THE RELATIONSHIP BETWEEN WORK-RELATED MUSCULOSKELETAL DISORDERS, ABSENTEEISM AND VISITS TO THE STAFF CLINIC BY NURSES IN AN eThekwini DISTRICT HOSPITAL.

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A thesis presented in fulfillment of the requirements for the Masters in Nursing degree at the Durban University of Technology.

Supervisor: Professor T. Puckree

Date: August 2014

DECLARATION

I hereby declare that **"The relationship between work-related musculoskeletal disorders, absenteeism and visits to the staff clinic by nurses in an eThekwini district 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.

_____ _____

Signature of student Date

Approved for final submission

_____ _____

Prof. T.Puckree Date

DEDICATION

This dissertation is dedicated to all nurses who had to be declared “temporarily or permanently incapacitated” as a result of work-related musculoskeletal disorders and those that are still suffering. To my late parents (Mr. and Mrs Shozi); especially my mother who passed on during the course of this study, thank you for always believing in me and encouraging me to further my studies.

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All the praises to the Lord, Almighty, for all the strength and capabilities He has blessed me with. Then, I would like to thank:

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ABSTRACT

Introduction

Work-related musculoskeletal disorders are the most commonly reported work-related illnesses impacting on the quality of life of nurses. Absenteeism, work restriction, loss of income and disability are related outcomes. Nurses are at a higher risk of work-related musculoskeletal disorders (WMSD) compared to other healthcare professionals because of the nature of their duties.

Problem statement

The relationship between work-related musculoskeletal disorders, absenteeism and visits to the staff clinic by nurses has not been established in South Africa.

Purpose

The purpose of this study was to determine the prevalence of WMSD in nurses and its relationship to absenteeism and visits to the staff clinic by nurses in a selected eThekwini District hospital.

Research method

A cross-sectional quantitative descriptive survey was conducted in two stages namely the prospective cross-sectional survey of nurses and the retrospective review of records. A random sample of 231 nurses was selected, proportionally, from all nursing ranks and invited to fill in the self-administered musculoskeletal questionnaire.

Results

The lifetime prevalence of WMSD in nurses in this study was 77% with the twelve months prevalence of 67% and the seven days prevalence of 43%. The prevalence of low back pain was higher (21% for twelve months and 47% for seven days) than that of other body regions with a higher tendency (65%) of WMSD affecting more than two body regions. Although the prevalence and patterns of WMSD was almost the same across all nursing ranks, nurses working

in the Out Patients Department reported the highest prevalence (22%). There was no significant relationship between age, gender and smoking; however, a strong correlation between WMSD and participation in physical exercise, work task and workload was noted. No relationship could be established between WMSD and staff visits to the staff clinic as well as amount of sick leave taken.

Conclusion

This study showed that WMSD is high in the selected hospital. Nurses working in the Outpatients department reported the most WMSD; body parts affected was not related to age, gender, nurse rank or unit in which the nurse worked. There is a problem of under- reporting of WMSD. Nurses working in this hospital have an option of attending their private health service providers even following a WMSD. In these cases the staff clinic is unable to keep accurate statistics of WMSD, conduct reviews and proper management of the WMSD.

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List of Acronyms

BMI	Body Mass Index
CINAHL	Cumulative Index to Nursing and Allied Health Literature
GDP	Gross Domestic Product
ILO	The International Labour Organisation
IOD	Injury on duty
MSD	Musculoskeletal Disorders
NIOSH	The National Institute of Occupational Safety and Hygiene
PPE	Personal Protective Equipment
WHO	World Health Organisation
WMSD	Work-related Musculoskeletal Disorders

Definition of key concepts

Absenteeism:	A tendency of being away from work.
District hospital:	A hospital which receives referrals from and provides generalist support to clinics and community health centers with health treatment administered by general health care practitioners or primary health care nurses
Musculoskeletal:	relating to or denoting the musculature and skeleton together
Musculoskeletal Disorders or MSD:	An injury or disorder that affects the human body's movement or musculoskeletal system (i.e. muscles, tendons, ligaments, nerves, discs, blood vessels, etc.).
Nurse:	A person trained to care for the sick people. In South Africa, has to be registered or enrolled with the South African Nursing Council (SANC)
Relationship	An existing connection between two or more things or people
Staff clinic:	where healthcare is provided for employees at the workplace
Work -related muscoskeletal disorder:	same as above, but when it occurs whilst at work or as a result of some workplace issues.

APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Background

The musculoskeletal system is made up of ten regions that extend from the head to the toe. Injury can occur in any of these regions with more than one region involved at a time. These injuries can be acute; accumulative for example repetitive straining of the muscles and other structures or chronic overuse, eventually causing severe pain (Tinubu, Mbada, Oyeyemi and Fabunmi 2010).

Musculoskeletal disorders (MSD) represent one of the leading types of occupational injury and disability amongst the working population, especially healthcare workers and in particular nurses (Motacki and Motacki 2009: 221; Chetty 2010; Caruguno, Pesatori, Ferraio, Ferrarri, da Silva, Martins, Felli, Coggon and Bonzini 2012: 1632-1642). Work-related musculoskeletal disorders (WMSD) are a significant cause of morbidity amongst healthcare workers (Chetty 2010; Hinmikaiye and Bamishaiye 2012: 23-28; Yeung, Genaidy, Florentino, Teresa, Victor 2005: 85-95). This is a worldwide problem, as confirmed by studies that have been conducted in various hospital settings and in different communities (Hinmikaiye and Bamishaiye 2012: 23-28; Tinubu et al 2010 and Yeung et al 2005: 85-95).

More studies on WMSD in nurses have been carried out in the United Kingdom compared to Sub-Sahara Africa (Tinubu et al 2010; Motacki and Motacki 2009: 221-226). Very few studies on MSD in nurses have been conducted in South Africa in the past five years (Motacki and Motacki 2009: 221-226; Naidoo and Coopoo 2007: 66-68). Various database searches yielded none from KwaZulu Natal.

Nurses are more prone to injury since their duties involve manual lifting of patients, bending over patients, pulling and pushing equipment and sometimes working in confined spaces where they have to adopt awkward postures. Yeung et al (2012: 85-86) showed that some frequent nursing daily tasks were contributory to WMSD especially lower back pain in registered nurses in Portugal. The studies conducted by Caruso and Waters (2008: 523-534) and Siddharthan, Hodgson,

Rosenberg, Haiduven and Siddharthan et al (2006: 463-476) highlighted the relationship between work schedules and the development of WMSDs among healthcare workers.

Because nurses seldom associate their bodily discomfort with their work; WMSD are treated as minor ailments instead of an occupation related health problem resulting in the under reporting of WMSDs (Menzel 2008: 489-490; Engkvist 2008: 291; Siddharthan et al 2006: 463-476). In this regard nurses who experience muscle strains during the course of their duties often try self-management on a trial and error basis before seeking medical attention (Menzel 2008: 489-490).

Preventative measures to curb the problem of WMSD have been initiated in first world countries (National Institute of Occupational Safety and Hygiene (NIOSH): 2009; Menzel: 2008: 487-494). These include, among others, the introduction of "patient moving teams" which consist of specially trained staff on how to handle patients. The team is called into the ward to move the patient from the bed onto a wheelchair, stretcher, theatre table and etcetera. Some hospitals in these first world countries have installed patient lifting hoists whilst some have "no lifting" policies and provide "safe patient handling" training, to prevent WMSD in nurses (Motacki and Motacki 2009: 221-226; NIOSH: 2009).

In South Africa, huge budgetary constraints within the health system result in the use of equipment and beds that are not ergonomically designed. Anecdotal evidence suggests a relationship between the occurrence of WMSD and the increased turnover amongst nurses (Meeks-Sjostrom, Lopuszynski and Bairan 2009: 233-236) and the loss of these professionals through immigration to first world countries where working conditions are reported to be much better. This has led to a significant shortage of nurses with nurse-to-patient ratios dropping from 1:15 to 1:50 in South Africa. Nurses in public hospitals have to work for extended hours with shorter rest periods, thus increasing the risk of developing MSDs (Caruso and Waters 2008: 523-534; Long, Bogossian and Johnston 2013). Although nurses in South Africa receive general training on patient handling during basic nursing training, there are no preventative programmes or subsequent reinforcement of prevention strategies (Naidoo and Coopoo 2007: 66-68). Although Occupational Health Services was introduced in public hospitals a

few years ago, the service is staffed by professional nurses who are not qualified in occupational health thereby rendering the service ineffective.

None of the studies on WMSDs in nurses in Sub-Sahara Africa (Naude 2008: 1-98; Cilliers 2007: 1-93; Hodgskisss 2009; Altmann 2010: 1-148 and Nyantumbu Kieslowski and Rees 2011) sought to determine the prevalence of MSD in all the body regions, amongst all nursing categories and to determine the relationship between absenteeism and visits to the staff clinic by nurses. The current study will address the gaps identified from the previous studies cited above.

1.2 Problem statement

The relationship between work-related musculoskeletal disorders, absenteeism and visits to the staff clinic by nurses has not been established in South Africa.

1.3 Purpose of the study

The purpose of the current study is to determine the prevalence of WMSD in nurses and its relationship to absenteeism and visits to the staff clinic by nurses in a selected eThekwini District hospital. A district hospital was chosen because of the nature of the services it offers and the population that it services.

1.4. Objectives and research questions of the study:

1.4.1 Objective 1. To determine the prevalence of WMSD in nurses at one hospital in eThekwini district.

Research questions:

1.4.1.1 What is the seven days and 12 months prevalence rate of WMSD in nurses per each nursing category and in each hospital unit?

1. 4.1.2 Which body areas are most commonly affected?

1. 4.1.3 What are the patterns of WMSD in each unit?

1.4.2 Objective 2. To determine the number of work days lost as a result of WMSDs.

Research questions:

1.4.2.1. What is the number of reported WMSD over a 12 month period?

1.4.2.2. What is the number of staff clinic visits as a result of the WMSD.

1.4.2.3 What is the total number of days spent away from work as result of the WMSD?

1.4.2.4 What is the absenteeism rate per each hospital unit and nurse category?

1.4.3 Objective 3. To describe the common individual / lifestyle and work characteristics amongst nurses who have reported WMSD

Research questions:

1.4.3.1. Do nurses with common demographic characteristics (for example those with high BMI) report higher rates of WMSD than the others?

1.4.3.2 Do nurses with similar lifestyle (for example smoking, sedentary lifestyle, taking of alcohol) report higher rates of WMSD than the others?

1.4.3.3 Does the level of experience of a nurse have an influence on the development of WMSD?

1.4.3.4. During which shift do nurses experience the highest rates of WMSD?

1.4.4 Objective 4. To determine the correlation between the prevalence of WMSD in nurses and the rate of absenteeism and visits to staff clinic

Research questions

1.4.4.1 Is there a correlation between WMSDs and the rate of absenteeism and visits to the staff clinic in nurses?

1.4.4.2 How does the above compare in different nursing categories, different hospital units and different shifts worked by nurses?

1.5 Significance of the study

The study will add to existing South African literature on WMSD in nurses. Currently very little information relating to this topic exists for the province of KwaZulu Natal. With the introduction of the reengineered primary health care system in the face of a shortage of nurses in this province, it is likely that the findings of this study will inform strategies to ensure nurse health to improve and sustain services to all. It could be taken to the next level where preventative measures for the WMSD in nurses could be introduced e.g. patient lifting devices, lifting teams and training of procurement personnel and unit managers on choice of ergonomically suitable equipment.

The patient care could be improved through reduction of fall risks and prevention of bedsores by frequent changing of patients' positions made easy by the use of patient handling equipment. Improved nurses' musculoskeletal health, job satisfaction and lowered risk of WMSD all lead to improved morale and less nurse turnover. This would lead to higher retention of nurses within the study site and the country.

1.6 The alternative ($H_{A)}$ hypotheses for the study

H_A 1: A significant proportion of nurses will report a high seven days and 12 months prevalence of WMSD.

H_A 2: Profile of affected body parts due to WMSD injuries will be the same in all units.

H_A 3: The WMSD rates will be directly proportional to the absenteeism rate.

H_A 4: The lower nurse categories have the highest number of WMSD.

H_A 5: Nurses who are overweight and obese have a higher incidence of WMSDs than those with normal weight.

H_A 6: There is no link between the number of WMSD, absenteeism and staff clinic visits.

H_A 7: Staff clinic visits and absenteeism is not the same across all the nursing categories.

1.7 Conceptual framework

1.7.1 The "Linking Onset, Course and Care" Conceptual Model

This study will be based on the use of ""Linking Onset, Course and Care" Conceptual Model (Guzman, Hurwitz, Carroll, Haldeman, Côté, Carragee, Peloso, van der Velde, Holm, Hogg-Johnson, Nordin and Cassidy 2010: 199-213). The model is aimed at linking the epidemiology of neck pain (or musculoskeletal disorders for this study) with its management and consequences, hence, "Linking Onset, Course and Care."

1.7.2 The key concepts of this framework and their meaning for this study

Onset- means the initial recognition of signs and symptoms of work-related musculoskeletal disorders.

Care complex- means the different healthcare services available to the nurses in this study site to use in cases of work-related musculoskeletal disorders.

Participation complex- means the level of activity experienced by the nurse following the work-related musculoskeletal disorders incident.

Claim concept- means factors influencing the decision to report or not to report work-related musculoskeletal disorders incident.

Impact and outcomes of neck pain- the extent of the pain felt by the nurse will determine the route for future management for example termination of service on medical grounds in severe cases.

1.8 Flow of dissertation

1.8.1 Chapter 1: Introduction

The first chapter gives an overview of the study. It introduces the topic, discusses the background to the study, purpose and what is to be achieved by the study as well as the significance of the study.

1.8.2 Chapter 2: Literature review

In this chapter the analysis of research (relevant to the topic) that has been conducted by previous scholars will be discussed. Research conducted internationally will be presented first, followed by that from the Third World Countries and lastly South African. The discussion will highlight similarities and contradicting evidence in studies that have been conducted in different settings.

1.8.3 Chapter 3: Research methods

This chapter outlines the pathway that was followed by the researcher during data collection. A discussion of where the study took place, why the site chosen, which were the participants and how these participants were chosen, is detailed in this chapter. Also in this chapter the process and tools of collecting data are

explained; how this data was analysed and how the trustworthiness, research rigor, reliability and validity of the data was assured is discussed in depth.

Scientific research is guided by research ethical principles which ensure protection of subjects or participants. These are discussed in depth in this chapter and include all permissions and authorities required before conducting the study. Apart from obtaining permission to conduct the study, providing information to participants and getting an informed consent are equally important. The processes followed by the researcher in providing information on the study and obtaining consents, ensuring confidentiality, safe keeping and disposal of data containing documents are described in this chapter.

A cross-sectional quantitative descriptive survey was conducted in two stages namely the prospective cross-sectional survey of nurses and the retrospective review of records. A random sample of 231 nurses was selected, proportionally, from all nursing ranks and invited to fill in the self-administered musculoskeletal questionnaire.

1.8.4 Chapter 4: Presentation of results

The research results will be presented in this chapter in the form of narratives tables, graphs and percentages.

1.8.5 Chapter 5: Discussion of results

Research results will be discussed in detail in this chapter with the aim of re-affirming or disputing the hypothesis. This discussion will be supported by or compared to the findings of other scholars from previous studies in an attempt to meet all the identified objectives.

1.8.6 Chapter 6: Conclusion, limitations and recommendations

Conclusions will be drawn to address the achievement or not of the aims and objectives. The limitations of the study will be stated and recommendations suggested on how to strengthen the study which was limited in one way or the other.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Although there are many studies on WMSDs, the problem of WMSDs in nurses still persists. The following discussion critically reviews different studies that have been conducted nationally and internationally. Literature reviewed was sourced from Medline, PubMed, Summons, Science Direct, CINAHL SABINET, EBSCO host and Google Scholar databases. The search was limited to studies published in the period 2006 to 2013. A secondary search was done by searching for articles and studies that had been referenced by the authors from the primary search. The following key words were used in the primary search strategy:

> Work-related, musculoskeletal disorders, nurses, absenteeism in nurses and conceptual framework.

The following subheadings were used in compiling the literature review:

- Definition of work-related musculoskeletal disorders
- Prevalence of WMSD in nurses
- Demographic factors associated with WMSD
- Lifestyle factors associated with WMSD
- Association of work task and workload
- Absenteeism following reported WMSD
- Staff visits to the staff clinic following WMSD incidence
- Conceptual framework
- Conclusion

General overview

According to the United States Department of labour (2010), work-related musculoskeletal disorders represent the most common work-related health disorders across 27 European Union member States. The European Occupational Diseases Statistics in 2005 indicated an increase of up to 59% of WMSD. The WHO (2009) reported that WMSDs accounted for more than 10% of all years lost to disability. The WMSDs resulted in a huge financial burden, not only to the

employer but also the employee's family. The reduced productivity and work capacity resulted in increased health care expenditures. The International Labour Organisation (ILO) (2010) estimated that work-related accidents and diseases resulted in a four percent decrease in gross domestic products (GDP) annually.

The National Institute of Occupational Safety and Hygiene (NIOSH) (2009) attest to the above and further states that there are challenges and opportunities that exist to better understand the causes and effects, financial impacts and strategies that can effectively be implemented to prevent and manage these WMSDs. The National Institute of Occupational Safety and Hygiene (2009) reported that healthcare workers experience WMSDs at a rate much higher (4.5 times) than workers in the construction, mining and manufacturing industries. Although the causes were not classified as done by Chetty (2010), NIOSH (2009) seemed to have identified extrinsic causes as contributing to more problems. The emphasis has been on manual handling as the major contributory factor which is exacerbated by lifting obese patients and working in awkward postures. Nurses are often involved in manual lifting of patients and sometimes have to adopt awkward postures as they carry out their duties because of limited space in the units.

The problem exists in both first world countries as well as developing countries (Chetty 2010; Caruso and Waters 2008: 523-534). Intervention programmes in the first world countries focus more on preventative programmes compared to developing countries who often adopt a reactive approach (Motacki and Motacki 2009: 221-226).

2.2 Definition of work related musculoskeletal disorder

The term musculoskeletal disorders refers to an injury or disorder of the nerves, ligaments, muscles, joints, tendons and supporting structures of the upper and lower limbs, neck and spine which are caused by sudden or accumulative exposures to physical exertion (NIOSH: 2012; Fabunmi, Oworu and Odunaiya 2008: 21-25). These are termed work-related if they occur as a result or during some work activity (Tinubu et al 2010). Nyantumbu et al (2011) stated that WMSDs have a multifactorial aetiology, meaning that they may be caused by factors related to work as well as outside work. The ability to distinguish between

injuries sustained during work or leisure is difficult since minor injuries sustained elsewhere may manifest during working hours when exposed to more stress and strain. Most of the WMSDs are self-diagnosed and typically are not visible to the observer. Therefore the actual experience of the extent of pain is a subjective issue. The WHO (2010) has therefore recommended the term WMSDs rather than occupational disease because of this fact. The National Institute for Occupational Safety and Health (NIOSH) (2012) further states that WMSDs are precipitated or worsened by prolonged exposure to repetitive work, vibration, force exertion, long periods of static or awkward posture and sudden exertion. Nurses experience most of these situations in the course of their duties thus making them more prone to WMSD than other healthcare workers.

2.3 Prevalence of WMSDs in nurses

The prevalence of work-related musculoskeletal disorders amongst nurses and health care workers is high worldwide (Louw, Morris and Grimmer-Somers 2007; 523-534; U.S. Department of Labour 2010; NIOSH 2009). Chetty (2010: 1528) conducted a quantitative retrospective record review at an occupational health physiotherapy clinic based in London. The aim of the study was to determine the musculoskeletal injury patterns of employees (health care workers) seen at the physiotherapy clinic. A total of 303 employees had attended the physiotherapy clinic over a year and 1182 physiotherapy sessions were recorded during the same period. Chetty (2010: 1528-1529) stated that musculoskeletal injuries accounted for the most occupational problems and disabilities among healthcare workers (staff nurses had the highest prevalence rate of 23% and the least were healthcare assistants at nine percent). The causes for these injuries were divided into extrinsic and intrinsic factors. Examples of extrinsic factors included manual handling tasks, lifting heavy loads and inadequate support infrastructure. The intrinsic factors were described as poor job satisfaction, the age of the healthcare worker and the body size variations. Chetty's study (2010: 1528-1532) confirmed that WMSD were recorded as the highest (46% of reported cases) and the spine was the most frequently affected body part, comprising 57% of reported cases. It must be noted that this study was conducted at a Physiotherapy clinic; therefore the results could not be generalized to a general hospital setting.

Many national (Tinubu et al 2010; Naude 2008: 1-98; Naidoo and Coopoo 2007: 66-68) and international studies (Caruso and Waters 2008: 523-534; Mitchell, O'Sullivan, Burnett, Straker and Rudd 2008: 1636-1644) have reported high prevalence (above 40%) of WMSDs in nurses. Although the rates differ slightly in different communities and countries, the prevalence of WMSD amongst nurses remains between 40-98% (Tinubu et al 2010; Caruso and Walters 2008: 523-534, Mitchell et al 2008: 1636-1634). The lower back was most commonly affected, followed by the neck and shoulder (Hinmikaiye and Bamishaiye 2012: 23-28, Fonseca and Femandes 2010: 1076-1083).

The highest prevalence rates of above 70% were those recorded in the study conducted on Korean nurses by Smith, Choe, Jeon, Chae, Ju An and Jeong (2005: 433-438) which showed a prevalence rate of 97.9%. A study conducted two years later, in 2007, by Kee and Seo in the same country reported 56% prevalence; the prevalence rate had improved by almost 42%. What could not be established is whether this later study was done in the same hospital as the previous one because the scholars of the second study did not make any reference to the first study. Mitchell et al (2008: 1633-1644) showed a 90% 12 months prevalence rate for low back pain in Australian undergraduate nurses. In the Netherlands, Bos, Krol, van der Star and Groothof (2007: 198-206) reported a prevalence rate of 76% for low back and 60% for neck-shoulder complaints in their study of 3 169 employees (nurses working in specialised and non-specialised settings) affiliated to eight hospitals.

Fonseca and Femandes (2010: 1076-1083) conducted a cross-sectional exploratory study amongst 666 nursing technicians and nursing auxiliaries in a public hospital in Salvador-Bahia, Brazil. The prevalence for MSDs in nurses was found to be 57%. An association was made between MSD and psychosocial demands in this study. The criteria used to measure psychosocial demand was that high exposure was recorded when at least two of the following conditions were reported i.e. high demand, low support and low control. High demand was described as tasks that required extensive physical exertion for example long hours of standing, walking, repetitive movements and use of muscle strength. Examples of low support include; time pressure, having younger children and lack of supervision. Low control was closely associated with leadership styles that

inhibited communication and dialogue regarding one's work. The same prevalence rate of 57% was reported by Cameron, Armstrong-Stasen, Kane and Moro (2008: 103-114) from a cross-sectional descriptive field study conducted on 303 Canadian nurses. This study further identified the lower back as the most frequent MSD suffered by nurses and that more than two thirds (70%) of these nurses were in the age range of between 45-55 years.

Exposure to risk factors was reported to be perceived differently by occupational groups, with the non-experienced reporting more MSDs than the specialized group of nurses. This finding correlated with the cross-sectional study conducted among 244 nursing assistants in Taiwan (Feng, Chen and Mao 2007).The prevalence rate was 66%. The reason could be because the non-specialised nurses are the ones more involved in patient handling or it could be because of lack of training in patient handling (Bos et al 2007: 198-206: Feng et al 2007).

There have been notable differences in the prevalence rates of musculoskeletal disorders among nurses in the Nigerian community as reported in studies conducted by Fabunmi et al (2008: 21-25), Tinubu et al (2010) and Akinpetu, Odole and Odejide (2010). Fabunmi et al (2008: 21-25) reported a prevalence rate of 90.7% with low back pain being the most common with 78% prevalence. The study conducted by Tinubu et al (2010) sought to determine the lifetime, 12 month period and point of prevalence of WMSDs; the associated job risk factors and the coping strategies toward reducing the risk for development of WMSDs among nurses from selected hospitals in Ibadan, South-west Nigeria. A survey was conducted on prevalence, work factors and coping strategies of WMSDs among nurses in Nigeria. The prevalence rate was found to be 84.4% for WMSDs. This study confirmed the findings of Akinpetu et al (2010) in a rural community in Nigeria where the prevalence rate of MSD was 80%. Louw et al (2007: 523-534) following a critical literature review on WMSD in reported an average 50% prevalence of low back pain. This discrepancy could have been the result of under reporting of WMSD (Menzel 2008: 488-493) or the fact that the study had included other healthcare workers.

Altmann (2010: 129) reported that the prevalence rate of neck and shoulder pain among nurses working in seven wards of Tygerberg hospital, Stellenbosch, South

Africa, was 42.66%. This study was limited to only two musculoskeletal regions of the body (neck and shoulders). The author indicated that the results could be affected by the under-reporting of the WMSD. According to Altmann (2010: 138-140) the nurses were using various coping measures for example self-medication and denial. This prevalence rate is quite close to the 47% prevalence of low back pain among Tshwane District, Gauteng hospital employees in the study conducted by Naude (2008: 1-98). However, the study population consisted of all health care workers with nurses constituting the largest group (38%). This study was limited to factors associated with low back pain only.

Madiba, Hoque and Rakgase (2013: 20-23) reported an 84% prevalence of musculoskeletal pain among nurses in high acuity areas (Intensive care) in a tertiary hospital in South Africa. A cross-sectional survey was conducted amongst nurses working in the operating theatres (17 operating theatres and 82 nurses in total) and Intensive care units (two ICU's and 85 nurses). A total of 170 questionnaires were handed out and 125 participants responded, giving a response rate of 73.5%. The lower back was the most affected body region with more than half of the respondents (58%) reporting pain in this area, followed by shoulder pains at 23%. This prevalence was high compared to the other African studies done by Altmann (2010: 134-146) and Naude (2008: 1-98) but these two studies focused on the shoulder and neck regions and could possibly have yielded higher rates had they included the lower back as well. Another contributing factor could be that Naude's (2008: 1-198) study had included other healthcare workers and was not focused on nurses only. This South African report on the prevalence of WMSDs in nurses working in acuity areas and association of psychosocial aspects of work with WMSDs, in Madiba et al's (2013: 20-23) report is in agreement with De Souza, Lisboa, Griep, Kirchhof and De Azevedo's (2010: 190-196) study which was conducted on 491 nursing workers from a university hospital in Rio Grande do Sul. De Souza et al (2010: 190-196) also, same as Madiba et al (2013: 20-23) conducted a cross-sectional study where a comparison was made between nurses working in high acuity areas and those in low demanding work areas. The prevalence rate for MSDs was 96.3%; an increase of 15.5% in nurses working in acuity areas.

2.4 Demographic factors associated with WMSDs

The demographic factors that were compared amongst participating nurses in most of the studies were the age, gender, and body mass index (BMI). Most studies sought to determine whether or not demographic factors were contributory to the development of WMSDs.

2.4.1 Age

Most studies reported high prevalence of WMSD as the age of participants increased. Cameron et al (2008:105) reported the increased prevalence (70%) of WMSD amongst nurses over 56 years of age. Cameron et al (2008:109-110) cited reasons of degeneration of vertebral discs, the accumulative effect of prolonged exposure to strenuous work situations and the possibility of increased awareness of WMSD and therefore more reporting of the WMSD incidences as reasons for the high prevalence rate within this group of nurses. However, in a study conducted by Hinmikaiye and Bamishaiye (2012: 23-28) reported an increased prevalence of low back pain in nurses between 41 and 50 years to be 45% followed by the 51-60 years with 25% rate. They argued that the musculoskeletal symptoms began early in life and reached the peak between 35 and 55 years. This assumption can be considered true when reading the study by Puckree, Silal and Lin (2004: 54-59) which was conducted among school children and confirmed that scholars were experiencing MSD resulting from carrying schoolbags. Interestingly, the same view has been expressed by Mitchell et al (2008: 1640-1642) who had conducted a cross-sectional survey of low back pain in undergraduate student nurses in Australia and found that the lifetime prevalence was 79% and 71% for 12 months. There were no significant differences between the first year and the third year of study. A historical review of the participants indicated that the lifetime prevalence had increased between the ages of 12 and 22 which meant that most of the initial MSD occurred prior to commencing nursing studies and fulltime employment.

One third of nurses with WMSD continued to work beyond the age of 55 years. Most of the nurses chose to retire at the age of 55 years and an estimated five percent remained in the workforce beyond 60 years of age. This, according to

Cameron et al (2008:112) this was a cause for concern as it was adding to the already high rates of nurse shortages worldwide. This view was also echoed by Engkvist (2008:297) who said that the goal must be to reduce the load for nurses and improvement of the work environment in order to prolong their employment until the retirement age.

Altmann (2010) failed to show a significant relation between age and the development of WMSD. This was reiterated by Naude (2008: 1-98) in her study conducted amongst Tshwane District Hospital employees (all occupations) where age was found not to be a significant factor in the development of low back pain as well as Engkvist (2008: 291-301) and Daraiseh, Cronin, Davis, Shell and Karwowski (2010: 19-24). The study conducted by Tinubu et al (2010) showed a decrease in the incidence of WMSD amongst nurses aged 50 years and above. The researchers attributed the decrease to the years of experience and improved patient handling methods amongst this age group. Fabunmi et al (2008:27-28) argued that the decreased prevalence of WMSD amongst nurses over 50 years of age was due to reduced patient handling tasks or volume of work as this group often consisted of senior nursing personnel. De Souza et al (2010:190-196) stated that the "older" nurses would allocate more patient handling and lifting tasks to the younger ones. The older nurses often administered injections and did dressings and therefore experienced a higher incidence of joint pains (especially the elbows and wrists) due to the repetitive tasks. Their study reported a higher prevalence of problems involving the vertebrae (neck and lumbar spine) compared to lower extremity complaints among the younger nurses (De Souza et al 2010: 190-196).

2.4.2 Gender

In almost all studies, females recorded a higher incidence to WMSD compared to the males. Fabunmi et al (2008: 21-25) argue that this could be because females are the majority in the nursing profession. Nursing is a "caring" profession and caring is an activity that is mostly associated with females and that is why the profession attracts more females than males. In the study conducted by Fabunmi et al (2008: 28-29), the female respondents to the study made up 96.7%. Naude (2008: 10-11) argued that some studies did not show significant association of

gender with the development of WMSD; however she stated that the high incidence among female workers might be related to muscular strains experienced during household activities as well. This makes the diagnosis of WMSD very complex and requiring accurate history taking and reporting. De Souza et al (2010:190-196) stated that females were more eager to report pain and seek medical attention than men hence the higher female prevalence rate.

Sikuru and Shmaila (2009: 22-25) reported a significant association between gender and prevalence of low back pain in their study (though 35% respondents were males and 65% were females), females had higher prevalence rate than males. They attributed this difference to the anatomical, physiological and structural variations between males and females. Mechanical disadvantages for example back muscle weakness predispose the onset of sprain and strains which are more common in females than males. The ergonomic design of most work stations, personal protective equipment (PPE) and tools are based on male anthropometry thereby disadvantaging females who then are at a higher risk of developing WMSD than their male peers.

2.4.3 Body mass index

Body mass index (BMI) is calculated by dividing weight in kilograms by height squared. This is used mostly to classify underweight, overweight and obesity in adults at population levels. At individual level BMI has some limitations in that it is influenced by age, gender and ethnicity. BMI does not distinguish between fat and lean mass and do not reflect body-fat distribution WHO (2010).

$$\text{BMI} = \frac{\text{weight}}{\text{height}^2}$$

Table 2. 1: Classification of Body Mass Index (WHO 2010)

Classification	BMI (kg/m^2)	Risk of co-morbidities (health consequences)
Underweight	<18.5	Low but possibly increased risk of other clinical problems
Normal range (Healthy weight)	18.5-24.99	Average
Overweight	>25	Slightly increased
Pre-obese	25.0- 29.99	Increased
Obese class 1	30.0-34.99	Moderate
Obese class 2	345-39.99	Severe
Obese class 3	>40	Very severe

The spine is designed to carry the body's weight and distribute the loads exerted by the body during rest and any activity. When excessive load is carried, the spine is forced to absorb the burden which might lead to structural compromise and damage especially to the lower back or lumber region (Naidoo and Coopoo 2007: 66-73). Therefore obesity may aggravate the existing MSD or contribute to recurrence of the condition because of the increased pressure on disc endplates and facet joints.

Few studies sought to determine BMI as a contributing factor to WMSD. Cross sectional surveys conducted by Daraiseh et al (2010:19-20) and De Souza et al (2010:190), revealed an association between overweight (25<BMI<30) or obesity (BMI above 30) and the development of WMSDs in multiple regions. This was because of the strain that was exerted by weight onto the joints causing adoption of awkward postures. This was also supported by Engkvist (2008:297); her study reported that a BMI higher than 25 constituted a high risk for WMSD as most patients were also overweight. This was echoed in Humphreys (2008) study where she had reviewed several articles about work-related injuries in nurses and reported that obesity increased the risk of injury to both the patient and the nurse.

Naude (2008: 8-12), however, reported to have reviewed various studies that indicated that there was no association between an increased BMI and the onset of low back pain but a few studies indicated a very low percentage of (less than 12%) respondents with WMSD were overweight or obese. According to Naude (2008:10), increased BMI was an indirect influence of WMSD resulting from

mechanical and metabolical abnormalities. Collins, Van Rensburg and Patricios (2011: 242) reported that obesity contributed to a high incidence of WMSD, but there was no further explanation of how this occurred.

2.5 Lifestyle characteristics and WMSDs

"Lifestyle" in simple terms means "the way a person lives" and according to the Collin's English Dictionary (2008), it means a set of attitudes, habits or possessions that are associated with a particular person or group of people. This means living an existence that is modeled by identifiable behaviours which are based on an individual's choice and influenced by socioeconomic, environmental and interpersonal factors. This study will focus on smoking, alcohol consumption, participation in physical activities and occupational activities as specific lifestyle characteristics and how these contribute to the development and aetiology of WMSDs.

2.5.1 Smoking

Smoking increases the risk of hypoxia through reduction of blood flow thus resulting in chemical changes that cause muscle, joint and disc degeneration (Abete, Vanni, Pantalone and Salini 2013: 63-69). Abete et al (2013: 63-69) also stated that smoking delays fracture and tendon healing is associated with a number of higher post-operative short-term complications. Nicotine also causes excessive stimulation which can lead to a higher perception of pain, increasing self-reporting of WMSD among smokers.

Daraiseh et al (2010: 19-24) reported that an association existed between multiple WMSDs (where more than one body region is affected) and the individual's lifestyle. Smoking, body mass index and work experience were found to be significant confounders. Meanwhile, Naidoo and Coopoo (2007: 66-73) conducted a quantitative survey on 107 nurses from one hospital in Kwa-Zulu Natal with the purpose of determining the health and fitness profiles of nurses working in a public hospital. The results indicated overall very poor health and fitness profiles of nurses with a high incidence of back pain. The study further revealed that being overweight and at the same time smoking, increased the risk of development of WMSD and possible hospitalization. This was supported in a report by Lee, Patel,

Biermann and Dougherty (2013: 850-859) in their review of a current concept “The Musculoskeletal effects of Cigarette Smoking”. They reported that cigarette smoking leads to the increased fracture rates of hip, spine and distal radius.

2.5.2 Alcohol

There has been conflicting reports regarding the association of alcohol consumption and development of MSDs. Bergman, Symeonidou, Andersson, Soderlin and the BARFOT study group (2013) reported that moderate alcohol consumption has a beneficial effect on the development of MSD; whilst excessive alcohol consumption may impact on fine-motor skills and decrease body’s ability to fight repetitive strains. This study contradicts what was reported in the study conducted by Barclay, Barbour, Stewart, Day and Gilvary (2008: 139-151). Barclay et al (2008: 139-151) reported that alcohol consumption increased the risk of musculoskeletal injuries and fractures. Women were reported to be more at risk than men.

2.5.3 Lack of physical activity

Warburton, Nicol and Bredin (2006: 801-809) conducted a narrative review of available studies to determine health benefits of physical activity. They reported that lack of physical activity contributed to increase and complications of most chronic diseases including musculoskeletal diseases. Routine physical activity was said to improve musculoskeletal fitness which in turn had a positive impact on the overall health status of the individual. The prevalence of physical inactivity among Canadians (general population) according to Warburton et al (2006: 801-809) was found to be 51%. This finding, although not specific for nurses, was very close to the lack of physical activity prevalence rate of 48% reported in nurses by Naidoo and Coopoo (2007: 66-73). Musculoskeletal complaints were found to be more common in nurses that were not participating in any physical activity.

2.6 Association of work task and workload

Most studies indicated that there was direct association between work task performed for example patient handling, workload, staff shortages and the development of WMSDs (Louw et al 2007: 529-531;Caruso and Waters 2008) Manual handling of patients was perceived to be increasing the risk for WMSD by

7.2 times (Smith et al 2005: 390-396). Most WMSD occurred during patient transfer. Increased physical demands was cited as one of the leading factors to the development of WMSD in a study conducted in Taiwanese nursing homes (Feng et al 2007). Serranheira, Cotrim, Rodrigues, Nunes and Sousa-Uva (2012: 49-51) showed that some frequent nurses' work tasks were related to back pain and recommended that a hospital no-lift policy should be implemented as a means to promote occupational health amongst nurses. An interesting highlight has been made by Fonseca and Fernandes' (2010: 1076-1083) where they state that apart from the main factor of patient handling which is often associated with the development of WMSDs in nurses, other various work activities of nursing for example moving of equipment and furniture also require a great deal of physical effort.

Feng et al (2007) identified a close association between the workload, the frequency of performing the activity requiring carrying of that workload and development of WMSD. Work experience proved to be a positive factor in providing coping strategies among experienced nurses thus reducing the prevalence of WMSD among this group

Work schedule characteristics that are significant in the development of WMSD are shift work, long hours, extended work shifts, mandatory overtime, weekend work and less than ten hours off between shifts. Most studies reported increased risk of WMSD on the rotating shifts, working longer than eight hours per shift and having less hours of rest in between shifts (Caruso and Waters 2008: 523-534; Feng et al 2007).

2.7 Absenteeism following WMSD

The severity of WMSD differs with each individual according to their level of pain threshold. Some are minor and require no adjustment to duties and the nurse continues with his or her normal duties (the 'participation complex"). Some might require minor or moderate adjustments for example allocation to light duties for example where the injured nurse will not participate in manual lifting tasks. Sometimes a change of shift might be prescribed for example exclusion from working extended hour or change from night to day shift where there is more

support of other nurses. In other more serious cases, a change of unit for example to a unit where there is no or minimal patient handling might be recommended. In serious incidents the nurse could be booked off sick or in worst or chronic cases might be terminated from work on grounds of medical incapacity (Guzman et al 2010: 199-213)

Labriola's study (2008:377-379) highlighted the importance of ensuring that employees return to work as soon as possible after illness or injury. He further stated that the longer the worker is away from work, the more likely it is for that person not to ever return back to work. Most literature agree that WMSDs are a significant of morbidity in healthcare workers and most particularly the nurses (Caruso and Waters 2008:523; Louw et al 2007: 523-534), but very few studies investigated the impact of WMSD on absenteeism of nurses. This could be caused again by under and mis-reporting of WMSD where nurses attend their private health practitioners and are treated as minor ailments with no relation being made to workplace exposure. Kee and Seo (2007:207-212) estimated that economic loss resulting from WMSDs was estimated to $1billion. Increased absenteeism following WMSD has been confirmed by Engkvist (2008:297). The study revealed that an increased number of nurses went off sick following the WMSD incidents in 2003 as compared to the 1992 periods.

2.8 Staff visits to the staff clinic following WMSD incident

Most studies did not specify the type of care (the "care" complex) that was sought by the nurses who had WMSD. Although some of the studies did mention that the affected employees had reported WMSDs, visit to the staff clinic was mentioned in only two studies. The first one was Menzel's (2008: 457-494) study which aimed to determine the extent of under-reporting WMSD in nurses. This study highlighted the importance of accurate recording by the Occupational Health nurse and submission of accurate statistics with regard to reporting of WMSD. Secondly, a study conducted by Hagberg, Violante, Bonfiglioli, Descatha, Gold and Evanoff (2012: 109-115) also stressed the importance of the role of Occupational Health nurses in the prevention, diagnosis and reporting of WMSD. Health surveillance is seen by Hagberg et el (2012: 109-115) as an important activity that has to apply evidence-based medicine in assessing and diagnosing

employees at risk of developing WMSD and there after developing a preventative programme to improve the employees' health. Engkvist (2008:299) confirmed the problem of under-reporting of WMSD by nurses and also mentioned that the nurses more often do not seek medical care and took self-prescribed analgesics to a greater extent. The search did not retrieve any South African study that investigated nurses' visits to the staff clinic following WMSD incident.

The literature review confirmed that the prevalence of the WMSD in nurses is high worldwide and that the problem is persisting despite the several preventative measures that have been instituted in the developed countries. Although several studies have been conducted internationally and nationally; literature search revealed that there have been very few studies conducted in South Africa and particularly in KwaZulu Natal. Most studies in Sub-Sahara Africa were conducted by Physiotherapists and Environmental Health specialists and there has been none conducted by nurses. This means that the affected group (nurses) is not taking active leadership, participation and ownership of their occupational health.

2.9 Conceptual framework

Theories allow researchers to integrate observations and facts into an orderly scheme (Polit and Beck 2012: 126-148). Although there might be an interrelation among the existing theories and conceptual frameworks, one has to find the one that best fits in the study. A theoretical framework is important in providing a guideline and formulating or mapping the route that the study should follow.

Many WMSD studies have not included conceptual frameworks for example, the studies reported by Nyantumbu et.al (2011); Altmann (2010: 134-146); Naude (2008: 1-98); Cilliers (2007) and Hodgskiss (2009: 1-199). Very few studies that focused on the preventative aspects of WMSD have used conceptual framework. Labriola (2008: 377-387) used "**The Dynamic Work Disability Model**" which is a conceptual framework that takes into account the dynamics of work, individual and environmental factors which affect absenteeism, return to work and disability. This framework though it has some relevance, will not fit well with the current study since it described some of the factors that lead to absence as poor level of education and job dissatisfaction. This model might be relevant on follow up

studies where absenteeism rate, return to work and disability following WMSD have been confirmed.

2.9.1 The "Linking Onset, Course and Care" Conceptual Model

This is a conceptual model that was developed by the 12 members Scientific Secretariat of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and its Associated Disorders (Guzman, Hurwitz, Carroll, Haldeman, Côté, Carragee, Peloso, van der Velde, Holm, Hogg-Johnson, Nordin and Cassidy 2010: 199-213). The model is aimed at linking the epidemiology of neck pain with its management and consequences, hence, "Linking Onset, Course and Care." Although this model was developed and has been used for the study of neck pain, its components do fit in and is relevant in the current study. This conceptual framework has five components namely:

1) Factors affecting the onset and course of the pain
2) The "care" complex (no care, self-care or health care)
3) The "participation" complex
4) The "claim" complex
5) The impact and outcomes of neck pain

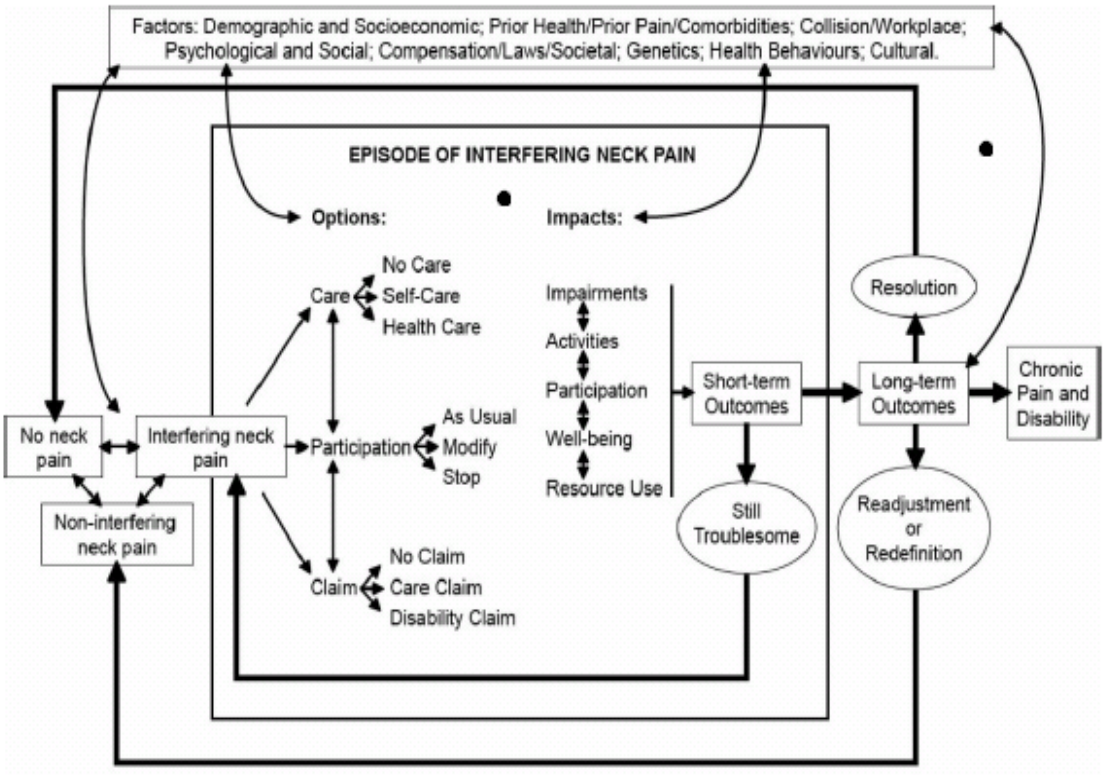

Figure.1: Simplified graphical representation of the Bone and Joint Decade

2000-2010 Task Force on Neck Pain and its Associated Disorders Conceptual Model for the onset, course and care of neck pain (Guzman et al 2010: 199-213).

Each component will be discussed briefly and application of this conceptual framework with the current study will be demonstrated.

2.9.1.1 Factors affecting the onset and course of the pain

According to the "Linking Onset, Course and Care" Conceptual Model (Guzman et al 2010: 199-213), there are various factors that affect the development, course and outcome of pain. In terms of the WMSDs, there may either be intrinsic or extrinsic factors associated with the development, course and development of WMSD. Intrinsic factors that could influence the development of WMSD include prior health status (psychosocial and physical), existing pain or disease, genetics, health behaviours, demographic and cultural factors. Demographic factors that are usually associated with musculoskeletal disorders are age, gender, body mass index (BMI) and lifestyle factors. These factors may contribute to the individual nurse's exposure risk (probability of having WMSD), extent of injury and the duration of pain. Naude (2008: 8-9) and Cameron et al (2008: 105) reported in their studies that the ageing nurses were more prone to WMSD because of the disc prolapse and this led to high prevalence rate of WMSD in this age group.

Extrinsic factors may include socioeconomic factors such as good working environment as well as good social support (both at work and home) which contribute to improved occupational health and safety with subsequent reduced incidents of WMSDs. Other extrinsic factors are influences from the political and legal system for example Compensation laws, insurance services and policies governing provision of health care (Guzman et al 2010: 199-213). In Engkvist study (2008: 291-301), the accident process of back injuries amongst nurses in the hospitals of Stockholm during 2002-2003 were compared with her earlier study reported in 1992-1993; the nurses were older and more experienced than in the earlier study but had more injuries that often led to sick leave. Most nurses reported being stressed at the time of the accident and not having adequate patient moving equipment or support. In Fonseca and Fernandes (2010: 1076-1086) study, it was confirmed that psychosocial factors were important in the

development or worsening of WMSD and that psychosocial demands may influence sensitivity to pain resulting in increased reporting or perception of WMSD symptoms. However, contrary to Guzman et al (2008: 199-213) and Engkvist (2008: 291-301) reports, there was no association on development of WMSD with work dissatisfaction.

2.9.1.2 The "care" complex (no care, self-care or health care)

Menzel (2008: 489-490), Siddharthan et al (2006: 463-476) and Engkvist (2008: 291) observed that nurses were not accurately reporting the WMSDs. There might be various reasons for this none or under-reporting which relate to the "care" complex. Perception of the level of health care provided and previous experiences might influence the nurses' decision whether to report the WMSD or not. If the hospital policies on Injury on Duty (IOD) reporting and processes are not favourable, this might result in poor reporting of WMSD incidences. Engkvist (2008: 291-301) had observed that nurses in the second study which was conducted 10 years after the first one, had increased reporting of WMSD incidences and were taking more sick leave than the earlier study. Engkvist stated that this could have been because of increased awareness on the available benefits to nurses following a WMSD incidence.

The intrinsic and extrinsic factors discussed under "Factors affecting the onset and course of the pain" do affect the decision of the nurse whether to seek care or not; the available options of healthcare will influence the decision on the type of healthcare to attend for example whether the nurse has an option of attending the staff clinic or own private doctor. Most studies did not interrogate whether the nurses did seek care following WMSD or what level of health care was sought.

2.9.1.3 The "participation" complex

This component is characterized by the level of participation of the individual in his/her usual activities guided by the pain one experiences. Pain might be bearable or non-interfering with participation levels thus remaining as usual. In some cases there might be need for adjustment in participation levels for example change of tasks or duties and in both instances there are no lost man-hours. Pain might be severe and require immediate stopping with normal duties thus resulting in absenteeism or it might persist even after intense therapy leading to disability or

need for incapacity management. Sikuru and Shmaila (2009: 22-25) reported a 33.33% absenteeism rate (over a twelve month period) in nurses who had reported lower back pain. One of the questions in the Standardized Nordic Questionnaire for Musculoskeletal Symptoms (Kuorinka, Johnson, Vinterberg, Biering-Sorensen, Anderson and Jorgensen: 1987), which is used in most MSD studies, ask about the impact of the MSD on the normal work and leisure participation level.

2.9.1.4 The "claim" complex

The information regarding reporting and processing the claim that the individual has, availability of insurance or compensation and previous experiences determine the option that will be taken by the worker. The level of claim depends on the extent of the problem for example no claim, claim on medical care or disability claim. This has not been established in any of the studies that were reviewed although few studies made a reference on how WMSD were contributing to increased morbidity and disability amongst healthcare workers (Caruso and Waters 2008:523; Louw et al 2007: 523-534; Yeung et al 2012: 85; Kee and Seo 2007:207-212).

2.9.1.5 The impact and outcomes of pain

Most studies do agree that WMSD are a major cause for morbidity amongst healthcare workers (Chetty 2010; Yeung et al 2012: 85). The impact of MSD can be short-term, long-term or chronic pain and disability. Short-term impact could result in mild interferences with the person's activities, participation, wellbeing and need for review of care, participation and claim. Long-term outcomes might finally resolve to no pain or need readjustment which could result in no pain or continuing pain requiring continuing care, participation review and claim review. This might lead to chronic pain and disability. (Guzman et al 2010: 199-213). It has been reported in other studies that WMSDs and poor working conditions contribute to "brain drain" amongst health care workers in third world countries and in South Africa (Naidoo and Coopoo 2007 66-73; Motacki and Motacki 2009: 221-226).

CHAPTER 3

RESEARCH METHODS

3.1. Study Design

The aims of the study were achieved by conducting a quantitative cross-sectional descriptive survey. This was the method of choice because although WMSD in nurses have been previously researched in most first world studies; the researcher wanted to study further this topic in the South African context. The study was both prospective (cross-sectional survey of nurses), and retrospective (review of records) to determine the seven days and 12 months prevalence of WMSD. These are presented and described as Part 1 and Part 2 respectively. Correlations between WMSD and some variables for example age, experience, BMI and hospital unit were done to establish whether there were any existing relationships.

3.2. Setting

The study was conducted at one public hospital in eThekwini district with a bed capacity of 1200, which was chosen because it offers services both at regional and district levels. This hospital caters for a wide range of patients from a variety of socio-economic statuses and communities i.e. township, informal settlements, urban, peri-urban and rural.

3.3. Part 1 Prospective cross- sectional survey

3.3.1 Population

The population consisted of approximately 1375 nurses who work as permanent staff in the selected hospital. This included females and males as well as day and night duty staff members. Up to a third of this number may be off duty at any given time due to annual or sick leave. Table 3.1 shows the breakdown of the number of nurses as per nursing categories.

Table 3.1: Number of nurses available for participation per nursing categories

Nurse category	Total
Professional nurses in General stream	322
Professional nurses in Various specialities	258
Enrolled nurses	458
Enrolled nursing assistants	317
Total	**1375**

The gender categorization of nurses was not available from the Human Resources Department.

3.3.2 Inclusion criteria

To be included in the population, nurses had to meet the following criteria

- All nurses in all nursing categories who have been permanently employed for at least 12 months in the chosen hospital.
- Nurses who were working in units that are mostly involved in patient handling. These are the units where nurses have to physically assist patients in and out of bed, stretcher, wheel chair or couch, perform bed baths, dressings and change patients' positions.

3.3.3 Exclusion criteria

Nurses were excluded on the basis of the following criteria:

- Nurses who were pregnant or have been pregnant within the past 12 months from the date of the study.
- Nurses who have had other injuries within the past 12 months for example sports injuries and motor vehicle accidents.
- Nurses who are being treated for other chronic musculoskeletal diseases.
- Nurses who took part in the expert group and pretesting of data collection instrument.

3.3.4 Sample and Sampling

To achieve a 95% confidence level, 231 nurses were selected using proportional systematic sampling by nurse category to participate in the study. Every third nurse, from each category, was selected from the unit allocation list.

Multistage sampling is described below

3.3.4.1 Hospital units

The hospital consists of 81 units. Forty two units were identified to be involved in patient handling. These hospital units were arranged according to their specialisation (strata) for example surgical, orthopaedics, etcetera and approximately fifty per cent was drawn from each stratum, as per the table below.

Table 3. 2: Sampling of hospital units

Unit specialisation	Total	Number of units selected
Surgical	3	2
Medical	6	3
Orthopaedic	5	3
Gynae and Obstetric	9	5
Paediatric	5	3
Out patients	10	5
ICU	2	1
Theatres	2	1
Total	**42**	**21 (50%)**

3.3.4.2 Sampling of Nurses

Nurses from each identified unit were randomly selected as per the table below.

Table 3. 3: Sampling of nurses by unit

Unit specialisation	Total PN	Selected PN	Total EN	Selected EN	Total ENA	Selected ENA
Surgical	26	**6**	29	**7**	12	**3**
Medical	49	**12**	53	**13**	40	**10**
Orthopaedic	40	**10**	45	**11**	13	**3**
Gynae and Obstetric	60	**14**	40	**10**	31	**7**
Paediatric	52	**13**	48	**12**	38	**8**
Out patients	89	**22**	82	**20**	59	**14**
ICU	62	**15**	20	**5**	9	**2**
Theatres	41	**10**	12	**3**	2	**1**
Total	**419**	**102**	**329**	**81**	**204**	**48**

(PN= Professional nurses, EN= Enrolled nurses and ENA= Enrolled nursing assistants).

From the 952 nurses who met the selection criteria, 231 were randomly selected and invited to participate in the study. All 231 nurses enrolled into the study.

3.3.5 Instrument for data collection

Data was collected from 01 October 2013 to 31 January 2014 utilizing an adapted Standardized Nordic Questionnaire for Musculoskeletal Symptoms (Kuorinka, Johnson, Kilbom, Vinterberg, Biering-Sorensen, Anderson and Jorgensen, 1987) (Appendix D). This instrument was developed by the Nordic Ministers with the purpose of screening of musculoskeletal disorders in ergonomic settings and to serve as a screening and surveying tool for MSD in the occupational health services. The questionnaire had open access and did not require any permission for use.

The standardized questionnaire had been used extensively in almost all the studies that investigated musculoskeletal injuries, diseases, symptoms as well as ergonomic factors in various countries internationally and nationally (Chetty 2010: 1528-1529; Hinmikaiye and Bamishaiye 2012: 23-28; Tinubu et al 2010). The questionnaire was made up of three sections.

Section A gathered personal data and required the participant's weight and height for the calculation of BMI which were measured using a bathroom scale. Most nurses did not know their weight and height and some wards had scales that were not functioning. Section B enquired about the participant's occupational history and section C probed deeply into the symptoms, classified according to nine musculoskeletal regions of the body, over the previous seven days and 12 months. Most of the questions were close ended but a few open ended questions had been included in order to add value to the responses. Themes that were covered in the questionnaire were prevalence and severity of the symptoms, duration, management or treatment received and duration of sick leave or absenteeism (Appendix D).

The English questionnaire was not translated into any other language because all participants were nurses who understood English. Information giving sessions were conducted in each unit by the researcher to ensure consistency of information given. Participants were given a general overview of the research and their participation. Thereafter each participant was given a letter of information (Appendix B) and consent form (Appendix C) to sign. Reliability of the data was assured by having one person, the researcher undertaking all parts of data collection, namely completing data collection checklist, conducting briefing sessions, handing out and collecting the questionnaires from the participants. This meant that the same information was given to all the participants.

3.3.6 Data collection procedure

Data was collected in venues that were allocated by unit managers (sister in charge) mostly during the participants' lunch or tea time; although a few units had allowed nurses to participate in the study during the visiting hours when most patients were occupied by their visitors. The venues used were usually the nurses' tea lounge, meeting room, nurses' station and consultation rooms. Approximately

30-40 minutes was allowed to complete the questionnaire. The researcher was available to give clarity when needed but did not assist in answering of the questionnaire. The participants were not allowed to take the questionnaires away with them or to instruct someone else to answer on their behalf. Completed and spoilt questionnaires were placed in a sealed box and taken away at the end of each session.

3.3.7 Validity and reliability

The two most important aspects of precision are reliability and validity. Reliability is computed by taking several measurements on the same subjects. A reliability coefficient of 0.70 or higher is considered as “acceptable” with 0.6 being the lower limit. The Cronbach’s alpha score for all of the ordinal items that constituted the questionnaire was n=227 (98.3%). The reliability and validity of the Standardized Nordic Questionnaire for Musculoskeletal Symptoms had been demonstrated in various other studies and communities (Dawson, Steele, Hodges and Stewart 2009: 517-525) Dawson et al further reported that the Standardized Nordic Questionnaire for Musculoskeletal Symptoms had demonstrated reliability results with Kappa values ranging from 0.88 to 1, and this questionnaire is said to be internationally validated and respected.

Experts in Occupational and Primary Health Nursing and an Exercise Physiology were consulted and given the adapted data collection instrument to establish content and construct validity. The criteria used to classify one as an expert was that they had to have a Post Graduate qualification in the particular specialisation field, and have a minimum of five years’ experience. Pretesting of the data collection tool was conducted among six nurses, two from each category. This was done to assess the content validity and applicability of all the items for the nursing population, its level of understand- ability and the time it takes to be completed. After completion of the questionnaire; a group discussion with the pretesting participants was held to test content validity of the instrument (by re-testing on some questions from the questionnaire) and to see whether it was necessary to rephrase or change any of the questions. The response from the participants was that all questions were found to be clear and therefore there was no need of changing or rephrasing any of the questions.

3.4 Part 2: Retrospective records review

Data relevant to staff reporting of WMSD, including work-related musculoskeletal injuries, record of the staff clinic visits and absenteeism records for the period of 12 months (from 01 January 2013 to 31 December 2013) was collected from the hospital Occupational Health Nurse Practitioner and the Human Resources Manager.

Checklists were used to record the patient code, age, nature of complaint, unit or ward and number of days away from work (Appendix E and F). Both checklists had five columns where the following information was recorded for each participant:

- the participant's code (this was matched with each completed questionnaire)
- Nature of injury or discomfort
- Date of injury or discomfort
- Unit or ward
- Date visited staff clinic (in the case of staff clinic visits checklist) or dates absent from work (in the case of absenteeism checklist).

3.5 Ethical considerations

An application to conduct the study was submitted at the Durban University of Technology (DUT) Faculty of Health Science Research and Higher Degrees Committee. After approval was received, an ethical *clearance* (permission to commence the study) was requested from the DUT Institutional Research Ethics Committee (IREC) and this was approved on 10 June 2013, IREC Number 36/13 (Appendix A). *Permission* was also requested and granted from the Department of Health, Provincial and eThekwini District office (Appendix B1), Hospital management (study site) and Unit managers (Appendix B2) to conduct the study. Information giving sessions were conducted in each hospital unit where nurses were informed about the benefits of the study and that *participation was voluntary* and that they had *rights to withdraw* at any stage of the study with no consequences. The participants were also assured that this study will not cause any harm to them and feedback on the findings of the study will be provided to the

District office and hospital management. Participants were recruited and *information letters* (Appendix C) were issued to each participant. *Informed consent* was signed by all participants (Appendix D), this was the only document which had the participants' names. *Confidentiality and anonymity* had been assured by having all consent forms coded and the same patient code was used in all participants' correspondence for example staff clinic visit and absenteeism. However, the consent forms were kept separately from all other documentation under lock and key. No names were written on any filled in questionnaires, the completed and spoilt questionnaires were placed on a sealed box (handled by the researcher only) and this box removed at the end of each session. All collected data and signed consent forms were kept by the researcher and will be destroyed by shredding after 5 years. The findings of the study have been made available to the participants, other scholars and the public through the compilation of this dissertation which will be kept at Durban University of Technology Repository.

3.6 Data Analysis

The data collected from the responses was analysed with Statistical Package for Social Sciences (SPSS) version 22.0.The results present the descriptive statistics in the form of graphs, cross tabulations and other figures for the qualitative data that was collected. Inferential techniques included the use of correlations and chi square test values; which were interpreted using the p-values. Values of significance were $p<0.03$ or 95% confidence level.

Means and standard deviations were determined for the demographic factors (namely height, weight and BMI). Categorical parameters for example gender, nurse category and units were summarised using frequencies, percentages and cross-tabulations. Comparison between prevalence of WMSD patterns/body parts with respect to categorical parameters for example nurse category and units were conducted using Fisher's exact. Chi square test which was performed to determine whether there was a statistically significant relationship between the variables (for example prevalence of WMSD and lifestyle characteristics- alcohol, smoking and level of physical activity).

Reliability was computed by taking several measurements of the same respondents. A reliability coefficient of 0.70 or higher is considered as

“acceptable” with 0.6 being the lower limit. In this study, the Cronbach’s alpha score was .719 (96%) for the entire ordinal items that constituted the questionnaire. This is an acceptable score.

CHAPTER 4

RESULTS

4.1 Introduction

This chapter presents the data obtained from the prospective cross-sectional survey and retrospective records review. These results are presented under the following sub-topics:

4.2 Part 1: Prospective cross-sectional survey

In total, 231 questionnaires were administered and 231 were returned which gave a 100% response rate. The total number of respondents with WMSD was 178 (77%).

4.2.1 Demographic characteristics of the respondents

Table 4.1 shows the age and gender distribution of the respondents as well as the age and gender distribution of the respondents with WMSD.

Almost 88% of the respondents were females with the male to female ratio of 1:7. The females constituted 90% of the total respondents with WMSD. There was no correlation between gender and the development of WMSD.

Table 4.1: Distribution of Respondents and those with WMSD by Age, Gender and WMSD

Reported WMSD			Age					Total
			20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	
			n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
With WMSD		Male	2 (1)	11 (6)	3 (2)	2 (1)	0 (0)	18 (10)
		Female	15 (9)	68 (38)	56 (31)	18 (10)	3 (2)	160 (90)
	Total		**17 (10)**	**79 (44)**	**59 (33)**	**20 (11)**	**3** (2)	**178 (100)**
Total		Male	2 (1)	15 (6)	8 (4)	3 (1)	0 (0)	28 (12)
		Female	22 (10)	92 (40)	65 (28)	21 (9)	3 (1)	203 (88)
	Total		**24 (11)**	**107 (46)**	**73 (32)**	**24 (10)**	**3 (1)**	**231 (100)**

A large number (89%) of the respondents were younger than 50 years of age. The 30-39 years age group comprised 46% of the total respondents and 44% of this age group complained of WMSD. Eighty seven percent of the respondents younger than 50 years of age complained of WMSD. The minimum age of respondents was 25 and maximum 63. The mean and standard deviation of the age for the total respondents was 39.48 ± 8.28, for those with WMSD it was 80.77 ± 18.11. No association between age and WMSD was observed.

Table 4.2 shows the BMI and age distribution of respondents with WMSD.

Table 4.2: Distribution of respondents with and without WMSD by BMI and age

Reported WMSD			Age					Total
			20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	
			n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
With WMSD	BMI	Normal	8 (5)	16 (9)	4 (2)	1 (1)	0 (0)	29 (17)
		Overweight	3 (2)	24 (13)	20 (11)	4 (2)	0 (0)	51 (28)
		Obese	6 (3)	39 (22)	35 (20)	15 (8)	3 (2)	98 (55)
	Total		**17 (10)**	**79 (44)**	**59 (33)**	**20 (11)**	**3 (2)**	**178(100)**
Total	BMI	Normal	8 (3.3)	18 (8)	6 (3)	2 (1)	0 (0)	34 (15)
		Overweight	8 (3.3)	39 (17)	23 (10)	7 (3)	0 (0)	77 (33)
		Obese	8 (3.3)	50 (22)	44 (19)	15 (6)	3 (1)	120 (52)
	Total		**24 (10)**	**107 (47)**	**73 (32)**	**24 (10)**	**3 (1)**	**231(100)**

Almost 52% of the respondents had BMI which classified them as obese at the time of data collection and 55% of respondents who reported WMSDs were from this group. As shown in table 4.2, the overweight and obese respondents made up 85% of the total respondents and 83% of respondents with WMSDs. The minimum BMI of the respondents was 19 and the maximum 51; the mean and standard deviation of the BMI values for the total sample were 31.20 ± 6.60 and 31.00 ± 7 for respondents with WMSD. None of the respondents were underweight.

4.2.2 Lifestyle characteristics

The lifestyle characteristics that were investigated in relation to WMSD included smoking, consumption of alcohol and involvement in physical exercise.

Twelve (5%) respondents smoked cigarettes. About 54% smoked an average of four cigarettes per day. Nine of these respondents (75%) suffered from WMSD. This group made up four percent of the total respondents with WMSDs. One participant did not respond to the question. A total of 15 (6%) respondents drank alcohol. Of these, nearly 47% drank two liters per day. Eleven (73%) respondents from this group reported WMSDs, which represented five percent of respondents with WMSDs. One participant did not respond to the question. The results showed a direct moderate relationship between smoking with WMSD (R= .698; p=o.o1) and alcohol intake with WMSD (R= 0.354; p=0.01). These results were taken with caution as only a few were smoking or drinking alcohol.

In terms of the respondents' involvement in structured physical exercises, 16% (only 37 out of 231) participated in structured physical exercises. Two respondents did not respond to the question. In terms of the frequency of exercises performed by these respondents, 54% of them exercised three to five times per week. Reported WMSDs amongst this group constituted 13% of the total respondents with WMSDs. There was a significant correlation between WMSD and participation in exercise (R= 0.412; p= 0.01).

4.2.3 Work tasks and workloads of respondents

This section reports on occupational characteristics related to WMSD of the respondents for example the duration of employment as a nurse, employment category, shift worked, work tasks and workload performed.

On average, respondents have been employed as nurses for ± nine years. The mean values and standard deviations for nurses' employment and WMSD was 13.89 ± 3.56 and 12.30 ± 4.21 respectively. The period of employment in their current job is (on average) half of the period employed as a nurse. A strong directly proportional relationship existed between the two variables (Pearson's R=0.701). As shown in figure 4.1, the majority of the respondents were enrolled nurses (EN) with non- specialised professional nurses (Non-Sp PN) making up the second largest group. There is a high prevalence of WMSD in all ranks, with the average twelve months prevalence being 79%. Enrolled nurses reported the highest incidence of WMSDs. The incidence of WMSD does not appear to be directly related to the rank of a nurse.

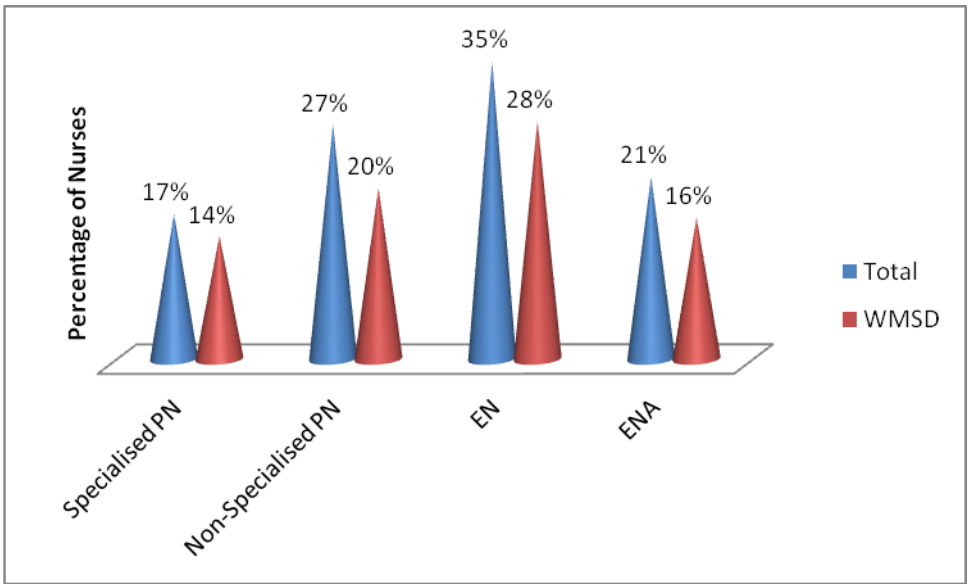

Figure 4.1: Comparison of nurse categories with WMSD

Table 4.3 shows the relationship between the units the respondents work in and ratio of nurses reporting WMSDs by rank. When compared to other units, the Out-Patients Department (OPD) had more nurses (n=56) and also the highest number reporting WMSDs (n=38) in all ranks. This department made up 25% of the total respondents and 26% of reported WMSD. For most of the ranks with the

exception of specialty professional nurses, nurses in the Medical Department also had higher rates of WMSDs (n=30) contributing 13% of the respondents with WMSD. Within the nurses' categories or ranks, the enrolled nurses (EN) had the highest number of WMSDs, followed by the non-specialised professional (Non-Sp PN) nurses. More than 80% of the respondents worked day shift, 40 hours per week on average during the data collection period. Fifty to ninety three percent of the nurses in the majority of the units reported WMSD (Table 4.3).There was a significant correlation between the nurse category and the unit where the nurse worked (R= -.155, p= -0.19) however, the relationship is inverse, implying that the more specialised the unit is, the less likely that general staff would be employed in those hospital units.

Table 4.3: Distribution of nurses, total (N) with WMSD (n) by rank and per unit

Nurse Category	Surg N (n)	Med N (n)	Ortho N (n)	OBGyn N (n)	Paed N (n)	OPD N (n)	ICU N (n)	Theat N (n)	Total N(n)
SPN	2 (0)	3 (2)	4 (2)	5 (5)	4 (3)	9 (6)	7 (6)	5 (5)	39(29)
NSPN	4 (3)	9 (9)	7 (6)	8 (6)	9 (5)	13(10)	8 (5)	5 (4)	63(48)
EN	7 (7)	13(11)	10 (10)	10 (10)	12 (7)	20(12)	5 (5)	2 (3)	79 (65)
ENA	3 (3)	10 (8)	3 (2)	7 (6)	9 (4)	14(10)	2 (2)	2 (1)	50 (36)
Totals	16 (13)	**35(30)**	24 (20)	30 (27)	34(19)	**56(38)**	22(18)	14(13)	231 (178)

Table 4.4 indicates the different nursing activities and the frequency of involvement of respondents in each of the activities. Some of these activities include lifting loads weighing between nil to above 50kg, bending, walking, repetitive movements, overstretching and pulling or pushing. On average, only about eight of respondents did not have to do any of the listed activities. Most of these WMSD inducing activities were reported as being undertaken more than three times per day; for example walking and standing (92% and 91% respectively), pushing or pulling, writing and bending (between 79% and 86%) and

the less frequent task with the least percentage (four percent) at a frequency of more than three times a day and a score of never occurring (20%) was sitting.

Table 4.4: Participation rate in specific nursing activities

	Never	Seldom	1-3 per week	0-3 per day	More than 3 times/day
	n (%)	n (%)	n (%)	n (%)	n (%)
Lifting: 0-5kg	26 (11)	7 (3)	7 (3)	47 20)	143 (62)
Lifting: 6-50kg	24 (10)	12 (5)	17 (7)	40 (17)	138 (60)
Lifting: Above 50 kg	28 (12)	18 (8)	19 (8)	58 (25)	107 (47)
Bending	3 (1)	8 (4)	4 (2)	32 (14)	184 (80)
Overstretching	6 (3)	21 (9)	18 (8)	39 (17)	146 (64)
Pulling/Pushing	5 (2)	3 (1)	4 (2)	20 (9)	199 (86)
Writing/ PC use	4 (2)	3 (1)	1 (0)	36 (16)	187 (81)
Standing always	5 (2)	7 (3)	4 (2)	4 (2)	211 (91)
Sitting always	45 (20)	102 (44)	40 (17)	34 (15)	10 (4)
Walking always	2 (1)	3 (1)	3 (1)	10 (4)	213 (92)
Repetitive movements	13 (6)	34 (15)	22 (10)	78 (34)	84 (36)
Same posture for long periods	41 (18)	86 (37)	20 (9)	27 (12)	57 (25)
Awkward posture	34 (15)	90 (39)	19 (8)	39 (17)	48 (21)

4.2.4 Reported Work-related Musculoskeletal Disorders

This section reports the WMSDs experienced per each body region in the past seven days and twelve months period, is displayed in Table 4.5. Low back pain was the most prevalent compared to all other body regions and in all the hospital units and across all age groups. The seven days and twelve months prevalence of low back pain was reported to be 59% and 26% respectively, followed by the upper back pain at 41% for seven days prevalence and 18% for twelve months prevalence. The neck also showed second highest prevalence at twelve months reporting with 18.5%. The lowest report of pain or discomfort was in the elbows, with an equal two percent both seven days and twelve months. One participant (0.4%) did not report on the neck, shoulders and ankles/feet regions. Unfortunately, this participant could not be contacted on subsequent visits to the study site because she had changed shifts.

The results further provide information on whether the occurrence of such WMSD had prevented the nurse from performing normal duties and participating in leisure activities or not (the "participation" complex). The affirming responses on the question whether the participant had experienced a reportable WMSD was five percent (12 out of 231), while 30% (69 out of 231) confirmed that they had experienced some WMSD in a separate question and 77% (n=178) of the respondents were able to identify either one or more musculoskeletal region which had been affected in the past seven days (59%) and twelve months (77%) period. More than half (66%) of the respondents reported that the WMSD had interfered with the ability to perform either normal duties or participate in leisure activities.

Table 4.5: Prevalence of pain and discomfort by body part/ region

Area of pain (body part)	Prevalence	
	Twelve months n (%)	Seven Days n (%)
Neck	33 (18.5)	40 (23)
Right shoulder	21 (11.8)	25 (14)
Left shoulder	19 (10.7)	26 (15)
Both shoulders	20 (11.2)	29 (17)
Right elbow	4 (2.2)	3 (2)
Left elbow	3 (1.6)	4 (3)
Both elbow	3 (1.6)	2 (2)
Right wrist/hand	10 (5.6)	9 (5)
Left wrist/hand	8 (4.5)	8 (5)
Both wrist/hand	6 (3.4)	5 (3)
Upper back	32 (18.0)	73 (41)
Low back (small of the back)	47**(26.4)**	104 **(59)**
One or both thighs	7 (3.9)	9 (5)
One or both knees	17 (9.6)	18 (11)
One or both ankles/feet	22 (12.4)	56 32)
Overall	178 (76.7)	136 (59)

Table 4.6 shows the number of reported WMSD per unit and body part/s affected. Sixty five percent of the respondents had experienced WMSD in more than two body parts. The highest recorded symptoms were from those working in OPD (17%), followed by the Medical unit (twelve percent) and Gynae and Obstetrics units (ten percent), however these amounts were proportionate to the number of nurses in those units.

Table 4.6: Number of reported WMSD per unit and body part/s

Body parts/ WMSD regions	**Hospital units**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Neck or shoulders	0 (0)	1 (0)	0 (0)	0 (0)	1 0)	3 (1)	0 (0)	0 (0)
One or two arms	0 (0)	0 (0)	2 (1)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Upper back	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)
Lower back	0 (0)	2 (1)	1 (0)	1 (0)	0 (0)	2 (1)	2 (1)	1 (0)
Lower limbs	0 (0)	2 (1)	3 (1)	0 (0)	2 (1)	2 (1)	1 (0)	0 (0)
Two to three parts	4 (2)	8 (3)	3 (1)	11 (5)	8 (3)	13 (6)	9 (4)	4 (2)
More than three parts	9 (4)	17 (7)	11 (5)	12 (5)	7 (3)	19 (8)	6 (3)	9 (4)
Total	**13 (6)**	**30 (12)**	**20 (8)**	**25 (10)**	**18 (7)**	**40 (17)**	**18 (8)**	**14 (6)**

Hospital units: 1= Surgical; 2= Medical; 3= Orthopaedic; 4= Gynae and Obstetrics; 5= Paediatric 6= Out Patients Department (OPD); 7= Intensive Care Unit (ICU); 8= Theatres

Half of the respondents (51%) who had experienced WMSDs had consulted doctors, physiotherapists or other medical practitioners as a result of the WMSD problem. Almost twelve percent had to be hospitalised and about six percent had to change their jobs as a result of the WMSD.

Table 4.7 indicates the number of reported WMSD per unit, nurse rank and duration of experienced symptoms. Up to 67% experienced some problem in the past twelve months; 38% reported to have had the problem for more than 30

days. The surgical and ICU unit nurses had symptoms that persisted longer the other units, with 92% and 90% of the nurses respectively reporting symptoms that persisted for more than seven days. As shown in table 4.6, the symptoms of the nurses in both these units were not isolated to specific body parts but were predominantly experienced in two or more body parts by the respondents.

Table 4.7: Prevalence of reported WMSD per unit, nurse rank

	WMSD prevalence (7 day and 12 month by nurse category									
	SPN		NSPN		EN		ENA		Total	
Unit	7 day	12 month	7 day	12 month	7 day	12 month	7 day	12 month	7 day	12 month
Surgical	0	**0**	0	3	0	7	0	3	0	13
Medical	1	1	3	6	2	9	0	8	6	**24**
Orthopaedics	1	1	0	6	1	9	1	1	3	17
Gynae/Obst	1	4	1	5	1	9	0	6	3	**24**
Paediatric	0	5	1	5	0	10	0	6	1	**26**
OPD	0	6	2	8	2	10	1	9	5	**33**
ICU	0	6	1	4	0	5	0	2	1	17
Theatre	1	4	1	3	0	3	0	1	2	11
Total	4	**27**	9	**40**	6	**62**	2	**36**	21	165

PN-SP =Professional nurse specialty; Non SP-PN=; Non-specialised professional nurse; EN= Enrolled nurse; ENA= Enrolled nursing assistant

4.3 Part 2: Retrospective records review

This activity was aimed at reviewing the existing hospital records for WMSD related data in nurses. The records that were reviewed were staff clinic records and staffs leaves records.

4.3.1 Staff clinic records

Two sets of staff clinic records in respect of nursing staff visits to the staff clinic were reviewed. These were the daily clinic attendance register and the monthly clinic statistics record.

The daily clinic register recorded all staff clinic (Occupational health clinic) attendees, diagnosis and number of sick leave days granted. The daily register

had further classified WMSD into six musculoskeletal conditions; these are shown in table 4.8. Tendonitis was the most reported WMSD at 28%, followed by trauma (unspecified) at 20%.

In the monthly statistics, diagnosis were classified as follows; Respiratory system (included new Tuberculosis cases, flu, bronchitis and allergic rhinitis) (n=1515), skin conditions (n=114), immunisations (Hepatitis B and Flu vaccine) (n=904), occupational related complaints (n=185), medical surveillance (n=114), chronic diseases (n=2420), Voluntary counselling and testing (VCT) (n-526) and other (n=3527). Occupational related complaints were further classified under seven sub-categories namely; Injury on Duty incidents (though these were not specified), needle stick injuries, body splashes, myalgia, arthralgia, falls and other. Injury on duty accidents was the highest at 51%, followed by Myalgia and Arthralgia (both are MSD conditions) at 23% of the total occupational related complaints for the whole year in 2013. The monthly statistics indicated that the total attendance by all hospital staff (all occupations) to the staff clinic from 01 January 2013 to 31 December 2013 was n=9523; this total included all other diagnoses. Almost 46% of the clinic attendees were classified as other; the second highest number (26%) had chronic illnesses and was followed by 15% who had respiratory illnesses. Both clinic records (daily attendance register and monthly statistics) did not specify the hospital units and employee categories of staff that attended the staff clinic. Therefore it was difficult to establish the relationship between reported WMSD, absenteeism and the staff clinic visits (H_A 6).

The occupational related complaints represented less than five percent of the total staff clinic visits per annum.

Table 4.8: Clinic classification of WMSD in the monthly register

WMSD Classification	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Tendonitis	5	5	2	2	4	2	4	5	11	12	0	5	**57**
Backache	6	1	3	1	2	3	5	2	2	8	1	0	**34**
Myalgia	6	2	0	1	1	2	2	1	0	0	3	4	**22**
Arthralgia	2	0	3	4	0	1	1	2	4	3	5	2	**27**
Trauma	4	1	8	3	1	6	4	6	2	3	0	3	**41**
Other	4	1	0	1	3	3	4	2	2	3	2	1	**26**
Total	**27**	**10**	**16**	**12**	**11**	**17**	**20**	**18**	**21**	**29**	**11**	**15**	**207**
Sick leave granted	0	0	6	15	3	7	16	4	10	13	0	0	**74**

4.3.2 Absenteeism records

Nursing staff leave records were extracted from the hospital staff leave record, the daily clinic attendance register, information gathered on the questionnaire (Appendix D) and absenteeism checklist (Appendix F). The latter two records had been collected during the first phase of data collection. Staffs leave in the hospital leave record are presented in table 4.9; breakdown of sick leave by nurse category is presented in Figure 4.2. The hospital staff leave records contained leave classification as follows:

- Annual leave or vacation leave.
- Sick leave: sick leave comprised of paid sick leave and when temporal incapacity certificate had not been submitted.
- Other leave: this included Family responsibility leave, Maternity leave, Study leave and examination leave
- Unauthorised leave or absent without official leave (AWOL)

Table 4.9: Total leave taken by nursing staff for the period 01/01/2013-31/12/2013

Leave classification	Number of days
Vacation leave	25 464
Sick leave	11 644
Other leave	2 671
Unauthorised leave	766
Total	**39 166**

The staff sick leave records did not indicate the nature of illness and therefore WMSD related sick leave could not be identified. It was only on analysis of the staff clinic daily attendance register, shown in table 4.8, that an association was made of staff who had been booked off sick for 74 days in twelve months due to musculoskeletal conditions. However, this record does not indicate the employment category of the staff. From the total leave record (Table 4.9), nurses sick leave was compiled as per nurse category as indicated in Figure 4.2. Professional nurses had the highest sick leave days (44%) than the other two nursing categories. The hospital staff leave record had also indicated the total temporal incapacity leave taken by Professional nurses (n=6) to be n=458 days, Enrolled nurses (n=1) n= 36 days and Enrolled nursing assistants (n=7) n= 694 days in twelve months. Injury on duty leave was recorded to be nil for Professional nurses, eight for Enrolled nurses and 18 for Enrolled nursing assistants.

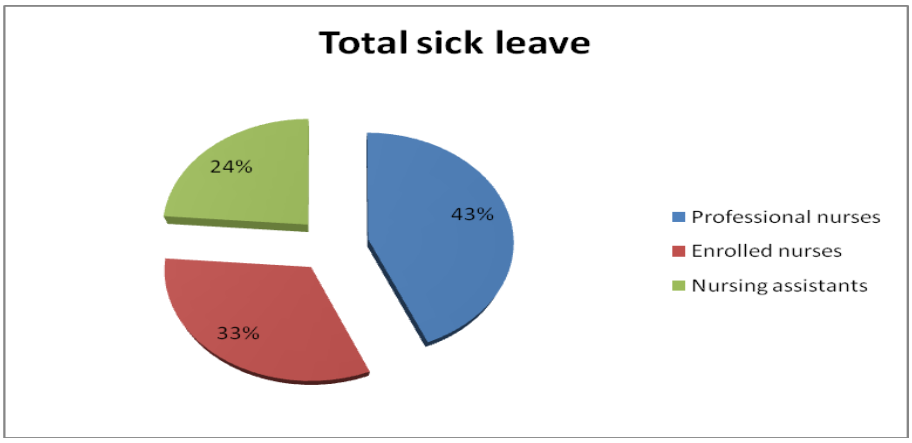

Figure 4.2: Sick leave record for the period 01/01/2013 to 31/12/2013 by nursing staff category

As indicated in table 4.10, the enrolled nursing assistants had the highest rate of sick absenteeism due to WMSD which was 37% of the total reported WMSD absenteeism. The answers on the question asked about the number of days that the respondent had stayed away from work as a result of the WMSD had indicated that the total number of days for all nurse categories had been 302 over the twelve months period.

Table 4.10: WMSD Sick leave record for the period 01/01/2013-31/12/2013 by unit and Nursing staff category

Average leave days	Nurse Categories			
	PN	**EN**	**ENA**	**Total**
ICU	12	11	4	27
Medical	15	14	12	41
Obstetrics/Gynae	13	13	23	49
OPD	11	10	14	35
Orthopaedics	12	13	17	42
Paediatric	10	12	24	46
Surgical	13	10	8	31
Theatre	11	11	9	31
Grand Total	**97**	**94**	**111**	**302**

PN- Professional nurse EN-Enrolled nurse ENA-Enrolled nursing assistant

4.4 Summary of results

Work-related musculoskeletal disorders, though a preventable disease, continues to affect a large number of the healthcare workers and leads to increased staff shortages, absenteeism and disability. In this study, the WMSD had affected all nurse categories, male and female, young and old and all hospital units in almost equal severity. The next chapter will give an in-depth discussion of the results and explain the identified relationships between any of the variables and WMSD.

CHAPTER 5

DISCUSSION

5.1 Introduction

This chapter will focus on discussion of the study findings that have been presented in chapter four. This discussion will be done under the following headings:

5.2 Part 1: Findings of the prospective cross-sectional survey

5.2.1 Prevalence of WMSD in nurses

The lifetime prevalence of WMSD in nurses in this study (77%) was within the prevalence range in previous studies between 60-95% (Smith et al 2005:431-440 ; Tinubu et al 2010; Mitchel et al 2008: 152; De Souza et al 2010: 429-435; Bos et al 2007: 198-206). The twelve months prevalence of 67% was still within the range but seven days prevalence of 43% was lower than that described in the

literature. The first hypothesis that a significant number of nurses will report a high seven and twelve months' prevalence of WMSD was confirmed.

Only 30% of the nurses linked the WMSD with specific work activity, and only five percent reported suffering the WMSD at the time. This may suggest under reporting of WMSD by the nurses as stated in various previous WMSD studies (Menzel 2008:489; Engkvist 2008:291 and Siddharthan et al 2006:463-476). The seven days prevalence in the current study was lower than the twelve months prevalence; this is consistent with all other studies (Tinubu et al 2010; Mitchel et al 2008: 152). It is possible that nurses adapt and adjust to pain due to the nature of their work and only seek medical attention when the condition becomes unbearable. Ignoring symptoms together with the self-management of WMSD during the early phase could explain the lower seven days prevalence of WMSD. Tinubu et al (2010) reported that 30% of the respondents in their study self-managed their body ailments. Wiitavaara, Barnekow-Bergkvist and Brulin (2007:1379-1390) also believed that nurses ignored their pain as part of the coping mechanism and wanted to be seen as "caring for patients." Altman (2010: 134-146), also reported that nurses always placed the welfare of their patients before their own. This meant that the tendency was to ignore their own pains and discomfort whilst making the patients as pain free and comfortable as possible.

5.2.2 Affected body areas

The current study sought to compare the prevalence of WMSD in all ten body regions or areas; however, the Nordic Questionnaire for Musculoskeletal Symptoms (Kuorinka et al 1987) (Appendix D) had grouped the last two body regions namely the ankles and feet into one body region to make a total of nine body regions. Several studies focused on WMSD in some body regions. Caruguno et al (2012) explored WMSD in six body areas, namely, neck, shoulders, elbows, wrists/hands, low back and knees, while Altman (2010) reported on neck and shoulders dysfunction; compared to Daraiseh (2010) and Smith et al (2005:431-440) who focused on lower back pain in nurses. Many studies (Mitchell et al 2008:1633-1644; Bos et al 2007:198-206 and Cameron et al 2008:103-114)showed low back pain was the most prevalent (30-78%) WMSD. The prevalence of pain in the low back (21% for the twelve months and 47% for

the seven days) in this study was higher than that of other body regions. Low back pain was the most prevalent in all units and across all nurse ranks. Naidoo and Coopoo (2007:71) found that the lack of physical exercise was a contributing factor to the weak back muscles which resulted in the increased back pain complaints in their study. This report is congruent to our finding that 84% of the respondents were not engaged in physical exercises at the time of the study. Caruguno et al (2012) had reported a direct link between lifting weights greater than 25 kg and the development of low back pain.

Tinubu et al (2010) and Smith et al (2005: 431-440) reported that the second highest prevalence of WMSD was that in the neck area, at 28% and 44% respectively. Tinubu et al (2010) reported low rates of complaints involving the hips and thighs (four percent) whilst Smith et al (2005) reported that the elbows (six percent) were the least affected in their study.

There was a higher tendency (65%) of WMSD affecting more than two body parts. In all cases where more than two body parts were affected, low back was one of the reported parts. Daraiseh (2010: 19-24), in her study on nurses in the United States, speculated that where WMSD affected one region there might be an association (if not a precursor) to symptoms in another region. The literature had varying views on the extent to which WMSD interfered with the work or leisure of the person experiencing the symptoms. Almost 47% of the respondents reported that although they had pains from the WMSD, they were able to cope with their normal duties at work, however, the tendency would be to suspend all leisure activities and be on complete bed rest at least the first off from work day.

5.2.3 Patterns of WMSD in each unit

Although the prevalence and patterns of WMSD was almost the same across all nursing ranks, the highest recorded symptoms were from those working in OPD (22%), followed by Medical unit (17 %,) gynae/obstetrics and paediatric units (16%). In a study conducted in Nigerian nurses by Sikuru and Hanifa (2010), they had reported that poor working conditions and incorrect lifting procedures were significant contributory factors to the development of WMSD in nurses. The low prevalence of WMSD reported by nurses working in the orthopaedics (12%) are dissimilar to that observed by Goswam, Haldar and Sahu (2013) in their study on

nurses working in an orthopaedic ward in a hospital in India; where the findings showed the waist to be the most affected body part. It could be argued though that the study by Goswam et al (2013) could not be generalised because it consisted of a very small sample (23) and included staff (enrolled) nurses only. The low prevalence rate in ICU nurses contradicts the findings by Madiba et al (2013: 20-23) who had reported 80% prevalence rate amongst ICU nurses in their study in Pretoria. The OPD and medical units had the highest numbers of nurses experiencing WMSD in more than three body areas.

Half of the respondents (51%) who had experienced WMSDs had consulted doctors, physiotherapists or other medical practitioners as a result of the WMSD problem and 49% had self-medication or no medication. This was slightly lower percentage than that reported by Sikuru and Shmaila (2010); who found that about 42% of nurses with WMSD consulted medical practitioners, 27% went for physiotherapy sessions and 32% preferred self-medication. Among the Australian undergraduate nurses, Mitchell et al (2008) reported that 60% of nurses required at least one medication, modification of their work or treatment as a result of the lower back problem.

5.2.4 Common characteristics amongst nurses with WMSD

The characteristics that had been reviewed in this study were the demographic and lifestyle characteristics.

5.2.4.1 Demographic characteristics and WMSD

Three specific demographic characteristics (age, gender and the body mass index (BMI)) were identified from other studies (Caruguno et al 2012: 1632-1642; Nelson 2006:463-476; Tinubu et al 2010 and Naude 2008: 8-9) that sought to establish the relationship of these characteristics to WMSD.

The literature shows conflicting findings with regards to the correlation of age and the development of WMSD with some scholars reporting an increased prevalence of WMSD on nurses above 50 years of age (Cameron et al 2008: 105, Nelson 2006: 463-476. Hinmikaiye and Bamishaiye (2012), Mitchel et al (2008: 1640-1642) and Tinubu et al (2010) reported that the prevalence of WMSD decreased with the advancement of one's age, especially between 51-60 years of age. The

current study is in agreement with the findings of Altman (2010), Naude 2008, Engkvist (2008: 291-301) and Daraiseh (2010:19-20), that there is no significant relationship between age and WMSD. The results did not show any significant relationship between age, BMI and the development of WMSD within this population thus rejecting the alternative hypothesis (number 5) that nurses who are overweight and obese have a higher incidence of WMSDs than those with normal weight.

As with all other studies (Fabunmi et al 2008: 28-29; Naude 2008: 10-11 and Sikuru and Shmaila 2009), and possibly because the nursing profession attracts more females than males, the majority of respondents (88%) in this study were females with the male to female ratio of 1:7. Whilst Sikuru and Shmaila (2009) reported a significant relationship between gender and WMSD, Naude (2008:50) and Fabunmi et al 2008:28-29) did not find any significant relationship between gender and WMSD. The current study, did not show any significant relationship between gender and WMSD.

Eight five percent of the respondents in this study were classified as overweight and obese and this group contributed 83% to WMSD group. Naude (2008: 52-53) believes that there are other contributory lifestyle characteristics that influenced the increased BMI and hence the development of WMSD. There was no statistically significant relationship between WMSD and BMI in Naude's (2008:52-53) study. Contrary to these findings, De Souza et al (2010:190) and Engkvist (2008:297) reported a significant relationship between BMI and WMSD in their studies. The current study did not find any significant relationship between BMI and WMSD. This failed to prove the fifth alternative hypothesis (H_a5) of this study, that nurses who are overweight and obese have a higher incidence of WMSDs than those with normal weight.

5.2.5 Lifestyle characteristics and WMSD

The lifestyle characteristics considered in the current study included smoking, alcohol consumption and involvement in physical exercise.

The pattern of WMSD in smokers was no different from their non-smokers peers. Smoking had been reported not to be significant to WMSD by Naude (2008: 53), although she felt that the very low number of smokers in her study could have

contributed to these results. Contrary to these findings, a significant association of smoking and WMSD had been reported by Abete et al (2013: 63-69) and Lee et al (2013: 850-859); whilst Daraiseh et al (2010: 19-24) reported an association between smoking and development of WMSD in multiple body areas. The prevalence of WMSD in smokers in this study was, however, very low compared to the reported regional smoking rates (Health Systems Trust 2012).

This study showed a moderate relationship between alcohol consumption and development of WMSD. This is supported by Barclay et al (2008: 139-151) who had reported that chronic alcohol consumption resulted in reduction of calcium absorption and nutritional deficiencies which led to osteoporosis, osteomalacia, fractures, avascular necrosis and toxic myopathy. However, Naude (2008: 1-98) reported that there was no significant relationship between the development of WMSD. Bergman et al (2013: 220) reported a conflicting report that alcohol in the body Naude (2008: 53) had reported alcohol consumption was closely associated with decreased self-reported disease in female rheumatoid patients. The results of alcohol consumption in this study were very low compared to the Alcoholism Statistics for South Africa (2007) which had reported that about 60% of trauma patients admitted in hospital had dangerously high levels of alcohol in their bloods and six out of ten drivers die as a result of alcohol intoxication. The low prevalence rate of respondents taking alcohol could be one result of social desirability (Polit and Beck 2012: 313).

Respondents' reporting on participation on physical activity had shown very low rate of respondents who participated in structured physical activities. The results did show an association between the development of WMSD and participation in physical activities. There were positive benefits (low prevalence of WMSD) for those that were participating to physical activities. Naude (2008: 54) reported two separate results regarding the significance of physical exercise and WMSD; one was that there was no significant relationship between WMSD and back pain. The argument was that those that exercised had one or two sessions of exercise per week. The second group had showed a significant relationship between WMSD and exercise, this group was made up of respondents who were involved in group exercises. Naude (2008: 54) made an assumption that respondents participating

in group exercises had benefited from structured exercises because of better compliance.

5.2.6 Work tasks and workloads

Determining the relationship between the work tasks or workloads with the development of WMSD was another objective. Yeung et al 2012:85-86 and Tinubu et al 2010 showed that WMSD were a significant contributing factor towards the morbidity of healthcare workers. In the present study, almost 31% of the respondents who reported WMSDs had their work and leisure activities decreased by the occurrence of the MSDs. Nurses, in particular, experience WMSDs more frequently because of physical exertion due to the type of their duties (Tinubu et al 2010; Motacki and Motacki 2009: 221-226). A high number of nurses (92%) in this study undertook these duties at a frequency of more than three times a day with walking, standing and pushing or pulling being more frequent at 92%, 91% and 86% respectively.

This resulted in a high rate of WMSD occurring in lower parts of the body for example lower back pain reported to be 61.5% compared to 48.5% for upper back pain; discomfort or injury on the ankles and feet were reported by 41% of the total sample compared to five percent for wrist and hands complaints. This confirmed the relationship between work schedule and the development of WMSDs among healthcare workers as highlighted in the study that was conducted by Caruso and Walters (2009:523-534). However, in terms of WMSDs between nurse categories in this study and as indicated in table 4.3, the prevalence rate of WMSD was the proportionate to the total number of nurses within each category. The hypothesis number 4, that lower nurse categories have the highest number of WMSD, is therefore rejected.

Naude (2008:56), reported that lifting was not found to be a significant factor for the development of WMSD (OR 1.78 CL 0.98) but, had recommended direct observation of working positions rather than the self-administered questionnaire as a more reliable method of assessing the postural workload.

5.3 Part 2: Findings of retrospective records review

5.3.1 Staff clinic visits

The staff clinic operates on a daily basis from Monday to Friday (excluding holidays) between 07:00 to 16:00. Hospital staff who requires medical attention outside these hours, attends the hospital out patients department. The daily clinic register had further classified WMSD into six musculoskeletal conditions namely; tendinitis, backache, myalgia, arthralgia, trauma and other. Tendonitis had the highest twelve months prevalence of 28% followed by trauma and backache at 20% and 17% respectively. The daily clinic attendance register was used to formulate monthly clinic statistics.

The clinic reporting of WMSD during the study was compared to the clinic records of reported WMSD and staff clinic visits records. The results indicated that there was poor reporting of WMSD by nurses. This evident in the discrepancy between the high prevalence (77%) of WMSD but the occupational related complaints made up less than five percent of the total clinic attendees moreover, the clinic statistics included all other hospital employees. The factors that could be contributing to this may be influenced by what Guzman et al (2010:199-213) had defined as the “care” and the “claim” complexes. These complexes include the decision that a person has to make in terms of whether to seek for help or not, where to seek this help (public or private service provider) and influences of the outcome of a claim or reporting following the WMSD.

The inaccurate reporting of WMSD incidents were also observed by other researchers (Menzel 2008:489-490; Siddharthan et al 2006 and Engkvist 2008: 291) and as in this study, sometimes nurses resorted to self-medication as a quicker option of addressing the WMSD problems especially when there would be a long process to be followed in reporting the WMSD.

5.3.2 Absenteeism records (staff leaves)

The leave period under review was from the first January 2013 to the thirty first December 2013.There was no link between absenteeism and the number of reported WMSD, staff visits to the staff clinic and sick leave records. The number of days lost in this study was slightly higher than the reported lost number of days

(202 days for 570 respondents) in Sikuru and Shmaila (2009) study conducted in a Nigerian hospital. However, their study focused only on low back pain. Sick leave days were proportionate to the number of nurses per unit and the different nurse ranks.

The days lost due to WMSD cost the healthcare sector a lot of money, especially in an already overstretched South African health system. Meeks- Sjostrom et al (2009) reported that the huge nurse turnover was due to injuries related to patient lifting and estimated that the cost of replacing one professional nurse was about $25 000 (R375 000) and that about $89 000 (R1 335 000) was lost in 2005 due to patient lifting incidents. Naidoo and Coopoo (2007) Motacki and Motacki (2009) reported that inadequate research on WMSD was conducted in South Africa to address the problem of huge nurse turnover.

5.3.3 Summary of all hypotheses

This study proved that a significant number of nurses will report a high for seven days as well as twelve months prevalence of WMSD (H_A 1) and that there was no link between the number of WMSD, absenteeism and staff clinic visits (H_A 6). However, it refuted that the profile of affected body parts due to injuries will be the same in all units (H_A 2), the WMSD rates will be directly proportional to the absenteeism rate (H_A 3) and that lower nurse categories have the highest number of WMSD (H_A 4). This study also supported that absenteeism and staff clinic visits were not the same across nurse categories (H_A 7). The study also refuted that nurses who are overweight and obese had a higher incidence of WMSD than those with normal weight.

CHAPTER 6

CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

6.1 Conclusion

Nurses' duties expose them to high risks of work-related musculoskeletal disorders, which contribute to immobility and high nurse turnover. The lifetime prevalence of WMSD in nurses in this study was 77% with the twelve months prevalence of 67% and the seven days prevalence of 43%. The prevalence of low back pain was higher (21% for twelve months and 47% for seven days) than that of other body regions with a higher tendency (65%) of WMSD affecting more than two body regions. Although the prevalence and patterns of WMSD was almost the same across all nursing ranks, nurses working in the Out Patients Department reported the highest prevalence (22%) than all other units.

Factors such as age, gender, BMI, smoking and alcohol did not predispose to an increase in the prevalence of WMSD. However, this study showed a moderate relationship between alcohol consumption and development of WMSD and there were positive benefits (low prevalence of WMSD) for those that were participating to physical activities. Private healthcare providers were chosen as healthcare providers in most incidences with a resultant increased absenteeism, reduced staff clinic visits, poor reporting or follow up of WMSD incidents.

6.2 Limitations

The study could not establish whether there was a relationship between reported WMSD, visits to the staff clinic and staff leaves because of unavailability of supporting records at the staff clinic and the Human Resources department.

The hospital records were incomplete for example reasons for sick leave taken were not recorded; and therefore could not establish a relationship between WMSD, absenteeism and the staff clinic visits by nurses.

6.3 Recommendations.

This study should be expanded to other hospitals. A comparison between public and private hospitals and the preventive strategies for each sector will yield valuable information that could assist in the improvement of strategies for the

preventative and management of WMSD in nurses. In addition the ergonomics of hospital equipment should be determined and compared to the prevalence of WMSD. Management and all stakeholders should ensure that they promote a supportive WMSD reporting, follow up and management policies and environment that will encourage nurses to report all WMSD immediately or at least before the end of the shift as well as increase utilization of the staff clinic.

6.3.1 Clinical recommendations to the hospital

Health risk assessments (HRA) should be done at each hospital unit to identify hazards and eliminate ergonomically unsuitable equipment and furniture. The HRA would identify high risk units whereby urgent corrective actions and financial resources could be directed. The planning for and purchasing of hospital equipment and furniture should be a joint action between the purchasing department and the Safety, Health, Environment and Quality (SHEQ) team. The HRA will assist to identify gaps and adequate provision of resources (finance, buildings, personnel including SHEQ team, all necessary patient lifting equipment) would thus be ensured. The nurse managers would also benefit from this in that the nursing staff at risk of developing complications from WMSD would not be allocated to these high risk units. Courses on the prevention of WMSD should be provided to all nursing staff, initially during nurse training and thereafter on-going in-service training and refresher courses on Proper Patient Handling and Prevention of WMSD.

All relevant stakeholders should work together towards the development of work-related musculoskeletal prevention policies and Standard Operating Procedures for the prevention, reporting, minimizing and management WMSD. This would also involve review of the current reporting of WMSD systems, if any and also improve the management and record keeping of such incidents. The daily attendance clinic register should indicate the name, personnel number, unit, category and diagnosis of each clinic attendee to enable proper identification of the employee, unit and disease trends for follow up and management of occupational related illnesses and injuries.

6.3.2 Recommendations for further research

The other fellow researchers could do follow up studies that would determine the reasons why nurses do not report the WMSD. Another study could determine reasons nurses do not choose the staff clinic as their preferred health service provider especially when experiencing WMSD. Further research is needed with an objective of developing the WMSD Prevention Programme and Safe Patient Handling Guidelines for all healthcare workers in order to improve health status of nurses and lower the nurse turnover.

6.4 Competing interests

The researcher had no competing interests.

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Appendix A

DURBAN UNIVERSITY of TECHNOLOGY

INSTITUTIONAL RESEARCH ETHICS COMMITTEE (IREC)

10 June 2013

IREC Reference Number: **REC 36/13**

Mrs B T E Kumalo
P O Box 36091
Ntokozweni
4089

Dear Mrs Kumalo

The relationship between work-related musculoskeletal disorders, absenteeism and visits to the staff clinic by nurses in an eThekwini District hospital

I am pleased to inform you that Full Approval has been granted to your proposal REC 36/13.

The Proposal has been allocated the following Ethical Clearance number IREC 048/13. Please use this number in all communication with this office.

Approval has been granted for a period of one year, before the expiry of which you are required to apply for safety monitoring and annual recertification. Please use the Safety Monitoring and Annual Recertification Report form which can be found in the Standard Operating Procedures [SOP's] of the IREC. This form must be submitted to the IREC at least 3 months before the ethics approval for the study expires.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC SOP's. In addition, you will be responsible to ensure gatekeeper permission.

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Yours Sincerely

Dr D F Naude
Chairperson: IREC

Appendix B

Department of Nursing, 2nd floor Open House Building, Ritson Campus, Durban. 4001.
Tel: 031 3732606 Fax: 031 3732039

Kwa-Zulu Natal Department of Health
Private Bag X9051
PIETERMARITZBURG
3200

Dear Sir/Madam

REQUEST FOR PERMISSION TO CONDUCT A STUDY

I am a student registered for the M Tech: Nursing at Durban University of Technology. My study topic is "The relationship between work-related musculoskeletal disorders, absenteeism and visits to the staff clinic by nurses in an eThekwini District hospital."

Musculoskeletal disorders are the most commonly reported work-related illnesses impacting the quality of life through absenteeism, work restriction, loss of income and disability. Nurses are more at risk of work-related musculoskeletal disorders (WMSD) than other healthcare professionals because of the nature of their duties

The study aims to determine the work- related musculoskeletal disorders, risk factors, rate of absenteeism and staff clinic visits in nurses working in an eThekwini District hospital.

A quantitative cross-sectional survey will be conducted in one of the 11 Provincial hospitals in an eThekwini district. This hospital offers services at both regional and district level with a bed capacity of 1200. Through stratified random sampling of hospital units, a proportional sample of *230* nurses by category will be invited to participate in the study. An adapted, Nordic Questionnaire will be used to collect data. The data collection questionnaire will be validated using an expert group and pilot study will be conducted among six nurses (two from each category). Retrospective twelve months records review of absenteeism and staff clinic visits will be done. Confidentiality and anonymity of both the participants and the institution will be maintained at all times. Feedback and recommendations will be given at the completion of the study.

Permission is hereby requested to conduct the study at Prince Mshiyeni Memorial Hospital. All participant information will be kept confidential and the outcomes will be reported to you. Ethical approval will be obtained from the Durban university of Technology Institutional Research Ethics committee.

Person to contact in the event of any problems or queries:

Researcher: Thandi Kumalo (B.Tech Nursing) Tel: 031 373 2036
Supervisor: Prof T Puckree (PhD Exercise Physiology) Tel: 031 373 2704
Dept. HOD: Dr N Sibiya (D.Tech nursing) Tel: 031 373 2606
Institutional Research Ethics administrator: 031 373 2900

Complaints can be reported to the DVC: TIP, Prof F.Otieno on 031 373 2382.

Thank you

……..	…….
Babusisiwe Thandi Kumalo	Prof. T Puckree (Supervisor)
Date:	Date:

Appendix B1

health

Department:
Health
PROVINCE OF KWAZULU-NATAL

Postal Address: Private Bag X54318 Durban 4000
ss: 83 Jan Smuts Highway, Mayville, Durban 4001
Tel.031 2405308: Fax. 031 2405500
Email. nan.hoosain@kznhealth.gov.za
www.kznhealth.gov.za

Enquiries: Ms Jabu Hlazo
Tel: 031 240 5303
Date: 11 July 2013

Attention: T. Kumalo.
E-mail : babusisiwek@dut.ac.za

REQUEST TO CONDUCT RESEARCH:
"The relationship between work-related musculoskeletal disorders, absenteeism and visit to the staff clinic by nurses in an eThekwini District Office."

Support is hereby granted to conduct research on the above topic.

Please note the following:

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regard to this research.
2. This research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN Department of Health.
3. Please ensure that this office is informed before you commence your research.
4. The District Office will not provide any resources for this research.
5. You will be expected to provide feedback on your findings to the District Office.

[redacted]

For The District Manager
EThekwini Health District
Telephone: 031 2405303
Fax: 031 2405500
Email: jabulisiwe.hlazo@kznhealth.gov.za

Appendix B2

HEALTH
KwaZulu-Natal

Prince Mshiyeni Memorial Hospital
Private bag X 07, MOBENI 4060
Mangosuthu Highway
Dr. M Aung: Senior Manager: Medical
Tel: 031-907 8304/8317, Fax: 031-9061044
Email: myint.aung@kznhealth.gov.za

Enquires : Dr. M Aung
Ref No. :23 /RECSH/13
Date: 30.08.2013

TO: Babusisiwe Thandi Evan Khumalo

RE: LETTER OF SUPPORT TO CONDUCT RESEARCH AT PMMH

Dear Researcher;

I have pleasure to inform you that PMMH has considered your application to conduct research on **"The relationship between work-related musculoskeletal disorders, absenteeism and visits to the staff clinic by nurses in an eThekwini District hospital"** in our institution.

Please note the following:

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
2. This research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN Department of Health.
3. Please ensure this office is informed before you commence your research.
4. The institution will not provide any resources for this research.
5. You will be expected to provide feedback on you finding to the institution.

Should the following requirements be fulfilled, a Permission/ Approval letter will follow.

- Full research protocol, including questionnaires and consent forms if applicable.
- Ethical approval from a recognized Ethic committee in South Africa

Thank you.

Regards;

[redacted]

Dr. M Aung
Senior Manager: Medical & Specialist in Family Medicine
MBBS(Rgn), PGDip in HIV (Natal), DO(SA)
M.Med.Fam.Med (Natal)

Appendix C

MSD 001

LETTER OF INFORMATION

Thank you for agreeing to participate in this study.

Title of the Research Study: The relationship between work-related musculoskeletal disorders, absenteeism and visits to the staff clinic by nurses in an eThekwini District hospital.

Principal Investigator/s/researcher: Mrs Thandi Kumalo (B.Tech Nursing)

Co-Investigator/s/supervisor/s: Professor T Puckree (PhD Exercise Physiology)

Brief Introduction and Purpose of the Study: Work-related musculoskeletal disorders (WMSD) are the most commonly reported work-related illnesses impacting the quality of life through absenteeism, work restriction, loss of income and disability. Nurses are more at risk of work-related musculoskeletal disorders (WMSD) than other healthcare professionals because of the nature of their duties

The study aims to determine the work- related musculoskeletal disorders, risk factors, rate of absenteeism and staff clinic visits in nurses working at a hospital in eThekwini district.

Outline of the Procedures:

I shall hold briefing sessions with all the nurses in the units that have been identified and explain the nature of the study, purpose and confidentiality of the information given. Should you choose to participate in the study, you are requested to sign a consent form. Participation is voluntary.

I shall personally distribute questionnaires to all the participants and allowed you time to complete the questionnaire, approximately 30 minutes. I shall be available to give clarity when needed but I shall not assist in answering of the questionnaire. Questionnaires will be completed during tea or lunch breaks at a venue that will be allocated by the person in charge of the unit. You will not be allowed to take the questionnaire away or to instruct someone else to answer on your behalf. Please fold and place completed questionnaires in the sealed box provided and this will be taken away by me at the end of each session.

Risks of discomforts to the subject: There are no risks associated with this study. There are no repercussions to you in terms of your employment in participating.

Benefits:

The results of the study will be presented to the hospital management. If there is indication of high incidence and prevalence of work-related musculoskeletal diseases, recommendations will be made to prevent and minimize the condition.

Reason/s why the participant may be withdrawn from the study:

You can withdraw from the study at any stage and will be no consequences.

Remuneration: There is no remuneration that will be offered for participating in this research.

Costs of the study: There are no costs involved for participating in this study.

Confidentiality:

Confidentiality of all the information given will be assured at all times. No names of participants will be attached to the questionnaires. Questionnaires will be taken away by the researcher at the end of each session. Consent forms with participant's names will only be used for the purpose of research rigor and these will be kept confidential by the researcher. Consent forms will be kept separate from the questionnaires. You will be allocated a code which will be used to identify all the data collected from you as well as your records reviewed from the staff clinic visits register and absenteeism records. This will help to compare all the data collected relating to you. Your name or any part of the collected data will not be given to your employer. All collected data will be handled by the researcher only and will be kept under lock and key for 5 years, after which it will be destroyed by shredding.

Research related injury: The study does not have potential to cause any injury or harm.

Person to contact in the event of any problems or queries:

Researcher: Thandi Khumalo Tel: 031 373 2036

Supervisor: Prof T Puckree Tel: 031 373 2704

Departmental HOD: Prof M N Sibiya Tel: 031 373 2606

Institutional Research Ethics administrator: 031 373 2900

Complaints can be reported to the DVC: TIP, Prof F.Otieno on 031 373 2382.or dvctip@dut.ac.za.

Appendix D

MSD 001

INSTITUTIONAL RESEARCH ETHICS COMMITTEE (IREC) CONSENT

Statement of Agreement to Participate in the Research Study:

Thank you for accepting the invite to participate in this study which aims to determine the work-related musculoskeletal disorders amongst nurses within your institution.

- I hereby confirm that I have been informed by the researcher, *Thandi Khumalo,* about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: 048/13
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my gender, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- I also give the researcher permission to view my absenteeism and staff clinic visits records as part of data collection for this study.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____ _____ _____ _____

Full Name of Participant **Date** **Time** **Signature / Right Thumbprint**

I, *B.T.E.Kumalo* (the researcher) herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____ _____ _____

Full Name of Researcher **Date** **Signature**

_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**
_____	_____	_____
Full Name of Legal Guardian (If applicable)	**Date**	**Signature**

Appendix E

QUESTIONNAIRE

Please answer all questions by indicating with a cross (X) your answer or fill in the information where appropriate. All information that you give will be kept confidential. Do not write your name in any of the forms.

Section A : Personal Information

Date of enquiry

D	M	Y

1. Gender

M
F

2. Date of birth

D	M	Y

3. Your weight

Kg

4. Your height

5. BMI

6. Are you right or left handed?

Rt
Lt

7. Do you smoke?

Yes	Total per day:
NO	

8. Do you consume alcohol?

Yes	Total per week:
NO	

9. Are you currently involved in any structured physical exercises?

Yes	1-2 times per week	3-5 times per week	Every day
NO			

10. Have you been involved in a motor vehicle accident in the past 12 months where you had to be away from work?

Yes	Number of days away from work:
NO	

11. Have you received or currently receiving treatment for a musculoskeletal disease?

Yes	Duration:
NO	

12. Have you had reportable work-related musculoskeletal injury in the past 12 months?

Yes	Date:	Injured body part/s:
NO		

Section B: Occupational history

13. How long have you been employed as a nurse?

years

14. How long have you been employed in your present job

years

15. In which category are you employed?

PN Specialty	**EN**	**ENA**
PN Non specialty		

16. In which unit/ ward are you working? (e.g. surgical, I CU, etc).....

17. On average how many hours per week do you work?.....

18. On average how many days per week do you work?.....

19. What shift are you on? Day……Night……

20. Does your job involve any of the following? Indicate (X) which one/s and the frequency:

	Never	**Seldom**	**1-3 per week**	**0-3 per day**	**More than 3 times/day**
Lifting: 0-5kg					
6-50kg					
Above 50 kg					
Bending					
Overstretching					
Pulling/Pushing					
Writing/ PC use					
Standing always					
Sitting always					
Walking always					
Repetitive movements					
Same posture for long periods					
Awkward posture					

21. Have you had work related injury or discomfort in the past 12 months? **No Yes Date……Area/s affected ……**

21. Were you off from work as a result of such an injury? **No Yes** No of days……

Section C

Standardized Nordic Questionnaire for Analysis of Musculoskeletal Symptoms (Kuorinka et al., 1987)

HAVE YOU AT ANYTIME DURING THE LAST 12 MONTHS HAD TROUBLE (ache,pain,discomfort) in:			To be answered only by those who have had trouble: have you at anytime during the last 12 months been prevented from doing normal work(at home or away from home)because of the trouble?		To be answered only by those who have had trouble: Have you had trouble at anytime during the last 7 days	
1. NECK						
1 NO ☐	2 ☐	YES	NO ☐	☐ YES	NO ☐	YES ☐
2. SHOULDERS						
1 NO ☐	2 ☐	yes in the right shoulder	NO ☐	☐ YES	NO ☐	YES ☐
	3 ☐	yes, in the left shoulder				
	4 ☐	yes, in both shoulders				
3. ELBOWS						
1 NO ☐	2 ☐	Yes, in the right elbow	NO ☐	☐ YES	NO ☐	YES ☐
	3 ☐	yes, in the left elbow				
	4 ☐	yes, in both elbows				
4. WRIST/ HANDS						
1 NO ☐	2 ☐	yes, in the right wrist/hand	NO ☐	☐ YES	NO ☐	YES ☐
	3 ☐	yes, in the left wrist/hand				
	4 ☐	yes, in both wrists/hands				
5. UPPER BACK						
1 NO ☐	2 ☐	YES	NO ☐	☐ YES	NO ☐	YES ☐
6. LOW BACK(small of the back)						
1 NO ☐	2 ☐	YES	NO ☐	☐ YES	NO ☐	YES ☐
7. ONE OR BOTH HIPS/THIGHS						
1 NO ☐	2 ☐	YES	NO ☐	☐ YES	NO ☐	YES ☐
8. ONE OR BOTH KNEES						
1 NO ☐	2 ☐	YES	NO ☐	☐ YES	NO ☐	YES ☐
9. ONE OR BOTH ANKLES /FEET						
1 NO ☐	2 ☐	YES	NO ☐	☐ YES	NO ☐	YES ☐

10. Have you ever been seen by a doctor, physiotherapist, chiropractor, or other such person because of the problem?

1 NO ☐ 2 ☐ YES

11. Have you ever been hospitalised due to these pains or problem?

1 NO ☐ 2 ☐ YES

HAVE YOU AT ANYTIME DURING THE LAST 12 MONTHS HAD TROUBLE (ache,pain,discomfort) in:	To be answered only by those who have had trouble	
	have you at anytime during the last 12 months been prevented from doing normal work(at home or away from home)because of the trouble?	Have you had trouble at anytime during the last 7 days

12. Have you ever had to change jobs due to these pains or problem?

1 NO ☐ 2 ☐ YES

13. What is the total time that you've had this problem in the past 12 months?

0 days ☐ 1-7 days ☐
8 - 31 days ☐ 30+ days ☐
Every day ☐

14. Has any of the above troubles caused you to reduce your activity during the last 12 months?

a) work activity (at home or away from home)?

1 NO ☐ 2 ☐ YES

b)leisure activity?

1 NO ☐ 2 ☐ YES

15. What is the total length of time that the problem prevented you from doing your normal work?

0 days ☐ 1-7 days ☐
8 - 31 days ☐ 30+ days ☐
Every day ☐

Thank you for participating in this study.

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Contact no: 031 373 2606/36

Appendix F

MSD 000

Study Title: The relationship between work-related musculoskeletal disorders, absenteeism and visits to the staff clinic by nurses in an eThekwini District hospital.

Checklist for absenteeism

(Record nurses' absenteeism as a result of the WMSD)

Participant code	Nature of injury/ discomfort	Date of injury/discomfort	Unit/ward	Dates absent from work

Appendix G

MSD 000

Study Title: The relationship between work-related musculoskeletal disorders, absenteeism and visits to the staff clinic by nurses in an eThekwini District hospital.

Checklist for staff visits to the clinic

(Record nurses' visits to the clinic as a result of the WMSD)

Participant code	Nature of injury/ discomfort	Date of injury/discomfort	Unit/ward	Date/s visited staff clinic