THE EPIDEMIOLOGY OF POSTPARTUM LOW BACK PAIN WITHIN THE ETHEKWINI MUNICIPALITY AREA

By

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Dissertation submitted in partial compliance with the requirements for the

Master's Degree in Technology: Chiropractic

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I, Bhavna Bhoodram, do hereby declare that this dissertation is representative of my own work in both conception and execution (except where acknowledgements indicate to the contrary)

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DEDICATION

I dedicate this dissertation to my parents.

Nishan and Reena Bhoodram, thank you for all your guidance and wisdom. You have made me the person I am today. There are no words to describe how grateful I am to, and for, you.

This research is a tribute to them and how important they were in getting me here. I love you guys. I am eternally grateful for all the two of you have sacrificed and done for me.

ACKNOWLEDGEMENTS

I would like to thank the following people who have helped me in this final step towards success.

The Supreme Lord Krishna: Thank You for all Your wisdom and guidance, especially through the difficult times.

To my brother, Renae for being a positive influence in my life and always showing interest in my studies and progress, all this would not have been possible without your constant motivation throughout the years.

To my nephew Kriday, thank you for keeping me grounded by helping me appreciate the simpler things in life. You've always brought a smile to "Foowa's" face.

To Arveen Samlall, my better half, "A relationship is not based on the length of time you've spent together, it's based on the foundation you've built together." Thank you for being there for me every step of the way, for never growing tired of encouraging me and for being a voice of reason in times of need. Thank you for believing in me and for taking on my goals as your own. I appreciate all you have done for me and thank you for sincerely loving me.

To my extended family, Dhadi, Roshen Khaka, Nana, my late Nani and Lesley. Thank you for all you have done for me in all the years leading to this point.

To my supervisor Dr Keseri Padayachy for giving all your time and dedication to my research. Your input, knowledge and support are truly appreciated. Thank you for your interest and commitment, all of which allowed me to reach my goals.

To Kapil Brijnath, my stand-in Durban brother. Thank you for all the support and understanding through all the years. You are always there where help is needed, and you ask nothing in return. You will be blessed throughout your life journey.

My very special friends: Shaylene, Nazmeera and Karishma for their love, support, motivation and humour during our time together in our endeavours to become Doctors of Chiropractic. Years may come and go, but memories will always remain.

To Professor Glenda Matthews, thank you for your assistance in the statistical analysis of my dissertation.

To Elize van der Walt for her proofreading expertise.

To all my lecturers at DUT, thank you for equipping me with the knowledge and skills needed to make a difference in people's lives, through Chiropractic.

To all the clinicians who moulded me into the Chiropractor that I am and all the years of wisdom they shared with me, many thanks.

To the KwaZulu-Natal Department of Health and eThekwini Municipality Health Unit as well as La Lucia, Overport and Bluff clinics for allowing me permission to conduct my research.

To all the females who dedicated their time to participate in this study, thank you for helping to make this research possible.

ABSTRACT

Background

Previous investigations into the epidemiology of low back pain (LBP) in South Africa were limited to various ethnic groups, student population and work-related activities. There have been many international studies on postpartum low back pain experienced by females which have shown varied results, largely attributed to the various time frames and risk factors. Consequently, there has been a remarkable increase in the use of epidural anaesthesia during delivery.

Aim

The aim of this study was to determine the prevalence of, and risk factors for, postpartum low back pain within the eThekwini Municipality.

Method

A quantitative paradigm and a cross sectional epidemiological design was used to survey 384 postpartum females in selected areas within the eThekwini Municipality, having 128 participants in each of the three suburbs (high-, medium- and low-income areas).

A pre-validated questionnaire was used to collect data from the females who agreed to participate. The survey contained questions related to low back pain, pregnancy, socio-demographic, psycho-social, lifestyle and occupational factors. The data was analysed using the Statistical Program for the Social Sciences (SPSS) version 24.0.

Results

The prevalence of LBP was recorded as follows: Of the entire population a 41.1% prevalence for postpartum low back pain was reported, with 54.7% at La Lucia municipal clinic (high-income region), 36.7% at Bluff municipal clinic (low-income region) and 32% at Overport municipal clinic (middle-income region). 57% of the

participants who experienced postpartum LBP reported that it had an effect on their daily tasks with 62% stating that the pain presented with a slow/gradual onset. The most common type of pain was described as “sharp/poking” with “dull ache” being the second most common. Non-progression of LBP was reported by 46% of participants, while 26% reported a decrease in pain, 18% noted an increase in pain and 10% were unsure. 28% of the participants noted that the individual episodes of pain they experienced were usually 60 minutes or longer. The population group was split almost uniformly in quarters with regards to how frequently the individual pain episodes occurred i.e.: daily (23%), twice a week (24%), weekly (26%) and monthly (27%).

A logistic regression model was fitted in order to establish which variables are associated with lower back pain. The significant variables ($p<0.05$) were stress levels, type of birth, clinic, race and whether lower back pain was experienced before pregnancy.

Conclusion

More studies are warranted on this group of individuals as the factors associated with the predisposition of postpartum LBP were in some instances not in keeping with the existing literature. Postpartum LBP has a significant impact on females and their quality of life and therefore effective strategies to prevent and manage postpartum LBP in females are obligatory.

Key words: epidemiology, low back pain, prevalence, risk factors, postpartum, eThekwini Municipality, pregnancy.

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LIST OF SYMBOLS AND ABBREVIATIONS

=	Equals
%	Percentage
CI	Confidence Interval
Kg	Kilogram
m	Meters
OR	Odds Ratio
df	Degrees of Freedom
Wald	Wald statistic
S.E.	Standard Error
B	Parameter Estimates
n	Number of participants (total sample)
n_x	Number of participants (sample sub-group)
Ƞ	Eta score
P	*p*-value showing statistical significance
BMI	Body Mass Index
B.Tech	Bachelor of Technology
CIOMS	Council for International Organisations of Medical Sciences
DoH	Department of Health
DUT	Durban University of Technology
et al.	and others
IC	Informed Consent
IREC	Institutional Research and Ethics Committee
LBP	Low Back Pain

LOI	Letter of Information
MSK	Musculoskeletal
M.Tech	Master of Technology
N. Dip	National Diploma
RHDC	Research and Higher Degrees Committee
SD	Standard Deviation
SES	Socio-economic Status
SPSS	Statistical Program for the Social Sciences
USA	United States of America
UK	United Kingdom
VBAC	Vaginal Birth After C-section
WHO	World Health Organisation
YLD	Years lived with disability

DEFINITIONS

Epidemiology

According to the WHO (2016) epidemiology is defined as the study of the distribution and determinants of health-related states or events (including disease), and the application of this study to the control of diseases and other health problems. For the purpose of this study the investigation involved determining the prevalence of, and risk factors for, postpartum LBP in the female population of the eThekwini Municipality.

Low Back pain (LBP)

According to this study LBP is defined as “pain limited to the region between the lower margins of the 12th rib and the gluteal folds” (Galukande, Muwazi and Mugisa, 2005).

Prevalence

Prevalence refers to the proportion of individuals in a population having a disease or characteristic. It is a statistical concept referring to the number of cases of a disease present in a particular population at a given time, whereas incidence refers to the number of new cases that develop in a given period of time (MedicineNet, 2016).

Point Prevalence

According to Galukande (2005) point prevalence is the measure of proportion of people in a population who have a disease/LBP condition at a particular time or present time. This study was conducted among postpartum females.

eThekwini

A municipality located in the province of KwaZulu-Natal (Municipalities of South Africa, 2012).

Risk factor

A risk factor is any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury (WHO, 2018).

Postpartum

The period just after delivery (MedicineNet, 2016).

CHAPTER ONE

INTRODUCTION

1.1. BACKGROUND

According to the World Health Organisation (WHO) musculoskeletal conditions are considered to be the second greatest cause of years lived with disability (YLD), with low back pain (LBP) ranked number one of the top ten leading causes of global YLD (Bergström *et al*. 2016).

Low back pain (LBP) related to pregnancy affects women's lives severely, having a great impact on their quality of life (Katonis *et al.* 2011). The aetiology of LBP related to pregnancy to date is poorly understood (Mogren, 2008), although the most likely causes can be attributed to weight gain, biomechanical changes, postural changes, hormonal changes and stress (Dagenais and Haldeman, 2012). Usually this pain disappears a few weeks after birth. However, some women continue to experience LBP months after the birth and for a few, it first presents postpartum (Ostgaard and Andersson, 1992).

Bergström *et al.* (2014) stated that although pregnancy-related LBP is one of the most common complications of pregnancy, the underlying aetiology remains unknown. There are relatively few studies regarding persistent pregnancy-related LBP postpartum of more than 3 months (Russell *et al*. 1996; Macarthur *et al*. 1995; MacLeod *et al.* 1995).

LBP after childbirth is a frequent complaint (Sabino and Grauer, 2008). Due to the increase in the use of epidural anaesthesia during labour and delivery, obstetric anaesthesiologists are confronted with the belief that the LBP experienced by their postpartum patients is in some way connected to the administration of the epidural

anaesthesia. The existence of this causal relation has been debated in several studies (Russell *et al.* 1996; Macarthur *et al.* 1995; MacLeod *et al.* 1995) with diverse outcomes (Breen *et al.* 1994).

Survey studies conducted by Butler and Fuller (1998) stated that in the United Kingdom (UK) they have found an association between epidural anaesthesia and postpartum LBP. The reported prevalence of LBP varied amongst studies but was much higher in the studies conducted in the USA (Breen *et al.* 1994) and the UK (Russell *et al.* 1996) compared to the study from Canada (Macarthur *et al.* 1995) which allowed for the possibility of regional differences. This research study is relevant due to the paucity of literature on the epidemiology of postpartum LBP and its associated risk factors within South Africa. Thus, this research aims to further study this phenomenon along with the other birthing options and the risk factors associated with postpartum LBP in South African women.

1.2. AIMS AND OBJECTIVES

1.2.1. Aim

To determine the prevalence of, and risk factors for, postpartum low back pain within the eThekwini Municipality.

1.2.2. Objectives

1. To determine the point and period prevalence of postpartum LBP in eThekwini Municipality area.

2. To describe the characteristics of LBP in this population (Pain, Intensity, Duration, Location).

3. To determine the association between selected risk factors (age, race, height, weight, smoking habits, physical exercise, occupation, stress, pregnancy and prior LBP) and LBP.

1.3. LIMITATIONS

The participants in the study are required to report truthfully when responding to the questionnaire. Therefore, it is assumed that the responses of the participants are truthful. The research was conducted on specific days at three Department of Health (DOH) approved clinics. This limited the population group to those who utilise public clinics in general, to those who utilised the specific clinics used in this study only, and to those who were present on the specific days visited by the researcher.

1.4. RATIONALE FOR AND SIGNIFICANCE OF THE STUDY

The international ethical guidelines for epidemiological studies - prepared by the Council for International Organisations of Medical Sciences (CIOMS) and with the World Health Organisation (WHO) - state that it is justifiable to perform epidemiological studies due to the need to discover methods to improve the health in different populations and individuals (WHO, 2008).

The literature with regards to epidemiological studies on postpartum low back pain is insufficient. Most of the research performed internationally focuses on pain during pregnancy as well as whether epidural anaesthesia is linked to postpartum LBP (Mogren, 2008; Katonis *et al.* 2011; Breen *et al.* 1994; Sabino and Grauer, 2008). Hence, there was a need for the development of South African based research focusing on the prevalence of, and risk factors associated with, postpartum low back pain to compare against statistics internationally, as well as develop independent statistics.

Although there had been studies investigating LBP in general amongst various population groups in South Africa (Docrat, 1999; van der Meulen, 1997; Dyer, 2012), none are specifically targeted at postpartum women. LBP greatly impacts on the quality of women's lives and is also the most common cause of sick leave postpartum (Bergström *et al.* 2016).

The prevalence of and risk factors for postpartum LBP were identified and a guide to management and prevention of postpartum LBP can become more apparent with the information obtained in this study.

1.5. FLOW OF THE THESIS

Chapter two provides an in-depth literature review on the prevalence of, and various risk factors for, postpartum low back pain.

Chapter three addresses the methodology used to conduct the research study. Ethical considerations from all the respective authorities are highlighted in this chapter. This chapter also outlines the statistical tests used in obtaining the study's results.

Chapter four describes the results of the study. These are presented in the form of tables, graphs, figures and written information.

Chapter five is a critical discussion of the results obtained in the study.

Chapter six provides a summary of the study and outlines recommendations for future studies.

The references provide a list of all the academic sources used for this dissertation.

The appendices include all appropriate, additional material used in this study.

CHAPTER TWO

LITERATURE REVIEW

2.1. INTRODUCTION

This chapter presents the relevant literature on the subject of low back pain as well as identifies gaps in the literature. It includes the clinical definition of the low back region, the profile of low back pain and the factors unique to postpartum women. The pathologies that are discussed in this chapter focus on their clinical effect on the low back area. The profile of low back pain presents the epidemiology, known causative factors, presentation and consequences of postpartum low back pain. The unique factors of the postpartum population include structural, metabolic, and lifestyle differences.

The literature review was conducted using the following search engines: PubMed, Summon, Medscape, and Google scholar. The keywords used in the search engines were as follows: “postpartum low back pain”, “epidemiology of low back pain”, “risk factors associated with low back pain”, “prevalence of postpartum low back pain”, epidemiology of low back pain in South Africa”, “epidural and postpartum low back pain”, “smoking and low back pain”, “causes of postpartum low back pain” and “low back anatomy”.

2.2. CLINICAL DEFINITION OF THE LOW BACK

The back is comprised of the posterior aspect of the trunk, superior to the buttocks and inferior to the neck (Moore and Dalley, 2006). The gluteal region extends superiorly from the iliac crests to the gluteal fold inferiorly. (Moore and Dalley, 2006). In keeping with the above anatomical definitions, the low back can be clinically defined as the region between the lower margins of the 12th rib and the gluteal folds, therefore comprising of the inferior aspect of the back as well as the entire gluteal region (Senthil and Eva, 2013; Galukande *et al*. 2005).

2.3. EPIDEMIOLOGY OF LBP

The World Health Organization (WHO, 2016) defines epidemiology as the study of the distribution and determinants of health-related states or events (including disease) and the application of this study to the control of diseases and other health problems. Low back pain is ranked number one of the top ten leading causes of global years lived with disability (YLD) (WHO, 2016). It is a leading cause of disability amongst all cultures as it affects work, quality of life and is the most common reason for seeking out a medical consultation (Hoy *et al.* 2010).

The worldwide prevalence review of low back pain in 2008, included 165 studies from 54 countries that estimated the mean point prevalence of low back pain to be 18.3%. (Maher *et al.* 2017). The results revealed that low back pain (LBP) was more common in female than male individuals and in those aged 40–69 years than in any other age groups. Prevalence of LBP was greater in high-income countries (30.3%), than middle-income (21.4%) or low-income (18.2%) countries, with no significant difference in prevalence between urban and rural areas (Maher *et al.* 2017).

Low back pain has been documented as a significant problem in many different countries. It is the leading cause of limitation of activity and absence at work globally, and it causes a huge economic burden on individuals, families, communities, industry and governments (Hoy *et al.* 2014; Coole *et al.* 2010). About 70–85% of all individuals experience back pain at some period in their life.

Low back pain exists in epidemic proportions within the Western world and is on the increase. The literature on the epidemiology of low back pain from high-income countries comprises 15% of the world population while developing countries have nominal documented studies in comparison. (Galukande *et al.* 2005).

Maher *et al.* (2017) stated that many people with low back pain did not seek out medical care. A review of ten population-based studies (13 486 people) reported a combined prevalence of 58% of individuals who sought out some form of medical care. Persons who were more likely to seek medical care included females, individuals with previous low back pain, poor general health and more disabling or extra painful episodes of low back pain.

Globally, LBP causes a greater number of YLD than any other condition. Governments, health services, research providers and donors have not attributed enough attention to the burdens that LBP causes. Further research is essential to better understand the predictors and clinical course of LBP across different settings, and for the prevention and management of LBP (Andersson, 1999).

2.4. CAUSES OF LBP

Low back pain (LBP) is generally mechanical in nature, which suggests that any mechanical stress placed on the muscles, ligaments, bones, and supportive tissues of the spine may aggravate symptoms. There can be many underlying causes for LBP often with no specific reason, therefore better identification of the source of the LBP may result in more effective treatments (Hamidreza *et al.* 2013). LBP is characterized by symptoms such as pain, muscle tension, stiffness, weakness in the legs or feet, or a tingling or burning sensation traveling down the legs (Roffey *et al.* 2010).

2.4.1. Demographics

2.4.1.1. Ethnicity

According to Andersson (1999) low back pain was more common among white people (68.7 per 1000 people) than black people (38.7 per 1000 people) and the risk of chronic low back pain increased with increasing age. In contrast, Hurwitz and Morgenstern (1997) noted an increased likelihood for LBP in non-white ethnic groups.

These groups were 1.41 times more likely than white ethnic groups to experience LBP. This could be linked to cultural influencers related to different ethnic groups, where the white ethnic groups are more likely to have access to care for LBP (Hurwitz and Morgenstern, 1997; Dagenais and Haldeman, 2012).

Epidemiological studies that were conducted on populations with LBP and their ethnicity in South African populations revealed the following: The prevalence of LBP among black South Africans (53.1%) (Van der Meulen, 1997), coloured South Africans (32.6%), Indian South Africans (45.0%) (Docrat, 1999) and the white population (47.5%) (Dyer, 2012).

This is further supported by the study by Green *et al*. (2003) who concluded that different ethnic groups experience pain differently.

2.4.1.2. Age

Prevalence of LBP was shown to increase with age, with the chances of developing pain being twice as likely if LBP was experienced earlier in life (Maher *et al.* 2017; Andersson, 1999). Hoy *et al.* (2010) said due to the substantial information available on the prevalence of low back pain and the diversity of studies, caution should be exercised with interpretation. According to studies mentioned by Hoy *et al.* (2010) the incidence of low back pain was found to be the highest in the third decade of life, with the overall prevalence increasing with age until the 60–65-year age group, whereafter it gradually declines. A study conducted by Louw *et al*. (2007) on the African continent suggested that lifetime LBP potentially increased with age.

2.4.1.3. Body mass index (BMI)/Obesity

Obesity is known as a major public health problem in industrialized countries and it is associated with various musculoskeletal disorders, particularly non-specific chronic low back pain (Vismara *et al.* 2010).

Livshits *et al.* (2011) found that weight and body mass index (BMI) were strongly correlated ($r=0.91$, $p<0.001$) to LBP, with weight more highly correlated.

Graham *et al.* (2016) stated that pregnancy - together with becoming a parent - often for the first time, are periods of change which put women at higher risk for becoming obese later in life. Less educated, unmarried, non-white women are more likely to have risky and unhealthy behaviours (Graham *et al.* 2016), therefore, pregnancy and the postpartum periods are especially important for changing behaviours to promote healthy weight management.

2.4.1.4. Marital status

Reisbord *et al*. (1985) first noted that there was a higher prevalence of LBP in single or unmarried persons compared to their married counterparts. They also found that separated/divorced/widowed persons were more likely to suffer from LBP than their married counterparts.

2.4.1.5. Education and Occupation

A. Education

A lower educational status has been shown to be associated with an increased prevalence of low back pain (Hoy *et al.* 2010). The association between the educational status and increased prevalence of LBP has been seen as a strong predictor for the duration of the episode of LBP, resulting in poor outcomes. This is further documented in a Russian study where participants with lower education levels were shown to have significantly greater low back pain complaints ($P < 0.05$) (Toroptsova *et al.* 1995). Other studies have found an inverse relationship between educational status and the occurrence of low back pain (Hoy *et al.* 2010).

B. Occupation

In the United States, Guo *et al.* (1995) estimated that 65% of low back pain cases could be attributed to the combined effects of occupational exposures. Physical risk factors such as manual handling of materials, bending and twisting (Waddell and Burton, 2000), lifting (Waddell and Burton, 2000; Abdulmonem *et al*. 2014), prolonged

sitting and improper posture (Abdulmonem *et al*. 2014) may also cause the onset of LBP.

2.4.2. Health and exercise

In general, it is agreed that being active is a form of pain prevention, in particular LBP (Haldeman, 2005; Morris, 2006; Dagenais and Haldeman, 2012). However, the literature states otherwise. Cady *et al*., (1985); Riihimaki (1991); Leino (1993); Salminen *et al*. (1995); Harreby *et al*. (1996); Heistaro *et al*. (1998) state that a sedentary lifestyle predisposes people to LBP, whereas Battie *et al*. (1989); Riihimaki *et al*. (1989); Holmstrom *et al*. (1992); Magnusson *et al*. (1992); Mortimer *et al*. (2001); Power *et al*. (2001) suggest there is no association between LBP and different levels of activity.

A more recent systematic review by Heneweer *et al*. (2010) indicated that home do-it yourself activities and high load activities were in fact predictive of LBP and strongly linked to the development of LBP (Hoogendoorn *et al*. 2000; Heneweer *et al*. 2010). This was especially true for females, where it was recognised that high intensity physical activity seemed to predispose females to a higher likelihood of LBP (Heneweer *et al*. 2010).

Mogren (2008) stated that postpartum back pain had been associated with considerable perceived disability in movement-related activities. Physical activity and sexual activity during pregnancy usually decline as a great number of women suffer from low back pain during pregnancy, which in turn negatively influences perception of health. However, it has been found that there is an increased well-being in women who maintain or increase their levels of exercise and sporting activity postpartum.

Physical activity is a major determinant of life-long health and is also well known to be beneficial for physical and psychological well-being before, during, and after

pregnancy. Unfortunately, the epidemiology of physical activity shows a consistent decline from adolescence to young adulthood (Mogren, 2008).

2.4.2.1. Stress

There is strong evidence that psychosocial risk factors (individual or work-related) influence the onset of LBP. These include anxiety, depression, job dissatisfaction, mental stress, low level of education, lack of social confidence, inadequate income and the person's psychological frame of mind (Andersson, 1999; Abdulmonem *et al*. 2014).

2.4.2.2. Smoking

The pathogenesis of cigarette smoking is multifaceted; it has harmful effects on the musculoskeletal system such as the loss of bone mineral density which increases the risk of fractures. Negative effects in the tendons have also been observed due to smoking. (Abate *et al*. 2013). The nicotine acquired with cigarette smoking increases calcium ion concentrations which results in muscular contraction, hence resulting in pain and fatigue (Goesling *et al*. 2012).

2.5. EPIDEMIOLOGY OF POSTPARTUM LBP

Usually, low back pain disappears a few weeks after birth. However, some women continue to experience pain months after the birth and for a few, LBP first presents postpartum (Ostgaard and Andersson, 1992).

Katonis *et al.* (2011) stated that about 50% of pregnant women will suffer from some form of LBP at some point during their pregnancies or during the postpartum period due to various factors, such as mechanical, hormonal, environmental, personal and others. Although pregnancy-related LBP is one of the most common complications of

pregnancy, the underlying aetiology remains unknown and there are relatively few studies regarding persistent pregnancy-related LBP postpartum of more than three months (Bergström *et al.* 2014; Turgut *et al.* 1998).

A study was done by Ostgaard and Andersson (1992) in which eight-hundred-and-seventeen women were monitored throughout their pregnancy and up to a period of twelve-months postpartum. It was noted that 67% of the women had experienced low back pain just after delivery. At the twelve-month postpartum follow-up examination, 37% of the women still had low back pain and on the eighteen-month postpartum follow-up examination, 7% of the women had low back pain.

Research by Butler and Fuller (1998) stated that in survey studies conducted in the UK they found an association between epidural anaesthesia and postpartum LBP. The reported prevalence of LBP varied amongst researchers but was much higher in the USA studies (Breen *et al.* 1994) and the UK (Russell *et al.* 1996) compared to the Canadian study (Macarthur *et al.* 1995) which highlighted the possibility of regional differences. This research is therefore pertinent due to the paucity of literature in South Africa on the epidemiology of postpartum LBP and its associated risk factors.

2.6. CAUSES OF POSTPARTUM LBP

The aetiology of LBP related to pregnancy to date is poorly understood (Mogren, 2008). Furthermore, no consensus over the definition of the condition has been established, although attempts have been made, with the most likely causes being attributed to weight gain, biomechanical changes, postural changes, hormonal changes and stress (Dagenais and Haldeman, 2012). Postpartum low back pain has been linked to considerable perceived disability in movement-related activities, with the prevalence of persistent LBP after pregnancy being estimated at 43% (Mogren, 2008; Mogren, 2007; Mogren, 2005; Mogren and Pohjanen, 2005). The pain experienced can arise from many different sources, such as muscles, nerves, bones and even referred pain from abdominal organs (Hamidreza *et al.* 2013). Often the

underlying cause for LBP is idiopathic, therefore better identification of the source of the LBP will result in better treatment options.

According to Bergström *et al.* (2016) predictors of postpartum pain included previous LBP, high body mass index (BMI), high maternal age, hypermobility and physical strenuous work situation. The research also reported that females with recurrent or continuous pain postpartum may have a poor prognosis in regard to future sick leave and disability. Mogren (2008) mentioned that the risk of experiencing LBP in a subsequent pregnancy is extremely high, about four out of ten women report persistent LBP six months postpartum. At three years postpartum, 20% of all women with back pain during pregnancy report persistent pain symptoms. Butler and Fuller (1998) found other factors associated with the development of postpartum low back pain included age, weight, null parity and a previous history of back pain.

Bergström *et al.* (2014) stated that although pregnancy-related LBP is one of the most common complications of pregnancy, the underlying aetiology remains unknown and there are relatively few studies regarding persistent pregnancy-related LBP, postpartum of more than three months.

Due to the increase in the use of epidural anaesthesia during labour and delivery, obstetric anaesthesiologists are confronted with the belief that the LBP experienced by their postpartum patients is in some way connected to the administration of the epidural anaesthesia. The existence of this causal relation has been debated in several studies with diverse outcomes (Breen *et al.* 1994; Russell *et al.* 1996; Macarthur *et al.* 1995; MacLeod *et al.* 1995).

Declercq *et al.* (2008) attributed the rising caesarean section rate partly to maternal request which is linked to the desire to avoid the pain associated with vaginal birth. Abbasi *et al.* (2014) stated that there are multiple factors responsible for the variable rate of the utilisation of epidural analgesia by pregnant women all over the world.

Contributing factors in Pakistan included inadequate patient knowledge, cultural influences, inadequate anaesthesia services and fear of complications. It was reported that despite advances in neuraxial analgesia such as the refinement in techniques and availability of the latest drugs, the most common questions asked by patients and their relatives were related to postpartum back pain or perceived 'lifelong damage' to the spinal cord.

A study conducted by Katonis *et al.* (2011) showed that women with a history of LBP prior to pregnancy were more likely to suffer from more severe pain and of a longer duration after childbirth. Epidural or spinal anaesthesia during labour was found to not be associated with an increased risk of persistent postpartum LBP.

2.7. IMPLICATIONS OF POSTPARTUM LBP

If there were a causal relationship between epidural analgesia and low back pain, the implications would be that, every year, tens of thousands of new mothers would suffer chronic low back pain as a result of choosing epidural analgesia in labour (Howell *et al.* 2001).

It is important to identify factors that increase the risk of developing postpartum low back pain, to clarify which mechanisms are involved and also to inform patients appropriately of the risks of developing postpartum back pain (Butler and Fuller, 1998).

2.8. CONCLUSION

Studies have shown that LBP is a multi-factorial condition with various aetiologies. The impact of LBP on the general population indicates that this condition is one of the most common, debilitating, musculoskeletal problems. The significance of LBP amongst postpartum women is evident in the numerous studies attempting to isolate risk factors. However, due to the multi-factorial influences in the development of LBP, personal factors as well as pregnancy-related factors need to be considered.

In conclusion, the literature indicates that there is specific demographic, occupational and lifestyle factors which influence postpartum low back pain (Butler and Fuller, 1998; Breen *et al*. 1994; Russell *et al*. 1996; Macarthur *et al*. 1995). To date, no studies have been conducted on the prevalence of, and risk factors for, postpartum low back pain within the eThekwini Municipality. This study will attempt to isolate the risk factors found in postpartum women as there may be similarities to previous studies. It will also serve to highlight differences within the South African context, particularly in the eThekwini Municipality.

CHAPTER THREE

METHODOLOGY

3.1. INTRODUCTION

This chapter will outline the material and methods utilised in this study to achieve the aims and objectives stated in chapter one.

3.2. STUDY DESIGN

The study design utilised a quantitative paradigm and a cross-sectional epidemiological survey which used a questionnaire to collect data in selected areas within the eThekwini Municipality to determine the prevalence of, and risk factors for, postpartum LBP. An epidemiology study was initiated by approaching high-, middle- and low-income suburbs and randomly selecting clinics that would be used in the study.

This study was approved by the Durban University of Technology, Faculty of Health Sciences, Research and Higher Degrees Committee (RHDC) and the Institutional Research and Ethics Committee (IREC) (Appendix A) prior to the collection of data.

3.3. SAMPLING

3.3.1. Sample size and recruitment

The sample size was calculated by a biostatistician, using a total of 55 746 registered births recorded in the eThekwini Municipality (Statistics South Africa, 2013-2015). A confidence interval of 95% with a 5% margin of error and a minimum sample size of 382 was calculated. A response rate of approximately 80% was anticipated therefore a total of 450 questionnaires were printed. Each clinic received 150 questionnaires - of which 128 were completed at each clinic - resulting in a sample size of n=384.

Convenience sampling was used, that is, potential participants who were present at the selected clinics on the data collection days were approached with a request to participate in the study.

The sampling procedure involved a two-stage stratified cluster sample:

Stage 1:

A selection of areas within the eThekwini Municipality that are stratified into high-, medium- and low-income suburbs. In order to determine this, Statistics South Africa (www.statssa.co.za, 2011) supplied income statistics on all the suburbs that are distributed in the eThekwini Municipality. The statistics were then analysed to establish which three suburbs had the best average of all three income areas (high, medium, low). The suburbs chosen for the study were Umhlanga (high-income), Musgrave (medium-income) and Bluff (low-income).

Stage 2:

This entailed a random selection of participants from each of the selected areas (convenience sampling). This included the use of a randomly selected post-natal clinic from each of the selected areas. The three clinics that were randomly selected from the abovementioned areas were La Lucia Public Clinic in Umhlanga (High), Overport Clinic (Ridge Road) in Musgrave (Medium) and Bluff Public Clinic in Bluff (Low). Once permission was granted from the Department of Health (DOH) (Appendix M), eThekwini Municipality Health Unit (Appendix N), Institutional Research and Ethics Committee (IREC 060/17) (Appendix A) and the various clinics (Appendix J,K,L), the sample size of 384 was obtained by the researcher randomly selecting postpartum participants (from the abovementioned clinics) to complete the questionnaire (128 participants from each clinic as to meet the sample size requirements). At the outset they were each given a letter of information (Appendix D) to read through and if the participant agreed to participate, they were given the questionnaire (Appendix P).

3.3.2. Study population

The study population consisted of postpartum women from the selected areas within the eThekwini municipality who were present at the selected clinics. A total of 450 postpartum women who met the inclusion and exclusion criteria participated in the study. In order for the women to participate in this study the following inclusion and exclusion criteria had to be applied.

3.3.3. Inclusion criteria

- Females, aged 18 years and older, were required to read the letter of information (Appendix D) and sign the informed consent form (Appendix E).

- Females with or without LBP were included in this study.

- Residents of the eThekwini Municipality.

3.3.4. Exclusion criteria

- Females younger than 18 years of age at the time of data collection were excluded from this study.

- Females who had participated in the focus group or pilot study were excluded.

3.4. DATA COLLECTION MEASUREMENT TOOL

3.4.1. Development of the questionnaire

A self-administered questionnaire (Appendix O) was used to conduct this study. Permission was obtained from Dyer (2012) (Appendix G) and Noor Mahomed (2017) (Appendix H) to use and alter the questions from their respective studies to construct the questionnaire which was then critiqued by both a focus and a pilot group. Those questions based on the epidemiology of postpartum lower back pain as well as the risk factors, together with factors from the literature (Sabino and Grauer, 2008; Breen

et al. 1994; Bergström *et al*. 2014; Katonis *et al*. 2011) were used to formulate the original questionnaire of this study (Appendix O).

There were 36 questions in the questionnaire and they covered categories such as a brief history of the patient, activities at home and work, number of pregnancies, type of delivery and number of children as well as risk factors involved which could lead to low back pain. These questions were close ended and confined to either yes/no or multiple-choice questions.

3.4.2. Validation of the questionnaire for use in this study

In order for the questionnaire to be utilised successfully in this research study, the questionnaire had to be validated. Validity refers to the dependability and accuracy of statistics, instruments, information and results in research, so that the particular tool that will be utilised in upcoming research investigations can ensure accuracy (Bernard, 2012). In this study, this was done through the use of a focus group and pilot study.

Following approval from IREC to conduct the validation of the questionnaire, a focus group meeting was organised to assess the questionnaire for face and content validity. A focus group assists the research process by enhancing the face and content validity of the questionnaire and improving its relevance in the research study. (Salant and Dillman, 1994; Mouton 1996; Dyer, 1997).

In order to attain face validity, the focus group members collectively had to agree that the questionnaire fulfilled the aims and objectives of the study.

The focus group consisted of seven members:

- The researcher who acted as the chairperson of the Focus Group meeting
- The research supervisor who guided the researcher through the research process
- A qualified chiropractor who had been in practice more than five years

- A qualified homoeopath (also a postpartum female) who had been in practice less than five years
- Three chiropractic masters students who had conducted survey research previously

The focus group members were welcomed and informed of the role of the group. They were also informed that the focus group discussion would be recorded. The members were informed that confidentiality would be maintained and that their names would not accompany any report in the dissertation. The members were also requested not to divulge anything that would be discussed in the focus group to people outside of the group.

Each member of the focus group was required to read a letter of information (Appendix B) and to sign a consent form (Appendix C). Each member was also given a copy of the original questionnaire (Appendix O).

Once all members agreed to the terms of the focus group, the researcher explained that members should think critically about the issues encompassing each research question (Salant and Dillman, 1994), that they should then analytically consider the significance of the questions and make recommendations for each question to provide development of the questionnaire.

Each question was then discussed, and suggestions, modifications and recommendations were recorded. Group consensus was required in order to modify each question. Following the focus group meeting discussion, the questionnaire was modified to produce the post-focus group questionnaire (Appendix P).

Specific changes at each point of the questionnaire is highlighted in Table 3.1. below.

Table 3.1. Changes from original questionnaire to post focus-group questionnaire

QUESTION NUMBERS	FOCUS GROUP RECOMMENDED CHANGES	STUDENT/ SUPERVISOR RESPONSE	PRE-FOCUS GROUP QUESTIONNAIRE	POST-FOCUS GROUP QUESTIONNAIRE
SECTION A:	**Demographics**			
Intro	**Remove** background information as well as repetition of instructions.	The background information heading as well as instruction repetitions were removed.	Heading Page 1	Heading Page 1
Question 1	**Categorize** Question **"How old are you?"** into age categories.	Added the following categories: 18-24, 25-29, 30-34, 35-39, 40-44, 45-49 and >50	Question 1 Section A Page 1	Question 1 Section A Page 1
Question 2	No change			
Question 3	No change			
Question 4	No change			
Question 5	No change			
Question 6	**Remove** options **"other"** and **"specify"**.	Removed	Question 6 Section A Page 1	Question 6 Section A Page 1
Question 7	**Split** Question **"Are you currently employed? If yes, what is your occupation"** making **"what is your occupation"** a separate question.	Question 7 split into question 7 and 8	Question 7 Section A Page 1	Question 7 & 8 Section A Page 1

Questions 8	**Add** parameters in question for number of years in current and previous occupation.	Added the following parameters: 0-3 years, 4-6 years, 7-9 years, 10 years and over, specify years.	Question 8 Section A Page 1	Question 9 Section A Page 1
Question 9	No change			
Question 10	**Add** parameters in question for number of years in current and previous occupation.	Added the following parameters: 0-3 years, 4-6 years, 7-9 years, 10 years and over, specify years.	Question 10 Section A Page 2	Question 11 Section A Page 1
Section B:	**Low Back Pain**			
New Question	**Add** Question **"Do you have LBP after your pregnancy? If no, skip to Section C (Health and Exercise) Question 22"** as questions that follow ask specific questions about the current (postpartum) LBP.	Question added	Section B Page 2	Question 15 Section B Page 2
Question 11	**Rephrase** Question from **"Do you have LBP in the area located within the square in the diagram below?"** to **"Have you ever had LBP in the area located within the square in the diagram below?"**	Questions rephrased with box added around LBP picture to demarcate low back area.	Question 11 Section B Page 2	Question 12 Section B Page 2

	with box around low back picture made bold.			
Question 12	**Change** options for **"How often do you have LBP"** changed into easier to understand terms.	Parameters changed to: Daily, twice a week, weekly and monthly.	Question 12 Section B Page 2	Question 16 Section B Page 2
Question 13	Reword **"What is the duration of your LBP(minutes)?"** to **"How long does the pain last?"** and parameters options were added.	Question reworded, and parameters added: 0-5 min, 5-10 min, 10-15 min, 15-30 min, 30-60 min & >60 min.	Question 13 Section B Page 2	Question 17 Section B Page 2
Question 14	**Change** the option "**gradually"** to "**slowly"**.	Word changed	Question 14 Section B Page 2	Question 18 Section B Page 2
Question 15	**Remove "electric"** and **"other"** as options and **add** "**poking"** as **"sharp/poking".**	Amended options	Question 15 Section B Page 3	Question 19 Section B Page 2
Question 16	**Change "Progression of your LBP"** to **"Has there been any change in your low back pain".**	Wording changed	Question 16 Section B Page 3	Question 20 Section B Page 2
Question 17	**Change** Question into a yes/no type of question to determine if the pain affects everyday tasks of the participant.	Changed from parameters into yes/no.	Question 17 Section B Page 2	Question 21 Section B Page 2

Question 18	**Move:** Questions **"Did you have LBP before pregnancy?"** after Question **"Have you ever had LBP in the area located within the square in the diagram below?"**	Moved and changed numbering.	Question 18 Section B Page 2	Question 13 Section B Page 2
Question 19	**Move:** Questions **"Did you develop LBP during your pregnancy?"** after Question **"Did you have LBP before pregnancy?"**	Moved and changed numbering.	Question 19 Section B Page 2	Question 14 Section B Page 2
Section C:	**Health and Exercise**			
Question 20	**Change** Question from number scale to words describing levels of stress.	Changed to include the following parameters: Highly stressed, mildly stressed and none.	Question 20 Section C Page 3	Question 22 Section C Page 3
Question 21	**Format** Question to yes with option next to it and no below.	Formatted	Question 21 Section C Page 3	Question 23 Section C Page 3
Question 22	**Add "Before"**, "**during**" and "**after"** pregnancy options to establish when patient was diagnosed with illnesses.	Options added	Question 22 Section C Page 3	Question 24 Section C Page 3

Question 23	**Format** Question to yes with option next to it and no below.	Formatted	Question 23 Section C Page 3	Question 25 Section C Page 3
Question 24	**Format** Question to yes with option next to it and no below.	Formatted	Question 24 Section C Page 3	Question 26 Section C Page 3
Question 25	**Add** Examples of types of exercise to the different options.	Examples added: cardio(running), endurance(tennis) and weight(dumbbells)	Question 25 Section C Page 3	Question 26 Section C Page 4
Question 26	**Change "How many exercise sessions per week? (Combined if more than 1 type)"** to **"How many days per week do you exercise?"** and include parameter options with the number of days.	Question changed with the following parameters added: 1-2 days, 2-3 days, 3-6 days and daily.	Question 26 Section C Page 4	Question 27 Section C Page 4
Section D:	**Pregnancy**			
Question 27	Reword question: **"How many months postpartum (post-natal) are you?"** to **"How many months since your last delivery"** in order to make it more understandable.	Question reworded	Question 27 Section D Page 4	Question 28 Section D Page 4
Question 28	No change			

Question 29	**Move** parameter options so they are listed below each other for easier reading.	Moved options	Question 29 Section D Page 4	Question 30 Section D Page 4
Question 30	**Add** pictures to make options more understandable.	Pictures added	Question 30 Section D Page 5	Question 31 Section D Page 4
Question 31	**Change** the word **"complications"** to **"difficulties"** and add **"breech"** as an example of one of the possible responses. **Format** Question to yes with option next to it and no below.	Changes made Formatted	Question 31 Section D Page 5	Question 32 Section D Page 4
Question 32	No change			
Question 33	**Add "Twins/triplets"** as example next to multiple births. **Format** Question to yes with option next to it and no below.	Example added Formatted	Question 33 Section D Page 5	Question 34 Section D Page 5
Question 34	**Remove** Question as it was covered previously in questionnaire.	Removed	Question 34 Section D Page 5	Removed
Question 35	No change			
Question 36	**Remove "If no, please skip question". Change** option B to **"wiping**	Removed "if no" and changed option B to "wiping floors with a mop" Options	Question 36 Section D Page 6	Question 36 Section D Page 5

	floors with a mop". Add options.	added: Hanging clothes, changing diapers, bathing the baby, breast feeding the baby and bottle feeding the baby.		

3.4.3. Final discussion on the questionnaire

Pilot testing was required prior to the questionnaire being administered to the participants. In order to determine the viability of the research measurement tool, a trial run of the research was conducted on the members of the research population through pilot testing (Trochim, 2000).

The pilot study was aimed at determining whether the research population could relate to the questionnaire and whether there were any discrepancies or oversights evident in the questionnaire (Brancato *et al.* 2006). The pilot study involved a small sample of six participants from the population group to which the post-focus group questionnaire was administered. They were required to read and understand the letter of information (Appendix D) and complete the informed consent (Appendix E) and post-focus group questionnaire (Appendix P). The participants were instructed to make any necessary recommendations or changes to the questionnaire as they answered each question. There were no recommended changes and so the post focus group questionnaire formed the final questionnaire in the research study (Appendix P) which was used for data collection in this study.

3.4.4. Final Questionnaire

The research study questionnaire (Appendix P) consisted of questions in the following categories:

Section A: Demographics

Section B: Low Back Pain

Section C: Health and Exercise

Section D: Pregnancy

3.4.5. Main research study

Following completion of the pilot study, full ethical approval was granted by the Institutional Research and Ethics Committee (IREC 060/17) (Appendix A), permitting data collection. The researcher obtained permission from the chosen clinics (Appendix J, K, L) as well as from the eThekwini municipality health unit (Appendix N) and the Department of Health (Appendix M). The research procedure was briefly explained to the potential participants. They were informed that participation was voluntary and that their participation would be confidential. Those wanting to participate were handed a letter of information. Once the participant had read the letter of information (Appendix D), agreed to partake in the study and met the inclusion criteria, the researcher handed out the following two documents:

- Informed consent (Appendix E).
- The questionnaire (Appendix P).

The completed informed consent form (Appendix E) and questionnaire (Appendix P) were each placed in separate sealed ballot boxes by the participant in order to conceal the identity of each participant. The sealed ballot boxes were collected by the researcher on the same day. The researcher was available and present for the duration of the time the participants were completing the questionnaire to guide and answer any possible questions. All questionnaires (Appendix P) were kept confidential and only seen by the researcher and supervisor. The data was electronically captured on a spread sheet for data analysis by the selected biostatistician.

The data obtained from the research study will be stored in a locked unit at Durban University of Technology (DUT) for 5 years as per DUT requirements and thereafter destroyed as per arrangements made by the researcher and the university.

3.5. ETHICAL CONSIDERATIONS

• Permission of all participants was obtained in order for them to be included in the study.

• All participants were required to sign the Informed Consent (Appendix E) and Letter of Information (Appendix D) before filling out the questionnaire (Appendix P).

• The participants' identification details were required by the researcher in the questionnaire. All information and data were only used and seen by the researcher, the supervisor and the statistician. It was protected in safe storage during the progression.

• The data will be safely kept in the Durban University of Technology Chiropractic Department for approximately five years. Thereafter it will be shredded and disposed of.

• No remuneration was awarded as participation was voluntary.

• Autonomy – the participants were able to make their own decisions without influence as they were entitled to their own opinions.

• Non-maleficence – the participants were not harmed in this study.

• Beneficence – this study will benefit the chiropractors as well as the public as it will create awareness on chiropractic management and promote a holistic approach to management involving alternative medicine such as chiropractic.

• Justice – every participant included in the study had a fair and equal chance to voice their opinions in this study, there was no discrimination.

3.6. STATISTICAL ANALYSIS

The data was analysed by a qualified biostatistician (Matthews, 2017) using SPSS version 24 (SPSS Inc., Chicago, Illinois, USA). A p-value < 0.05 was considered to indicate a statistically significant result. Frequency distributions were used to

summarise categorical data and bar graphs and pie charts provided a graphical summary. The mean and standard deviation were calculated for quantitative data such as age and BMI. The chi-squared test for association between variables was used to establish whether there were associations between the presence or absence of lower back pain and other variables of interest. A logistic regression model was used to identify predictor variables for the binary dependent variable, which is whether lower back pain was experienced or not. Odds ratios (OR) were used to explain the relationship between the independent variables of interest and the presence or absence of lower back pain (Hosmer and Lemeshow, 2000).

CHAPTER FOUR

RESULTS

4.1. INTRODUCTION

This chapter presents and explains the results of the study with particular emphasis on the statistical significance and relevant findings.

4.2. AIMS AND OBJECTIVES

The **aim** of this study is to determine the prevalence of, and risk factors for, postpartum low back pain within the eThekwini municipality.

Objectives of the study:

- To determine the point and period prevalence of postpartum LBP in eThekwini municipality area.
- To describe the characteristics of LBP in this population (Pain, Intensity, Duration, Location).
- To determine the association between selected risk factors (age, gender, race, height, weight, smoking habits, physical exercise, occupation, stress, pregnancy and prior LBP) and LBP.

4.3. DATA SOURCE

This chapter was compiled using data from both primary and secondary data sources.

4.3.1. Primary data source

The participants of this study provided information by means of completing a questionnaire (Appendix P) which was used to collect data.

4.3.2. Secondary data sources

The secondary data was composed using the information gathered through the literature, as depicted in Chapter Two, which was obtained from research dissertations, journals, articles, library books, internet sources and communication with the statistical analyst (Matthews, 2017) and supervisor.

4.4. RESULTS

Data were analysed using SPSS version 24 (SPSS Inc., Chicago, Illinois, USA). A p-value < 0.05 was considered to indicate a statistically significant result. Frequency distributions were used to summarise categorical data and bar graphs and pie charts provided a graphical summary. The mean and standard deviation were calculated for quantitative data such as age and BMI. The chi-squared test for association between variables was used to establish whether there were associations between the presence or absence of lower back pain and other variables of interest. A logistic regression model was used to identify predictor variables for the binary dependent variable i.e.: whether lower back pain was experienced or not. Odds ratios (OR) were used to explain the relationship between the independent variables of interest and the presence or absence of lower back pain (Hosmer and Lemeshow, 2000).

4.4.1. Responses

All questionnaires returned were included as none were incomplete. A total of 450 questionnaires were distributed among three public clinics in the eThekwini municipality. Three-hundred-and-eighty-four questionnaires were completed and returned, thus resulting in sample size of n=384. A minimum sample size of 382 was calculated for statistical viability by the statistician (Singh, 2017). Hence, n=384 resulted in a response rate of 96% with 33.3% (128) participation from each chosen clinic i.e.: La Lucia municipal Clinic, Overport municipal Clinic and Bluff municipal clinic.

4.4.2. Prevalence

Key	
n_1	La Lucia Municipal Clinic
n_2	Overport Municipal Clinic
n_3	Bluff Municipal Clinic
n_4	Married participants
n_5	Single participants
n_6	Employed participants
n_7	Postpartum LBP participants
n_8	Smoking participants

The sample population n=384 showed a prevalence of 41.1% for postpartum low back pain. The highest prevalence of LBP was reported at La Lucia municipal clinic (54.7%, $n_1={}^{70}/_{128}$) followed by Bluff municipal clinic (36.7%, $n_3={}^{47}/_{128}$) and Overport municipal clinic having the lowest prevalence (32%, $n_2={}^{41}/_{128}$).

4.5. DEMOGRAPHICS

This section depicts biographical characteristics of the respondents.

4.5.1. Age

The majority of the women were from the age category of 25-29 years (36.5%, $n={}^{140}/_{384}$) followed by ages 30-34 years (28.6%, $n={}^{110}/_{384}$). The 45 years and above age group had the least number of participants (0.3%, $n={}^{1}/_{384}$). Most of the participants from the La Lucia clinic were from the age group 30-34 years (35.9%, $n_1={}^{46}/_{128}$) as compared to the participants from the Overport and Bluff clinics whom were mainly from the age groups 25-29 years (41.4%, $n_2={}^{53}/_{128}$) and (33.6%, $n_3={}^{43}/_{128}$) respectively.

The percentage of women within each age category in each clinic is shown in Figure 4.1.

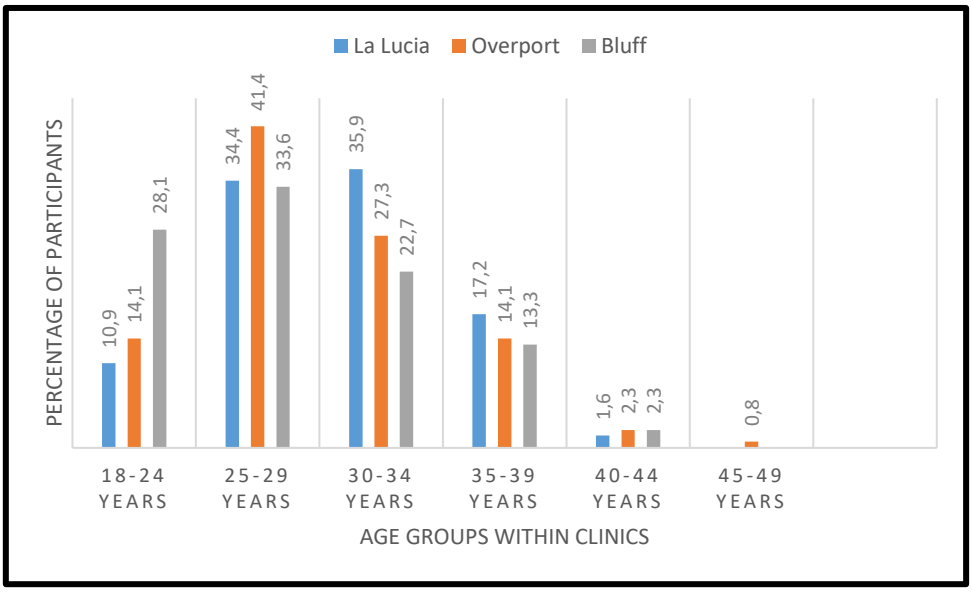

Figure 4.1. Distribution of participants in the different age categories

4.5.2. Ethnicity

Blacks represented 50.3% (n=$^{193}/_{384}$) of the study population, followed by Indians at 27.1% (n=$^{104}/_{384}$), Coloureds and white participants (6.5%, n=$^{25}/_{384}$) and (9.9%, n=$^{38}/_{384}$) respectively. A minority of the study population were foreigners (6.3%, n=$^{24}/_{384}$). The percentage of women from different ethnic backgrounds in each clinic is shown in Figure 4.2.

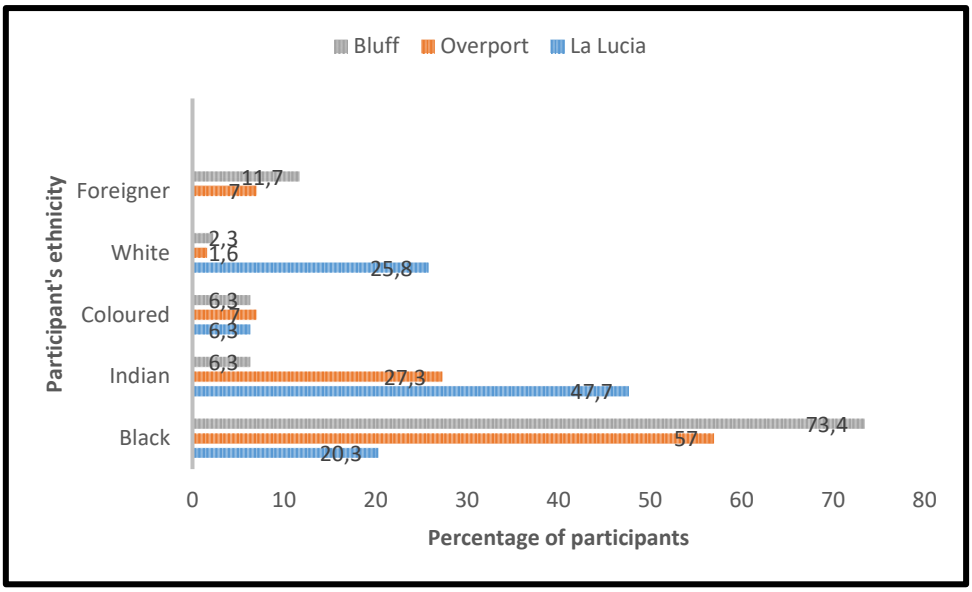

Figure 4.2. Distribution of participants from the different race groups

4.5.3. Height and Weight

The average height and weight for all the clinics were 1.60m and 65.42 kg respectively. Data categorized by weight and height revealed that the average weight of the study participants was very similar within each clinic, La Lucia 64.34 kilograms (kg), Overport 66.47 kg and Bluff 65.45 kg. The average height in La Lucia was 1.59 meters (m) with both Overport and Bluff averaging 1.60 m. The predictor of weight status - being the Body Mass Index (BMI) - was calculated by dividing weight (in kilograms) by height (in meters) squared. The data revealed that the average BMI for the study sample (n=384) is 25.57 thus representing the overweight range with 47.9% (n=$^{184}/_{384}$) of the women falling in the “Normal range”. Refer to Table 4.1.

Table 4.1. Body mass index classification

BMI Classification	Total participants % (n)
Underweight: < 18.5kg/m²	**4.2% ($^{16}/_{384}$)**
Normal range: 18.5-24.9 kg/m²	**47.9% ($^{184}/_{384}$)**
Overweight: 25.0-29.9 kg/m²	**31.0% ($^{119}/_{384}$)**
Obese Class I: 30.0-34.9 kg/m²	**12.5% ($^{48}/_{384}$)**
Obese Class II: 35.0 – 39.9 kg/m²	**3.4% ($^{13}/_{384}$)**
Obese Class III: > 40.0 kg/m²	**1.0% ($^{4}/_{384}$)**

BMI as classified by the World Health Organization (World Health Organization)

4.5.4. Marital Status

Most women who participated in the study were married (55.7%, n=$^{214}/_{384}$). The La Lucia clinic reported the highest number of married women (79.7%, n_1=$^{102}/_{128}$). Bluff clinic had the greatest number of single women (49,2%, n_1=$^{63}/_{128}$).

The data shows that most of the women who attended these clinics were either married (55.7%, n=$^{214}/_{384}$) or single (29.4%, n=$^{113}/_{384}$). Of those, 74.3% (n_4=$^{159}/_{214}$) of married women and 55.8% (n_5=$^{63}/_{113}$) of single women said “yes” to having postpartum LBP. Figure 4.3. below depicts women of different marital statuses and whether they experienced postpartum LBP or not.

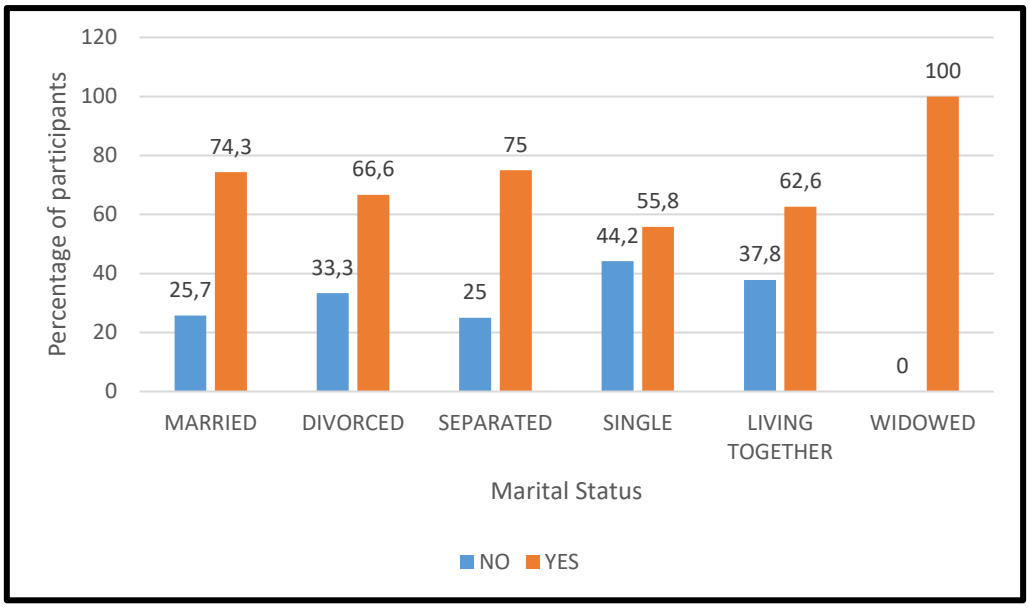

Figure 4.3. Percentage of participants with or without postpartum LBP

4.5.5. Educational Status

Women from all levels of educational backgrounds formed part of the study population (Table 4.2.). 44.3% ($n=^{170}/_{384}$) of the study population had a tertiary qualification, followed by 30.2% ($n=^{116}/_{384}$) who obtained a matric qualification. The La Lucia Clinic had a higher educational status (Tertiary) compared to those women who attended the Overport and Bluff clinics (69.5%, $n_1=^{89}/_{128}$ vs 46.9%, $n_2=^{60}/_{128}$ vs 16.4%, $n_3=^{21}/_{128}$). The Bluff clinic showed 41.1% ($n_3=^{53}/_{128}$) of participants had obtained a matric qualification.

Table 4.2. Educational status of the participants

Level of Education	**Total participants %**	**n**
No formal education	0.5%	2
Primary school	2.3%	9
High school	22.7%	87
Matric	30.2%	116
Tertiary	44.3%	170
Total	**100%**	**384**

4.5.6. Employment History

Less than half of the study population were employed (45.8%, n=$^{175}/_{384}$). Most of the women who were employed attended the La Lucia clinic (56.3%, $n_1=^{72}/_{128}$) as compared to the Overport and Bluff clinics (49.2%, $n_2=^{62}/_{128}$ & 32%, $n_3=^{41}/_{128}$). From the study population, more than half the women who were employed said “yes” to having postpartum LBP (75.43%, $n_6=^{132}/_{175}$; p = 0.003). Figure 4.4. below depicts employed women and whether they experienced postpartum LBP or not.

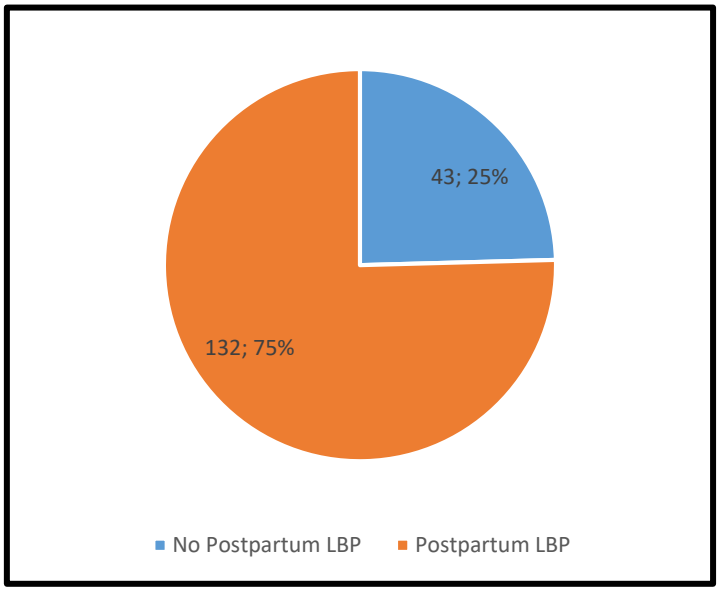

Figure 4.4. The number in the sample and percentage of employed participants with or without postpartum LBP

The demographic factors have been compiled into a single table with frequencies and percentages of each of the clinics well as the totals (Appendix R).

4.6. LOW BACK PAIN

Two-thirds of the study population stated that they suffered from low back pain at some point during their lives (67.4%, n=$^{258}/_{384}$).

Only 20.6% (n=$^{79}/_{384}$) of the women stated that they had suffered from low back pain before their pregnancy, with 54.9% (n=$^{211}/_{384}$) having suffered from low back pain during pregnancy and 41.4% (n=$^{158}/_{384}$) having suffered from low back pain after the pregnancy.

Of the women who suffered from low back pain after their pregnancy, 61.6% (n_7=$^{98}/_{158}$) mentioned that the onset of pain was gradual.

The Figures below depict the percentages for onset, type, frequency, duration and change of LBP experienced by participants, as well as those who stated that the pain experienced affected their everyday tasks.

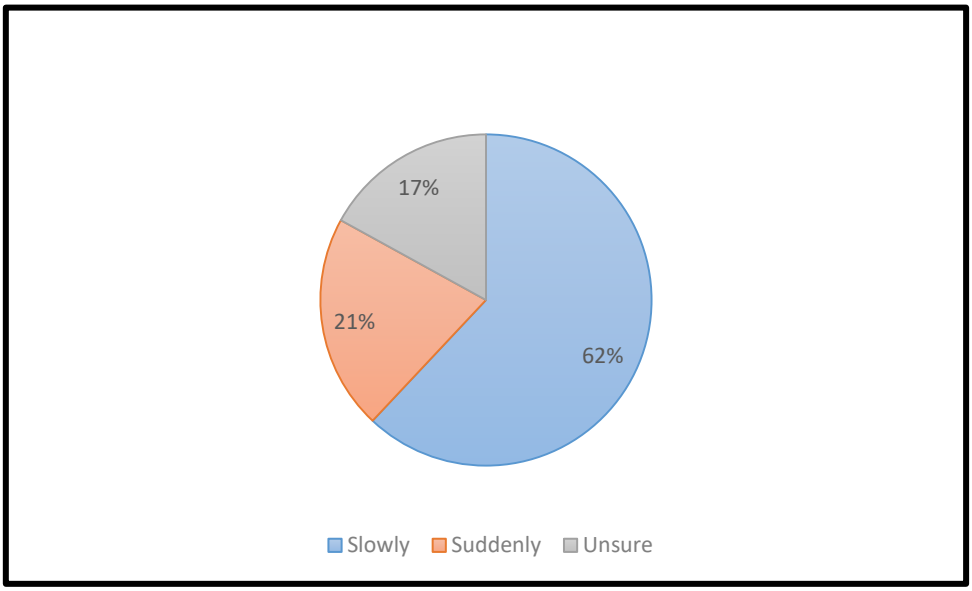

Figure 4.5. The onset of LBP in the participants

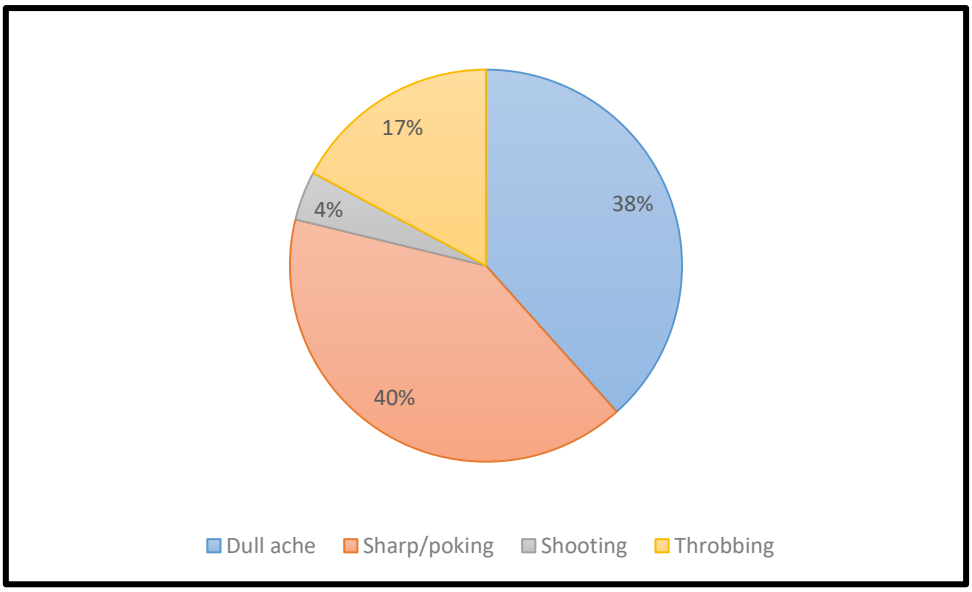

Figure 4.6. The type of LBP experienced by the participants

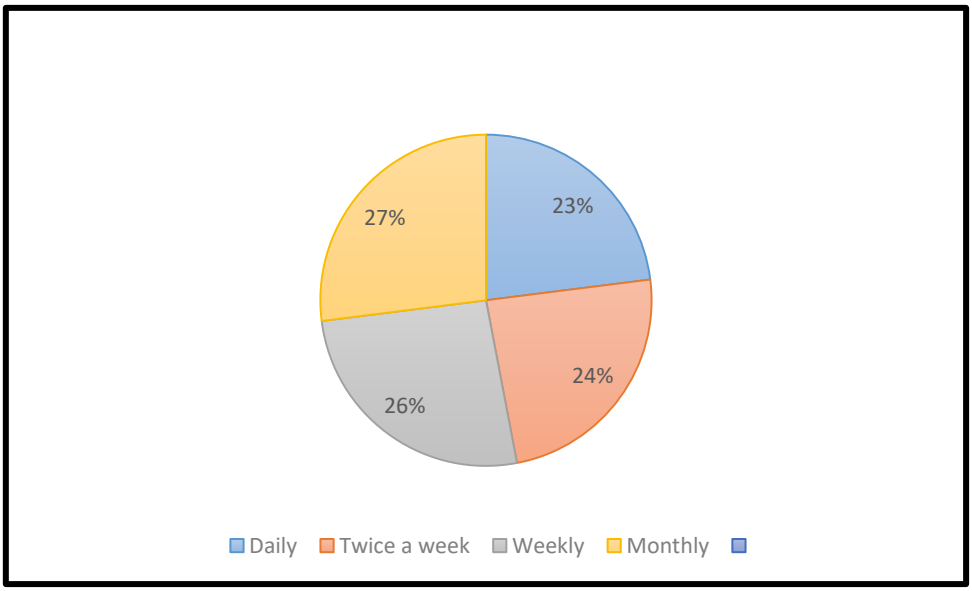

Figure 4.7. The frequency of LBP experienced by the participants

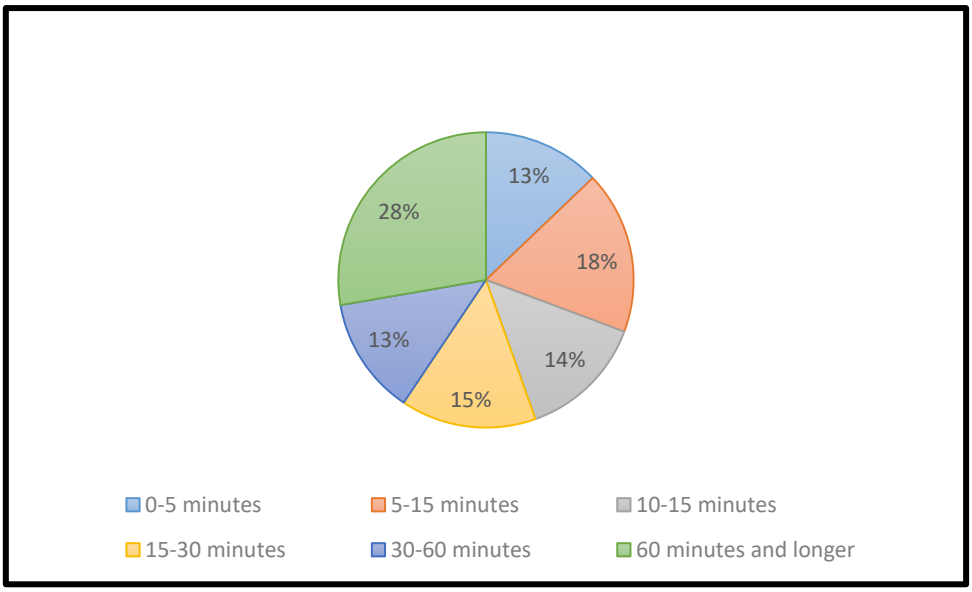

Figure 4.8. The duration of LBP experienced by the participants

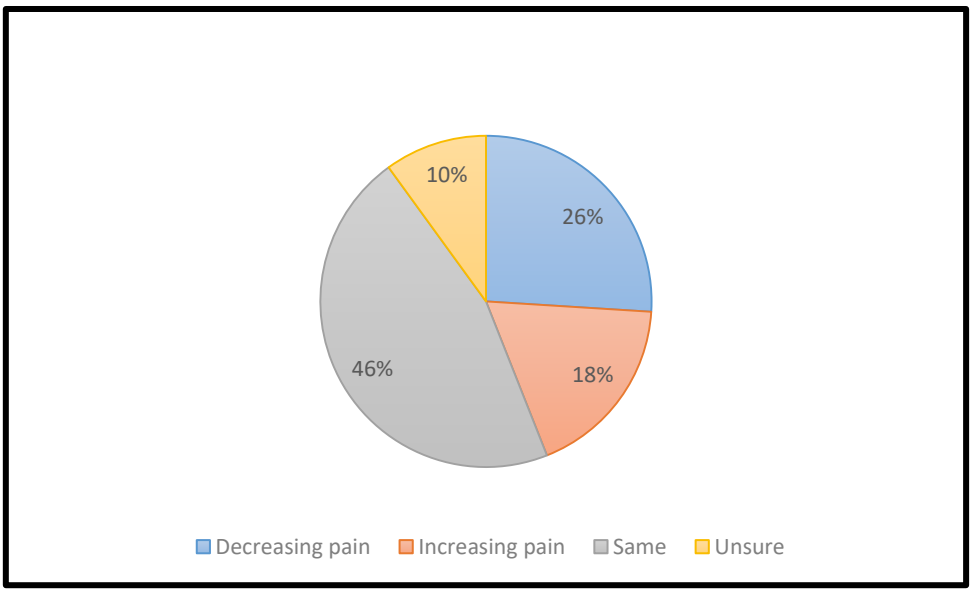

Figure 4.9. The change in LBP in the participants

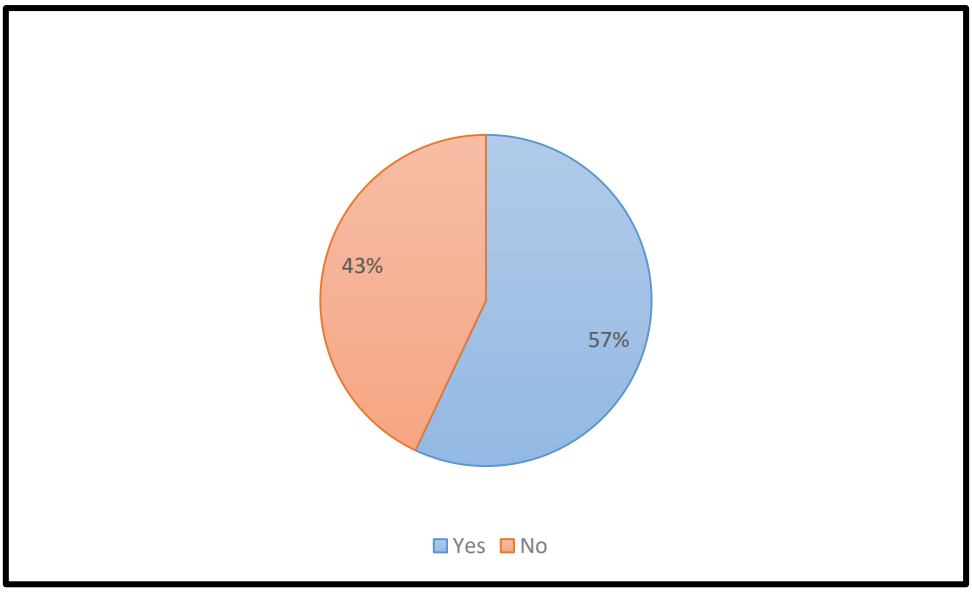

Figure 4.10. The number of participants whose day to day tasks were affected by LBP

4.6.1. Logistic Regression model for lower back pain

A logistic regression model was fitted to establish which variables are associated with lower back pain. The dependent variable is lower back pain. It is coded 1 if the individual did suffer from lower back pain after pregnancy and is coded 0 if lower back pain is not experienced after pregnancy. The predictor variables considered were age, race, weight, height, employment, clinic, stress level, type of birth and whether lower back pain was experienced before pregnancy. Stress levels, ethnicity, LBP prior to pregnancy, delivery method and the individual clinics were the variables which showed to be significant ($p<0.05$). For this analysis the birth types vaginal birth after C-section (VBAC) (0.8%, n= $^{3}/_{384}$) and forceps delivery (0.5%, n= $^{2}/_{384}$) were not included in the modelling (because of the low frequencies for these categories) and hence 378 cases were used for the logistic regression model.

Table (4.3.) below summarizes the parameter estimates (B), the standard error (S.E.) the Wald statistic (Wald), the degrees of freedom (df), the p-value and odds ratio OR=Exp(B).

Table 4.3. Logistic Regression model for lower back pain

	B	S.E.	Wald	df	p-value	OR=Exp(B)
Race (ref cat = Black)			14.048	4	.007	
Indian	1.070	.319	11.276	1	.001	2.917
White	.831	.493	2.848	1	.092	2.297
Coloured	.099	.461	.046	1	.830	1.104
Other	.362	.507	.509	1	.476	1.436
Lower back pain before pregnancy (ref cat = 0)	.931	.293	10.093	1	.001	2.537
Stress levels (ref cat = 3)			6.491	2	.039	
Stress levels (1)	.777	.357	4.731	1	.030	2.176
Stress levels (2)	.534	.264	4.085	1	.043	1.706
Birth type (ref cat = vaginal)			28.391	3	.000	
Vaginal + epidural	1.840	.705	6.812	1	.009	6.299
C-section + epidural	1.269	.256	24.530	1	.000	3.557
C-section	.982	.464	4.475	1	.034	2.669
Clinics (ref cat = 3)			5.445	2	.066	
Clinics (1)	.010	.358	.001	1	.977	1.011
Clinics (2)	-.608	.310	3.840	1	.050	.544
Constant	-1.716	.283	36.755	1	.000	.180

The last column in the table (OR=Exp(B)) shows the probability of low back pain for Indians is 2.9 times more likely than low back pain for blacks (the control variable in the model). Similarly, the probability of low back pain for whites is 2.3 times more likely than low back pain for blacks.

The probability of low back pain after pregnancy is 2.5 times more likely for a woman who suffered low back pain before pregnancy, than one who did not.

When looking at stress levels, we see that for a woman with stress level (1) - highly stressed - the probability of low back pain is 2.2 times more likely than low back pain for a woman with stress level (3), which is no stress.

The probability of low back pain after pregnancy for a woman who had a vaginal birth with epidural is 6.3 times more likely than low back pain for a woman who had a vaginal birth. Similarly, the probability of low back pain for a woman who had a C-section with epidural is 3.6 times more likely than low back pain for a woman who had a vaginal birth.

4.7. HEALTH AND EXERCISE

4.7.1. Stress

45.6% (n=$^{175}/_{384}$) of women reported having no stress, with 39.6% (n=$^{152}/_{384}$) reporting mild stress and 14.6% (n=$^{56}/_{384}$) mentioning that they were highly stressed. There was a significant number of participants (Chi-Square value = 17.46, p=0.001) who suffered from postpartum LBP and also mentioned suffering from some type of stress (High/Mild) as seen in Figure 4.11 below.

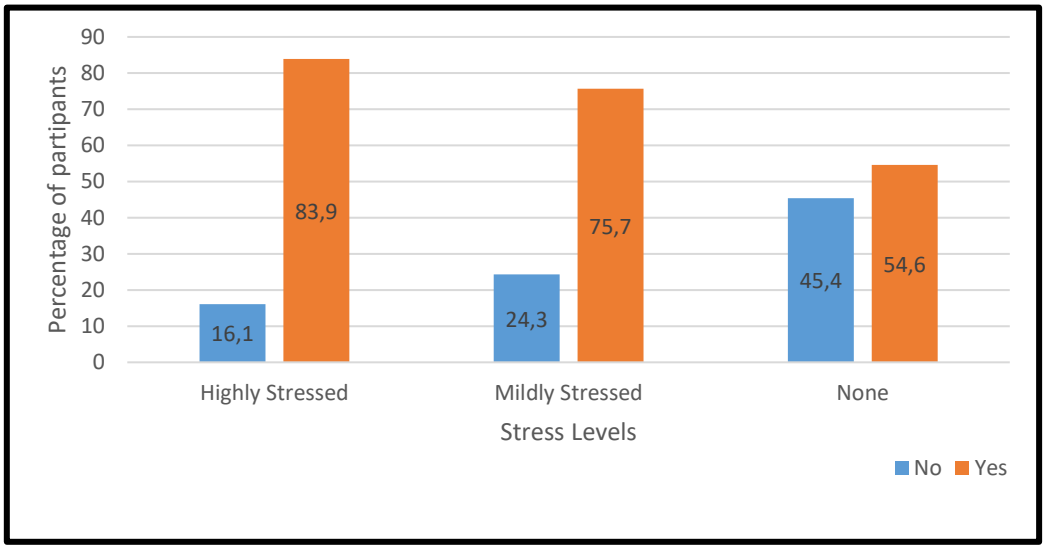

Figure 4.11. Percentage of participants with postpartum LBP and stress

4.7.2. Smoking

Approximately 10% of the participants answered “yes” to smoking (Table 4.5.). Of the 10% (n=$^{38}/_{384}$) who smoked, 50% (n_8=$^{19}/_{38}$) experienced postpartum LBP (Table 4.4.). The number of participants who smoke, shows a p-value of 0.243 which shows non-significance in order to determine if smoking is a risk factor for postpartum LBP (Chi-squared value = 1.37).

Table 4.4. Cross-tabulation of postpartum LBP and smoking

		Smoke		
		No	**Yes**	**Total**
LBP_after_preg	**No**	207	19	226
	Yes	139	19	158
Total		346	38	384

Table 4.5. Participants who smoked

Smoking	**Total participants % (n)**
Yes	9.9 ($^{38}/_{384}$)
No	90.1 ($^{346}/_{384}$)

4.7.3. Health Status

Of the participants, 46.9% (n=$^{180}/_{384}$) stated that they had been diagnosed with an adverse health condition. Hypertension (14.4%, n=$^{56}/_{384}$), anaemia (13.9%, n=$^{54}/_{384}$) and hypotension (7.2%, n=$^{28}/_{384}$) were the most common diagnosed conditions reported by the participants from all three clinics. Table 4.6. below show the diagnosed conditions reported by participants at the various clinics.

Table 4.6. Diagnosed conditions reported by participants

Health Condition	Total participants % (n=384)	La Lucia clinic % (n_1=128)	Overport clinic % (n_1=128)	Bluff clinic % (n_1=128)
Hypertension	14.4 ($^{56}/_{384}$)	16.4 ($^{21}/_{128}$)	13.3 ($^{17}/_{128}$)	14.1 ($^{18}/_{128}$)
Hypotension	7.2 ($^{28}/_{384}$)	11.7 ($^{15}/_{128}$)	3.1 ($^{4}/_{128}$)	7 ($^{9}/_{128}$)

Diabetes	5.9 ($^{23}/_{384}$)	10.9 ($^{14}/_{128}$)	6.3 ($^{8}/_{128}$)	0.8 ($^{1}/_{128}$)
Depression	5.4 ($^{21}/_{384}$)	7 ($^{9}/_{128}$)	5.5 ($^{7}/_{128}$)	3.9 ($^{5}/_{128}$)
Anaemia	13.9 ($^{54}/_{384}$)	21.9 ($^{28}/_{128}$)	11.7 ($^{15}/_{128}$)	8.6 ($^{11}/_{128}$)
Thyroid Disease	3.1 ($^{12}/_{384}$)	6.3 ($^{8}/_{128}$)	1.6 ($^{2}/_{128}$)	1.6 ($^{2}/_{128}$)
Arthritis	1.3 ($^{5}/_{384}$)	2.3 ($^{3}/_{128}$)	0.8 ($^{1}/_{128}$)	0.8 ($^{1}/_{128}$)
Other	10.1 ($^{39}/_{384}$)	3.9 ($^{5}/_{128}$)	12.5 ($^{16}/_{128}$)	18.8 ($^{24}/_{128}$)

4.7.4. Medication

Of the study population, 26% (n=$^{100}/_{384}$) reported that they were taking some form of medication or supplement. The most commonly reported medications were antiretroviral drugs, birth control and iron supplements. Not all participants who had been diagnosed with a condition were on medication for that condition.

4.7.5. Physical activity

Of the study population, 39.7% (n=$^{152}/_{384}$) were involved in physical activity. 42% (n=$^{64}/_{384}$) of the participants who were involved in physical activity reported experiencing postpartum LBP (Table 4.7.). (Chi-squared value = 0.075 with p = 0.784). Figure 4.12. depicts those participants who noted that they were physically active.

Table 4.7. Cross-tabulation of exercise and LBP after pregnancy

		Exercise		Total
		No	Yes	
LBP after preg	No	137	88	225
	Yes	94	64	158
Total		231	152	383

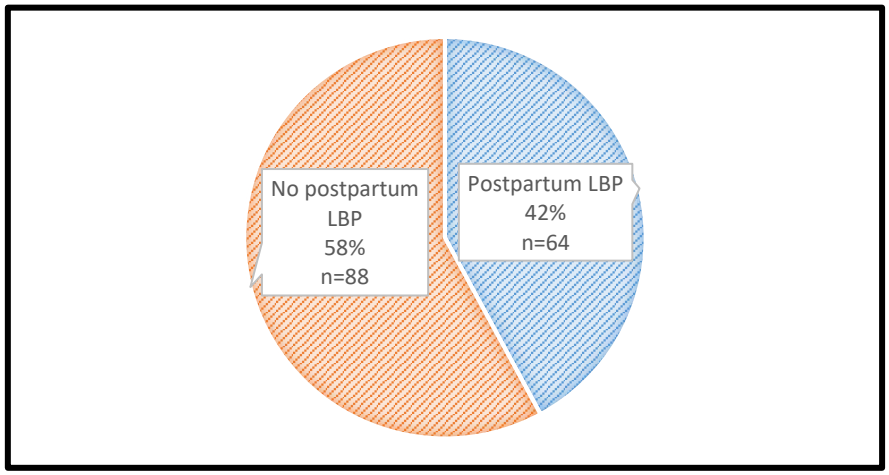

Figure 4.12. Participants who were physically active

4.8. PREGNANCY

4.8.1. Months postpartum

Women up to 12 months postpartum formed part of the study population. Table 4.8. shows the proportion of women postpartum. 33.9% (n=$^{130}/_{384}$) of the study participants were at 12 months postpartum.

Table 4.8. Months postpartum

Months postpartum	Total participants % (n=384)
1 month	11.7 ($^{45}/_{384}$)
2 months	8.6 ($^{33}/_{384}$)
3 months	7.6 ($^{29}/_{384}$)
4 months	6.3 ($^{24}/_{384}$)
5 months	4.4 ($^{17}/_{384}$)
6 months	5.7 ($^{22}/_{384}$)
7 months	2.9 ($^{11}/_{384}$)
8 months	3.1 ($^{12}/_{384}$)
9 months	6.3 ($^{24}/_{384}$)
10 months	4.9 ($^{19}/_{384}$)
11 months	4.7 ($^{18}/_{384}$)
12 months	33.9 ($^{130}/_{384}$)

Of the study population, 52.1% ($n=^{200}/_{384}$) reported that they had experienced more than one pregnancy. 53.5% of the study population had one other pregnancy in the past. 31.5% had two prior pregnancies. 10.5% mentioned having three prior pregnancies with 4.0% having four and 0.5% having had five previous pregnancies.

19.5% ($n=^{75}/_{384}$) of participants reported having suffered a miscarriage. There was no significant difference between the number of miscarriages in the various clinics (Chi-squared value = 1.29, p=0.524), La Lucia (18.8%, $n_1=^{24}/_{128}$), Overport (22.7%, $n_2=^{29}/_{128}$) and Bluff (17.2%, $n_3=^{22}/_{128}$).

Table 4.9. below shows the percentages of participants from each type of delivery and Figure 4.13. shows whether they presented with postpartum LBP.

Table 4.9. Method of delivery

Birth type	Total participants % (n=384)
C-section with epidural	34.1 ($^{131}/_{384}$)
Vaginal birth with epidural	3.4 ($^{13}/_{384}$)
Vaginal birth	54.2 ($^{208}/_{384}$)
C-section with spinal block	7.0 ($^{27}/_{384}$)

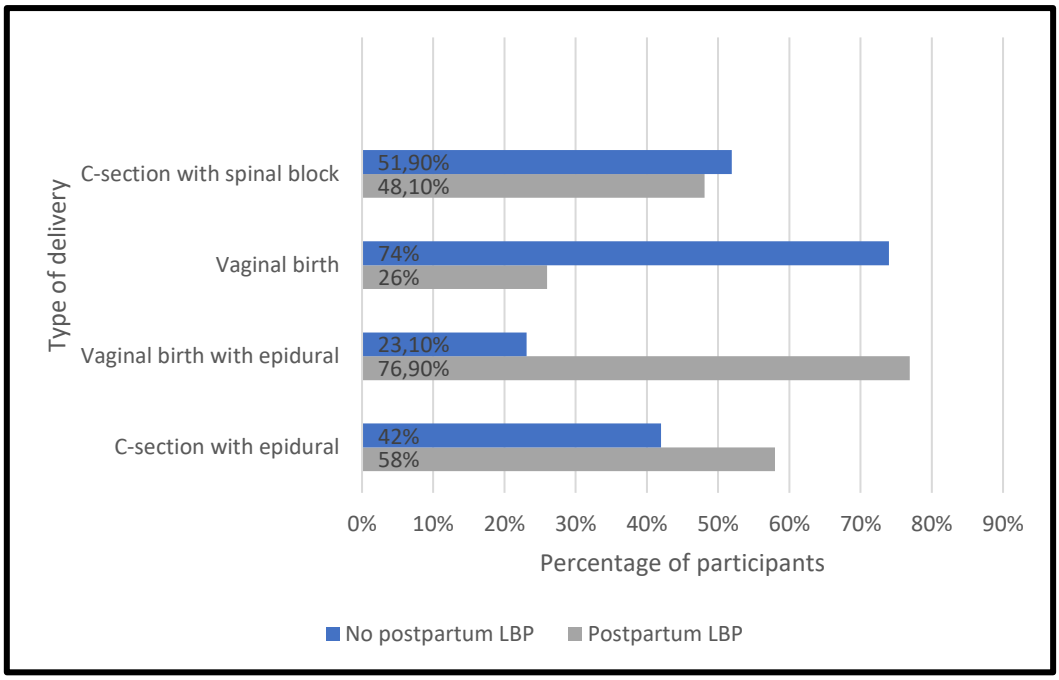

Figure 4.13. Participants with or without postpartum LBP after delivery type

12.8% (n=$^{49}/_{384}$) of women reported that they had difficulties during their pregnancy. The most common conditions that were reported included breech baby (3.4%, n=$^{13}/_{384}$), followed by macrosomia (2.3%, n=$^{9}/_{384}$), foetal distress (1.3%, n=$^{5}/_{384}$) and premature birth (1.0%, n=$^{4}/_{384}$).

4.8.2. Household chores

Participants from all three clinics were engaged in household chores i.e.: La Lucia reported 87.5%(n_1=$^{112}/_{128}$), Overport 88.3%(n_2=$^{113}/_{128}$) and Bluff 83.6%(n_3=$^{107}/_{128}$).

The chore most frequently performed by women from all three the clinics was changing diapers (78.6%, n=$^{302}/_{384}$) and bathing the baby (78.1%, n=$^{300}/_{384}$). Table 4.10. shows the percentage of women and the chores they performed.

Table 4.10. Participants who performed household chores

Household chore	**Total participants %(n=384)**
Wiping floors: on knees	18.8% ($^{72}/_{384}$)
Wiping floors with a mop	56% ($^{215}/_{384}$)
Carrying shopping bags	52.4% ($^{201}/_{384}$)
Making beds	67% ($^{257}/_{384}$)
Cleaning windows	19.8% ($^{76}/_{384}$)
Washing clothes by hand	41.2% ($^{158}/_{384}$)
Ironing clothes	51.6% ($^{198}/_{384}$)
Hanging clothes	57.9% ($^{222/}_{384}$)
Washing dishes	67.7% ($^{260}/_{384}$)
Sweeping	65.1% ($^{250}/_{384}$)
Vacuuming	13.8% ($^{53}/_{384}$)
Bathing the baby	78.1% ($^{300}/_{384}$)
Breastfeeding the baby	46.8% ($^{180}/_{384}$)
Bottle feeding the baby	49.7% ($^{191}/_{384}$)
Changing diapers	78.6%($^{302}/_{384}$)
Cooking	4.7% ($^{18}/_{384}$)

CHAPTER FIVE

DISCUSSION

5.1. INTRODUCTION

This chapter provides a discussion of the results in context with documented literature mentioned in the literature review (chapter two). It summarises the key findings and compares and contrasts these to similar studies that have been conducted.

5.2. PREVALENCE OF POSTPARTUM LBP

The present study reported a 41.1% prevalence of postpartum low back pain. Epidemiological studies that were conducted on populations with LBP and their ethnicity in South African populations revealed the following: The prevalence of LBP among black South Africans is 53.1% (Van der Meulen, 1997), among coloured South Africans 32.6%, Indian South Africans 45.0% (Docrat, 1999) and white South Africans 47.5% (Dyer, 2012). According to this study, the high-income area, Umhlanga (La Lucia clinic) had the highest prevalence of postpartum LBP at 54.7%, whereas the middle-income area, Musgrave (Overport clinic) had the lowest prevalence (32%) and the low-income area, Bluff (Bluff clinic) had a prevalence of 36.7%.

5.3. CHARACTERISTICS OF LBP

5.3.1. Pain

The type of postpartum pain experienced by the participants differed. The most common type of pain was described as “sharp/poking” with “dull ache” being the second most common. Pain is processed in various ways. This can be dependent on the individual, but also on the pathological process leading to the pain. (Roffey *et al.* 2010).

5.3.2. Intensity

Of the participants who experienced postpartum LBP, 57% mentioned that it had an effect on their daily tasks. This is in keeping with Hoy *et al.* (2010) who stated that LBP is the leading cause of disability amongst all cultures as it affects work, quality of life and is the most common reason for seeking out a medical consultation. However, 46% of the participants who experienced postpartum LBP noted that the pain had not increased or decreased in intensity since onset.

5.3.3. Duration

The current study attempted to establish the onset, frequency and duration of individual episodes of postpartum LBP. Of the 158 women experiencing postpartum LBP, the majority (62%) mentioned that they had a slow onset of pain. The population group was split almost uniformly in quarters with regards to how frequently the individual pain episodes occurred i.e.: daily (23%), twice a week (24%), weekly (26%) and monthly (27%). This is in keeping with Hoy *et al.* (2010) who observed the natural history of LBP as being extremely variable, with the pain experienced either lasting a few days or persisting for years. Most of the participants also noted that the individual episodes of pain experienced were usually 60 minutes or up to an estimated four days.

5.3.4. Location

The clinical definition of the lower back is the posterior aspect of the trunk, superior to the buttocks and inferior to the neck (Moore and Dalley, 2006). The gluteal region extends superiorly from the iliac crests to the gluteal fold inferiorly (Moore and Dalley, 2006). In keeping with the above anatomical definitions, the low back can be clinically defined as the region between the lower margins of the 12th rib and the gluteal folds, therefore comprising the inferior aspect of the back as well as the entire gluteal region (Senthil and Eva, 2013; Galukande *et al*. 2005).

The questionnaire consisted of a diagram with the abovementioned parameters of the lower back demarcated. To correctly identify the location where the individual experienced pain as being the low back, the participants were asked to refer to the abovementioned diagram. Of the study population, 67.4% stated that they had suffered from low back pain at some point during their lives. This is further supported by Galukande *et al. (*2005) who mention in their study that about 70–85% of all individuals experience back pain at some period in their lives.

5.4. POSTPARTUM LBP RISK FACTORS

5.4.1. Demographics

5.4.1.1. Age and Ethnicity

The majority of women who participated in the study were in the age category of 25-29 years. This is in keeping with the findings of Breen *et al.* (1994) who indicated that the mean age of participants in their study was 30 years. The current study did not examine age in relation to the prevalence of postpartum LBP. Breen *et al.* (1994) however, observed that a negative trend with age was statistically significant by trend analysis (p=0.03).

A logistic regression model was fitted, and it was established that the probability of postpartum low back pain for Indians is 2.9 times the probability of postpartum low back pain for blacks (controlling all other variables in the model). Similarly, the probability of postpartum low back pain for whites is 2.3 times greater than for blacks. The current study results are in keeping with the results from Andersson (1999) that showed low back pain was more common amongst whites than blacks.

5.4.1.2. Body Mass Index (BMI)

The average BMI of the sample population was 25.57, but 47.9% of the women fell in the “Normal range” category. According to the South African Demographic and Health Survey (SADHS) (2016), based on BMI score, two-thirds (68%) of the women in South Africa are overweight or obese, 3% are endomorphic, and 30% are within the normal

range. Therefore, the present study showed a higher percentage of women within the "Normal range" than that of the SADHS.

5.4.1.3. Marital status

Reisbord *et al*. (1985) first noted that there was a higher prevalence of LBP in single or unmarried persons (44-46%) compared to their married counterparts. They also found that separated/divorced/widowed persons were more likely to suffer from LBP than their married counterparts. The majority of women who attended the clinics were either married (56%) or single (29.4%). The current study found that there was a higher prevalence of married women (74.3%) who said "yes" to having postpartum LBP as opposed to single women (55.8%).

5.4.1.4. Education/Occupation

Hoy *et al.* (2010) noted in a single study in Russia that those with a lower educational level were more likely to have LBP complaints, whilst other studies found a converse relationship between educational status and the occurrence of LBP. The majority of participants in the current study had some form of tertiary education, with the next highest having acquired a grade 12 pass.

Studies conducted by Waddell and Burton (2000) and Abdulmonem *et al*. (2014) noted that physical risk factors played a role in the cause and onset of LBP. More than two thirds of the study population of the current study who were employed, mentioned that they experienced postpartum LBP. This concurs with literature which shows an increase in the likelihood of experiencing postpartum LBP in the presence of tasks which require manual handling of materials, bending and twisting (Waddell and Burton, 2000), lifting (Waddell and Burton, 2000; Abdulmonem *et al*. 2014), prolonged sitting and improper posture (Abdulmonem *et al*. 2014). Employed individuals may be required to fulfil the abovementioned tasks depending on the nature of the individual's employment.

5.4.2 Health and exercise

5.4.2.1. Stress

Andersson (1999) and Abdulmonem *et al.* (2014) suggested there was strong evidence that the onset of LBP can be influenced by psychosocial risk factors (individual or work-related). These can include anxiety, depression, job dissatisfaction, low level of education, lack of social confidence, mental stress and the person's psychological frame of mind. The current study revealed that 54.2% of the women reported having some form of stress, with 39.6% reporting mild stress and 14.6% mentioning that they were highly stressed. A significant number of participants who reported being stressed (Chi-Square value = 17.46, p=0.001) also mentioned that they experienced postpartum LBP.

5.4.2.2. Smoking

Whilst the multifaceted harmful effects of cigarette smoking on the musculoskeletal system was noted in the literature (Abate *et al*. 2013; Goesling *et al*. 2012). In the current study, only about 10% of the targeted population smoked. This number was not significant enough to determine whether smoking was in fact a risk factor for postpartum LBP.

5.4.2.3. Physical activity

General agreement is that activity is preventative of pain and, in particular, LBP (Haldeman, 2005; Morris, 2006; Dagenais and Haldeman, 2012). There is however a dispute within the literature about the different levels of activity and their link to LBP. Cady *et al*. (1985); Riihimaki (1991); Leino (1993); Salminen *et al*. (1995); Harreby *et al*. (1996) and Heistaro *et al*. (1998) all agree that a sedentary lifestyle predisposes people to LBP. However, Battie *et al*. (1989); Riihimaki *et al*. (1989); Holmstrom *et al*. (1992); Magnusson *et al*. (1992); Mortimer *et al*. (2001) and Power *et al*. (2001) suggest there is no association between LBP and different levels of activity. In 2010

Heneweer *et al.* in a systemic review reported that high intensity physical activity seemed to predispose females to a higher likelihood of the presentation of LBP. The study indicated that home do-it-yourself activities and high load activities were in fact predictive of LBP and strongly linked to the development of LBP (Hoogendoorn *et al.* 2000; Heneweer *et al*. 2010). The present study showed that 39.7% of participants were involved in some form of exercise. Of those who exercised, 42.0% experienced postpartum LBP.

5.4.3. Pregnancy

5.4.3.1. Prior LBP

Sabino and Grauer (2008) mentioned that females who experienced previous or chronic LBP were twice as likely to develop pain during pregnancy than those females who had no prior complaints. The pain experienced by these females was also more likely to be severe and longer in duration (Katonis *et al.* 2011; Butler and Fuller, 1998). It was found that those who experienced LBP prior to their pregnancy in the current study were 2.5 times more likely to experience postpartum LBP. The current study's findings were in keeping with the observation by Sabino and Grauer (2008).

5.4.3.2. Method of delivery

The administration of the epidural anaesthesia during labour and deliver has become more common and the LBP experienced by these postpartum patients has caused obstetric anaesthesiologists to believe that these are in some way connected. (Breen *et al.*, 1994). The current study revealed that the probability of low back pain after pregnancy for a woman who had a vaginal birth with epidural is 6.3 times more likely than low back pain for a woman who had a vaginal birth without epidural. Similarly, the probability of low back pain for a woman who had a C-section with epidural is 3.6 times more likely than low back pain for a woman who had a vaginal birth only.

CHAPTER SIX

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

This chapter provides a conclusion of the results of the study. Recommendations for future studies are also suggested in this chapter.

6.1. CONCLUSION

The results of this study showed that LBP occurred in 41.1% of the postpartum females living within the eThekwini Municipality of KwaZulu-Natal, thus providing further evidence that LBP is a worldwide phenomenon, commonly affecting all population groups. The highest prevalence of LBP was 54.7% reported at La Lucia municipal clinic, followed by 36.7% at the Bluff municipal clinic, with the lowest prevalence of 32% at the Overport municipal clinic

The demographic composition of the study sample comprised 50.3% black participants, 27.1% Indians, 6.5% Coloureds and 9.9% white participants. A minority of the study population was foreigners (6.3%). Due to this unbalanced distribution, although accurately representative, an accurate comparison of an ethnic nature was made impossible. It could be argued that the results of this study are most accurately representative of the black female population.

Of the entire population, 67.4% mentioned that they had suffered from low back pain at some point during their lives. The most common type of pain experienced by the postpartum females was described as “sharp/poking” in nature with “dull ache” being the second most common. 57% of the participants who experienced postpartum LBP reported that it had an effect on their daily tasks, with 62% stating that the pain presented with a slow/gradual onset.

Non-progression of LBP was reported by 46% of participants, while 26% reported a decrease in pain, 18% noted an increase in pain and 10% were unsure. 28% of the

participants noted that the individual episodes of pain they experienced were usually 60 minutes or longer. The duration of these individual pain episodes is reported at 23% daily, 24% twice a week, 26% weekly and 27% monthly - showing almost a quarterly distribution.

Risk factors found to be associated with postpartum LBP included demographic, occupational, general health, psychological and pregnancy.

The consequence of postpartum LBP in women is that it negatively impacts work and social life which directly affects the quality of life of the individual.

6.2. LIMITATIONS

The questionnaire was only administered in English as it was noted that the clinics used to obtain data, utilised only English forms, information and writing material. Therefore, it was expected that the participants would be literate in English. This may not necessarily have been the first language for some of the participants and may have influenced the understanding of the questionnaire when answered.

The questionnaire was lengthy in order to gain comprehensive information regarding the participants demographics, pregnancy and LBP. A more concise, detailed and user-friendly questionnaire may have produced a better response.

The validity of the results of the current study rests on the candour of the participants. Untruthful reporting of behaviour or activities, and over-exaggeration may have influenced the results of the study**.**

The questionnaire was only given to those participants who attended either of the three municipal clinics within the eThekwini Municipality, and thus may not be representative of a broader population of postpartum women within the eThekwini Municipality.

6.3. RECOMMENDATIONS

An increased sample size would allow for further affirmation of the outcomes obtained in this study and potentially further validate the findings. It may also be important to look at other major areas within the country (e.g. Gauteng or Cape Town) by repeating this study in the abovementioned areas to determine whether the results obtained in this study are unique to the context of this particular study, or whether they have a broader application in South Africa.

This particular study was designed as a cross sectional epidemiological study. Future studies should use a longitudinal cohort design to further establish the risk factors for postpartum low back pain.

Similar studies on other postpartum females should be undertaken, not only those who utilise public clinics, to determine if these females are also affected by postpartum LBP.

It is recommended that - in conjunction with a questionnaire - a physical examination of the participant should be utilised. This will allow for objective reporting on the various aspects of LBP.

It is further recommended that the results of this study are made available to all Chiropractic practitioners. This will allow for the entire Chiropractic profession to design an effective management program when dealing with postpartum patients.

A prospective design study is recommended where females who are free from LBP prior to pregnancy are followed up postpartum for the development of LBP. This will help eliminate any confusion as to the causality of LBP experienced.

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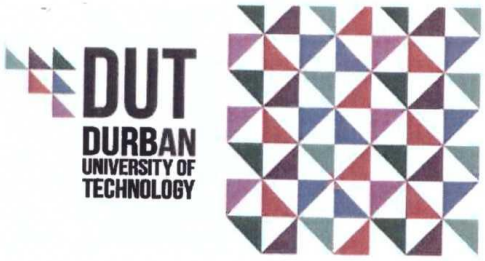
APPENDICES

Appendix A: Institutional Research Ethics Committee Provisional Approval



Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwyn Court
Gate 1, Steve Biko Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2375
Email: lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

16 August 2017

IREC Reference Number: **REC 51/17**

Ms B Bhoodram
9 Stoneyhouse Road
Hayfields
Pietermaritzburg
3201

Dear Ms Bhoodram

The epidemiology of postpartum low back pain within the eThekwini Municipality area

I am pleased to inform you that Provisional Approval has been granted to your proposal REC 51/17 subject to:

- Piloting of the data collection tool

Full approval is subject to meeting the above condition.

The Proposal has been allocated the following Ethical Clearance number **IREC 060/17**. Please use this number in all communication with this office.

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

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC SOP's.

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

Please note that you may continue with validity testing and piloting of the data collection tool. Research on the proposed project may not proceed until IREC reviews and approves the final document. If there are no changes to the data collection tool, kindly notify the IREC in writing.

Yours Sincerely

Chairperson: IREC

Appendix B: Letter of information (Focus group)

LETTER OF INFORMATION – FOCUS GROUP

Dear Participant

I would like to welcome you into the focus group of my study and thank you for your participation.

Title of my Research Study:

The epidemiology of postpartum low back pain within the eThekwini Municipality area.

Objectives of this study.

Principal Investigator/researcher: Bhavna Bhoodram (B.Tech: Chiropractic)

Co-Investigator/supervisor: Dr K Padayachy (M.Tech Chiropractic, PhD (LMMS))

Brief Introduction and Purpose of the Study:

Postpartum low back pain origin is a controversial topic and debated amongst many, with the belief that the LBP experienced by their postpartum patients is in some way connected to the administration of the epidural anaesthesia. The aim of this study is to determine the prevalence of and risk factors for postpartum low back pain within the eThekwini municipality.

Outline of Procedures:

Before commencing the focus group discussion, kindly read and sign the Informed Consent Form. Each member will then receive a copy of the questionnaire, after which each of the questions will be analysed and discussed in sequential order. All comments from the members of the focus group can contribute to the validity of the questionnaire.

Questionnaire evaluation and discussion throughout the focus group must be kept confidential.

This focus group will be recorded, if u have any objection to being filmed please advise accordingly and you will be placed in a position where you will be heard and not seen.

Risks or Discomforts to the Participant:

There is no risk or discomfort associated with participating in this research.

Benefits:

The focus group is imperative to ensure validity of the questionnaire.

Reason/s why the Participant May Be Withdrawn from the Study:

Participants are free to withdraw from the study at any time should you wish to do so without any consequence.

Remuneration:

Participation is voluntary and there are no payments associated with participation.

Costs of the Study:

There are no costs associated with participation in this study.

Confidentiality:

Comments made during the focus group will be confidential and will not be linked to you. The letter of information and informed consent as well as the questionnaire will be stored in separate boxes as to maintain confidentiality.

Research-related injury:

There will be no research related injury

Your participation in my study will be highly appreciated.

Please complete the consent form should you wish to participate in the focus group.

Persons to Contact in the Event of Any Problems or Queries:

Principal Investigator:

Bhavna Bhoodram Cell: 0835205657 Tel: (033)3966350

Supervisor:

Dr K Padayachy Cell: 0843716438 Tel: (031) 4644057

Institutional Research Ethics administrator on 031 373 2900. Complaints can be reported to the DVC: TIP, on 031 373 2382 or dvctip@dut.ac.za

Appendix C: Informed consent (Focus group)

FOCUS GROUP CONSENT

Statement of Agreement to Participate in the Research Study:

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

_____	_____	_____	_____
Full name of participant	Date	Time	Signature

Thumprint

I, Bhavna Bhoodram herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____

Appendix D: Letter of information (Research study)

LETTER OF INFORMATION

Dear Madam

Welcome to my research study. I am a Masters student in Chiropractic at the Durban University of Technology. This research project is a compulsory requirement for completion of my degree. Kindly read this document and should any information not be understood, please ask.

Title of the research study:

The epidemiology of postpartum low back pain (LBP) within the eThekwini Metropolitan area.

Principal Investigator/researcher: Bhavna Bhoodram

Supervisor: Dr K Padayachy (M.Tech Chiropractic, PhD (LMMS))

Brief Introduction and Purpose of the Study:

Postpartum low back pain origin is a controversial topic and debated amongst many, with the belief that the LBP experienced by their postpartum patients is in some way connected to the administration of the epidural anaesthesia. The aim of this study is to determine the prevalence of and risk factors for postpartum low back pain within the eThekwini municipality.

Outline of the Procedure:

If you are willing to participate in the research and have signed the letter of informed consent, you are encouraged to complete the questionnaire which will be handed out to you. Participation in the study will require a short amount of your time to complete and hand in.

Risks or Discomforts to the Participant:

There is no risk or discomfort associated with participating in this research.

Benefits:

The researcher will benefit by obtaining a Master's degree. Due to the paucity in the literature pertaining to the risk factors, delivery method and chiropractic care of postpartum low back pain, the study will indirectly benefit the participants and this will assist both the patients and health care professionals to make a more informed decision.

Reason/s why the Participant May Be Withdrawn from the Study:

Participants are free to withdraw from the study at any time should you wish to do so without any consequence.

Remuneration:

Participation is voluntary and there are no payments associated with participation.

Costs of the Study:

There are no costs associated with participation in this study.

Confidentiality:

Privacy, anonymity and confidentiality will be ensured. The signed, informed consent forms will be collected separately from the questionnaire. No names or personal identifying information will be on the questionnaire. No reference will be made to specific individuals throughout the study. All questionnaires will be stored in a locked cupboard to which only the investigator will have access.

Research-related injury:

There will be no research related injury

Persons to Contact in the Event of Any Problems or Queries:

Principal Investigator:

Bhavna Bhoodram	Cell: 0835205657	Tel: (033)3966350

Supervisor:

Dr K Padayachy	Cell: 0843716438	Tel: (031) 4644057

Institutional Research Ethics administrator on 031 373 2900. Complaints can be reported to the DVC: TIP, on 031 373 2382 or dvctip@dut.ac.za

Appendix E: Informed consent (Research study)

CONSENT

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Bhavna Bhoodram, about the nature, conduct, benefits and risks of this study – Research Ethics Clearance Number: 060/17
- I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of the research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____ _____ _____ _____

Full name of participant Date Time Signature

Thumprint

I, Bhavna Bhoodram herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____ _____ _____

Full Name of Researcher Date Signature

Appendix F: Letter of permission to clinic managers

Chiropractic Department – Ritson Campus

Steve Biko Road

Durban University of Technology

Durban

23 May 2016

To whom it may concern

Re: Permission to carry out my research at your institution.

My name is Bhavna Bhoodram, I am a Masters student at Durban University of Technology. In order to meet the requirements of this course, we are required to complete a research study.

My area of interest is postpartum lower back pain and my research topic is titled: The epidemiology of postpartum low back pain within the eThekwini Metropolitan area. I am required to obtain information on the epidemiology and the risk factors associated with postpartum low back pain.

With your permission I would like to distribute my questionnaire to your patients/mothers of patients. This practice/clinic is a suitable site as there are many patients that visit your practice on a daily basis.

I would also like to assure you that all results will be confidential and there will be no mention of name or information regarding the patient's personal medical history.

Your consideration in this matter would be much appreciated.

Yours sincerely

Bhavna Bhoodram

Appendix G: Permission from Dr Brinique Dyer

Bhavna Bhoodram <bbhoodram@yahoo.com>

bdyer1@its.jnj.com

Dear Brinique,

My name is Bhavna Bhoodram and I am conducting my Chiropractic research on " The epidemiology of postpartum low back pain within the eThekwini Municipality area.".

I would hereby seek your permission to use the questionnaire you formulated as a tool in my research. The questionnaire will be altered and not copied directly for the main purpose of my study.

If you require any further information with reference to my study, I will be willing to share my information with you.

Kind regards

Bhavna Bhoodram

Dyer, Brinique [JPPZA] <bdyer1@ITS.JNJ.com>

HI Bhavna,

I have no problem with you using my questionnaire.

Good luck!

Kind regards,

Brinique

Sent from my iPhone

On 02 Sep 2016 Bhavna Bhoodram <bbhoodram@yahoo.com> wrote:

Hi Brinique

Thank you so much.

Kind Regards

Bhavna

Appendix H: Permission from Dr Nazmeera Noor Mahomed

Bhavna Bhoodram <bbhoodram@yahoo.com>
To
Nazmeera Noor Mahomed
Feb 13 at 10:14 AM

Dear Nazmeera,

My name is Bhavna Bhoodram and I am conducting my research on "The epidemiology of postpartum low back pain within the eThekwini Municipality area".

I would hereby seek your permission to use the questionnaire you formulated as a tool in my research. The questionnaire will be altered and not copied directly for the main purpose of my study.

If you require any further information with reference to my study, I will be willing to share my information with you.

Kind regards

Bhavna Bhoodram

Nazmeera Noor Mahomed <nazzymo@gmail.com>
To
Bhavna Bhoodram
Feb 13 at 11:11 AM
Dear Miss Bhoodram

I understand the nature of your research study and hereby give You permission to use my Questionnaire in your study.

Regards
Nazmeera Noor Mahomed
(Mtech. Chiropractic)

Appendix I: English facility letter of notice

04 July 2017

To whom it may concern

I hereby state that all documents, forms, writing materials and information materials utilised in this facility are in English. It is also the most preferred language used amongst our patients.

Kind Regards

Name of clinic	Date	Stamp/Sign
[redacted]	04 July 2017	ETHEKWINI MUNICIPALITY HEALTH UNIT:NORTH LA LUCIA CLINIC
[redacted]	26.07.17	ETHEKWINI MUNICIPALITY OVERPORT CLINIC 472 PETER MOKABA RD, OVERPOR Date 26.07.17
[redacted]	04/07/2017	ETHEKWINI MUNICIPALITY HEALTH DEPARTMENT BLUFF CLINIC BLUFF ROAD

Appendix J: Permission from La Lucia Municipal clinic

Chiropractic Department – Ritson Campus

Steve Biko Road

Durban University of Technology

Durban

04 July 2017

To whom it may concern

Re: Permission to carry out my research at your institution.

My name is Bhavna Bhoodram, I am a Masters student at Durban University of Technology. In order to meet the requirements of this course, we are required to complete a research study.

My area of interest is postpartum lower back pain and my research topic is titled: The epidemiology of postpartum low back pain within the eThekwini Municipality area. I am required to obtain information on the epidemiology and the risk factors associated with postpartum low back pain.

With your permission I would like to distribute my questionnaire to your female patients. This practice/clinic is a suitable site as there are many patients that visit your practice on a daily basis. The questionnaire will be completed in my presence and should take no longer than 6 minutes per participant to complete.

I would also like to assure you that all results will be confidential and there will be no mention of name or information regarding the patient's personal medical history.

Permission from Department of Health was also requested.

Your consideration in this matter would be much appreciated.

Should you have any further questions please contact me on 083 520 5657, or my supervisor

(Dr Keseri Padayachy) on 084 371 6438.

Yours sincerely

Bhavna Bhoodram

[redacted]

ETHEKWINI MUNICIPALITY
HEALTH UNIT: NORTH
LA LUCIA CLINIC
TEL:

Appendix K: Permission from Overport Municipal clinic

Chiropractic Department – Ritson Campus

Steve Biko Road

Durban University of Technology

Durban

04 July 2017

To whom it may concern

Re: Permission to carry out my research at your institution.

My name is Bhavna Bhoodram, I am a Masters student at Durban University of Technology. In order to meet the requirements of this course, we are required to complete a research study.

My area of interest is postpartum lower back pain and my research topic is titled: The epidemiology of postpartum low back pain within the eThekwini Municipality area. I am required to obtain information on the epidemiology and the risk factors associated with postpartum low back pain.

With your permission I would like to distribute my questionnaire to your female patients. This practice/clinic is a suitable site as there are many patients that visit your practice on a daily basis. The questionnaire will be completed in my presence and should take no longer than 6 minutes per participant to complete.

I would also like to assure you that all results will be confidential and there will be no mention of name or information regarding the patient's personal medical history.

Permission from Department of Health was also requested.

Your consideration in this matter would be much appreciated.

Should you have any further questions please contact me on 083 520 5657, or my supervisor

(Dr Keseri Padayachy) on 084 371 6438.

Yours sincerely

Bhavna Bhoodram

[redacted]

ETHEKWINI MUNICIPALITY
OVERPORT CLINIC
472 PETER MOKABA RD, OVERPORT
Date 26.07.17

Appendix L: Permission from Bluff Municipal clinic

Chiropractic Department – Ritson Campus

Steve Biko Road

Durban University of Technology

Durban

04 July 2017

To whom it may concern

Re: Permission to carry out my research at your institution.

My name is Bhavna Bhoodram, I am a Masters student at Durban University of Technology. In order to meet the requirements of this course, we are required to complete a research study.

My area of interest is postpartum lower back pain and my research topic is titled: The epidemiology of postpartum low back pain within the eThekwini Municipality area. I am required to obtain information on the epidemiology and the risk factors associated with postpartum low back pain.

With your permission I would like to distribute my questionnaire to your female patients. This practice/clinic is a suitable site as there are many patients that visit your practice on a daily basis. The questionnaire will be completed in my presence and should take no longer than 6 minutes per participant to complete.

I would also like to assure you that all results will be confidential and there will be no mention of name or information regarding the patient's personal medical history.

Permission from Department of Health was also requested.

Your consideration in this matter would be much appreciated.

Should you have any further questions please contact me on 083 520 5657, or my supervisor

(Dr Keseri Padayachy) on 084 371 6438.

Yours sincerely

Bhavna Bhoodram

[redacted]

ETHEKWINI MUNICIPALITY
HEALTH DEPARTMENT
BLUFF CLINIC

Appendix M: Letter of permission from Department of Health

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

330 Langalibalele street
Private Bag X9051 PMB, 3200
Tel: 033 395 2805/3189/3123 Fax: 033 394 3782
Email: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

DIRECTORATE:
Health Research & Knowledge Management (HKRM)

Reference: HRKM293/17
KZ_2017RP36_979

25 July 2017

Dear Ms B Bhoodram
(Durban University of Technology)

Subject: Approval of a Research Proposal

1. The research proposal titled **'The epidemiology of postpartum low back pain within the eThekwini Municipality area'** was reviewed by the KwaZulu-Natal Department of Health (KZN-DoH).

   The proposal is hereby **approved** for research to be undertaken at Overport, La Lucia and Bluff Clinics.

2. You are requested to take note of the following:
   a. Make the necessary arrangement with the identified facilities before commencing with your research project.
   b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.

3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Ms G Khumalo on 033-395 3189.

Yours Sincerely

[redacted]
Dr E Lutge
Chairperson, Health Research Committee
Date: 25/07/17

Fighting Disease, Fighting Poverty, Giving Hope

Appendix N: Letter of permission from eThekwini Municipality Health Unit

12 September 2017

Dear Researcher,

Subject: Approval of a Research Proposal

The research proposal titled: **The Epidemiology of postpartum low back pain, within the eThekweni Municipality Area** has been viewed by the eThekweni Municipality Health Department Research Committee. The study is hereby **approved at the following facilities: Overport, La Lucia and Bluff facilities in eThekweni Health Unit.**

The following conditions need to be noted:

- Submission of the indemnity form obtainable from the EThekwini Municipality Health Unit before commencement of the study.
- Prior arrangements to be made with the facility and an assurance that all services will not be disrupted.
- No staff member should be used for collecting data for the researchers.
- Progress reports to be provided and the final report of the study to the eThekwini Municipality Health Unit or emailed to: rochelle.peters@durban.gov.za
- Obtain permission from the eThekwini municipality health department for press releases and release of results to communities/stakeholders.
- The department has to receive recognition for the assistance given.
- Any amendment to the study must be communicated with the eThekwini Municipality Health Unit and the relevant amendment form obtainable from the unit to be submitted.
- Withdrawal of permission to conduct research will be left to the discretion of the eThekwini Municipality Health Unit.

Yours faithfully

[redacted]

Head of Health

Appendix O: Pre-focus group questionnaire

Original Questionnaire

Dear Madam

Please answer the questions in this questionnaire as completely and honestly as you can where applicable. Please tick the appropriate boxes. Your participation is greatly appreciated.

Background Information

Instructions – Put an 'X' in the applicable box

A) Demographics

1) How old are you? (years) ☐

2) Race[1]

a. Black ☐ b. Indian ☐ c. Coloured ☐ d. White ☐ e. Other ☐

Specify _____

3) Height (cm) ☐

4) Weight (kg) ☐

5) Marital Status

a. Married☐ B. Divorced ☐ c. Separated ☐ d. Single ☐ e. Living together ☐ f. Widowed ☐

6) Highest level of education?

a. No formal ☐ b. Primary School ☐ c. High School ☐ d. Matric ☐ e. Tertiary ☐ f. Other ☐

Specify_____

7) Are you currently employed?

a. Yes ☐ b. No ☐

If yes, what is your occupation?

_____

[1] For statistical purposes only.

8) How long have you been in your current occupation? (Years) ☐

9) If you are unemployed, what was your previous occupation?

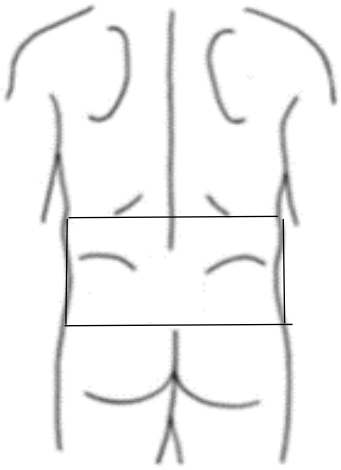
_____

10) For how long were you in previous occupation? (Years) ☐

B) Low Back Pain

11) Do you have LBP in the area located within the square in the diagram below?

a. Yes ☐ b. No ☐



12)How often do you have LBP?

a. Constant ☐ b. Frequent ☐ c. Intermittent ☐ d. Seldom ☐

13) What is the duration of your LBP (minutes)?

14) How did the LBP begin?

a. Gradually ☐ b. Sudden ☐ c. Unsure ☐

15) How would you describe the pain?

a. Dull ache ☐ b. Electric ☐ c. Sharp ☐ d. Shooting ☐ e. Throbbing ☐ f. Other ☐

Specify_____

16) Progression of your LBP?

a. Decreasing pain ☐ b. Increasing Pain ☐ c. Same ☐ d. Unsure ☐

17) Disability due to LBP?

a. Mild ☐ b. Moderate ☐ c. Severe ☐ d. None ☐

18) Did you have LBP before pregnancy?

a. Yes ☐ b. No ☐

19) Did you develop LBP during your pregnancy?

a. Yes ☐ b. No ☐

C.Health and Exercise

20) Please rate your stress levels 1-5? (1=Least 5=Most)

a. 1 ☐ b. 2 ☐ c. 3 ☐ d. 4 ☐ e. 5 ☐

21) Do you smoke?

a. Yes b. No ☐

If Yes, how many cigarettes do you smoke per day? ☐

22) Have you been diagnosed with any of the following ailments? a. Yes ☐ b. No ☐

Please tick where appropriate and indicate if no, skip to 23

Medical conditions Tick When were you diagnosed

22.1 High blood pressure

22.2 Low blood pressure

22.3 Diabetes/ sugar

22.4 Depression

22.5 Anemia

22.6 Thyroid disease

22.7 Arthritis

22.8 Other

23) Are you taking any medication?

a.Yes ☐ b. No ☐

If yes, what medication?

_____

24) Do you do any exercise?

a. Yes ☐ b. No ☐

25) If yes, what type of exercise do you do most of the time? (Tick All Applicable options)

a. Cardio ☐ b. Endurance ☐ c. Weight ☐

26) How many exercise sessions per week? (Combined if more than one type) ☐

D. Pregnancy

27) How many months post-partum (post-natal) are you?

a. 1 months ☐ b. 2 months ☐ c. 3 months ☐ d. 4 months☐ e. 5 months ☐ f. 6 months ☐

g. 7 months☐ h. 8 months☐ i. 9 months ☐ j. 10 months☐ k. 11 months☐ l. 12month

28) Was this your first pregnancy?

a. Yes ☐ b. No ☐

If no, how many pregnancies have you had in the past?

_____

29) What type of birth did you have?

a. C-section with epidural ☐ b. Vaginal Birth with epidural ☐ c. Vaginal birth ☐ d. C-Section with spinal block ☐

e. Vaginal birth after c-section(VBAC) ☐ f. Vacuum extraction ☐ g. Forceps Delivery ☐ h. Other (Specify) ☐

_____

30) If you had a vaginal birth, please specify?

a. Stirrup ☐ b. Water ☐ c. Other (Specify) ☐

_____

31) Did you have any complications during pregnancy? eg. Posterior positioning of baby

a. Yes ☐ b. No ☐

If yes, please specify.

_____

32) Did you have any miscarriages in the past?

a. Yes ☐ b. No ☐

33) Have you had any multiple births in the past?

a. Yes ☐ b. No ☐

If yes, specify.eg. 1 set of twins.

_____

34) Have you had any pregnancy related health problems in the past?

a. Yes ☐ b. No ☐

If yes, state what the problem was.

_____

35) Did you lift heavy objects during your pregnancy?

a. Yes ☐ b. No ☐

36) During your pregnancy did you perform any household chores?

a. Yes ☐ b. No ☐

If no, please skip the question

If yes, please tick the chore that you perform and indicate the time spent. (can tick more than 1 box)

Type of chore	Tick	10min	20min	30min	>30min
a. Wiping floors: on knees					
ab. with a mop					
b. Carrying shopping bags					

c. Making beds

d. Cleaning windows

e. Washing clothes by hand

f. Ironing clothes

g. Washing dishes

h. Sweeping

i. Vacuuming

j. Looking after other children

k. Other

Specify:

Thank you for your participation.

Appendix P: Post-focus group questionnaire/Research study questionnaire

Final Questionnaire

Dear Madam

Please answer the questions in this questionnaire as completely and honestly as you can where applicable. Please tick the appropriate boxes. Your participation is greatly appreciated.

Section A: Demographics

1) How old are you? (years)

a. 18-24☐ b. 25-29 ☐ c. 30-34☐ d. 35-39☐ e. 40-44☐ f. 45-49☐ g. >50☐

2) Race[1]

a. Black ☐ b. Indian ☐ c. Coloured ☐ d. White ☐ e. Other ☐

Specify _____

3) Height (cm) _____

4) Weight (kg) _____

5) Marital Status

a. Married☐ B. Divorced ☐ c. Separated ☐ d. Single ☐ e. Living together ☐ f. Widowed ☐

6) Highest level of education?

a. No formal ☐ b. Primary School ☐ c. High School ☐ d. Matric ☐ e. Tertiary ☐

7) Are you currently employed?

a. Yes ☐ b. No ☐

8) What is your occupation?

_____

9) How long have you been in your current occupation?

a. 0-3 years☐ b. 4-6 years☐ c. 7-9 years☐ d.10 years and over☐ Specify _____ years

10) If you are unemployed, what was your previous occupation?

_____

11) For how long were you in previous occupation?

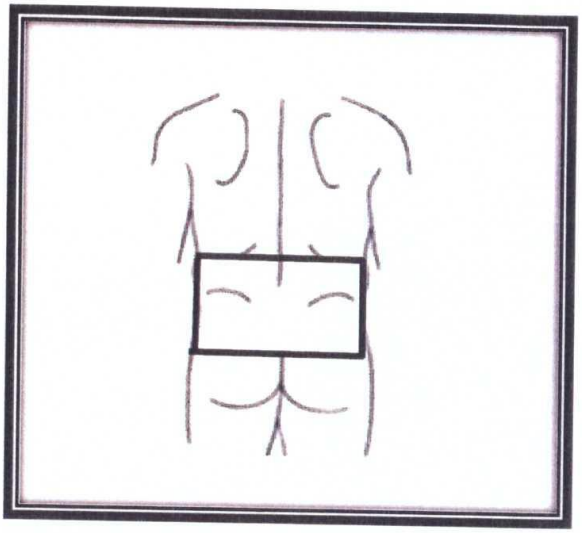
a. 0-3 years☐ b. 4-6 years☐ c. 7-9 years☐ d.10 years and over☐ Specify _____ years

[1] For statistical purposes only.

Section B: Low Back Pain

12) Have you ever had LBP in the area located within the square in the diagram below?

a. Yes ☐ b. No ☐



13) Did you have LBP before pregnancy?

a. Yes ☐ b. No ☐

14) Did you develop LBP during your pregnancy?

a. Yes ☐ b. No ☐

15) Do you have LBP after your pregnancy? If no, please skip to Section C (Health and Exercise) Question 22

a. Yes ☐ b. No ☐

16)How often do you have LBP?

a. Daily ☐ b. Twice a week ☐ c. Weekly ☐ d. Monthly ☐

17) How long does the pain last?

a. 0-5 min ☐ b. 5-10 min ☐ c. 10-15min ☐ d. 15-30 min ☐ e. 30-60 min ☐ f. >60min ☐

18) How did the LBP begin?

a. Slowly ☐ b. Sudden ☐ c. Unsure ☐

19) How would you describe the pain?

a. Dull ache ☐ b. Sharp/Poking ☐ c. Shooting ☐ d. Throbbing ☐

20) Has there been any change in your LBP?

a. Decreasing pain ☐ b. Increasing Pain ☐ c. Same ☐ d. Unsure ☐

21) Does the LBP affect your day to day tasks?

a. Yes ☐ b. No ☐

Section C: Health and Exercise

22) Please rate your stress levels.

a. Highly stressed ☐ b. Mildly stressed ☐ c. None ☐

23) Do you smoke?

a. Yes ☐ ... If Yes, how many cigarettes do you smoke per day?_____

b. No ☐

24) Have you been diagnosed with any of the following illnesses?

a. Yes ☐ b. No ☐

Please tick where appropriate and indicate when you were diagnosed.
If no, skip to question 25

Medical conditions	Tick	Before pregnancy	During pregnancy	After pregnancy
23.1 High blood pressure				
23.2 Low blood pressure				
23.3 Diabetes/ sugar				
23.4 Depression				
23.5 Anemia				
23.6 Thyroid disease				
23.7 Arthritis				
23.8 Other				

25) Are you taking any medication?

a. Yes ☐ If yes, what medication? _____

b. No ☐

26) Do you do any exercise?
a. Yes ☐ ... If yes, what type of exercise do you do most of the time? (Tick All Applicable options)

a. Cardio (eg.Running) ☐ b. Endurance (eg.Tennis) ☐ c. Weight (eg.Dumbells) ☐

b. No ☐

27) How many days per week do you exercise? (Combined if more than one type)
a. 1-2 days ☐ b. 2-3 days ☐ c. 3-6 days ☐ d. daily ☐

Section D: Pregnancy

28) How many months since your last delivery?
a. 1 months ☐ b. 2 months ☐ c. 3 months ☐ d. 4 months ☐ e. 5 months ☐ f. 6 months ☐
g. 7 months ☐ h. 8 months ☐ i. 9 months ☐ j. 10 months ☐ k. 11 months ☐ l. 12months ☐

29) Was this your first pregnancy?
a. Yes ☐ b. No ☐

If no, how many pregnancies have you had in the past?
a. 1 ☐ b. 2 ☐ c. 3. ☐ d. 4 ☐ e. 5 or more ☐

30) What type of birth did you have?

Birth Type	Tick
a. C -section with epidural	
b. Vaginal birth with epidural	
c. Vaginal birth	
d. C- section with spinal block	
e. Vaginal birth after Csection (VBAC)	
g. Forceps delivery	
h. Other (specify)	

31) If you had a vaginal birth, please specify?

a. Stirrup ☐

http://denver.citymomsblog.com/sponsored 1

b. Water ☐

http://babymakingmerrygoround.blogspot.c 1

c. Other ☐ _____

32) Did you have any difficulties during pregnancy? eg. Breech/Posterior positioning of baby

a. Yes ☐ ... If yes, please specify_____

b. No ☐

33) Did you have any miscarriages in the past?
a. Yes ☐ b. No ☐

34) Have you had any multiple births (twins/triplets etc.) in the past?

a. Yes ☐ ... If yes, specify.eg. 1 set of twins_____

b. No ☐

35) Did you lift heavy objects during your pregnancy?
a. Yes ☐ b. No ☐

36) During/After your pregnancy did you perform any household chores?

a. Yes ☐ b. No ☐

If yes, please tick the chore that you perform and indicate the time spent. (can tick more than 1 box)

Type of chore	Tick	10min	20min	30min	>30min
a. Wiping floors: on knees					
b. Wiping floors with a mop					
c. Carrying shopping bags					
d. Making beds					
e. Cleaning windows					
f. Washing clothes by hand					
g. Ironing clothes					
h. Hanging clothes					
i. Washing dishes					
j. Sweeping					
k. Vacuuming					
l. Bathing the baby					
m. Breastfeeding the baby					
n. Bottle feeding the baby					
o. Change diapers					
p. Other					
Specify:					

Thank you for your Participation ☺

Appendix Q: Institutional Research Ethics Committee Full Approval

DUT
DURBAN
UNIVERSITY OF
TECHNOLOGY

Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor, Berwyn Court
Gate 1, Steve Biko Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4001

Tel: 031 373 2375
Email: lavishad@dut.ac.za
http://www.dut.ac.za/research/institutional_research_ethics

www.dut.ac.za

29 August 2017

IREC Reference Number: **REC 51/17**

Ms B Bhoodram
9 Stoneyhouse Road
Hayfields
Pietermaritzburg
3201

Dear Ms Bhoodram

The epidemiology of postpartum low back pain within the eThekwini Municipality area

The Institutional Research Ethics Committee acknowledges receipt of your final data collection tool for review.

We are pleased to inform you that the questionnaire has been APPROVED; you may now proceed with data collection on the proposed project.

Kindly ensure that participants used for the pilot study are not part of the main study.

Yours Sincerely

[redacted]

Professor JK Adam
Chairperson: IREC

DUT DURBAN UNIVERSITY OF TECHNOLOGY
2017 -08- 29
INSITUTUTIONAL RESEARCH ETHICS COMMITTEE
P O BOX 1334 DURBAN 4000 SOUTH AFRICA

Appendix R: Demographic factors

Clinics	**LaLucia % (n_1=$^{128}/_{384}$)**	**Overport % (n_2=$^{128}/_{384}$)**	**Bluff % (n_3=$^{128}/_{384}$)**	**Total % (n=384)**
Demographics				
Age				
18-24	10.9($^{14}/_{128}$)	14.1($^{18}/_{128}$)	28.1($^{36}/_{128}$)	17.7($^{68}/_{384}$)
25-29	34.4($^{44}/_{128}$)	41.4($^{53}/_{128}$)	33.6($^{43}/_{128}$)	36.5($^{140}/_{384}$)
30-34	35.9($^{46}/_{128}$)	27.3($^{35}/_{128}$)	22.7($^{29}/_{128}$)	28.6($^{110}/_{384}$)
35-39	17.2($^{22}/_{128}$)	14.1($^{18}/_{128}$)	13.3($^{17}/_{128}$)	14.8($^{57}/_{384}$)
40-44	1.6($^{2}/_{128}$)	2.3($^{3}/_{128}$)	2.3($^{3}/_{128}$)	2.1($^{8}/_{384}$)
45-49	none	0.8($^{1}/_{128}$)	none	0.3($^{1}/_{384}$)
Ethnicity				
Black	20.3($^{26}/_{128}$)	57.0($^{73}/_{128}$)	73.4($^{94}/_{128}$)	50.3($^{193}/_{384}$)
Indian	47.7($^{61}/_{128}$)	27.3($^{35}/_{128}$)	6.3($^{8}/_{128}$)	27.1($^{104}/_{384}$)
Coloured	6.3($^{8}/_{128}$)	7.0($^{9}/_{128}$)	6.3($^{8}/_{128}$)	6.5($^{25}/_{384}$)
White	25.8($^{33}/_{128}$)	1.6($^{2}/_{128}$)	2.3($^{3}/_{128}$)	9.9($^{38}/_{384}$)
Other	none	7.0($^{9}/_{128}$)	11.7($^{15}/_{128}$)	6.3($^{24}/_{384}$)
Marital Status				
Married	79.7($^{102}/_{128}$)	53.1($^{68}/_{128}$)	35.2($^{45}/_{128}$)	56.0($^{215}/_{384}$)
Divorced	1.6($^{2}/_{128}$)	1.6($^{2}/_{128}$)	1.6($^{2}/_{128}$)	1.6($^{6}/_{384}$)
Separated	1.6($^{2}/_{128}$)	1.6($^{2}/_{128}$)	none	1.0($^{4}/_{384}$)
Single	7.8($^{10}/_{128}$)	31.3($^{40}/_{128}$)	49.2($^{63}/_{128}$)	29.4($^{113}/_{384}$)
Living together	9.4($^{12}/_{128}$)	12.5($^{16}/_{128}$)	13.3($^{17}/_{128}$)	11.7($^{45}/_{384}$)
Widowed	none	none	0.8($^{1}/_{128}$)	0.3($^{1}/_{384}$)
Educational Status				
No formal	none	1.6($^{2}/_{128}$)	none	0.5($^{2}/_{384}$)
Primary school	none	2.3($^{3}/_{128}$)	4.7($^{6}/_{128}$)	2.3($^{9}/_{384}$)
High school	3.9($^{5}/_{128}$)	22.7($^{29}/_{128}$)	41.4($^{53}/_{128}$)	22.7($^{87}/_{384}$)
Matric	26.6($^{34}/_{128}$)	26.6($^{34}/_{128}$)	37.5($^{48}/_{128}$)	30.2($^{116}/_{384}$)
Tertiary	69.5($^{89}/_{128}$)	46.9($^{60}/_{128}$)	16.4($^{21}/_{128}$)	44.3($^{170}/_{384}$)