

Prevalence of Low Back Pain Amongst Nurses at Edendale Hospital

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DEDICATION.....	VI
ACKNOWLEDGEMENTS.....	VII
DECLARATION.....	VIII
ABSTRACT.....	IX
LIST OF TABLES.....	X
LIST OF FIGURES.....	XI
DEFINITION OF TERMS.....	XIII
ACRONYMS.....	XIV
LIST OF ABBREVIATIONS.....	XV

CHAPTER 1: BACKGROUND TO THE STUDY

1.1 INTRODUCTION.....	1
1.2 SIGNIFICANCE OF THE STUDY.....	3
1.3 AIM.....	4
1.4 OBJECTIVES.....	4
1.5 OVERVIEW OF DISSERTATION.....	4

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION.....	5
2.2 THE DEFINITION OF LOW BACK PAIN.....	5
2.3 BURDEN OF LOW BACK PAIN.....	6
2.4 PERSONAL FACTORS ASSOCIATED WITH LOW BACK PAIN.....	7
2.5 OCCUPATIONAL AND ENVIRONMENTAL FACTORS.....	12
2.6 PSYCHOLOGICAL FACTORS.....	13
2.7 INTERVENTIONS TO REDUCE LOW BACK PAIN.....	14
2.8 CONCEPTUAL FRAMEWORK: FACTORS CONTRIBUTING TO LOW BACK PAIN.....	16

CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION.....	20
3.2 RESEARCH SETTING.....	20
3.3 STUDY PERIOD.....	20
3.4 STUDY DESIGN.....	21
3.5 SOURCE POPULATION.....	21
3.6 SAMPLE POPULATION.....	21
3.7 SAMPLING STRATEGY AND SIZE.....	21
3.8 DATA SOURCES.....	23

3.9 DATA COLLECTION	27
3.10 DATA ANALYSIS.....	27
3.11 DATA MANAGEMENT AND STORAGE	28
3.12 ETHICS APPROVAL	28
3.13 CONCLUSION	29

CHAPTER 4: RESULTS

4.1 INTRODUCTION.....	30
4.2 SAMPLE SIZE	30
4.3 THE PREVALENCE OF LOW BACK PAIN	30
4.4 OCCUPATIONAL LOW BACK PAIN.....	30
4.5 DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS....	31
4.6 RELATIONSHIP BETWEEN PERSONAL FACTORS AND CURRENT LOW BACK PAIN	32
4.7 RELATIONSHIP BETWEEN EMPLOYMENT HISTORY AND THE PRESENCE OF CURRENT LOW BACK PAIN	33
4.8 OCCUPATIONAL FACTORS AND CURRENT LOW BACK PAIN....	34
4.9 RELATIONSHIP BETWEEN ENVIRONMENTAL FACTORS AND CURRENT LOW BACK PAIN	35
4.10 RELATIONSHIP BETWEEN PSYCHOLOGICAL FACTORS AND CURRENT LOW BACK PAIN	36
4.11 RELATIONSHIP BETWEEN PERSONAL FACTORS AND CHRONIC LOW BACK PAIN PREVALENCE	40
4.12 RELATIONSHIP BETWEEN EMPLOYMENT HISTORY AND CHRONIC LOW BACK PAIN PREVALENCE	41
4.13 OCCUPATIONAL FACTORS AND CHRONIC LOW BACK PAIN ..	42
4.14 RELATIONSHIP BETWEEN ENVIRONMENTAL FACTORS AND CHRONIC LOW BACK PAIN PREVALENCE	43
4.15 THE RELATIONSHIP BETWEEN PSYCHOLOGICAL FACTORS AND CHRONIC LOW BACK PAIN PREVALENCE	44
4.16 LOGISTIC REGRESSION.....	45
4.17 CONCLUSION	46

CHAPTER 5: DISCUSSION

5.1 INTRODUCTION.....	47
5.2 THE PREVALENCE OF LOW BACK PAIN	47

5.3 PERSONAL FACTORS AND THEIR RELATIONSHIP TO THE PRESENCE OF LOW BACK PAIN.....	48
5.4 EMPLOYMENT HISTORY AND PRESENCE OF LOW BACK PAIN.	51
5.5 OCCUPATIONAL FACTORS AND PRESENCE OF LOW BACK PAIN	52
5.6 ENVIRONMENTAL FACTORS AND PRESENCE OF LOW BACK PAIN	54
5.7 PSYCHOSOCIAL FACTORS AND THEIR RELATIONSHIP TO LOW BACK PAIN.....	55
5.8 LOGISTIC REGRESSION.....	56
5.9 LIMITATION OF THE STUDY	57
 CHAPTER 6	
6.1 CONCLUSIONS	58
6.2 RECOMMENDATIONS.....	59
 REFERENCES.....	61
 APPENDICES.....	68

Dedication

To God be the glory, for the grace and strength during my study period;

To my parents for the prayers and for instilling a culture of learning;

To my brother and sisters for always believing the best of me.

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Declaration

I Thembelihle P. Dlungwane declare that:

(i) The research reported in this dissertation, except where otherwise indicated, is my original work.

(ii) This dissertation has not been submitted for any degree or examination at any other university.

(iii) This dissertation does not contain other person's data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.

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Abstract

Introduction

Low back pain is an important public health problem affecting 70-85% of the population worldwide and is a common cause of work-related disability. At Edendale Hospital, the physiotherapy nursing case load related to the management of low back pain increased from 30% to 45% over the past 3 years. The risk factors for low back pain at Edendale Hospital remain unclear and it is not clear whether low back pain is more prevalent in certain wards. Knowing the risk factors contributing to the prevalence of low back pain at the Hospital will assist nursing and hospital managers to plan appropriate interventions to minimize the occurrence.

Methods

An observational cross sectional study with an analytic component was implemented. Data was collected utilizing a self-administered questionnaire to determine the prevalence of low back pain amongst nurses at the Hospital. Bivariate analyses and logistic regressions were performed to determine the risk factors associated with low back pain.

Results

The point prevalence of current low back pain was 59%, of chronic low back pain was 47% and occupational low back pain was 57%. Logistic regression revealed bending and working in orthopaedic, surgery, paediatrics, obstetrics and gynaecology is significantly associated with low back pain.

Conclusion

Occupational factors are strongly associated with low back pain. Thus workplace interventions are required.

List of Tables

Table 3.1 Ward distribution of the Study Sample	23
Table 4.1 Demographic distribution of the study sample (N=271)	32
Table 4.2 The relationship between personal factors and the current low back pain	33
Table 4.3 Employment history and the presence of current low back pain	34
Table 4.4 Occupational factors and presence of current low back pain	35
Table 4.5 Environmental factors and presence of current low back pain	36
Table 4.6 Psychosocial factors and their relationship to current low back pain	37
Table 4.7 Personal factors and 12- month low back pain prevalence	41
Table 4.8 Employment history and 12- month low back pain prevalence	42
Table 4.9 Occupational factors and 12- month low back pain prevalence	43
Table 4.10 Environmental factors and 12- month low back pain prevalence	44
Table 4.11 Psychological factors and 12- month low back prevalence	45
Table 4.12 Logistic regression and risk factors	46

List of Figures

Figure 2.1 Conceptual framework: Factors contributing to low back pain	19
Figure 4.1 Depression and current low back pain	38
Figure 4.2 Anxiety and low back pain	39
Figure 4.3 Stress and current low back pain	40

List of Appendices

Appendix A	Perreira's and DASS Questionnaires
Appendix B	Information Document
Appendix C	Consent to Participate
Appendix D	Permission from KwaZulu-Natal Department of Health
Appendix E	Permission from Postgraduate Committee
Appendix F	Ethical Clearance Certificate

Definition of Terms

- Current low back pain in this study refers to pain that respondents had at the time the study was conducted, lasting for 3 months or more in an area between the twelfth ribs and gluteal folds [10].
- 12-month low back pain in this study refers to pain lasting for 12 months or more in an area between the twelfth ribs and the gluteal folds and for the purpose of this study is called chronic low back pain [10].
- Occupational back pain is defined as pain, ache, stiffness or fatigue localized to the back related to nursing practice [9].
- Professional nurse refers to a registered nurse who has completed four year training at a recognised nursing college or university
- Staff nurse refers to a registered nurse who has completed two year training at a nursing college
- Nursing assistant refers to a registered nurse who has completed one year training at a nursing college

Acronyms

BMI	Body Mass Index
DASS	Depression Anxiety Stress Scale
HC	High Care
ICU	Intensive Care Unit
LBP	Low Back Pain
OT	Operating Theatre
OPD	Out Patient Department

List of Abbreviations

Admin

Administration

Obs/gyn

Obstetrics and Gynaecology

Paeds

Paediatrics

Chapter 1: Background to the Study

1.1 Introduction

Low back pain is an important public health problem prevalent not only in South Africa, but all over the world [1]. Low back pain affects 70-85% of the population worldwide and is a common cause of work related disability among workers. The annual prevalence of low back pain ranges from 15% to 45%, with point prevalence averaging 30%. In the United States of America (USA), back pain is the most common cause of activity limitation in people under the age of 45 years and is considered the second most frequent reason for visits to a physician. It is also ranked the fifth cause of admission to hospital and the third cause of surgical procedures. Two percent of the USA workforce is compensated for back injuries every year [2].

In the United Kingdom it is estimated that 116 million production days are lost due to low back pain related work incapacity and the resulting economic cost is around 12 billion pounds [3]. Low back pain related sick leave puts a lot of strain on the services and on the remaining staff that are expected to cover the duties of a person who is off sick. Sickness absenteeism from low back pain is an essential indicator of low back pain related disability [3].

Few studies have been conducted on low back pain in Africa and there is an assumption that low back pain prevalence is lower in Africa when compared to other countries. The mean point prevalence of low back pain in Africa among the adult population is 32% and the chronic low back pain prevalence among Africans ranges from 14%-72% [4]. The low back pain point prevalence among employees in a district hospital in South Africa was found to be 47% and a high percentage of nursing staff reported low back pain. The prevalence of low back pain among nurses in a Nigerian hospital was 74% [1, 5].

Studies have revealed a number of risk factors associated with low back pain in the general population such as [6, 7]:

- Age
- Alcohol and drug abuse
- Family history
- Gender
- Level of activity (Physical Fitness)
- Obesity
- Poor posture and alignment
- Smoking
- Occupational factors, such as prolonged standing and sitting
- Previous back injury
- Psychological and social factors

Low back pain is a major hazard in the workplace, particularly in the nursing profession [2]. The main occupational risk factors for nurses are [7, 8]:

- Lifting and moving patients
- Frequent twisting and bending
- Sustained postures
- Ergonomic structuring
- Job organization
- Improper work design
- Anxiety
- Depression
- Stress
- Low social support at work
- Poor job satisfaction
- Shortage of staff and poor working conditions

Recruitment and retention of nurses is a serious problem, and the nursing shortage has been exacerbated by occupational injuries and related disabilities. It is estimated that in the United Kingdom each year 12% of nursing personnel will consider a job transfer to decrease the risk of low back pain and another 12%-18% will actually leave the nursing profession due to chronic back pain. Work related musculoskeletal disorders in nursing are quite expensive and include indirect costs associated with temporary hires for replacement personnel, overtime to absorb the duties of an injured worker, legal fees, time costs for claim processing, decreased output following traumatic event, and training temporary and or replacement personnel [9].

At Edendale Hospital, the physiotherapy nursing case load related to the management of low back pain has increased from 30% to 45% over the past three years. Patients include all nursing categories (professional nurses, staff nurses and nursing assistants). Most of the nurses that have been receiving physiotherapy management services are working in theatre, intensive care units and medical wards. The risk factors for low back pain at Edendale Hospital remain unclear and it is not clear whether low back pain is more prevalent in certain wards. Knowing the risk factors contributing to the prevalence of low back pain will assist nursing and hospital managers to plan appropriate interventions to minimize the occurrence.

1.2 Significance of the study

The study will assess the prevalence of low back pain amongst nurses at Edendale Hospital. It will investigate the risk factors associated with low back pain amongst Edendale Hospital nurses. Recommendations for interventions to prevent low back pain specific to Edendale Hospital will be provided.

1.3 Aim

Determine the prevalence of low back pain amongst nurses and to ascertain possible risk factors associated with this condition at Edendale Hospital in 2010.

1.4 Objectives

The study has two objectives:

- 1) Measure the prevalence of low back pain amongst nurses, in terms of
 - Current low back pain
 - Chronic low back pain
 - Occupational low back pain
- 2) Ascertain the risk factors for low back pain amongst nurses at Edendale Hospital.

1.5 Overview of dissertation

The dissertation is organised as follows:

- Chapter 2 presents the review of literature
- Chapter 3 discusses the methods
- Chapter 4 comprises the presentation of results
- Chapter 5 elaborates and discusses the findings
- Chapter 6 provides conclusions and recommendations for future research

Chapter 2: Literature Review

2.1 Introduction

This chapter discusses critically the review of studies that describe the prevalence of low back pain in both developing and developed countries. Furthermore, the predisposing factors and the impact of low back pain among nurses and health workers are described. The preventive measures in workplaces to reduce the incidence and impact of occupational injuries are explored. Finally, the conceptual framework that underpins the study has been elaborated.

The literature reviewed was sourced through searches of electronic databases: from Pubmed, Medline and Cochrane databases. The following key words were used in the search strategy: low back pain, risk factors, prevalence, nurses, and health workers.

2.2 The Definition of Low Back Pain

Back pain is defined as pain experienced in any portion of the back, caused by back disorders, disc disorders or injuries to the back. Low back pain specifically is any pain posteriorly between the ribs and the top of the thigh, from any cause. Low back pain is considered a common musculoskeletal symptom that may be either acute or chronic, caused by a variety of diseases and disorders that affect the lumbar spine, namely the first to fifth lumbar vertebrae, or the sacroiliac joint. Low back pain is often accompanied by sciatica, called referred pain, which is pain that involves the sciatic nerve and is felt in the lower back, the buttocks and the back of the thighs, possibly the calves [10]. For the purpose of this study, low

back pain is defined as pain in an area between the twelfth ribs and the gluteal folds.

2.3 Burden of Low Back Pain

2.3.1 Developed Countries

In the developed world, low back pain is an important disability and a frequent cause of pain and musculoskeletal injury experienced by the nursing profession worldwide. It is a main problem facing the labor force. It is reported to be the second leading cause of work absenteeism and results in lost productivity more than any other medical condition [3, 7, 8, 11, 21].

In the United States, it is estimated that over 80 billion US dollars are spent on low back pain each year. The prevalence accounts for over 156 million lost working days along with 5.2 million people being disabled by low back pain and 2.6 million is permanently disabled. Other estimations show that 5 million adults in the United States consult medical practitioners due to low back pain every year. The prevalence of people consulting medical practitioners with low back pain has increased significantly and it is considered a 'twentieth-century healthcare disaster' [12].

2.3.2 Africa and South Africa

The effect of low back pain in Africa has not been fully investigated and this could be attributed to the negative impact of infectious diseases epidemic which has resulted in the shift of funding directions in health research [4]. In sub-Saharan Africa, hospital-based statistics have revealed that low back pain accounts for 30% to 40% of visits to rheumatologists [12]. The results of one study that was conducted in South Africa, investigating the factors associated with low back pain in hospital employees at Tshwane district hospital corresponds to that of nurses

in Nigeria and Ethiopia in that they both concluded that a high level of perceived stress increase the risk of low back pain. The African study also found that poor back care ergonomics, unavailability of lifting equipments are the major predisposing factors of low back pain among nurses in Africa [13, 14].

Research that has been done in South Africa has focused on the low back pain among steel workers. In South Africa it is calculated that 30,000 persons suffer daily from back and neck problems and 10% of them will become chronic cases. Compensation costs for low back pain in South Africa resulted in the equivalent of approximately 20 million US dollars in 2000 [15].

South African public hospitals have been struggling to employ enough nurses due to shortages of skilled nurses and due to the emigration of nursing staff to the private sector and overseas [16]. This has in turn has resulted in increased workloads for nurses working in public hospitals. The poor working conditions that prevail, shortage of staff, low social support and poor job satisfaction have been identified as main psychosocial factors leading to low back pain among nurses [17]. A study that was done amongst steel workers in South Africa supported the growing evidence linking the psychosocial factors with low back pain [15].

2.4 Personal Factors Associated with Low Back Pain

2.4.1 Age

The influence of age on low back pain is inconclusive and the association between age and low back pain is aggravated by occupational, household, leisure activities and posture [3, 18]. The mean low back pain point prevalence among African adolescents is 12%. This is attributed to the advances in technology and the installation of computers in most schools. People in this age

group tend to spend a lot of time using the computer, increasing the possibility of young people developing poor postural habits resulting in low back pain and discomfort. The majority of low back pain experienced by adolescents may manifest as chronic low back pain in adulthood [4]. A similar prevalence has been observed in Australia amongst this young age group and reports suggest that 16% of people aged between 15 and 24, and 18% of those in the 25 to 34 year age group suffer from low back pain [19].

Studies that have been conducted amongst health workers have also shown an association between age and presence of low back pain [5, 20]. A study that was conducted amongst nurses in Nigeria described that the prevalence of low back pain increased with the increasing age and found that 6.3% of nurses below the age of 35, 27% between the ages 36 and 45 and 66.7% of those above 46 years suffered from low back pain [5].

In contrast to the above findings, age was shown to have no influence over low back pain rates amongst nursing students compared to nurses that recently graduated. The increase in prevalence rates from nursing student to graduate nurse was attributed to occupational exposure once commencing nursing employment, rather than age [21].

Age is a constant predisposing factor for the development of low back pain. According to the literature reviewed in this study, age is a risk factor at various age groups and the effect is confounded by postural habits and degeneration [10].

2.4.2 Gender

The effect of gender on the prevalence of low back pain has produced conflicting results over the years. Some studies have shown that females are at greater risk

for low back pain, while other studies have shown no gender differences [5, 16, 18, 20, 22].

The effects of pregnancy have been associated with increase low back pain in females. The weight gain during pregnancy and the weight of the fetus, put pressure on the spine which results in back discomfort. The weight retention and hormonal changes during pregnancy can destabilize the spine and sacroiliac joints [23]. The risk of low back pain is reported to be increased in women that receive epidural anesthesia during labor. It has been suggested that epidural administration of local anesthetics during labor caused motor block of the lower back and legs leading to poor posture, immobility and adoption of stressed positions [24].

Women and men differ in the way they interpret and perceive pain. This is influenced by cultural and social expectations that have been created in different communities and societies [25]. When growing up, boys are taught that men don't cry and are encouraged to be less expressive and not to accept weakness, pain and discomfort. Women tend to have increased pain perception and decreased inhibition even when gynecological conditions are excluded. Women and men also differ in the ability to recall past illness [25].

Women are expected to carry out household tasks like cleaning, washing and cooking and they spend more time than men caring for children. These may be contributory factors to increases in low back pain amongst women [18]. An occupational study that was conducted in Paris concluded that the incidence and severity of low back pain were higher in women even when not exposed to manual handling [18].

Because of the structural, physiological and anatomical differences that exist between males and females, it is crucial to evaluate low back pain causative factors independently for males and females [5, 16].

2.4.3 Body Mass Index

Body mass index (BMI) is defined as the weight in kilograms divided by the square of the height in meters [26]. It is used to measure, and predict morbidity and mortality in different populations. Obesity is generally defined as a BMI of 30kg/m^2 and higher. Overweight is classified as a BMI between 25 and 30kg/m^2 . Normal weight is between 18.5 and 25kg/m^2 and underweight is considered to be below 18.5kg/m^2 [26].

The risk of low back pain in people who are obese has not been clearly defined in the literature [16, 26, 27]. Most studies to date have examined the relationship between weight and low back pain in secondary analyses. There has been no hypothesis driven research that tests specific questions regarding the relationship between low back pain and weight [27].

Although the relationship between BMI and low back pain is inconclusive, some studies have proposed that excessive weight around the waist leads to overload on the spine, which results in increase pressure on the intervertebral disc structures of the spine, triggering pain [28, 29]. High BMI has been significantly associated with disc degeneration at four disc levels. High BMI has also been classified as a prognostic factor for the duration of sick leave due to low back pain taken by employees [30, 31].

The link between the association of low back pain and BMI is not clear. The relationship between weight and low back pain may not be causal but may be influenced by other mediating factors like socioeconomic, lifestyle and physical activity [27].

2.4.4 Smoking

The prevalence of smoking in South Africa has decreased from 32.6% in 1993 to 27.1% in 2000 amongst people 16 years and older. The decrease is attributed to

massive public awareness programmes, increased taxation on cigarettes and the passing of anti-smoking legislation [32].

Smoking leads to reduced perfusion and malnutrition of the paravertebral tissues and intervertebral disc, which may lead to decrease in the stress resistance of the spine and can interfere with the healing process [33]. In adults, the blood supply to the intervertebral discs takes place through diffusion from the adjacent cartilaginous end plates surrounding the discs. A decrease in blood circulation affects the cellular uptake and solute exchange capacity, reducing the levels of collagen and proteoglycan – the main constituents of the disc [16]. Another reason why smoking is associated with low back pain may be as a result of the effect of nicotine on the central nervous system which results in an increased perception of pain [28].

Contrasting evidence was found in the literature on the influence of smoking and low back pain. The studies reviewed used different research methodologies. The studies that used a prospective design concluded that that heavy lifting and long standing was a predictor for low back pain in smokers even after adjusting for age, gender, and physical exercise [33, 34]. Another prospective study also suggested that smoking is a risk factor for long term sick leave due to low back pain [30]. A cross sectional study concluded that there was no significant correlation between smoking and low back pain [20, 35].

Despite conflicting results on the influence of smoking on low back pain, it is generally agreed that smoking is harmful to one's health [16].

2.4.5 Alcohol Consumption

The South African Medical Research Council estimates that the per capita consumption of alcohol in South Africa is between 10.3 and 12.4 litres. This places South Africa on the highest ranking of consumption per drinker when compared with the rest of the world [36]. Alcohol has been found to have a

protective effect and this could be due to the anti inflammatory effect, established in a study of mice. Low ethanol consumption delays the onset of collagen-induced arthritis and alcohol has a relaxing effect on people, which may affect the muscles of the back [34].

A systematic review of nine original research reports published between 1987 and 1995 concluded that alcohol consumption did not seem to be linked to low back pain [37]. The systematic review sourced information from studies, none of which were prospective in design, so the accuracy of the results is debatable.

However well designed studies on the influence of alcohol on low back pain are lacking.

2.5 Occupational and Environmental Factors

Occupational low back pain refers to pain which develops while the individual is engaged in occupational activities like repetitive lifting and tilting of the trunk. These factors, as well as the duration of exposure, are contributory factors in the development of low back pain. A strong association has been established between work related factors such as lifting, awkward, postures, bending, twisting, transfers and the development of low back pain [5, 7, 8, 15, 17, 38-40].

Ergonomics of the environment, such as availability of working space, working in cramped positions and reaching or working away from the body predisposes nurses to the development of low back pain [41]. The organizational factors with regard to patient-nurse ratio, and the perception of nurse staffing influences nurses' health and patient safety [42]. The type of ward that people work in can contribute to high low back pain rates. Nurses working in surgery, orthopaedics, obstetrics, gynaecology, intensive care units and medical wards are more at risk of developing low back pain as compared to nurses in other wards. Nurses in

these wards are caring for people that are normally bedridden and helpless and require more assistance with transfers and handling [5, 38, 41].

The association between night shift and low back pain has been established in some studies [41, 43]. Working at night leads to sleep deprivation and sleep disturbance which can result in muscle strain. There are usually fewer nurses at night and they are required to do heavy patient transfers with minimal assistance [41, 43].

Environmental and occupational factors are strongly associated with low back pain and appropriate interventions are indicated to reduce the rates of low back pain in nurses.

2.6 Psychological Factors

Low back pain has also considerable functional and emotional impacts on the lives of sufferers. Psychological factors associated with chronic pain include depression, somatization, and anxiety [10]. Depression, anxiety, coping strategies, fear-avoidance beliefs, and health locus of control have been linked to chronic disability from low back pain [10]

Psychosocial factors may cause increased muscle tension which may lead to altered spinal loading. This might result in compromised nutrition of the intervertebral discs, nerve roots and other spinal tissues. Raised plasma cortisol levels following psychological demands may leave muscles vulnerable to injury due to mechanical loads, increasing the susceptibility to low back pain [44]. Pain tolerance may also be decreased due to stress among people living in poor psychosocial environments [1].

Organizational culture and social factors are associated with low back pain. Low job satisfaction, negative perception and lack of support, poor relationship with

the supervisors or co-workers and tight dead lines, predispose individuals to low back pain [1, 33, 43]. Shortage of staff, work pressure and unexpected and stressful events, which are common in hospital settings can influence the development of low back pain [1, 38, 43].

The relationship between psychosocial factors and low back pain has been recognised in most studies in various part of the world but the exact physiological mechanism behind this relationship still needs to be established.

2.7 Interventions to Reduce Low Back Pain

In South Africa, the Public Health Service is committed to achieving health promotion and disease prevention objectives of “Healthy People 2000”, a Primary Health Service (PHS-led) national initiative for setting priority areas for health education and wellness programs. This includes low back pain, since it is classified as a chronic disabling condition [45]. The aim of prevention is to predict predisposing and risk factors of a disease and establish appropriate interventions to address risk factors [45]. In addition, the preventive approach includes measures to prevent the incidence of diseases, reduce risk factors, and to arrest their progress and reduce their consequences once recognised. Therefore, evaluating working conditions, correcting ergonomics and maintaining good posture in the workplace have been suggested to prevent low back pain at work [45].

The prevalence of, and costs associated with, occupational low back pain have made prevention an important research goal. Given the impact of low back pain, there is a need for effective treatment interventions in occupational healthcare that aim at the prevention of chronic disability and the realization of return to work. Therefore, the early identification of patients who are at risk for prolonged

work absence and disability could allow for targeted interventions within the acute phase that may reduce costs and the likelihood of chronic disability [12].

Ergonomics, the science of arranging and adjusting a work environment, has numerous physical benefits. It aims at identifying and reducing sources of biomechanical stress and resulting injuries by designing a better fit between the physical needs of employees and their workplaces [10]. Ergonomic prevention strategies in the workplace can reduce the incidence and impact of musculoskeletal injuries, illnesses, and disorders. Therefore, employers can reduce occupational injuries and absenteeism while improving productivity and work quality through the designing of safe, comfortable workplaces for employees [10].

The lay out of the workstation and the provision of assistive devices could make a difference in comfort and reduce injuries. Workplace layout or design determines ergonomic injury rates [11]. Nurses have been identified as being at increased risk of low back pain.

Low back pain is a serious problem caused by a multitude of factors in the population at large as well as among nursing staff. Therefore strategies to reduce it have included the following [46, 47]:

- Training of staff in basic patient lifting and transferring techniques
- Stretching and exercise programs
- Learning relaxation techniques
- Ergonomic structuring of the workplace
- Use of mechanical devices
- Changes in work organization
- Improved working conditions

Nurses are frequently required to undertake heavy lifting duties such as moving patients around on the bed, transferring patients between bed and chair, and lifting patients up from the floor [46]. In Great Britain, health and safety legislation requires employers to identify occupational hazards for musculoskeletal diseases among their workforce and to reduce the associated risk when practical. The actions taken have included the introduction of mechanical aids such as hoists, belts, and sliding sheets for lifting and moving patients, and training in techniques on patient handling. These actions have been found to improve low back pain injuries amongst nurses in England [46].

Evaluating working conditions greatly contributes to the recognition and prevention of low back pain. However, correcting ergonomics must be complemented with maintaining good posture. While seated upright, a chair should have good lumbar support to enable the individual to maintain an erect spine. Ergonomically designed chairs that are intended to preserve the neutral anterior curve have been demonstrated to help maintaining good posture while sitting [10].

2.8 Conceptual Framework: Factors Contributing to Low Back Pain

The conceptual framework that has been adopted to underpin the study has been developed from the literature review. The conceptual framework outlines risk factors for low back pain amongst nurses. The framework displays the risk factors and the interventions to deal with these risk factors. The risk factors have been classified into four categories: personal, occupational, environmental and psychosocial. All these factors have been found in the literature to be associated with low back pain amongst nurses. Personal factors consist of variables such as age, gender, weight, height and nursing category. Occupational factors include lifting, transfers, shift work details and sustained postures.

Environmental factors include ergonomic structuring, job organization, work design and assistive equipment availability. Psychosocial factors comprise anxiety, stress, depression, job satisfaction and social support.

Thus, low back pain is multifactorial. There are a number of potential strategies that may be adopted to assist with lowering the prevalence of low back pain and to help with eliminating the risk factors. Intervention strategies deal with preventative practices such as correct lifting techniques, back care, exercise, building healthy public policy and creating supportive environments.

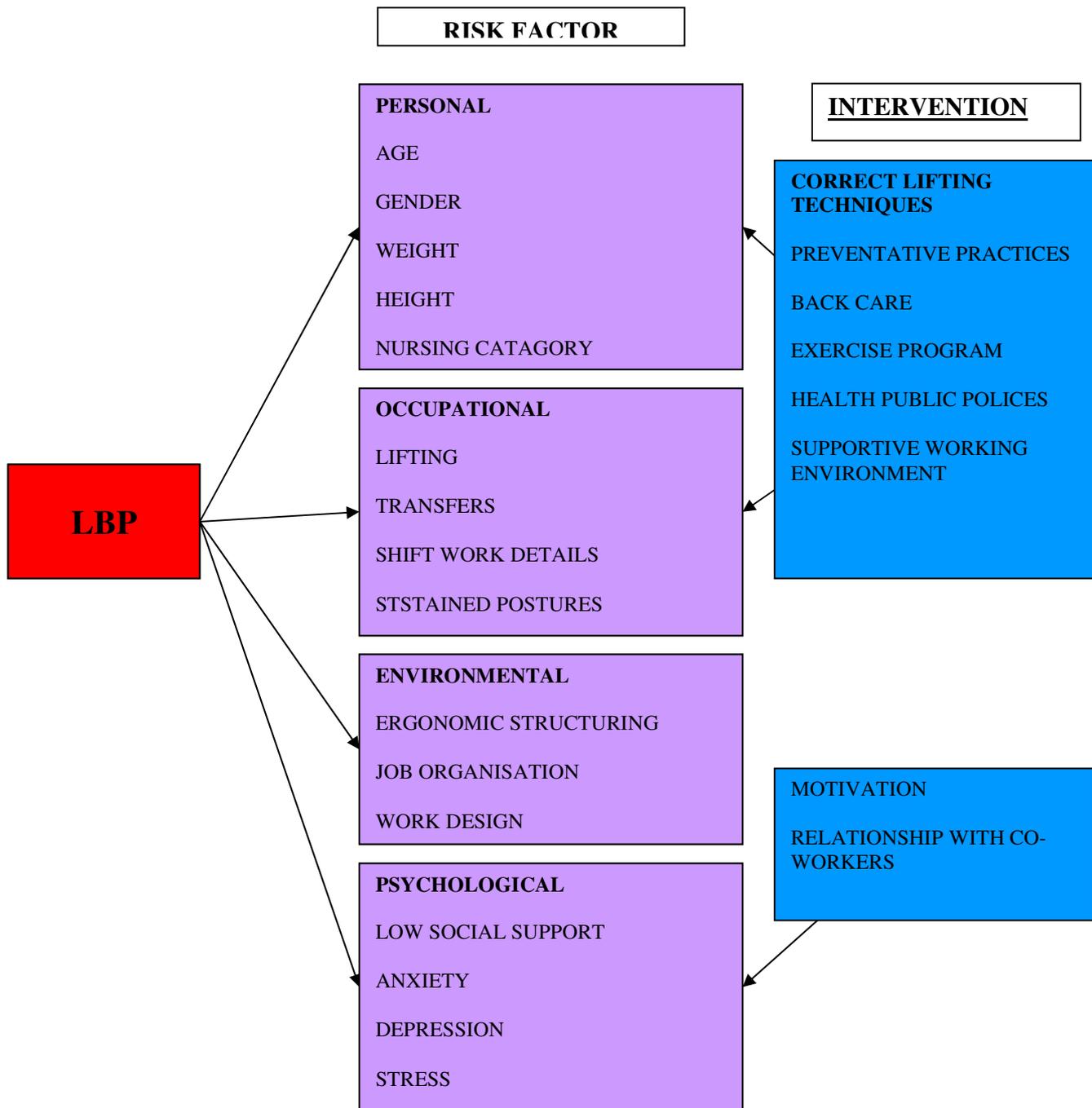


Figure 2 .1: Conceptual framework- Factors contributing to low back pain

In conclusion, the literature review demonstrates that the risk factors for low back pain differ in various settings. It is important to ascertain the risk factors amongst nurses in a specific setting to identify the most appropriate interventions.

Chapter 3: Research Methodology

3.1 Introduction

The research methodology is discussed in this chapter. The discussion includes the study setting, study period, study design, source population, sample population and sampling, data collection and analysis, and measures undertaken to ensure the validity of the study. Furthermore, the ethical considerations of the study are presented.

3.2 Research Setting

The study was conducted at Edendale Hospital in Pietermaritzburg, which is a hospital providing level 1 and 2 services. Edendale Hospital is fully recognised for post-graduate teaching in all major disciplines. The Hospital has 900 beds and the services provided are general surgery, obstetrics and gynaecology, medicine, orthopaedics, anaesthesia, paediatrics and neurosurgery. The Hospital employs about 1200 nurses.

3.3 Study Period

Full ethics approval was obtained on the 1st of March 2010 (BE161/09). The pilot study was conducted on the 10th of March 2010 and the actual data collection commenced on the 24th of March 2010.

3.4 Study Design

An observational, cross-sectional, descriptive study design with an analytic component was implemented.

3.5 Source Population

The source population consisted of all hospital-based nurses permanently employed at Edendale Hospital, Pietermaritzburg, KwaZulu-Natal Province, South Africa.

3.6 Sample Population

The study population comprised permanently employed nurses working at Edendale Hospital, both on day and night shifts, between January 2010 and June 2010.

Inclusion Criteria: All nursing categories working at Edendale Hospital.

Exclusion Criteria: Nurses with lower back pain as result of an accident, a deformity, or previous spinal injury; pathological backache due to infection; backache due to malignancy; and congenital problems. Student nurses were excluded because they are employed by Edendale Hospital on a temporary employment contract.

3.7 Sampling Strategy and Size

Nurses working at Edendale Hospital who met the inclusion criteria were invited to participate. The list of nurses permanently employed who met the criteria was obtained from the Human Resource Department. Convenience sampling was

used: all nurses on duty on the day and night shift of the day of the visit to a particular unit were surveyed.

There are 450 nurses on duty for both day and night duty on an average day in the Hospital. The total number of nurses that were targeted was 300. The expected prevalence of low back pain in the population from which the sample was drawn was estimated at 60%. The estimation was based on the number of nurses that reported suffering from low back pain during the back care awareness week in 2008. A sample size of 282 would provide 5% precision either side of the population estimate with 95% confidence. The desired sample size was increased to 300 to account for missing data. A total sample of 271 was achieved which still provided an acceptable level of precision. A total of 373 nurses were approached. Out of the 373, 290 questionnaires were returned of which 271 were valid responses and 19 were discarded. This yielded a response rate of 72%. The response rate was considered to be acceptable because this is an exploratory study.

Table 3.1 Ward Distribution of the Study Sample

Wards	No included	% of nurses in the ward
Surgical	38	14
Administration	7	3
High Care	8	3
IntensiveCare Unit	11	4
Medical	54	20
Obstetrics/ gynaecology	28	10
Out patients	26	10
Orthopaedics	21	8
Theatre	12	4
Paediatrics	58	21
Missing data	8	3
Total	271	100

3.8 Data Sources

3.8.1 Measurement Instrument

Standard self-administered questionnaires were used. The instrument to determine the prevalence of low back pain and its associated risk factors is a questionnaire that had been used in a previous study investigating the risk factors associated with low back pain amongst therapists (the Perreira questionnaire) [48]. The Perreira questionnaire was adapted slightly for the current study amongst nurses. The Perreira questionnaire was adapted in Section 1 to determine the shift work details and employment history of the respondents. The Perreira questionnaire consisted of closed ended questions which included Likert scales, binary scales and multiple answer questions (See Appendix A).

Given the association of low back pain with psychosocial factors [36] a psychosocial questionnaire, the Depression, Anxiety and Stress Scale (DASS) [49] was used to measure the emotional states of depression, anxiety and stress (See Appendix A). The DASS was adopted unchanged for the current study. DASS is a 42- item self report measure of depression, anxiety and stress that was developed by Lovibond and Lovibond. It has been previously used in other studies and has been found to be valid and reliable [49].

3.8.2 Variables

The variables measured in the questionnaire (refer to Appendix A) included:

3.8.2.1 Personal Factors

The section on personal factors collected information on demographic variables such as nursing category, age, sex, height and weight, and substance use (alcohol consumption per week and smoking history).

3.8.2.2 Employment History

Employment details were also elicited: years since practising as a nurse, years at Edendale Hospital, period working in the current ward; and other wards worked in the last year.

3.8.2.3 Low Back Pain History

Information was gathered on the history of previous low back pain: in the past 3 months; past 12 months; any low back pain during their career as a nurse; and whether they suffered from low back pain before working as a nurse. The number of days that respondents were absent from work in the past year due to low back pain was established. The respondents were also asked about the activities that cause the low back pain to recur. Those respondents who reported that they are suffering from low back pain were also asked if they were aware of their diagnosis and to state at what stage in their career did they start experiencing a major episode of low back pain.

3.8.2.4 Occupational Factors

Information was collected on: current work activities; work activity when first injured; work activities that cause low back pain to recur; length of time spent on each activity; and occupational risk factors

3.8.2.5 Environmental Factors

The respondents were asked about their manual handling activities, work surface height and chair height. Shift work details were also obtained, that is whether the respondents were currently working on day vs. night shift; whether permanently on night duty or permanently on day duty or whether they rotated between day shifts and night shifts.

3.8.2.6 Current Low Back Pain History

Information on the history of current low back pain included whether the respondents were currently suffering from low back pain and whether they believe that the low back pain is due to their occupation. They were asked about the type of ward they were working in when the current low back pain first occurred. They were further asked if the low back pain is exacerbated by nursing activities and the effect the pain has on activities of daily living. Intensity of pain and the frequency of pain were determined. Height and weight were measured and used to calculate respondents' body mass index.

3.8.2.7 Psychosocial Factors

Psychological factors were obtained using the depression, anxiety and stress scale [49]. The depression scale included items that measure symptoms associated with dysphoric mood (e.g. sadness and worthlessness). The anxiety

scale included items that are related to symptoms of physical arousal, panic attacks and fear. Finally the stress scale items measure symptoms such as tension, irritability, and tendency to overreact to stressful events [49].

3.8.3 Reliability and Validity of Instruments

Both questionnaires have been tested and validated in previous studies. The questionnaires were in English, which is the main language of communication in the hospital [48, 49]. Orthopaedic specialists and qualified physiotherapists that work in the spinal and back care field were consulted to establish the face and content validity of the Perreira questionnaire. The experts consulted gave input on the lay out of the questionnaire.

The Perreira questionnaire was pre-tested through a pilot study, to ensure that it was user friendly. The pilot study was conducted at Edendale Hospital, with a purposive sample of 20 nurses. Qualified physiotherapists were utilized as research assistants to assist with the distribution and completion of questionnaires and to ensure clarity of questions asked through the questionnaire. The research assistants were advised about the research by the researcher. One week prior to the pilot study, a meeting was held to explain the research process and to clarify the requirements. The pilot resulted in minor modification of the data collection process. It was decided that weight and height measurements should be taken in the beginning, to minimize incomplete data for these variables.

To ensure that the correct weight and height were recorded, a calibrated weighing scale and a tape measure were provided. The research assistants assisted the respondents to measure their weight and height.

3.9 Data Collection

The researcher arranged a meeting with the various units within the Hospital through the Nursing Services Manager. The Unit Managers introduced the study to nurses within their units, and explained the data collection process at the unit level prior to the researcher's visit to different units. The respondents on day and night duty on the day of data collection in the respective units completed the questionnaires as guided by the researcher and research assistants. Due to shortages of staff at the hospital and concomitant high work loads, some of the respondents completed the questionnaires as individuals and the researcher collected the completed questionnaires at the end of the shift.

The researcher provided a weighing scale and tape measure to make sure that accurate height and weight measures were obtained. The measurements were done by the researcher or research assistants. The weighing scale was calibrated using the following method:

- The weighing scale was placed on a flat surface, set to zero. Dumbbells weighing 2kg were placed on the scale three times. The average of the 3 weights was then calculated to get the correct weight. The scale was correct, providing the same weight at each weighing.

Psychological factors were measured using the standardized depression, anxiety and stress scale.

3.10 Data Analysis

Descriptive categorical data was analyzed in the form of frequency graphs and tables. Risk factors for current low back pain and low back pain in the last 12 months were assessed using Pearson's chi-square test for categorical risk factors and *t*-test for quantitative risk factors. Binary logistic regression models

were used to adjust for confounding. The lowest risk group was selected as the referent group but in cases where the lowest risk group had very small numbers the next group was chosen. Results where data quality was compromised were omitted.

3.11 Data Management and Storage

All gathered data and information was kept strictly confidential and was only accessed by researcher. All questionnaires were locked up in a cupboard for security and safety. A back-up system was set up off-site. The data was captured into Microsoft Excel 2003 and was then exported to SPSS version 15.

3.12 Ethics Approval

The researcher obtained approval to conduct the study towards the Master of Public Health from the University of KwaZulu-Natal Postgraduate Education Committee on 8th February 2010 (206520026)[Refer Appendix E]. The Biomedical Research Ethics Committee (BREC) granted ethics approval on 1st March 2010 (BE161/09) [Refer Appendix F]. The Head Office of the KwaZulu-Natal Provincial Department of Health granted permission for the study to be conducted on 2nd February 2010 (HRKM 013/10) [Refer Appendix D]. Edendale Hospital Management and the Executive Committee granted permission for the study to be conducted on the 21st January 2010.

3.13 Conclusion

An observational, cross sectional, descriptive study with an analytical component was implemented. A self- administered questionnaire was used to determine the demographic characteristics, prevalence and risk factors associated with low back pain. Two standardized close-ended validated questionnaires were administered to collect data. The Perreira's questionnaire was utilized and the DASS questionnaire. The data was analyzed using SPSS version 15.

CHAPTER 4: RESULTS

4.1 Introduction

This chapter begins by presenting sample size, the prevalence of low back pain and occupational back pain. The demographic characteristics of the sample population are reported. In addition the risks factors associated with low back pain among nurses at Edendale Hospital are documented.

4.2 Sample Size

Three hundred and seventy three (373) questionnaires were administered, of which two hundred and seventy one (271) were adequately completed, yielding a 72% response rate.

4.3 The Prevalence of Low Back Pain

The point prevalence of current low back pain and the chronic prevalence of low back pain among the respondents was 59% (n=242) and 47% respectively (n=238).

4.4 Occupational Low Back Pain

Of the 242 respondents with current low back pain, 126 (57%) reported not suffering from low back pain before working as a nurse.

4.5 Demographic Characteristics of the Respondents

4.5.1 The Demographic Distribution of the Study Population

The demographic distribution of the respondents is shown in Table 4.1. The majority of the respondents were female, professional nurses and aged between 40 and 49 years.

Table 4.1 Demographic distribution of the study sample (N=271)

Demographic factors	Category	No. of respondents	% of total respondents
Professional category	Professional Nurse	158	59.2
	Staff Nurse	68	25.5
	Nursing Assistant	35	13.1
	Matron	6	2.2
Age	20-29 years	27	11.1
	30-39 years	73	29.9
	40-49 years	80	32.8
	Older than 50 years	64	26.2
Sex	Male	21	7.7
	Female	215	79.3

4.6 Relationship between Personal Factors and Current Low Back Pain

Table 4.2 shows the relationship between personal factors and current low back pain. The results show a higher prevalence of low back pain amongst staff nurses, respondents aged 30 to 39, females and those that are classified as obese.

Table 4.2 The relationship between personal factors and the current back pain

Personal factors	Category	Low back pain n (%)	Odds ratio	95% CI	p-value
Professional category	Professional Nurse	78(54)			
	Staff Nurse	40(68)	1.81	0.96-3.42	0.07**
	Nursing Assistant	20(67)	1.72	0.75-3.92	0.19
	Matron	2(40)	0.57	0.09-3.53	0.55
Age	20-29	10 (42)			
	30-39	47(68)	2.99	1.15-7.78	0.03*
	40-49	39(56)	1.76	0.69-4.50	0.24
	Older that 50 years	35(63)	2.333	0.88-6.19	0.09
Gender	Male	7(37)			
	Female	117(61)	2.71	1.02-7.19	0,05*
BMI	Underweight/Normal	4(25)			
	Overweight	24(57)	4.24	1.17-15.40	0.03*
	Obese	114(62)	4.89	1.52-15.74	0.08**

Level of significance ≤ 0.05

*statistically significance

**borderline significance (0.06-0.08)

4.7 Relationship between Employment History and the Presence of Current Low Back Pain

Table 4.3 shows the relationship between employment history and the presence of current low back pain. The risk of low back pain for respondents working in obstetrics and gynaecology, orthopaedics and surgery wards was high when compared with high care and ICU.

Table 4.3 Employment history and the presence of current lower back pain

Employment history	Category	Low back pain n (%)	Odds ratio	95% CI	p-value
Years in nursing	0-10	57(60)			
	11-20	43(56)	0.84	0.46-1.55	0.58
	21-30	31(61)	1.03	0.52-2.07	0.93
	31-40	8(73)	1.78	0.44-7.13	0.42
	40 and above	1(100)	1.15	0.31-4.19	0.84
Years at Edendale	0-10	79(61)			
	11-20	38(57)	0.83	0.46-1.51	0.54
	21-30	21(57)	0.83	0.39-1.74	0.62
	31-40	4(67)	1.27	0.22-7.17	0.79
Ward	HC/ICU	5(26)			
	Admin	3(51)	2.80	0.42-18.67	0.29
	Medical	28(61)	4.36	1.338-4.18	0.02*
	Ob/Gyn	18(69)	6.30	1.67-23.53	0.01*
	OPD	15(65)	5.25	1.38-19.93	0.02*
	Ortho/Surgery	37(68)	6.09	1.89-19.67	0.002*
	OT	4(40)	2.33	0.48-11.17	0.29
	Paeds	31(61)	4.34	1.35-13.92	0.01*

Level of significance ≤ 0.05

*statistically significance

**borderline significance (0.06-0.08)

4.8 Occupational Factors and Current Low Back Pain

Table 4.4 shows the relationship between occupational factors and current low back pain. Bending, twisting, transferring patients, prolonged sitting, pushing and pulling were strongly associated with low back pain.

Table 4.4 Occupational factors and presence of current low back pain

Occupational factors	Low back pain n (%)	Odds ratio	95% CI	p-value
Reaching away from the body	4(22)	2.01	0.89-4.50	0.09
Bending or twisting	91(80)	2.76	1.44-5.30	0.002*
Lifting	117(74)	1.80	0.78-4.16	0.17
Prolonged position	98(77)	2.09	1.07-4.05	0.03*
Repetitive task	9(24)	1.46	0.73-2.92	0.28
Responding to sudden movement	6(15)	2.01	0.69-6.62	0.18
Transferring a patient	13(19)	2.63	1.35-5.10	0.004*
Working in cramped position	2(9)	2.07	0.89-4.80	0.09
Working awkward position	2(6)	2.15	0.89-4.80	0.09
Pushing or pulling	14(19)	1.96	1.03-3.74	0.04*

Level of significance ≤ 0.05

*statistically significance

**borderline significance (0.06-0.08)

4.9 Relationship between Environmental Factors and Current Low Back Pain

Table 4.5 shows the relationship between environmental factors and the presence of current low back pain. All respondents on permanent night duty reported current low back pain.

Table 4.5 Environmental factors and presence of current low back pain

Environmental factors	Category	Low back pain n (%)	Odds ratio	CI 95%	p-value
Employment history	Day duty	123(61)			
	Night duty	17(52)	0.98	0.34-1.51	0.37
	Perm day	4(57)			
	Perm night	4(100)	0.71	0.57- 3.13	0.51
	3 month rotation	10(46)			
	6 month rotation	16(84)	6.40	1.44-28.44	0.02*
	Yearly rotation	26(50)	0.99	0.44-3.26	0.72
Assistance with handling	Yes	129(61)			
	No	3(25)	0.78	0.23-2.71	0.33
Assistive devices with patient handling	Yes	47(60)			
	No	66(55)	0.89	0.21-2.13	0.26
Adjustable surfaces	Yes	33(54)			
	No	75(61)	0.78	0.50-1.89	0.23
Work surface height	Too high	19(68)			0.12
	Too low	33(81)	0.77	0.16-1.75	0.55
	Neither low or high	55(55)	0.58	0.21-1.96	0.64
Chair height	Too high	12(75)			
	Too low	20(69)	0.84	0.42-1.67	0.54
	Neither low or high	56(57)	0.94	0.32-1.78	0.34

Level of significance ≤ 0.05

*statistically significance

**borderline significance (0.06-0.08)

4.10 Relationship between Psychological Factors and Current Low Back Pain

Table 4.6 shows the relationship between psychosocial factors and current low back pain.

Table 4.6 Psychosocial factors and their relationship to current low back pain

Psychological Factor	Category	Low back pain n (%)	Odds ratio	95% C I	p- value
Depression	Normal	60(48)			
	Mild	14(88)	7.70	1.68-35.29	0.009*
	Moderate	18(75)	3.30	1.23-8.86	0.02*
	Severe	10(83)	5.50	1.16-26.12	0.03*
	Extremely Severe	8(89)	8.80	1.07-72.22	0.4*
Anxiety	Normal	48(45)			
	Mild	4(57)	1.64	0.35-7.68	0.53
	Moderate	13(65)	2.28	0.84-6.17	0.10
	Severe	18(75)	3.69	1.36-10.02	0.01*
	Extremely Severe	17(90)	10.45	2.29-47.48	0.0002*
Stress	Normal	51(45)			
	Mild	13(81)	5.27	1.42-19.50	0.01*
	Moderate	13(72)	3.16	1.05-9.46	0.04*
	Severe	11(92)	13.37	1.67-107.08	0.02*
	Extremely Severe	4(100)	21.19	2.34-53.44	0.99

Level of significance ≤ 0.05

*statistically significance

**borderline significance (0.06-0.08)

The greater the degree of depression, anxiety and stress the higher the risk of low back pain and this is further illustrated in Figures 4.1-4.3.

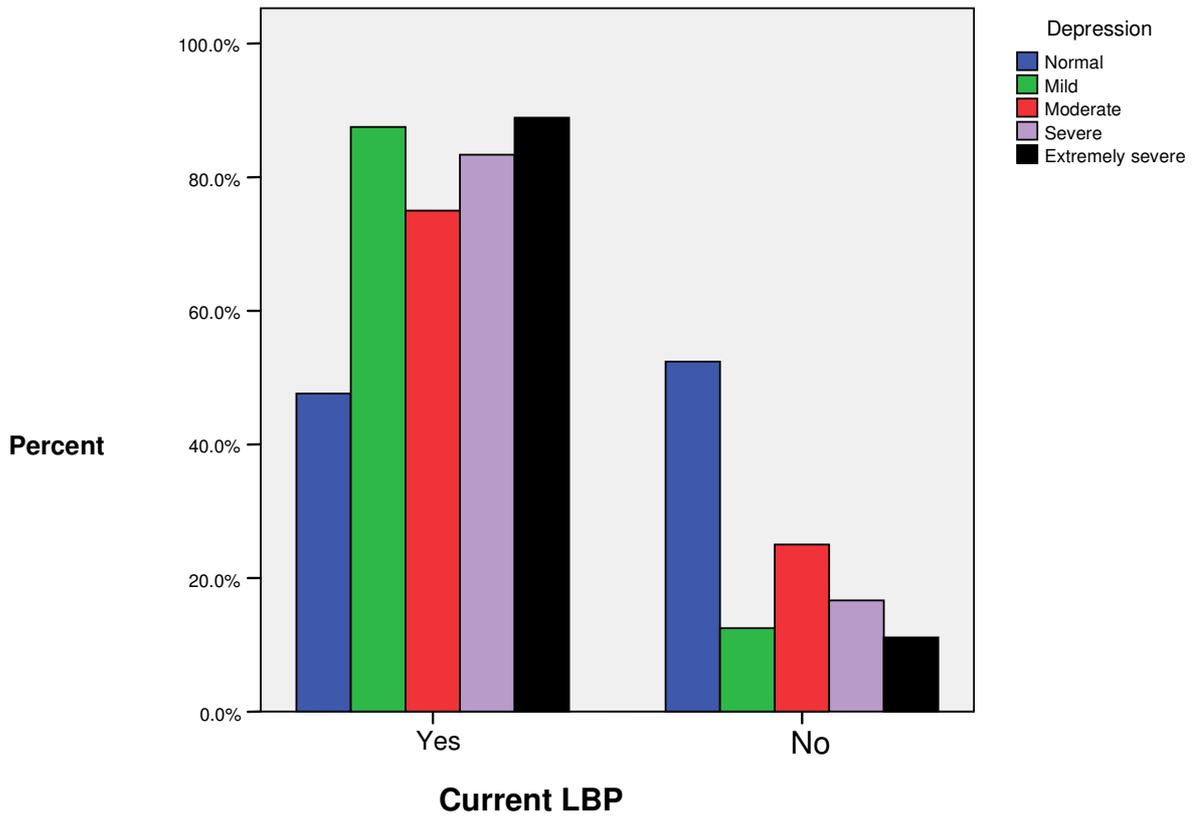


Figure 4.1 Depression and current low back pain

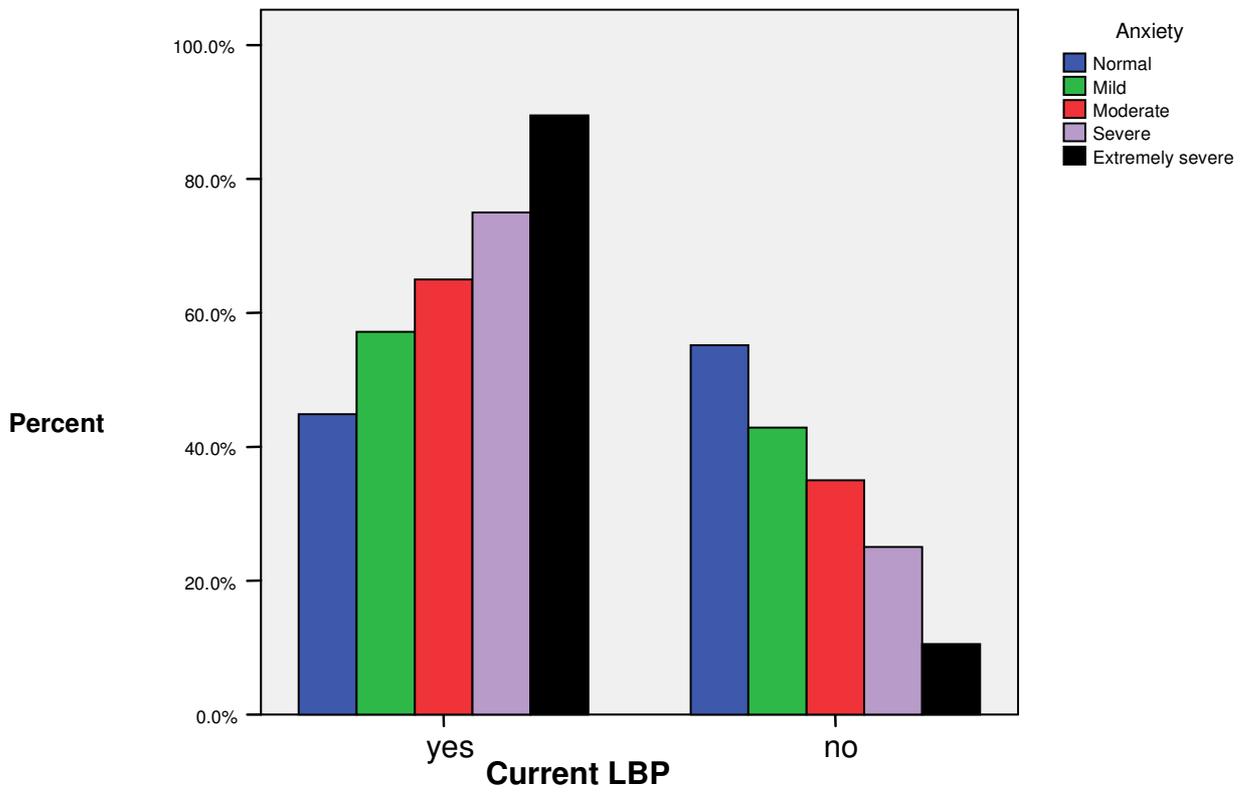


Figure 4.2 Anxiety and low back pain

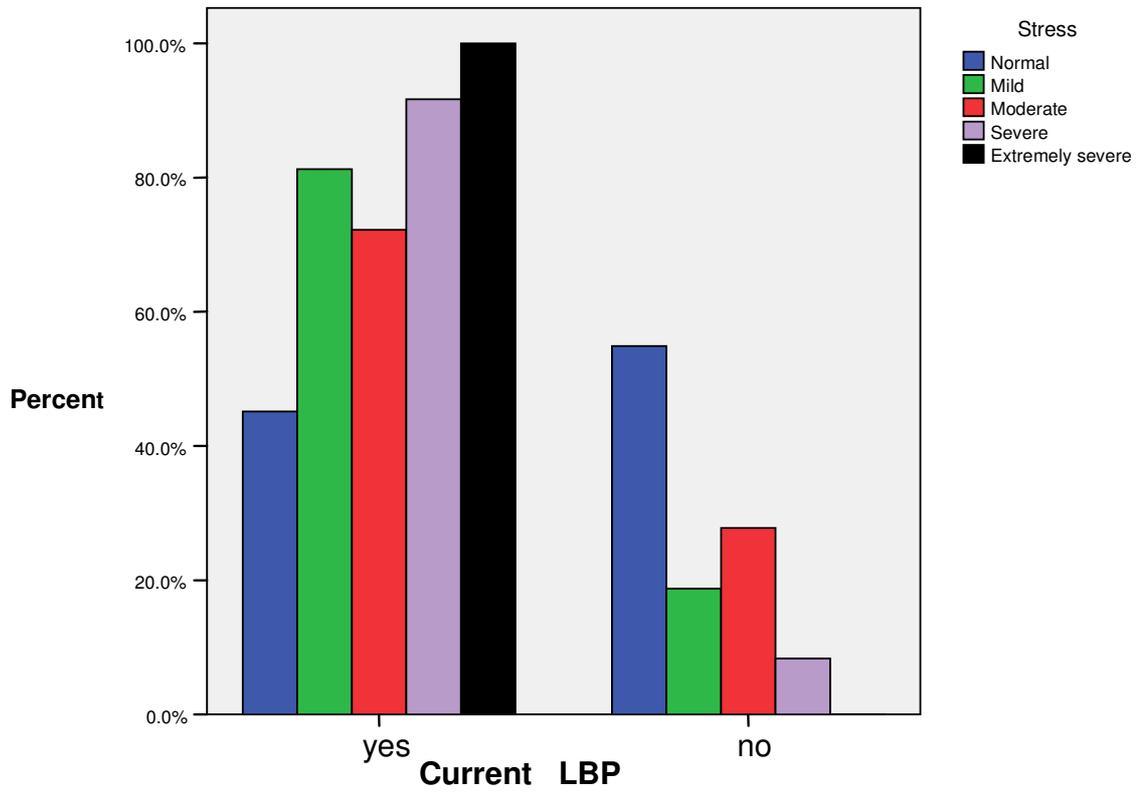


Figure 4.3 Stress and current low back pain

4.11 Relationship between Personal Factors and Chronic Low Back Pain Prevalence

Table 4.7 shows the relationship between personal factors and chronic low back pain prevalence. Nursing assistants and respondents older than 50 years had a high prevalence of 12-month low back pain.

Table 4.7 Personal factors and chronic low back pain prevalence

Personal factor	Category	Low back pain n (%)	Odds ratio	95% CI	p-value
Professional category	Professional Nurse	73(49)			
	Staff Nurse	34(53)	1.19	0.67-2.15	0.55
	Nursing Assistant	21(63)	1.70	0.79-3.65	0.17
	Matron	2(33)	0.53	0.09-2.97	0.47
Age	20-29	64(47)			
	30-39	34(50)	1.56	0.63-3.88	0.34
	40-49	23(66)	1.57	0.64-3.87	0.33
	Older that 50 years	5(71)	2.71	1.05-6.96	0.04*
Gender	Male	9(45)	2.48	0.92-6.71	0.07
	Female	102(50)	3.59	1.09-11.73	0.03*
BMI	Underweight/Normal	4(22)			
	Overweight	19(44)	1.44	0.46-4.46	0.54
	Obese	108(55)	2.39	0.86-6.63	0.09

Level of significance ≤ 0.05

*statistically significance

**borderline significance (0.06-0.08)

4.12 Relationship between Employment History and Chronic Low Back Pain Prevalence

Table 4.8 shows the relationship between employment history and chronic low back pain prevalence. The respondents working in surgery and orthopaedic wards had a high chronic prevalence of low back pain .

Table 4.8 Employment history and chronic low back pain prevalence

Employment history	Category	Low back pain n (%)	Odds ratio	95% CI	p-value
Years in nursing	0-10	58(57)			
	11-20	39(50)	1.32	0.73-2.38	0.36
	21-30	19(37)	2.28	1.15-4.55	0.02*
	31-40	2(20)	5.27	1.07-26.07	0.04*
	40 and above	0(0)			
Years at Edendale	0-10	72(53)			
	11-20	34(50)	1.13	0.63-2.01	0.69
	21-30	12(34)	2.16	0.99-4.68	0.05*
	31-40	2(29)	2.81	0.53-15.00	0.23
Ward	HC/ICU	7(40)			
	Admin	2(29)	0.63	0.09-4.17	0.63
	Medical	26(51)	1.63	0.55-4.87	0.38
	Ob/Gyn	13(48)	1.46	0.43-4.90	0.54
	OPD	8(36)	0.89	0.25-3.23	0.87
	Ortho/Surgery	37(66)	3.42	1.13-10.36	0.03*
	OT	6(55)	1.89	0.41-8.61	0.41
Paeds	28(51)	1.63	0.55-4.82	0.38	

Level of significance ≤ 0.05

*statistically significance

**borderline significance (0.06-0.08)

4.13 Occupational Factors and Chronic Low Back Pain

Table 4.9 shows the relationship between occupational factors and chronic low back pain prevalence. Working in cramped position was strongly associated with risk the of developing low back pain .

Table 4.9 Occupational factors and chronic low back pain prevalence

Occupational factors	Low back pain n (%)	Odds ratio	95% CI	p-value
Reaching away from the body	15(75)	1.94	0.93-4.04	0.07**
Bending or twisting	50(77)	2.15	1.17-3.96	0.01*
Lifting	95(67)	1.20	0.53-2.72	0.66
Prolonged position	48(74)	1.80	0.96-3.37	0.06**
Repetitive task	48(74)	2.77	1.37-5.60	0.004*
Responding to sudden movement	30(77)	2.17	1.18-4.02	0.01*
Transferring a patient	71(71)	1.75	0.96-3.19	0.07**
Working in cramped position	36(74)	3.10	1.02-9.45	0.05*
Working in awkward position	2(6)	2.51	1.16-5.43	0.02*
Pushing or pulling	14(19)	2.02	1.10-3.69	0.02*

Level of significance ≤ 0.05

*statistically significance

**borderline significance (0.06-0.08)

4.14 Relationship between Environmental Factors and Chronic Low Back Pain Prevalence

Table 4.10 shows the relationship between the environmental factors and chronic low back pain prevalence. The respondents that were on 6 month rotation were 3.90 more at risk when compared with 3 month rotation.

Table 4.10 Environmental factors and chronic low back pain prevalence

Environmental factor	Category	Low back pain n (%)	Odds ratio	95% CI	p-value
Shift Work details	Day duty	104(50)			
	Night duty	22(50)	0.94	0.47-1.87	0.86
	Perm day	4(44)			
	Perm night	3(100)	0.20	0.01-2.91	0.24
	3 month rotation	9(38)			
	6 month rotation	15(75)	3.90	1.35-18.47	0.04*
	Yearly rotation	30(57)	2.08	0.78-5.58	0.14
Assistance with handling	Yes	119(53)			
	No	4(31)	0.98	0.50-1.89	0.95
Assistive devices with patient handling	Yes	34(43)			
	No	71(55)	0.79	0.37-1.72	0.83
Adjustable surfaces	Yes	29(45)	0.67	0.45-1.54	0.54
	No	75(57)			
Work surface height	Too high	35(76)	0.64	0.78-2.45	0.89
	Too low	32(39)			
	Neither low or high	44(44)			
Chair height	Too high	18(60)	0.76	0.24-4.67	0.89
	Too low	28(39)			
	Neither low or high	48(49)			

Level of significance ≤ 0.05

*statistically significance

**borderline significance (0.06-0.08)

4.15 The Relationship between Psychological Factors and Chronic Low Back Pain Prevalence

Table 4.11 shows the relationship between psychosocial factors and 12-month low back pain prevalence. The prevalence of chronic low back pain increases as the severity of depression, anxiety and stress increases.

Table 4.11 Psychological factors and chronic low back prevalence

Psychological Factor	Category	Low back pain n (%)	Odds ratio	95% C I	p-value
Depression	Normal	60(45)			
	Mild	13(77)	4.39	1.18-16.28	0.03
	Moderate	17(71)	1.19	0.493-2.91	0.69
	Severe	6(46)	1.28	0.41-4.02	0.67
	Extremely Severe	6(67)	3.84	0.77-19.18	0.10
Anxiety	Normal	48(42)			
	Mild	4(57)	1.83	0.392-8.57	0.44
	Moderate	10(50)	1.38	0.531-3.56	0.51
	Severe	15(65)	2.58	1.012-6.57	0.05
	Extremely Severe	15(75)	4.13	1.403-12.13	0.01
Stress	Normal	53(43)			
	Mild	10(67)	1.95	0.62-6.61	0.25
	Moderate	10(53)	0.96	0.35-2.66	0.94
	Severe	9(75)	1.89	0.53-6.82	0.32
	Extremely Severe	5(100)	4.34	0.47-39.94	0.19

Level of significance ≤ 0.05

*statistically significance

**borderline significance (0.06-0.08)

4.16 Logistic Regression

Logistic regression revealed that bending was significantly associated with current low back pain. A high correlation was established between low back pain amongst nurses working in outpatient's, orthopaedics, surgery, obstetrics and gynaecology wards.

Table 4.12 Logistic regression and risk factors

Employment history	Category	Odds ratio	95% CI	p-value
Shift work details	3 month rotation			
	6 month rotation	5.892	0.78-44.54	0.09
	Yearly rotation	1.092	0.29-4.17	0.89
Occupational Factors	Bending	2.29	1.078-4.88	0.03*
Ward	HC/ICU			
	Admin	18.19	1.39-237.48	0.03*
	Medical	3.04	0.7412.49	0.12
	Ob/Gyn	14.10	2.26-87.99	0.005*
	OPD	6.88	1.36-34.89	0.02*
	Ortho/Surgery	5.16	1.22-12.79	0.03*
	OT	1.09	0.19-6.19	0.92
	Paeds	3.63	0.88-15.01	0.08**

Level of significance ≤ 0.05

*statistically significance

**borderline significance (0.06-0.08)

4.17 Conclusion

The current study concluded that the point prevalence of current low back pain is 59%, the 12-month prevalence is 47% and the occupational low back pain prevalence of 57%. Staff nurses, respondents aged between 30-39 years and females had the highest prevalence rate. Respondents working in orthopaedics, surgery, obstetrics and gynaecology showed the highest the prevalence rate. Logistic regression revealed that working in orthopaedic, surgery, paediatrics, obstetrics and gynaecology is significantly associated with low back pain.

Chapter 5: Discussion

5.1 Introduction

This chapter discusses the main findings of the current research. The findings will be discussed in relation to the aim and objectives of the study and in relation to similar studies. The objectives of the study were (1) to measure the prevalence of low back pain amongst nurses at Edendale Hospital and (2) to ascertain the risk factors associated with low back pain among nurses at Edendale Hospital. The results showed that the risk factors associated with current and chronic low back are similar. Therefore the discussion of the findings of acute, chronic and occupational low back pain will be integrated.

5.2 The Prevalence of Low Back Pain

The point prevalence of current low back pain among the nurses was 59%. In a study done by Naude' amongst 354 hospital employees in a level 1 hospital in South Africa, nursing staff were found to have a higher prevalence of low back pain (59%) as compared to other occupations that were part of the study population [16]. The high prevalence of low back pain among nurses in Naude's study was attributed to the manual handling that the job entails. A lower prevalence of 35.8% was reported among steel plant workers in South Africa [13].

The prevalence of chronic low back pain in the current study was 47% and this is comparable to the chronic prevalence rate of 46% found in a study conducted among hospital employees in Nigeria. An analysis of prevalence of back pain among occupational groups in the Nigerian study revealed that the highest prevalence of back pain (69%) was recorded amongst nurses [12]. A high prevalence of chronic low back pain of 83% was also reported amongst nurses in

rural Japan. The high prevalence in Japan was associated with lifting, moving and transferring patients [15]. Occupational low back pain prevalence in the current study was 57%.

5.3 Personal factors and their Relationship to the Presence of Low Back Pain

5.3.1 Professional Category

A higher percentage of staff nurses (68%) and nursing assistants (67%) experienced current low back pain as compared to professional nurses (54%). The prevalence of chronic low back pain was high amongst nursing assistants as compared to professional nurses with the odds ratio of 1.70, but the positive association was found to be statistically not significant ($p=0.17$). A high prevalence of low back pain amongst nursing assistant's and staff nurses has been reported in other studies [38,43].

The findings of this study are comparable with the results of a study done in Britain that concluded that sisters and senior staff nurses had a lower prevalence of back pain as compared with the assistant nursing group. The lower prevalence among sisters and senior nurses in the British study was attributed to the fact that professional nurses are less involved in the manual handling of patients because of their organizational and management responsibilities. The staff nurses and nursing assistants' job involves direct patient care, such as moving and transferring patients and transporting material and medical devices [40]. A study in Greece that compared low back pain in relation to nurses' education, suggested that the high prevalence amongst staff nurses and nursing assistants was due to the shorter duration of training, not giving enough time to cover prevention issues related to musculoskeletal injuries and manual handling [50]. This current study could not stratify by nursing category to ascertain whether nursing assistants reported occupational factors differently than the

other groups. The sample was too small. More research is needed to explore the relationship between nursing category and the presence of low back pain.

5.3.2 Age

Sixty eight percent of respondents between the ages of 30 and 39 years suffered from current low back pain and a positive association, which was statistically significant ($p=0.03$), was found between this age group and the presence of low back pain. A study conducted amongst hospital employees at Tshwane Hospital in South Africa showed a higher prevalence of low back pain amongst the respondents aged 26 to 40 years, with 50% of them suffering from low back pain as compared to the other age groups [16]. Nursing category may be a confounder with regard to the association between age and low back pain. The present study was unable to explain the differences in prevalence amongst different age groups, because the sample size was too small to stratify according to nursing category. Further research will need to be conducted with a larger sample.

The current study also concluded that 63% of respondents older than 50 years suffered from current low back pain, even though the association between low back pain and this age group was not found to be statistically significant. The current study concluded that there was an association between age and chronic low back pain. Chronic low back pain was predominant at ages greater than 50 years and amongst respondents that were between the ages of 40 and 49 years. A study conducted in Paris amongst workers from small companies showed that aging was the main risk factor for severity of low back pain and low back pain has been reported to increase with the increasing age in other studies [6, 17, 18, 29,31]. A systematic review of literature found strong evidence that age is a prognostic factor for longer duration of sick leave in patients suffering from low back pain [30]. The increasing risk of current low back pain with age could not be confirmed by the current study.

5.3.3 Gender

A high proportion of females (61%) suffered from current low back pain than males (37%). These findings are comparable to the results found in the Nigerian study of nurses that reported 68% prevalence for female nurses and 32% for male nurses. Fifty percent of the female respondents reported to have had low back pain in the past chronics with the odds ratio of 3.59. A positive association was found between females and the presence of low back pain.

These findings correspond with previous studies that were done in Paris and Nigeria. The Paris study concluded that females were more at risk of developing low back pain even if they are not exposed to known occupational risk factors [18]. The high prevalence in females was associated with extra occupational workload such as household chores and caring for children [18]. Furthermore the Nigerian study suggested that the difference in prevalence may be related to the anatomical, physiological and structural difference between males and females [5].

5.3.4 Body Mass Index

The prevalence of current low back pain was higher amongst the respondents that were overweight (57%) and obese (62%) as compared to respondents that were of normal weight and underweight (25%). Obese respondents were 4.89 times more likely of reporting current low back pain, followed by overweight respondents who were 4.24 times more at risk of reporting current low back pain. A positive association was found which was statistically significant between being overweight and current low back pain and borderline significance was found between obesity and current low back pain. Similarly, obese respondents were found to have a higher prevalence of chronic low back pain in the study. The risk of having low back pain was 2.39 more when compared with the respondents of normal weight and underweight.

The effect of high BMI on low back pain has been reported in other studies [28, 29]. A study conducted in Japan concluded that high BMI was significantly associated with disc degeneration at four disc levels. This could be a result of mechanical stress caused by the extra weight around the waist area [31].

The link between obesity and low back pain appears to be controversial and a clear dose response relationship between low back pain and obesity is lacking [26]. Studies have demonstrated a positive association and have found that both men and women with BMI of 30kg/m^2 or higher were twice as likely to have difficulties in performing a range of basic daily physical activities due to increased BMI [26, 27]. Compared with women with BMI lower than 25kg/m^2 those with BMI of 30 kg/m^2 or higher were 1.5 times more likely to have symptoms of intervertebral disk herniation [26, 27].

5.4 Employment History and Presence of Low Back Pain

Seventy three percent (73%) of the respondents that have been practicing nursing for 31 to 40 years reported low back pain, although the association was not found to be statistically significant. The risk of having low back pain was higher amongst respondents that had been nursing for 31-40 years with an odds ratio of 5.27 ($p=0.04$). A study that was done in Australia amongst nursing students and graduate nurses, suggested that the length of time in the profession and increased occupational exposure were found to be associated with the development of low back pain [9].

In contrast to the findings of the current study, a study conducted in the United Kingdom revealed that a high proportion of younger nurses with minimal nursing experience had low back pain compared with older nurses that have more years in the profession [40]. The number of years working at Edendale did not show significant effect on current low back pain amongst the respondents.

Working in medical, out patients, paediatrics, obstetrics and gynaecology, orthopaedics and surgery was positively associated with current low back pain and the association was found to be statistically significant. The respondents working in obstetrics and gynaecology, orthopaedics and surgery reported a higher prevalence of low back pain with an odds ratio of 6.30 and 6.09 respectively. The results of the current study correspond with the findings of previous studies concluding that nurses working in surgery and obstetric and gynecology departments have the highest prevalence of low back pain [15, 38].

Similarly, the nurses working in surgery and orthopaedic wards showed the highest prevalence of chronic low back pain. The risk of developing low back pain for respondents working in orthopaedic and surgery wards is 3.42 times more when compared with the respondents working in intensive care and high care units. The high prevalence in these wards could attributed to the fact that the patients in these wards are post surgery and require a lot of assistance with moving in bed and transfers[41].

It was not possible in this study to explain the differences in prevalence in these wards because of limited information. Further research accounting for nursing category, characteristics of patients and ergonomic task/analysis is needed to explain the differences in the low back pain prevalence amongst nurses working in these wards.

5.5 Occupational Factors and Presence of Low Back Pain

Bending, twisting and transferring patients were identified as significant risk factors for current low back pain in the present study, with an odds ratio of 2.76 and 2.63 respectively. The main occupational risk factors for chronic low back

pain were bending, twisting, and repetitive tasks, working in a cramped position, working in an awkward position, pushing or pulling. All the occupational risk factors were found to be statistically significant.

The results are consistent with previous studies indicating that manual handling, transferring or moving are predictors of low back pain. Manual handling is an important issue in nursing. Most patient handling activities are performed in less than ideal space and in suboptimal time frames. This results in great biomechanical strain, which may eventually lead to the development of low back pain [15]. The increased proportion of occupational risk factors in this study could be the result of poor working posture, the incorrect use of lifting/handling techniques and unavailability of manual handling equipment in the hospital [20]. The current study did not establish whether job aids were available at Edendale Hospital. Therefore it was difficult to conclude whether the high risk associated with occupational factors was due to unavailability of job aids or not. Another study is needed to explore the impact of ergonomic interventions on low back pain at Edendale Hospital

Lifting, pulling, pushing and sustained position have also been recognised as risk factors for current low back pain in the present study and the association was found to be statistically significant. Respondents in a study in a Nigerian hospital associated low back pain with heavy physical work, sustained position and lifting. This was also confirmed by a study that was conducted among Japanese nurses. In the Japanese study the risk of developing low back pain for nurses involved in manual handling was high with the odds ratio of 16.7 as compared with nurses who were not involved in manual handling [5, 15].

The need for nurses to carry out lifting and manual handling tasks is determined by the patient's mobility and most of the handling activities are closely connected. This made it difficult to distinguish their individual contributions to risk and establish the impact of cumulative effects on low back pain amongst nurses at

Edendale Hospital. Further research needs to be conducted to investigate the influence of cumulative effects of various manual handling activities on low back pain.

5.6 Environmental Factors and Presence of Low Back Pain

A high proportion of respondents (100%) who had current and chronic low back pain were permanently on night duty as compared with those that are on permanent day duty. The increase in prevalence amongst the nurses on night duty has been reported in other studies and the association has been explained by the fact that there are few staff during the night and nurses are required to perform more patient handling [41, 43]. Night duty could be a confounding factor because nurses who are suffering from chronic low back pain may be permanently placed on night duty because of the expected lower workload at night. This would need to be explored in further research.

The respondents on 6 month rotation were found to be 6.40 times more at risk of low back pain as compared to those who are on 3 month rotation. There was a statistically significant association between respondents that were on 6 months rotation and the presence of chronic low back pain which. The association between 6 months rotation and the presence of low back pain is not clearly understood.

No studies have explored the relationship between rotation system and low back pain. The rotation system has sparked some debate and conflict in the nursing profession in some institutions in KwaZulu-Natal. Some of the nurses don't want to be moved from certain wards. Forced rotation may create poor relations between workers and supervisors. Poor social support in the workplace and low job satisfaction has been associated with low back pain [44]. Furthermore it has been suggested that organizational and social factors in the work place may be

related to the increased stress and that can lead to development of low back pain [33].

The present study also found that 81% of respondents that suffered from current low back pain reported that their work surfaces were too low. Whilst the majority of respondents that reported that the work surface area and chair height were too high suffered from chronic low back pain. Uncomfortable chair and inadequate adjustable operating tables were associated with low pain in a study amongst doctors [11].

The relationship between body height, chair height, work surface has been established in other studies [11, 20]. The current study did not explore this relationship, but a further study is required to establish if this contributes to the high prevalence in the Hospital.

5.7 Psychosocial Factors and their Relationship to Low Back Pain

The study established that a high proportion of respondents who experienced mild to extremely severe symptoms of depression, anxiety and stress had current low back pain. The association was linearly correlated, with deeper levels of depression, anxiety and stress being associated with higher prevalence of current low back pain.

The current study also concluded that the greater the degree of depression, anxiety and stress the higher the risk of chronic low back pain. The risk of developing low back pain was high among respondents and it increased as the severity of depression, anxiety and stress increased.

Depression and long term disability for individuals with musculoskeletal disorders are significant societal losses. Insomnia and anxiety, which might be a manifestation of depression, are common complaints of people suffering from low back pain [1]. Over a period of time psychosocial and behavioral factors exacerbate the level of pain and therefore contribute to severe disability. These include lost work days, increased costs of medical care and workers' compensation benefits.

Unexpected and stressful events are also an integral part of daily patient care and the effect may be worsened by the lack of human resources. A significant effect of work related stress on low back pain was also found in a study that was done among hospital employees in Gauteng, South Africa [1]. The impact of staff shortages on development of low back pain was not explored in the present study, future research is required to assess whether the lack of human resources have any effect on the prevalence of low back pain amongst nurses at the Hospital.

What could not be derived from this present study is whether psychosocial factors were present before the onset of low back pain and whether the psychological factors are influenced by demographic factors [1]. A longitudinal study to include nurses that are free from pain at the beginning should be conducted to produce more scientific evidence on the impact of psychological factors on low back pain.

5.8 Logistic Regression

Logistic regression revealed that occupational factors were primary risk factors for both current and chronic low back pain. Bending and working in paediatrics, administration, orthopaedics, surgery, obstetrics and gynaecology were all statistically significantly associated with low back pain among nurses at Edendale

Hospital even after adjusting for various demographic and psychosocial factors. These results support the studies that established that surgery, obstetrics and gynaecology reported a higher prevalence of nurses suffering from low back pain. Therefore occupational interventions are most likely to reduce low back pain and concomitant loss of productivity, at Edendale Hospital.

5.9 Limitation of the study

This study used a cross sectional study design and it is difficult to establish causality because the time sequence is not clear. The study focused on nurses at Edendale Hospital. Therefore it cannot be generalized to nurses in other institutions. Healthy worker selection could have biased the results due to the fact that those suffering from low back pain might have left the nursing profession or changed to other jobs prior to data collection. The respondents were unable to state time spent doing activities like lifting, transfers, bending, sitting and standing. In order to draw accurate conclusions regarding these activities, this should be assessed by direct participant observation. The questionnaire did not include recreational activities and low back pain might have been aggravated by other activities such as exercise and household chores.

CHAPTER 6

6.1 Conclusions

The objectives of the study were to ascertain the prevalence of low back pain amongst nurses at Edendale hospital and the risk factors associated with low back pain.

The point prevalence of low back pain was 59%, prevalence of chronic low back pain was 47% and occupational low back pain was 57%.

Bivariate analyses showed that:

- The prevalence of low back pain was high amongst staff nurses, respondents aged 30 to 39, above 50 years, females and obese respondents.
- Orthopaedics, surgery, obstetrics and gynaecology wards showed the highest risk of low back pain.
- Bending, twisting and transferring, working in awkward positions were strongly associated with low back pain.
- All respondents on permanent night duty were suffering from low back pain and the risk of low back pain in nurses on day duty was highest amongst respondents on a 6 month rotation.
- The greater the degree of depression, anxiety and stress the higher the risk of low back pain.

Logistic regression concluded that:

- Bending and working in paediatrics, administration, orthopaedics, surgery, obstetrics and gynaecology were all statistically significantly associated with low back pain among the nurses at the Hospital.

Thus occupational factors are most strongly associated with low back pain

6.2 Recommendations

Taking into consideration the findings of the study the following recommendations are given for implementation at Edendale Hospital.

6.2.1 Nursing Managers

- Nurses must be taught a wide range of manual handling and lifting techniques to meet the needs of patients and staff.
- Edendale Hospital should be well equipped with appropriate assistive devices for manual handling of patients. Priority should be given to orthopaedics, surgery and obstetrics and gynaecology.
- Induction courses for back care for nursing assistants and staff nurses must be conducted for all new recruits.

6.2.2 Ward Managers

- The performance of staff nurses and nursing assistants in lifting and handling of patients should be assessed on a regular basis to ensure they are practicing techniques that protect nurses and patients.
- Regular in-service training on back care and ergonomics must be conducted in various wards to assist nurses to refresh manual handling techniques.

- Ward managers should identify the assistive devices required by the unique nursing needs in their wards and forward motivations to nursing managers.

6.2.3 Nurses

- Nurses must modify work practices and ensure that they use correct bending and lifting techniques.
- Nurses must ask for assistance when performing patient handling activities.

6.2.4 Future Research

- Further research needs to be conducted to determine the influence of cumulative effects of manual handling activities on low back pain.
- Further research accounting for nursing category, characteristics of patients and ergonomic task/analysis is needed to explain the differences in the low back pain prevalence amongst nurses working in various wards.
- A longitudinal study is needed to ascertain the impact of psychosocial factors on low back pain.

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Dear Participant

This questionnaire has been designed as part of the study for a Masters in Public Health. The study will investigate the prevalence of low back pain amongst nurses at Edendale Hospital.

Please fill in the questionnaire provided below and if you have any questions, please feel free to ask the physiotherapists.

Thank you

Appendices

Appendix A

LOW BACK PAIN RESEARCH QUESTIONNAIRE

Please answer the following questions. Where there is a choice of responses, please circle the correct response or tick the correct box

Section 1: Individual Factors

1) Nursing category: Please place a tick in the box that corresponds with your nursing role:

Professional Nurse	<input type="checkbox"/>
Staff Nurse	<input type="checkbox"/>
Nursing Assistant	<input type="checkbox"/>
Matron	<input type="checkbox"/>

2) What is your age? _____ Years

3) What is your sex? MALE / FEMALE

4) History of Smoking and Alcohol Consumption

1. Do you currently smoke cigarettes?	YES	NO
2. Have you ever smoked before?	YES	NO
3. Do you drink alcohol?	YES	NO

5) Shift Work Details.

1. How many years have you been practicing as a nurse?	
2. How long have you worked at Edendale?	
3. Which ward are you currently working in?	
4. How long have you worked in this ward?	
5. What other wards have you worked in the last year?	

6) Employment History

1. Are you currently on day duty?	YES	NO
2. Are you currently on night duty?	YES	NO
3. Are you permanently on day/night duty?	DAY	NIGHT
4. If rotating, how often are you rotated to other wards?	Every 3 months Every 6 months Yearly	

Section 2: Low Back Pain (LBP) History

DEFINITION: Low Back Pain is pain lasting for 3 months or longer in an area between the twelfth ribs and the gluteal folds

7)

1. Have you suffered from LBP in the past 3 months?	YES	NO
2. Have you suffered from LBP in the past chronics?	YES	NO
3. Have you ever experienced LBP in your career as a nurse?	YES	NO
4. Did you ever suffer from LBP before working as a nurse?	YES	NO
5. How many days have you been absent from work in the past year due to low back pain?		

8) What work activities cause your Low back symptoms to recur? Please check all that apply.

1. Bending or Twisting	
2. Lifting	
3. Maintaining a position for long periods of time e.g. standing, sitting, kneeling	
4. Performing manual therapy techniques e.g. massage, mobilization	
5. Performing repetitive tasks	
6. Reaching or working away from the body	
7. Transferring patients	
8. Working in cramped/awkward positions	
9. Pushing or pulling	
10. Other. Please specify:	

9) What type of low back injury did you incur? What was the current diagnosis?

1. N/A (No diagnosis)	
2. Degeneration	
3. Ligament Sprain	
4. Muscle Strain	
5. Neuropathy	
6. Vertebral disc involvement	
7. Other: Please specify:	

10) At what stage of your career did you experience a major episode of LBP for the first time? (i.e. How many years had you been working)?

As a student	
0-5 years	
6-10 years	
11-15 years	
16-20 years	
20+ years	

Section 3: Occupational Factors

11) How long do you spend doing the following activities? Please mark all that apply

ACTIVITIES	HOURS
1.Lifting	
2.Transfers	
3.Bending	
4.Sitting	
5.Standing	

12) What work activity was you doing when currently injured your back?

1.Giving Medication	
2. Bending or Twisting	
3. Instructing a patient	
4. Lifting	
5. Maintaining a position for a prolonged period of time. Please specify the posture. E.g. standing, sitting, kneeling or bent over	
6. Performing repetitive tasks	
7. Responding to an unanticipated or sudden movement by a patient	
8. Transferring a patient	
9. Working in an awkward or cramped position	
10. Working when physically fatigued	
11. Pushing or pulling	
12. Other. Please specify:	

13) In the following table are 18 potential job risk factors.

On a scale of 0-5; 0 being no problem and 5 being a major problem, please indicate to what extent each risk factor may be implicated in the development of your current low back pain.

JOB RISK FACTOR	0	1	2	3	4	5
1. Performing the same task over and over						
2. Working in the same position for long periods of time						
3. Working a shift with few staff on duty						
4. Bending or twisting your back in an awkward way						
5. Lifting or transferring dependant patients						
6. Continuing to work when injured or hurt						
7. Reaching or working away from your body						
8. Working in awkward or cramped positions						
9. Working near to or at your physical limits.						
10. Not enough rest breaks during the day						
11. Unanticipated sudden movement or fall by a patient						
12. Assisting patient during gait activities						
13. Carrying/lifting or moving heavy materials and equipment						
14. Working with confused or agitated patients						
15. Work schedule (e.g. overtime, on-call, irregular shifts)						
16. Inadequate training in injury prevention						
17. Other. Please specify:						

14)

1. Do you ask for assistance when performing patient handling activities?	YES	NO
2. Do you use assistive devices with patient handling activities?	YES	NO
3. Do you use height and /or angle adjustable work surfaces?	YES	NO
4. How many hours do you work per week?		

15) Do you consider your work surface area height to be any of the following?

Too high	YES	NO
Too low	YES	NO
Neither too high or too low	YES	NO

16) Do you consider your chair height to be any of the following?

Too high	YES	NO
Too low	YES	NO
Neither too high or too low	YES	NO

Section 4: Current Low back Pain History

17)

1. Are you currently suffering from LBP as defined above?	YES	NO
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NB: If your answer is NO for 17.1 Please ignore the following questions and proceed to the next page.

2. Do you believe your LBP is due to your occupation?	YES	NO
3. Are your symptoms of LBP exacerbated by nursing activities?	YES	NO
4. Has the LBP affected you outside of work in terms of activities of daily living and leisure activities?	YES	NO

18) What best describes the intensity of your LBP? Please tick what applies.

No pain at the moment	
Mild	
Moderate	
Severe	
Worst imaginable	

19) Which term best describes the frequency of your LBP? Please tick what applies.

Never	
Infrequent (1-2 days/wk)	
Frequent (3-5 days/wk)	
Constant (Daily pain)	

20) Please indicate in what type of ward you were working when your current low back pain first occurred?

1.ICU	
2.Theatre	
3.Medical	
4. Pediatrics	
5. Surgical	
6.Obs and Gynecology	
7. Orthopedics	
8.Outpatients	
9. Other. Please specify:	

Please note that your weight and height will be measured by the physiotherapist at the end

21)

Anthropometry and BMI

What is your weight?	
What is your height?	

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to a considerable degree, or a good part of time
- 3 Applied to me very much, or most of the time

1	I found myself getting upset by quite trivial things	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I just couldn't seem to get going	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I had a feeling of shakiness (e.g., legs going to give way)	0	1	2	3
8	I found it difficult to relax	0	1	2	3
9	I found myself in situations that made me so anxious I was most relieved when they ended	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting upset rather easily	0	1	2	3
12	I felt that I was using a lot of nervous energy	0	1	2	3
13	I felt sad and depressed	0	1	2	3
14	I found myself getting impatient when I was delayed in any way (e.g., lifts, traffic lights, being kept waiting)	0	1	2	3
15	I had a feeling of faintness	0	1	2	3
16	I felt that I had lost interest in just about everything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I perspired noticeably (e.g., hands sweaty) in the absence of high temperatures or physical exertion	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life wasn't worthwhile	0	1	2	3

Reminder of rating scale:

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to a considerable degree, or a good part of time
- 3 Applied to me very much, or most of the time

22	I found it hard to wind down	0	1	2	3
23	I had difficulty in swallowing	0	1	2	3
24	I couldn't seem to get any enjoyment out of the things I did	0	1	2	3
25	I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)	0	1	2	3
26	I felt down-hearted and blue	0	1	2	3
27	I found that I was very irritable	0	1	2	3
28	I felt I was close to panic	0	1	2	3
29	I found it hard to calm down after something upset me	0	1	2	3
30	I feared that I would be "thrown" by some trivial but unfamiliar task	0	1	2	3
31	I was unable to become enthusiastic about anything	0	1	2	3
32	I found it difficult to tolerate interruptions to what I was doing	0	1	2	3
33	I was in a state of nervous tension	0	1	2	3
34	I felt I was pretty worthless	0	1	2	3
35	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
36	I felt terrified	0	1	2	3
37	I could see nothing in the future to be hopeful about	0	1	2	3
38	I felt that life was meaningless	0	1	2	3
39	I found myself getting agitated	0	1	2	3
40	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
41	I experienced trembling (e.g., in the hands)	0	1	2	3
42	I found it difficult to work up the initiative to do things	0	1	2	3

Thank you for taking the time to complete this questionnaire.

Your co-operation is appreciated.

Reference: Nicole Perreira (DUT-M Tech Chiropractic Student)

DASS Available www.psy.unsw.edu.au/groups/dass

Appendix B

INFORMATION DOCUMENT

Study title: An investigation of the prevalence of Low Back Pain amongst nurses at Edendale

My name is Thembelihle Dlungwane. I am a Physiotherapist practising at Edendale. I wish to welcome you into this study the prevalence of Low Back Pain.

Introduction: I, Thembelihle Dlungwane, am doing research on the prevalence of Low Back Pain amongst nurses at Edendale. Research is a process to learn the answer to a question. In this study I want to find out how many nurses at Edendale that are suffering from Low Back Pain and I also want to find out about any risk factors that may contribute to nurses developing Low Back Pain . Low back pain' in this study refers to pain lasting for 3 months or more in an area between the twelfth ribs and the gluteal folds .Occupational back pain is defined as pain, ache, stiffness or fatigue localized to the back related to nursing practice .So I am undertaking this study in an attempt to found out what risks are involved in nurses getting Low Back Pain

Invitation: You have been selected for this research and I am inviting you to participate in this research study. Your participation will benefit you and all other nurses at Edendale.

What is involved in the study: The study is to be carried out by a questionnaire survey. All that is required is approximately 20 minutes of your time, during which you will be asked to answer some set questions on a questionnaire, as accurately as possible. The responses on the questionnaires will be collated and analysed in order for me to get the answer to the research question.

Risks: There are no foreseen risks in this study as it does not involve any physically invasive procedures.

Benefits: This study will benefit yourself and all other nurses at Edendale as it will clarify the proportion of nurses suffering from low back pain and risk factors contributing to Low Back Pain Amongst Nurses.

Nature of Participation: Participation in this study is voluntary. You will not be penalised in any way for refusing to take part. You are free to withdraw from the study at any time.

Confidentiality: The results will be confidential. Your name will not appear on the questionnaire and efforts will be made to keep personal information confidential. Absolute confidentiality cannot be guaranteed as personal information may be disclosed if required by law although this is unlikely in a study such as this. When this study is complete, you will receive a summary of the results so that you will know the outcome of this study that you have participated in.

Contact details: If you have any questions regarding this study, or study related adverse effects, please contact myself, Thembelihle Dlungwane on (033) 395 4100 or 076 2828 471.

Contact details of BREC Administrator or Chair – for reporting of complaints/problems:

Biomedical Research Ethics, Research Office, UKZN, Private Bag X54001, Durban 4000

Telephone: +27 (0) 31 260 4769 / 260 1074

Fax: +27 (0) 31 260 4609

Administrator: Ms D Ramnarain

Email: BREC@ukzn.ac.za

Appendix C

CONSENT TO PARTICIPATE IN RESEARCH

You have been asked to participate in a research study.

You have been informed about the study by _____

You may contact Thembelihle Dlungwane at 033 395 4100 or 0762828471 any time if you have questions about the research or if you have suffered any adverse effects as a result of the research.

You may contact the **Biomedical Research Ethics Office** on **031-260 4769 or 260 1074** or Email PREC@ukzn.ac.za if you have questions about your rights as a research participant.

Your participation in this research is voluntary, and you will not be penalized or lose benefits if you refuse to participate or decide to stop

If you agree to participate, you will be given a signed copy of this document and the participant information sheet which is a written summary of the research.

The research study, including the above information, has been described to me orally. I understand what my involvement in the study means and I voluntarily agree to participate.

Signature of Participant

Date

**Signature of Witness
(Where applicable)**

Date

**Signature of Translator
(Where applicable)**

Date