 6 years and 11 years (47.5%) and decreased as the working experience increased. Although there was a significant association between nurses' physical activity and working experience, less has been said about it in the available studies. However, it was found that older employees do not cope well with physically demanding activities as they accumulate more years of working (Aittomaki et al., 2005; Macaluso & DeVito, 2004). They however adopt better coping strategies such as avoiding and delegating physically demanding job-related activities (Schneider et al., 2005). A study conducted among primary health care physicians found that physicians who had practiced for more years were reluctant to recommend leisure time physical activities to their patients (Abramson, Stein, Schaufele, Frates & Rogan., 2000). They further say that physicians who performed exercises regularly were more willing to promote leisure time physical activities to their patients than those who did not (Abramson et al., 2000). This therefore gives an impression that the longer health workers stayed in practice, the lesser they become more involved in leisure time physical activities. Since there are positive findings stating that physical activity participation declines with advancing age, one may conclude that individuals who have more years of working experience are equally older and therefore less physically active.

### **5.5. Impact of physical activity on low back pain**

Although there was a lack of significant association between low back pain and physical activity in the current study, there are a number of studies that speak differently concerning low back pain and physical activity. However, most of them regard physical activity as a preventive measure for low back pain while others find no association between the two variables. In line

with most studies, physical activity may not be significantly related to low back pain but it has positive effects on the spinal health especially when not vigorously performed. Heneweer et al. (2009) argue that there is no association between physical activity and chronic low back pain especially when considered in terms of intensity or duration of physical activity performed. However, simply engaging in sport activity is said to be associated with less chronic low back pain. What is more, these authors continued to say that very little or too much physical activity will pose as a risk factor for low back pain. On the other hand, Mitchell et al. (2009) argue that the conflicting findings about association of low back pain and physical activity may be due to the fact that physical activity is measured in different ways and is dependent on different population groups involved in the surveys. In this case nurses may be categorized in the group that engage in less vigorous activities but which require more endurance and stability for the back muscles. This might not be true for another population group that requires more physical strength than endurance to perform their job such as non skilled manual laborers. Likewise, Mitchell et al. (2009) suggest that nurses need increased muscle endurance to sustain them in their profession. Additionally, studies do recommend exercises that aim at stabilizing muscular system of the lumbar spine in order to reduce the risk of injury to the spine and the recurrence of low back pain. However still, the authors argue that trunk muscle strength and endurance do not reduce symptoms of back pain (Brumagne, Cordo, Lysens, Verschueren & Swinnen, 2000). Besides, Osteras & Hammer (2006) in their study suggest that physical activity contributes to the health benefits of individuals such as physical (musculoskeletal fitness) and mental health. Also, Oldervoll, Zwart & Svebak (2001) conclude that muscle pains and job-related fatigue can be prevented by maintaining adequate physical activity capacity and muscle strength of individuals in order to increase the ability to counteract the job-related work loads. Equally, Yip (2001) suggests that strong and stable back muscles can lower chances of suffering LBP among nurses, and according to Roupa et al. (2008), physical fitness and engaging in exercise was found to

reduce the risk of having low back pain. They further suggest that nurses who maintain a physically active lifestyle present with less low back pain symptoms and improved psycho-social behavior. More to the point, Schiltewolf & Schneider (2009) concluded that the current sedentary life style of individuals is one of the major predisposing factors of low back pain which as a result affects the working capacity of employees. They continue to say that lack of physical activity incapacitates the normal functional capability of the back. It is in the same context that Karahan, Kav, Abbasoglu, & Dogan (2009) also concluded that physical inactivity was thought to increase the risk of low back pain. Also, scholars suggested that sports activities which lead to physical fitness in terms of strength and endurance may be a preventive measure of low back pain among nurses (Svensson, Stroyer, Ebbehøj & Mortensen, 2008; Bejia et al., 2005). Again, in reference to the Physical Activity Guidelines for Americans (2008), it has been suggested that regular physical activity is a preventive measure against many unfavorable health issues and that a little physical activity is better than none. In conclusion therefore, the researcher finds it important to promote physical activity as a means of reducing various health related issues, low back pain inclusive, among Kanombe hospital nurses and among the Rwandan population at large. Besides, a number of studies together with the World Health Organization (WHO, 2003) have shown that maintaining a healthy life style of staying physically fit contributes to various positive health benefits to an individual and to a nation. As well, chances of experiencing low back pain are minimized in general and particularly among nurses. Hence in summary, economically speaking leisure-time physical activity could be seen as a cost-effective means of managing and preventing low back pain for an individual as well as for the nation.

## **5.6. 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 industrialised nations, and a similarity was found for most studies. Among the implications of the study findings is that nurses are more exposed to job-related physical activities than leisure time physical activities. Overtime, this would be of more harm than good to their health and therefore need to be encouraged accordingly.



## **CHAPTER 6**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **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.

#### **6.1. Summary and conclusion**

The motive of this study was to determine the relationship between low back pain and physical activity among nurses at Kanombe hospital in Rwanda. Furthermore, the study sought to identify the prevalence of low back pain among KMH nurses, their physical activity levels, type and intensity. Finally, the study also intended to ascertain whether factors such as demographic characteristics and physical activity levels are related to low back pain.

A number of scholars have proved that low back pain is a major problem among the nursing profession worldwide, Rwanda inclusive. Besides, various studies have indicated that lack of exercise is a significant risk factor causing low back pain among nurses. Moreover, physical fitness is not only a protective means against low back pain, it is also recommended by World Health Organisation as a healthy life style that has various health benefits to individuals. No study has been done before in Rwanda concerning nurses and since they are thought to be at higher risk of occupational injuries, early interventions are needed to identify some of those risks and probably possible measures taken.

The study setting was one of the public hospitals in Kigali Rwanda and study population involved all the clinical nurses working in that hospital. A descriptive, quantitative study design was used. One hundred and twenty two nurses (122) composed of 82% female nurses and 18%

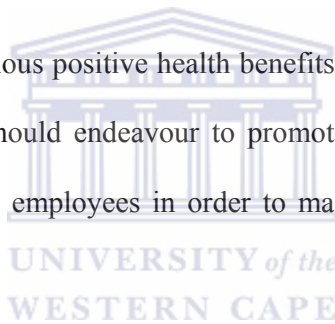
male nurses, voluntarily participated in the study. Three self administered questionnaires were used to collect data. Descriptive statistics was used to summarise demographic data and physical activity levels of nurses. Chi-square test was used to determine the relationship between low back pain and physical activity as well as other demographic variables, and all tests were done at significance level of  $p \leq 0.05$ . Finally, logistic regression was used to determine the correlation between low back pain and other factors related which have binary responses (Yes & No).

The results of the current study demonstrated that the prevalence of low back pain among nurses at Kanombe hospital was high (78%). Although there was lack of significant association between physical activity and low back pain, the results showed that the highest physical activity performance was job-related (83.6%) and the lowest was leisure-time physical activity (4.9%). This partly confirmed that nurses at Kanombe hospital engage themselves less or not at all in leisure-time physical activities. Furthermore, the present study demonstrated that demographic factors such as gender ( $p=0.001$ ) and marital status ( $p=0.020$ ) were significantly related to low back pain among nurses at Kanombe hospital. Moreover, analysis was done to determine if demographic factors are associated to physical activity. Age ( $p=0.033$ ), marital status ( $p=0.001$ ) and nurses' working experience ( $p=0.026$ ) were found to be associated with physical activity levels of nurses. 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 nurses. Such factors are; psycho-social factors (work-related stress or personal-related stress, emotional behaviours and cultural constraints), biological and environmental factors (biomechanics of the body, financial constraints and infrastructure). Finally, although, the study results provide significant information about the prevalence and risk factors of low back pain as well as physical activity levels of the nurses, the results are limited to the participants of one public hospital in Kigali. Therefore, extensive generalization cannot be made.

## 6.2. Recommendation

Recommendations are given based on the study results.

1. Kanombe military hospital management may use findings from this study to evaluate the risk of low back pain among their nurses as well as to design interventions aimed at reducing its prevalence, such as:
  - Training and providing manual labourers for transferring and lifting of patients.
  - Sensitising and encouraging nurses about using safe handling techniques while at work through workshops and use of posters.
  - Creating a safe working environment and conditions by providing psycho-socio-support to the nurses.
  - Finally, considering the various positive health benefits of leisure-time physical activity, the hospital management should endeavour to promote leisure-time physical activities among nurses and all other employees in order to maintain a healthy and competitive staff.
2. The ministry of health in Rwanda should make an effort to take action into preventing low back pain in the nursing profession at large by implementing preventive measures using a multi-dimensional approach since low back pain risk factors are multifactorial. Findings of this study may not be generalised to the whole population, however, they are not limited only to the nursing staff. The ministry of health may therefore use findings from this study to develop preventive measures of occupational related musculo-skeletal disorders, especially low back pain among all health workers in Rwanda.
3. Nurses should be responsible for their own health by taking into account preventive measures and coping strategies against job-related injuries such as low back pain which was



found so prevalent among them. Based on the literature that talks about physical fitness, the researcher highly recommends nurses to maintain a healthy life style in terms of physical fitness which also contributes to their mental wellbeing.

4. Finally, further research should be done to identify ways of improving healthy, safe and conducive working conditions of nurses in general. Since nurses have been pointed out to be the most professionals exposed to job-related injuries, this would probably minimize the risks.

### **6.3. Strength and weaknesses of the study**

#### **6.3.1. Strengths of the study**

The strength of the study is that there was a high response rate of 92%. This shows that the nurses were most willing to contribute to the study. As for the rest of the nurses (8%) who declined to participate in the study, they attributed it to one of the ethical considerations that clearly stated that participation in the study was voluntary.

#### **6.3.2. Weakness of the study**

One of the weaknesses of this study was the small sample size, thus the findings could not be generalised to all the clinical nurses in Rwanda. Secondly, a recall bias may have occurred especially on their low back pain experience as participants were asked to report if they had any low back pain during the last twelve months. In the same context, there could have been a bias also when participants had to recall and state the actual time in minutes or hours they spent doing an activity. Likewise, Levy & Readdy (2009) suggest that self-reported instruments may not favour individuals to consistently recall the accumulated frequency and duration of all physical activity they perform.



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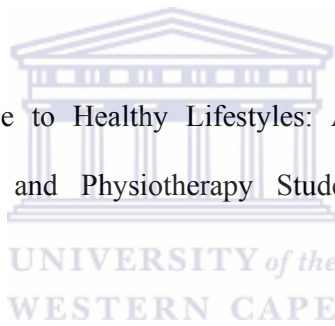
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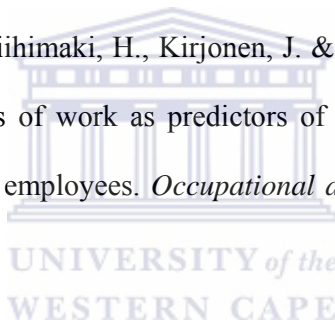
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# APPENDICES



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