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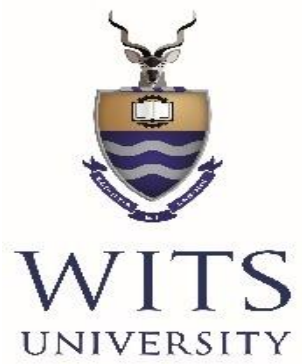
Knowledge, attitudes and beliefs towards patients with chronic low back pain among final year School of Therapeutic Sciences students at the University of the Witwatersrand: a cross-sectional study

Mukoka, Grace

2018

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KNOWLEDGE, ATTITUDES AND BELIEFS TOWARDS PATIENTS WITH CHRONIC LOW BACK PAIN AMONG FINAL YEAR SCHOOL OF THERAPEUTIC SCIENCES STUDENTS AT THE UNIVERSITY OF THE WITWATERSRAND – A CROSS-SECTIONAL STUDY

Grace Mukoka

Student number: 1622481

A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa, in partial fulfilment of the requirements for the degree of Master of Science in Physiotherapy (Orthopaedic Manipulative Therapy).

Johannesburg, 2018

DECLARATION

I, Grace Mukoka, declare that this research report is my own, unaided work except where otherwise indicated in the acknowledgement section. It is being submitted in partial fulfilment of the requirements of the degree of Masters of Science in Physiotherapy at the University of the Witwatersrand.

This work has not been submitted for any other degree or examination at this or any other university.

_____ 08/06/2018

Grace Mukoka Date

DEDICATION

I would like to dedicate this work to My God, who has been faithful to me from the beginning till the end. I never would have finished this work without constant reassurance from Him. I was going through a very difficult and heart breaking moment of my life and His joy and presence gave me strength. His words have come real in me.

"Isaiah 40:31; But those who trust in the Lord for help will find strength renewed. They will rise on wings like eagles; they will run and not get weary; they will walk and not grow weak." – Isaiah 40:31, GNT version.

ABSTRACT

Knowledge of pain influences health care providers' attitudes and beliefs about patients with chronic low back pain. In turn, affects the choice of management approach. However, little is known about this topic among students pursuing various undergraduate health science programmes. The purpose of this study was to determine the level of knowledge of pain, attitudes and beliefs about patients with chronic low back pain, and establish their association with demographic characteristics among final year undergraduate students of the School of Therapeutic Sciences at the University of the Witwatersrand in South Africa.

This is a cross-sectional study where two self-administered questionnaires (NPQ for knowledge of physiology of pain and HC-PAIRS for attitudes and beliefs) were distributed to the study population of 224 students, and the demographic details of participants were collected.

Out of 224 eligible students, 145(65%) participated in this study which represents the analytical population with female respondence (n = 115, 79%). The overall NPQ-mean score is 6.01(SD 1.98), and the mean scores were significant by gender (0.05) and across the programmes of study (0.005). Physiotherapy had the highest NPQ-mean scores 6.97(1.77) while occupational therapy had the lowest NPQ-mean scores 5.21(2.09).

An overall HC-PAIRS-mean score is 63.1(8.9). Females had significantly more negative attitudes and beliefs about patients with chronic low back pain (p-value = 0.04). There is no significance difference HC-PAIRS-mean scores by age, history of low back pain and programme of study. NPQ-mean scores has an inverse relationship with HC-PAIRS-mean scores (p-value = 0.0002).

There is a deficit in the level of knowledge of neurophysiology of pain among the final year, School of Therapeutic Science students. Their attitudes and beliefs regarding patients with chronic low back pain are negative. Knowledge of pain influences the attitudes and beliefs about patients with chronic low back pain. Therefore, changing the attitudes of students would require improving their knowledge of pain by updating their curriculi for chronic pain content with the current management recommendations.

Keywords: Knowledge of pain, attitude, beliefs, patients with chronic low back pain, undergraduate students

ACKNOWLEDGEMENTS

I would like to thank a number of persons who saw potential in me and rendered their support during my study at the University of the Witwatersrand. Their contribution made it possible for this work to be in existence.

My supervisors Professor Benita Olivier and Mrs Sadiya Ravat, for their endless support during my study. Their kindness made the whole process easier and it gave me the courage to approach them anytime I needed help.

My sponsors, from the Global Aids Interface Alliance in collaboration with Borchard foundation; who not only cared about my financial needs, but also my welfare and progress of my studies at the University of the Witwatersrand.

All the participants for giving their consent and took their time to participate in this study. Their willingness made my data collection process smooth.

All the heads of the involved departments for giving their permission to conduct this study among the final year students in their departments.

The head of the School of Therapeutic Sciences and the University Registrar for their permission to conduct this study at the premises of the University of the Witwatersrand – among the students of health science faculty.

Takondwa Bakuwa, for the emotional support and for helping to proof-read this paper.

Christopher Stanley Chikhosi, and School of Public Health at the University of the Witwatersrand for the statistical assistance.

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LIST OF ABBREVIATIONS

NPQ	Neurophysiology of pain
HC-PAIRS	Health Care Providers` Pain and Impairment Relationship Scale

CHAPTER 1. INTRODUCTION

1.1 Background

Low back pain is one of the top leading causes of disability worldwide (Hoy et al., 2014). Most cases of acute low back pain progress to chronic low back pain when recovery takes more than three months. This is due to psychosocial factors, brain structural change and also the neurochemical changes which lead to change in the central mechanism of the brain (Stubbs et al., 2016; Zhao et al., 2017; Zhuo et al., 2011; Zusman, 2004). The psychosocial factors include anxiety, stress, recovery expectation, somatisation, depression and fear avoidance behaviour (Moore, 2010; Pincus et al., 2002; Stubbs et al., 2016).

The management approach of chronic low back pain has evolved from the biomedical to the biopsychosocial approach in order to consider the psychosocial factors during assessment and management of patients with chronic low back pain (Gatchel et al., 2007; Moore, 2010; Nijs et al., 2014; O'Sullivan, 2012; Pillastrini et al., 2012; Wijma et al., 2016). The multidisciplinary team and biopsychosocial approach are currently recommended in managing patients with chronic low back pain in order to gain optimal results for patients (Luk et al., 2010). However, there is poor implementation of the biopsychosocial approach by healthcare providers due to the negative attitudes of health care providers, their knowledge of the neurophysiology pain, biomedical factors, and their patient perception (Bishop and Foster, 2010; Dwyer. et al., 2017).

Attitudes and beliefs about chronic low back pain among health care providers play a vital role in the choice of approach for the management of patients with chronic low back pain (Dwyer et al., 2017; Gardner et al., 2017). Education of the neurophysiology of pain has been effective in shifting the attitudes and beliefs of health care providers more positively hence ensuring success in implementation of the biopsychosocial approach (Domenech et al., 2011; Morris et al., 2011; Synnott et al., 2016).

Undergraduate students in School of Therapeutic Sciences are exposed to the clinical environment, where they are expected to manage patients with chronic low back pain. Their

knowledge of the neurophysiology of pain and their attitudes and beliefs about patients with pain are equally important in determining the appropriate approach in the management of patients with chronic low back pain.

1.2 Problem statement

The health care providers` level of knowledge of neurophysiology of pain are reported to influence their attitudes and beliefs towards patients with chronic low back pain, which then affects their assessment and treatment approach to the patients. This level of knowledge is found to differ across different professions due to a number of factors i.e. different curriculums and number of years of experience. In South Africa, the level of knowledge of pain was assessed among practicing physiotherapists only which was reported to be poor (Clenzos et al 2013). However, no research regarding this has been done among undergraduate students South Africa. The undergraduate Therapeutic Science students at the University of the Witwatersrand (comprising of Physiotherapy, Occupational Therapy, Nursing, Pharmacy and Pharmacology, and Exercise Science and Sports Medicine units) interact with patients with chronic low back pain during their clinical training. However, their level of knowledge, attitudes and beliefs towards patients with chronic low back pain, and how these are associated with each other are unknown.

1.3 Research question

What is the level of knowledge of the neurophysiology of pain, the attitudes and beliefs towards patients with chronic low back pain among final year School of Therapeutic Science students at the University of the Witwatersrand?

1.4 Research aim

The aim of this study was to determine the relationship between the demographic details, level of knowledge of neurophysiology of pain as well as the attitudes and beliefs towards patients with chronic low back pain among the final year School of Therapeutic Science students at the University of the Witwatersrand.

1.5 Significance of research

The final year undergraduate School of Therapeutic Science students at the University of the Witwatersrand are exposed to clinical work, which involves assessing and managing patients with chronic low back pain. The students' attitudes and beliefs are crucial in the choice of approach to be used in managing such patients. Hence, it is vital to understand the students' level of knowledge and attitudes and beliefs towards patients with chronic low back pain in order to inform if there is a potential need for an intervention.

1.6 Research objectives

- To determine the demographic characteristics of final year students from the School of Therapeutic science
- To determine the level of knowledge of neurophysiology of pain among the final year students from the School of Therapeutic Sciences
- To determine the attitudes and beliefs towards patients with chronic low back pain among the final year students from the School of Therapeutic Sciences
- To determine the correlation between knowledge of pain and attitude/beliefs of students towards patients with chronic low back pain and their relationship with demographic details.

CHAPTER 2. LITERATURE REVIEW

In this chapter literature is discussed in detail regarding the knowledge of neurophysiology of pain, attitudes and beliefs of health care providers towards patients with chronic low back pain and chronic pain definition and management. The instruments used to measure knowledge of the neurophysiology of pain, attitudes and beliefs towards patients with chronic low back pain are introduced.

2.1 Prevalence of low back pain

Low back pain is defined as "Pain limited to the region between the lower margins of the 12th rib and the gluteal folds" (Galukande et al., 2005; Louw et al., 2007). It is one of the top contributors of global health burden with a higher prevalence in females and the elderly (Dionne et al., 2006; Hoy et al., 2010b; Louw et al., 2007; Meucci et al., 2015). The point prevalence is reported to be 12% with one-month prevalence of 23.2 ±2.9% (Hoy et al., 2012; Manchikanti et al., 2014). One-year prevalence of acute low back pain ranges from 1.5% - 50% with an expected recovery period of three months (Hoy et al., 2010a). These findings are similar to a systematic review of studies that were done in Africa, which indicated a high prevalence of the low back pain (Louw et al., 2007). Low back pain can in some cases persist for more than three months and therefore becomes chronic (Dunn et al., 2013). A systematic review done in 2015 reports an increase in the prevalence of chronic low back pain from 3.9% to 25.4% (Meucci et al., 2015). This might be due to ineffective management of psychosocial factors that contribute to the chronicity of the condition (Freburger et al., 2009; Meucci et al., 2015).

2.2 Chronic low back pain and its impact on patients

Studies have previously used different definitions for chronic low back pain (Deyo et al., 2015). To resolve this problem, National Institutes of Health task force developed a standardised definition for chronic low back pain (Deyo et al., 2015). The results came from the consensus of experts in the field of chronic pain from different countries. They recommended that chronic low back pain be defined as “a low back pain problem that has

persisted at least 3 months and has resulted in pain on at least half the days in the past 6 months" (Deyo et al., 2015).

Quality of life for patients with chronic low back pain is reported to be compromised (Kelly et al., 2011). A systematic review found that many aspects of sleep were greatly affected in patients with chronic low back pain (Kelly et al., 2011). These include difficulty falling asleep, sleep quality, sleep dissatisfaction, reduced sleep duration and sleep disturbance. It was also noted that there was lack of agreement in the evidence to whether sleep efficiency was affected (Kelly et al., 2011). Therefore it is essential for health care providers to consider patients` sleeping as part of psycho-social aspect in management of chronic low back pain in order to improve their quality of life.

Studies have been conducted to identify the contributing factors for chronic low back pain - among which psycho-social factors have been found to be a major contributor. These include; depression, anxiety, stress, passive coping strategies, and fear-avoidance behaviour (Moore, 2010; Ramond et al., 2011). In a systematic review by Ki Ng et al., (2017), studies that used Magnetic Resonance Imaging protocols to identify brain changes in patients with chronic low back pain were analysed. A decrease in grey matter and changes in white matter were observed mainly in the areas involved with emotions and cognition (Ki Ng et al., 2017).

Chronic pain conditions are reported to be associated with neurochemical changes mostly in the frontal cortex, limbic system and parietal lobe (Zhao et al., 2017). These changes include a decrease in N-acetyl-aspartate, glutamate, glucose level, choline, and myo-inositol (Sharma et al., 2012; Zhao et al., 2017). It is still not clear if these changes cause pain chronicity or vice-versa (Wand et al., 2011). N-acetyl-aspartate is important in neuro-connectivity in the brain. Its reduction is mostly evident in the degenerative condition i.e. Alzheimer and in patients with depression (Wand et al., 2011; Zhao et al., 2017). This is the same for the patients with chronic low back pain since depression is associated with chronic pain. This evidence shows how essential it is to address the central mechanisms of pain in chronic condition

There are many changes in brain structure and function in patients with chronic pain (Kregel et al., 2015). Evidence has no consensus regarding the changes in cortical thickness in patients with chronic low back pain (Kregel et al., 2015). Other studies report an increase in cortical thickness which is associated with decreased activity of the primary somatosensory area during low-intensity pain; while others report a decrease in cortical thickness (Kong et al., 2013; Seminowicz et al., 2011) in the patients with chronic low back pain. Flor et al., (1997) reports that the representation of the lower back on the brain (homunculus), expands and shifts medially in patients with chronic low back pain. This shift is thought to be as a result of an emotional impact of chronic pain and painful memories that affect the processing of messages in the brain, which could be reversed by behavioural therapy, and graded motor imagery that provide feedback to the brain (Flor, 2003; Moseley and Flor, 2012; Wand et al., 2011).

Most patients with chronic pain disorders have variable degrees of central sensitisation (Phillips and Clauw, 2011; Schliessbach et al., 2013). This means that the brain is overly sensitised and this increases the size or intensity of pain due to presence of psychosocial factors. In a study by Giesbrecht and Battie, (2005), patients with chronic low back pain were found to have a low pain threshold to pressure in the sites related and unrelated to the lumbar spine compared to the volunteers without chronic low back pain. This suggests that there are more than biological changes in patients with chronic low back pain.

2.3 Stages of recovery for patients with low back pain

Patients with acute low back pain are expected to recover within the first three months after an episode of pain. In some cases, the symptoms persist and become chronic due to behaviour, psychosocial factors, and the degree of primary tissue injury (Hallegraeff et al., 2012; Katz and Seltzer, 2009; Stubbs et al., 2016). Patients with chronic low back pain are put on a long-term management without much progress (Pincus et al., 2006). Lack of adherence to the recommended treatment by the health care providers is found to be one of the contributing factors; this contributes to the economic burden on the patient`s family and healthcare system (Foster, 2011; Hoy et al., 2014).

2.4 Associated factors of chronic low back pain

There are a lot of factors that are associated with chronic low back pain (Stubbs et al., 2016). Many studies have found a strong association of chronic low back pain and psychosocial factors, which include anxiety, depression, and lack of sleep, work-related issues, stress sensitivity, negative outcome expectation, sleep disturbances and fear-avoidance behaviour (Dunn et al., 2013; Moore, 2010; Phillips and Clauw, 2011; Ramond et al., 2011; Schliessbach et al., 2013; Stubbs et al., 2016; Sullivan et al., 2001; Urquhart et al., 2008; Yang et al., 2016).

Patients' recovery expectations are associated with chronicity (Hallegraeff et al., 2012). Those with acute low back pain that have negative recovery expectations are more likely to develop chronic low back pain than those with positive expectations (Hallegraeff et al., 2012). Fortunately, patients' positive recovery expectations can be achieved by using an effective coaching strategy (Iles et al., 2014). Addressing both the peripheral and central elements of pain along with other somatic symptoms have shown to improve the management of chronic low back pain (Phillips and Clauw, 2011; Stilwell and Harman, 2017). These treatment approaches follow the biopsychosocial model, which needs to be considered in facilitating the optimum recovery of the patients with chronic low back pain.

2.5 Biomedical and biopsychosocial models

The biomedical model is an approach which some health care providers' use in managing patients. The model implies that pain is directly related to disability and the focus is to treat the tissue damage (Gatchel et al., 2007). This model which has been popular until late 90's, is associated with advice of bed rest and avoiding painful movements for a period of time (Colleary et al., 2017; Darlow et al., 2012). With an increase in the prevalence of chronic musculoskeletal pain, it was reported that this model was not effective in managing such cases (O'Sullivan, 2012). This led to research focusing on other factors that contribute to the chronicity of a condition.

The biopsychosocial model is another management approach where both illness and diseases are considered in the management of the patients with chronic pain (Gatchel et al.,

2007). Illness is defined as how the patient responds to the symptoms of a disease while disease is defined as tissue damage (Emson, 1987). The current clinical guidelines recommend the use of the biopsychosocial model over biomedical model in the management of chronic musculoskeletal pain (Pillastrini et al., 2012; van Tulder et al., 2006).

2.6 Therapists Attitudes and beliefs towards patients with chronic low back pain

Attitudes and beliefs of heath care providers affect the management of patients with chronic low back pain (Houben et al., 2005). The attitudes are either positive or negative and have a direct relationship with clinical recommendations to patients with chronic low back pain (Briggs et al., 2013). They are reported to be influenced by culture, knowledge of pain, experience, and work environment (Derghazarian and Simmonds, 2009; Ferreira et al., 2004; Magalhães et al., 2012; Simmonds et al., 2012; Sit et al., 2015). Therefore, to improve attitudes and beliefs of the health care providers, the factors mentioned above should be considered.

Alshami and Albahrani (2014) conducted a study to determine the attitudes and beliefs of second year - fourth year undergraduate physiotherapy students in Saudi Arabia and compared the results with the undergraduate physiotherapy students from Brazil and Australia. Saudi Arabian students had more negative attitudes and beliefs towards patients with chronic low back pain followed by Brazilian students and then Australian students. This difference could have been attributed by different in culture or curriculum.

A randomised control trial conducted among 72 undergraduate physiotherapy students in United Kingdom and Ireland universities aimed at finding the effect of pain education on knowledge, attitudes of the students (Magalhães et al., 2012). A Revised Pain Neurophysiology Quiz was used to assess the level of knowledge while Health Care Pain Attitudes and Impairment Relationship Scale (HC-PAIRS) was used to assess attitudes. The experiment group received a neurophysiology of pain education while the control group received a control pain education. Both courses run for 70 minutes. The results indicated an improvement in the attitudes for the experimental group as the level of neurophysiology of pain knowledge increased. This study shows the influence of knowledge on attitudes.

Education about knowledge of pain is effective in improving attitudes and beliefs towards patients with chronic low back pain (Colleary et al., 2017; Watt-Watson et al., 2004). Recommendations for modifying curriculi of the chronic low back pain content on undergraduate courses, and short courses for the qualified therapists were made (Domenech et al., 2011; Duke et al., 2013; F. et al., 2015).

2.7 Knowledge of the neurophysiology of pain

Educating patients about their pain is part of the treatment for chronic conditions (Adillón et al., 2015). Hence, health care providers are to understand the neurophysiology of pain in order to explain it to the patients (Adillón et al., 2015; Synnott et al., 2016). Recent studies have shown inadequate knowledge about chronic low back pain among undergraduate students and health care providers (Ali and Thomson., 2008; Al-Khawaldeh et al., 2013; Burnett et al., 2009; Clenzos et al., 2013; Kennedy et al., 2014; Ung et al., 2016). This varies among undergraduate students and also varies between health professions (Alshami and Albahrani, 2015; Ferreira et al., 2004; Kennedy et al., 2014). This difference could be because of different pain content in the curriculum used by different health science programmes in different countries (Colleary et al., 2017; Watt-Watson et al., 2004).

Al-Khawaldeh et al. (2013) conducted a survey among fourth year nursing students across three government universities in Jordan. The aim was to determine the level of knowledge regarding management of pain. Knowledge and Attitudes Survey Regarding Pain scale was used for data collection. The findings indicated that their overall level of knowledge was below average (34%). Another study done by Ali and Thomson (2008) was comparing the level of knowledge of chronic pain between final year undergraduate students of physiotherapy and medicine program. A chronic pain questionnaire was used which comprised of 16 questions. Despite an overall poor knowledge of pain in both programs of study, physiotherapy students had better knowledge about chronic pain compared to medical students. This indicate that the deficit in the knowledge of pain for the undergraduate final year students.

A cross-sectional study comparing the knowledge of pain among health science students across the years indicated that students in their final year of study had better knowledge of pain compared to first year students (Adillón et al., 2015). The knowledge about chronic low back pain among the undergraduate School of Therapeutic Science students at the University of the Witwatersrand is unknown. In this study it was hypothesised that the participants will have the knowledge of neurophysiology of pain as they are in their final year of study and would have learnt about the neurophysiology of pain.

2.8 Management of patients with chronic low back pain

There are a number of treatment protocols that have been tested and suggested for patients with chronic low back pain, yet no single treatment has been proven to yield permanent recovery (Pincus et al., 2006; Wand and O'Connell, 2008). Previously, patients were managed using the biomedical approach where heath care providers believed that pain justifies impairment. However, there was no progress with this approach (O'Sullivan, 2012).

Recent studies are recommending the use of the biopsychosocial approach which considers both the biological changes and the psychosocial aspects of a patient (Wijma et al., 2016). The assessment of the patient has to consider the psychosocial aspect in order to include them in the treatment plan (Figure 2.1). The biopsychosocial treatments include cognitive behaviour therapy, affective coaching, neurophysiology education and patient-led goal setting.

Patient-led goal setting is a new approach which has shown its effectiveness in the management of patients with chronic low back pain (Gardner et al., 2016). It is a form of the biopsychosocial approach, where patients set their treatment goals with guidance from their therapists and adhere to the treatment procedure over a period of 2 months (Gardner et al., 2016). Table 2.1 illustrates this intervention procedure.

Studies have been done to identify the orientation of treatment approach for chronic low back pain in relation to health care providers` attitudes and beliefs (Ruud M.A. Houben et al., 2005). It was found that health practitioners with less experience in their professions

are more oriented to the biomedical approach compared to the experienced practitioners (Magalhães et al., 2012). The health care providers` attitudes about chronic low back pain were found to shift more positively and were likely to use the biopsychosocial approach when they had undergone training on the knowledge of chronic low back pain (Morris et al., 2011; Synnott et al., 2016; Valenzuela-Pascual et al., 2015). Therefore, it is necessary to educate health care providers including the heath science students about these new treatment approaches.

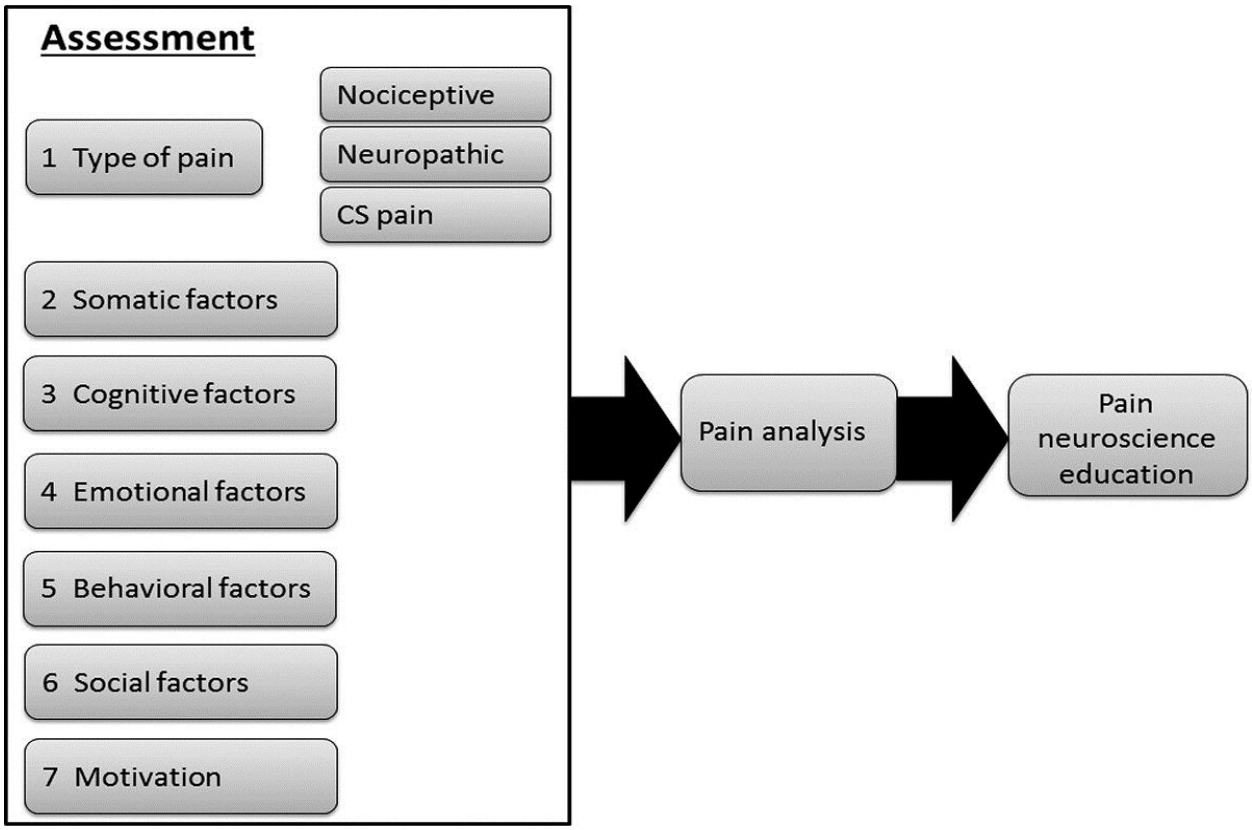


Figure 2.1 Biopsychosocial assessment (Wijma et al., 2016)**.**

Table 2.1 Patient led-goal setting intervention design (Gardner et al., 2016)**.**

Intervention	Measures
Session 1	
•Patient orientation	•QBPDS
•Consent	•SF36
•SMART approach explained	•DASS
•Goals and strategies determined	•PSEQ
Homework task: youtube video, read chronic pain section from participant handbook	•TAMPA
	•VAS
	•Treatment credibility
Session 2	
•Chronic pain model discussed	
•Review of goals, progress toward, and •barriers to achieving goals	
Strategies determined	
Sessions 3 and 4	
•Review of goals, progress toward, and barriers to achieving goals	
•Strategies	
•determined	
Session 5 (completion of intervention)	
•Review of goals, progress toward, and barriers to achieving goals	QBPDS
•Strategies	•SF36
•determined	•DASS
	•PSEQ
	•TAMPA
	•VAS
	•Treatment credibility
Monthly follow up (3 months)	
•Review of goals, progress toward, and barriers to achieving goals	
Monthly follow up (4 months)	
•Review of goals, progress towards, and barriers to achieving goals	•QBPDS
	•SF36
	•DASS
	•PSEQ
	•TAMPA
	•VAS
	•Treatment credibility

DASS indicates Depression anxiety stress scale; PSEQ, Pain self-efficacy questionnaire; QBPDS, Quebec back pain disability score; TAMPA, Tampa scale for kinesiophobia; VAS, visual analog scale.

2.9 Instrumentation

2.9.1 Attitudes and beliefs of chronic low back pain

There are a number of tools that have been established to capture quantitative data for attitudes and beliefs of qualified health care providers about patients with chronic low back pain. A systematic review done in 2007, identified five questionnaires, i.e. Attitudes to Back Pain Scale for musculoskeletal practitioners (ABS-mp), Fear of Avoidance Beliefs Questionnaire for Health Care Providers (FABQ for HCP), Pain Attitudes and Beliefs Scale for Physiotherapists (PABS.PT - biomedical and biopsychosocial), Back Beliefs Questionnaire (BBQ) and Health Care Providers` Pain and Impairment Relationship Scale (HC-PAIRS) (Bishop et al., 2007).

Over the past ten years, several questionnaires have also been established. However, none of them was developed specifically for health care undergraduate students. Hence, many studies that measured attitudes of students about patients with chronic low back pain employed the same tools that were used among qualified health care providers. Among these questionnaires, HC-PAIRS is used often among undergraduate students (Alshami and Albahrani, 2015; Briggs et al., 2013; Burnett et al., 2009; Colleary et al., 2017; Domenech et al., 2011; Ferreira et al., 2004; Latimer et al., 2004; Ryan et al., 2010). This could be because it has fewer questions and its reliability and validity are well established (Houben et al., 2004). HC-PAIRS was originally developed to measure the attitudes and beliefs towards patients with chronic low back pain among healthcare providers (Rainville et al., 1995). It has a reliability of $\alpha = 0.84$ and a validity ranging from $0.25 - 0.62$ (Houben et al., 2004; Rainville et al., 1995). Therefore, in this study, HC-PAIRS questionnaire was used to collect data for attitudes and beliefs of the undergraduate students about patients with chronic low back pain.

2.9.2 Knowledge of pain

Several tools have been developed to measure the level of knowledge of pain, i.e. Neurophysiology of Pain Questionnaire (NPQ), Knowledge and Attitudes Survey Regarding Pain' (KASRP), Pain Knowledge and Beliefs Questionnaire (PKBQ) (Ung et al., 2016). KASRP and PKBQ do not measure pain knowledge as a separate entity i.e. They

have both pharmacological and non-pharmacological questions. They have more than 35 questions and some of the questions include pain from conditions like cancer (Ung et al., 2016; Watt-Watson et al., 2004).

The Neurophysiology of Pain Questionnaire (NPQ) measures the conceptualisation of pain among health care providers. It was developed in 2003 (Adillón et al., 2015; Catley et al., 2013; Moseley, 2003) and has been widely used among undergraduate students, qualified health care providers and patients. It has two versions depending on the target population (Catley et al., 2013; Moseley, 2003). The first version has technical words and its reliability and validity was measured on health care providers; while the second version uses simple terms and it's used among patients. This questionnaire was revised in 2013, and its test – retest reliability ranges from ICC of 0.76 - 0.99 with internal consistence of 0.84 (Catley et al., 2013). In this study, the revised questionnaire was used to capture data.

2.10 Summary

This section discussed on different factors that might influence the attitudes of health professionals towards patients with chronic low back pain i.e. demographic details and knowledge of the neurophysiology of pain. The emphasis was made on the role of neurophysiology of pain knowledge in changing the attitudes and beliefs of students. It has also stated the changes that happen in the brain which facilitate the development of chronic pain in patients and its biopsychosocial implications.

CHAPTER 3. METHODOLOGY

In this chapter, procedures that took place in preparation of the study will be discussed in detail. The study design and study population are explained. The instruments used to collect data for this study are discussed. Ethical procedures are stated to ensure the integrity of the study and protection of participants' rights during the study.

3.1 Study design

The study was a quantitative, cross-sectional study. All the questionnaires collected quantitative data. It was a participatory study where all participants were invited.

3.2 Study population

Final year students of 2017 from the School of Therapeutic Sciences of the University of Witwatersrand were invited to participate in this study. There were a total of 224 final year students who were registered with the School of Therapeutic Sciences for 2017 academic year. These included 54 Physiotherapy students, 44 Occupational Therapy students, 26 Nursing students, 61 Pharmacy and Pharmacology students and 4 Exercise Science and Sports Medicine students and 35 Biokinetic students.

3.2.1 Inclusion criteria

- Those who consented to participate in the study and were registered as a final year student at the School of Therapeutic Sciences.

3.2.2 Exclusion criteria

- None

3.3 Variables

3.3.1 Independent variables

The independent variables were the demographic characteristics of the participants i.e. age, Gender, programme of study, present history of low back pain and past history of low back pain).

3.3.2 Dependent variables

The dependent variables were knowledge of the neurophysiology of pain, attitudes and beliefs towards patients with chronic low back pain.

3.4 Measuring tools

3.4.1 The Health Care Providers` Pain and Impairment Relationship Scale (HC-PAIRS)

Health Care Providers` Pain and Impairment Relationship Scale (HC-PAIRS) was used in this study to collect quantitative data on attitudes and beliefs towards patients with chronic low back pain (Appendix A). It contains 15 items, with each item, being rated on a 7-point Likert scale: 1 for completely disagree and 7 for completely agree. The scores range from 15-105 (Bishop et al., 2007; Rainville et al., 1995).The higher scores represent negative attitude and beliefs towards patients with chronic low back pain which indicate a stronger belief in the relationship between impairment and disability (Magalhães et al., 2012).

3.4.2 The Neurophysiology of Pain Questionnaire (NPQ)

The Neurophysiology of Pain Questionnaire (Appendix B) was developed to measure how an individual understands the mechanisms that underline pain (Adillón et al., 2015; Moseley, 2003). The revised version of this questionnaire has 12 items, with each item to be indicated as either true (T), or false (F) or undecided (U) (Catley et al., 2013). Correct responses were awarded 1 point, and incorrect or undecided responses were awarded 0 point. Therefore, the score ranges from 0-12. The higher the NPQ scores the better the understanding of the neurophysiology of pain.

3.4.3 Demographic questionnaire

Participants were asked to provide their demographic details which included age, Gender, programme of study, and current history of pain and previous history of pain (Appendix C). In the questionnaire, gender was replaced by sex to avoid students giving their perception about whether they are female or male.

3.5 Data collection procedure

During data collection, the researcher visited the participants' classrooms at a convenient time (ensuring not to interfere with their studies), to explain the purpose of the research and to invite them to take part in the study. Three self-administered questionnaires were given to the participants to complete in hard copy. The first questionnaire was capturing demographic details; the second questionnaire was NPQ, which measured the level of knowledge of the neurophysiology of pain; and the third questionnaire was the HC-PAIRS, which measured the attitudes and beliefs towards patients with chronic low back pain. The participants were invited to drop the completed questionnaires in a sealed box. The data collection was completed within a two month period.

3.6 Data management

Data obtained in this study was entered into Microsoft Office Excel where total scores for NPQ and HC-PAIRS for each participant were calculated. Data was then transferred into STATA IC version 14.1 program for analysis.

3.7 Data analysis

Data (Age, NPQ-scores and HC-PAIRS-scores) were normally distributes using Shapiro-Wilk test. Comparison of NPQ-score and HC-PAIRS-score between two groups (Gender: male and female, age: ≤ 22 and >22, with and without current history of low back pain, and with or without past history of low back pain) was done using two sided t-test. Analysis of variance (ANOVA) was used to compare mean scores across the programmes of study. Pare-wise correlation test was used to measure the correlation between NPQ-mean scores

and HC-PAIRES-mean scores. Tukey post-hoc test was used for ANOVA where a significant difference was observed.

Categorical data were summarised as proportions and percentages while mean [standard deviation (SD)] was used to summarise the continuous data. A bar chart and a pie chart were used to present the categorical data. The significance level was set at a two sided alpha level of 0.05. Where appropriate, 95% confidence intervals are presented. The median age was 22 years for this study population with an age range of 20 – 30 years. Three questionnaires did not indicate age; hence this information was ignored during data analysis.

The analysis was done with the help of the statistical team from the school of public health, at the University of the Witwatersrand. Table 3.1 presents a summary of the data analysis used in this study.

Table 3.1 Summary of data analysis

Objectives	Variables	Type of data	Test to use
To determine demographic profile of final year students from the School of Therapeutic science	Gender (male/female) Programme of study • (Physiotherapy, Occupational Therapy, Nursing, Pharmacy and Pharmacology, Exercise Science and Sports Medicine and Biokinetics) Age (years) Current history of pain (yes/no) Previous history of pain (yes/no)	Nominal Nominal Categorical Nominal Nominal	Frequency and percentage Frequency and percentage Shapiro-Wilk test (normally distributed) Frequency Frequency
To determine the knowledge of chronic low back pain among the final year students from the School of Therapeutic Sciences (using NPQ instrument).	Knowledge • Responses: (True/ False/Undecided) • Total score range 0-13	Interval	Mean(SD) Shapiro-Wilk test (normally distributed)
To determine the attitudes and beliefs of chronic low back pain amongst final year students from the School of Therapeutic Sciences (using HC-PAIRS questionnaire).	Attitude/beliefs • Likert scale of 1 to 7 • Total score range 15-105	Interval	Mean(SD) Shapiro-Wilk test (normally distributed)
To determine the correlation between knowledge of pain and attitude/beliefs of students towards patients chronic low back pain and their relationship with demographic details.	Knowledge Attitudes/beliefs Demographic determinants		Pare-wise correlation test (Pearson's test) ANOVA Two sided t-test

3.8 Ethical considerations

This study obtained ethical clearance from the University of the Witwatersrand`s Human Research Ethics Committee (clearance certificate number: M170615; Appendix D) before commencement. It was conducted in accordance with the principles of the 2013 declaration of Helsinki. The study received permission from the University Deputy Registrar (appendix E), the Head of the School of Therapeutic Sciences (Appendix F) and heads of the involved units (Appendix G).

Information sheets (Appendix H) were given to the participants, which informed them about their role and their rights in this study. The study population was informed that completing a questionnaire would mean giving consent. The demographic details did not include any identifiable information (i.e. names, physical address, mobile number, and email address or student number). Participants' responses were anonymous and were only used for this study's purpose. At the end of the project, a turnitin report was obtained to ensure that the work was not plagiarised (Appendix I).

CHAPTER 4. RESULTS

In Chapter 4, the results obtained from the questionnaires are explained in detail. These include demographic details of the participants, the scores from the questionnaires as well as the relationship between the demographic details, knowledge of the neurophysiology of pain and attitudes and beliefs towards patients with chronic low back pain.

4.1 Demographics characteristics

Demographic characteristics of the participants are summarised in Table 4.1 below. One hundred and forty five out of 224 final year students completed the questionnaires, which represents an overall 65% response rate. Knowledge of the neurophysiology of pain scores, age and attitudes and beliefs scores were normally distributed. The mean age was 22.6 (SD 1.4) years and there were more females than males representing 115 (79%) of the participants. For the history of back pain, 41 (28%) students were currently suffering from low back pain while 104 (72%) had a past history of low back pain.

Table 4.1 Demographic characteristics and history of low back pain amongst the study participants

Characteristics	n = 145	Percentage (%)
Age:		
≤ 22 years	79	54.5
> 22 years	66	45.5
Gender:		
Male	30	20.7
Female	115	79.3
Programme of study:		
Biokinetics	32	22.1
Exercise Science	4	2.8
Nursing	22	15.2
Occupational T	24	16.6
Pharmacy	29	20.0
Physiotherapy	34	23.5
Current history of low back pain:		
Yes	41	28.3
No	104	71.7
Past history of low back pain:		
Yes	104	71.7
No	41	28.3

Figure 4.1 illustrates the percentage of students represented in each programme of study. Majority of the participants were pursuing physiotherapy (n = 34, 23.5%) followed by biokinetics (n = 32, 22.1%) with exercise science having the lowest representation (n = 4, 2.8%).

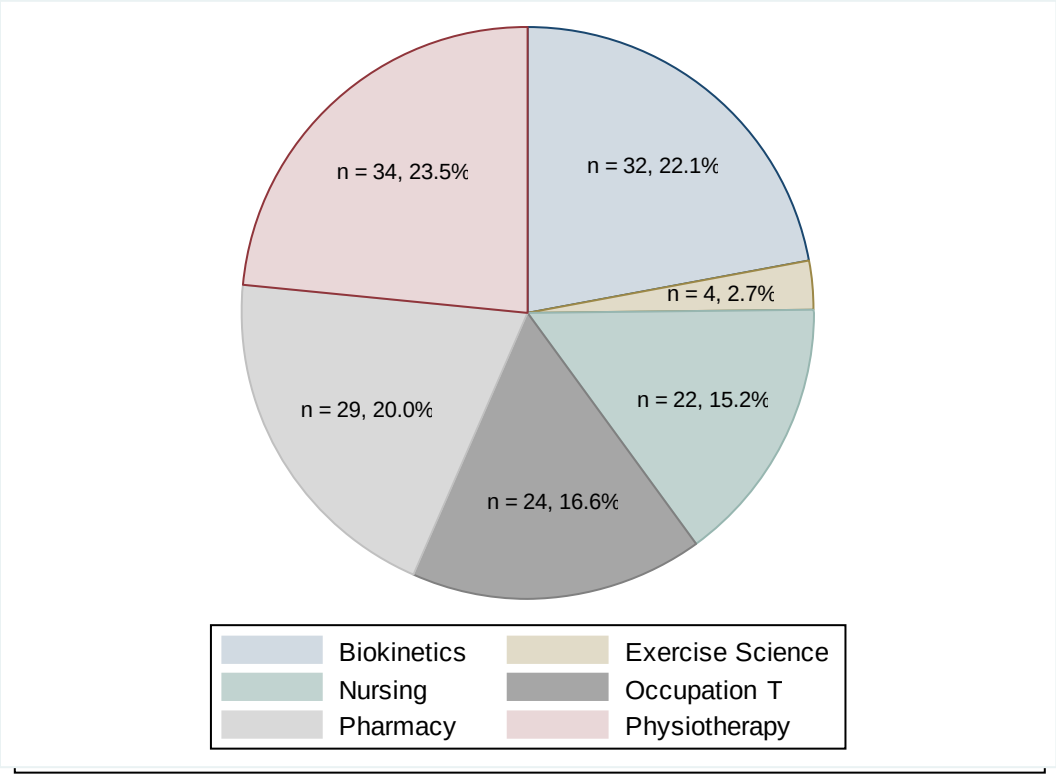


Figure 4.1 Programme of study

4.2 Students' Knowledge of the neurophysiology of pain; Neurophysiology of Pain Questionnaire (NPQ) - scores

The mean scores of knowledge of the neurophysiology of pain in relation to age, gender, programme of study and history of low back pain are summarised in Table 4.2. The overall NPQ-mean score was 50% indicated by 6.0(SD 1.9) out of 12. It was observed that some students (n = 7, 5%) got question two correct "When part of your body is injured, special pain receptors convey the pain message to your brain". This question deals with the conceptualisation of pain processes. Physiotherapy had the highest NPQ-mean score of 6.9(SD 1.8) while occupational students had the lowest mean score of 5.2(SD 2.09). There

was no significant difference in NPQ-mean score by age, current or past history of chronic low back pain (Table 4.2). Female students had significantly lower mean score on NPQ-questionnaire 5.8(SD 1.9) compared to male students 6.6(SD 1.8); (t-test, p = 0.05). NPQ-mean scores were significantly different across programme of study (ANOVA test, p = 0.005). Physiotherapy had a significantly higher NPQ-mean score than nursing (Tukey test, p = 0.02) and occupational therapy (Tukey test, p = 0.01).

Table 4.2 Neurophysiology of Pain Questionnaire (NPQ) mean scores

Characteristics	Number of participants (n = 145)	Percentage of participants (%)	NPQ- Score Mean(SD)	P-value
			Overall mean score: 6.0(1.9)	
Age:				0.3
≤ 22	79	54.5	5.9(2.2)	
> 22	66	45.5	6.2(1.7)	
Gender:				0.05
Male	30	20.7	6.6(1.8)	
Female	115	79.3	5.8(1.9)	
Programme of study:				0.01
Biokinetics	32	22.1	6.3(2.4)	
Exercise Science	4	2.8	6.3(2.5)	
Nursing	22	15.2	5.3(1.4)	
Occupational T	24	16.6	5.2(2.1)	
Pharmacy	29	20.0	5.7(1.4)	
Physiotherapy	34	23.5	6.9(1.8)	
Current history of low back pain:				0.8
Yes	41	28.3	5.1(2.2)	
No	104	71.7	5.9(1.9)	
Past history of low back pain:				0.6
Yes	104	71.7	5.9(2.1)	
No	41	28.3	6.2(1.8)	

The figure below shows scores of knowledge of the neurophysiology of pain (NPQ) by gender and programme of study. Male students had high NPQ scores while female students had low NPQ-scores. However, among the programmes, female physiotherapy students had a high NPQ-score while male physiotherapy students had low NPQ-scores. There were no male students in occupational therapy programme (Figure 4.2).

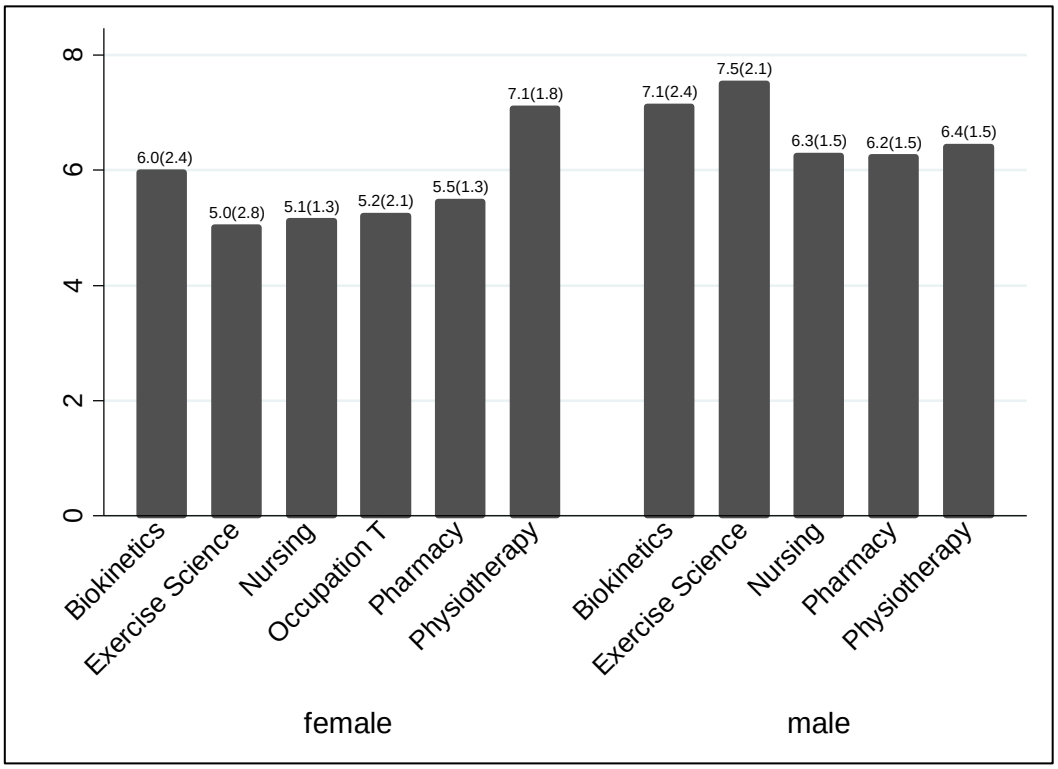


Figure 4.2 Neurophysiology of Pain (NPQ)-scores by gender and programme of study

4.3 Attitudes and beliefs towards patients with chronic low back pain: Health Care Providers` Pain and Impairment Relationship Scale (HC-PAIRS) scores

The mean score of attitudes and beliefs of students in relation to age, gender, programme of study and history of low back pain are summarised in Table 4.3. The overall HC-PAIRS-mean score is 63.1(SD 8.9) out of 105. There is a statistical difference in HC-PAIRS-mean score by gender (Table 4.3). Female students had significantly higher HC-PAIRS-mean score 63.9(SD 8.9) compared to male students

60.1(SD 8.7); (p = 0.04) (Table 4.3). There is no significance difference in HC-PAIRS mean scores by age, programme of study and history of low back pain.

Table 4.3 : Health Care Providers` Pain and Impairment Relationship Scale (HC-PAIRS) mean scores

Characteristics	**Number of participants n = 145**	**Percentage of partici-pants (%)**	**HC-PAIRS Score Mean(SD)**	**P-value**
			Overall mean score: 63.1(8.9)	
Age:				0.41
≤ 22	79	54.5	62.6(8.2)	
> 22	66	45.5	63.8(9.7)	
Gender:				0.04
Male	30	20.7	60.1(8.7)	
Female	115	79.3	63.9(8.9)	
Programme of study:				0.14
Biokinetics	32	22.1	60.4(6.6)	
Exercise Science	4	2.8	59.3(13.2)	
Nursing	22	15.2	63.9(10.8)	
Occupational T	24	16.6	65.6(10.2)	
Pharmacy	29	20.0	65.4(8.6)	
Physiotherapy	34	23.5	61.9(7.8)	
Current history of low back pain:				0.16
Yes	41	28.3	61.5(9.4)	
No	104	71.7	63.8(8.7)	
Past history of low back pain:				0.48
Yes	104	71.7	63.5(8.7)	
No	41	28.3	62.3(9.7)	

Figure 4.3 below shows scores of attitudes and beliefs towards patients with chronic low back pain by gender and programme of study. Female students of exercise science programme had a high HC-PAIRS mean scores 69.0(SD 0) while male students of exercise science programme have low HC-PAIRS mean scores 49.5(SD 12.0). However, these results should be used with caution considering the small percentage (2.8%) of exercise science participants.

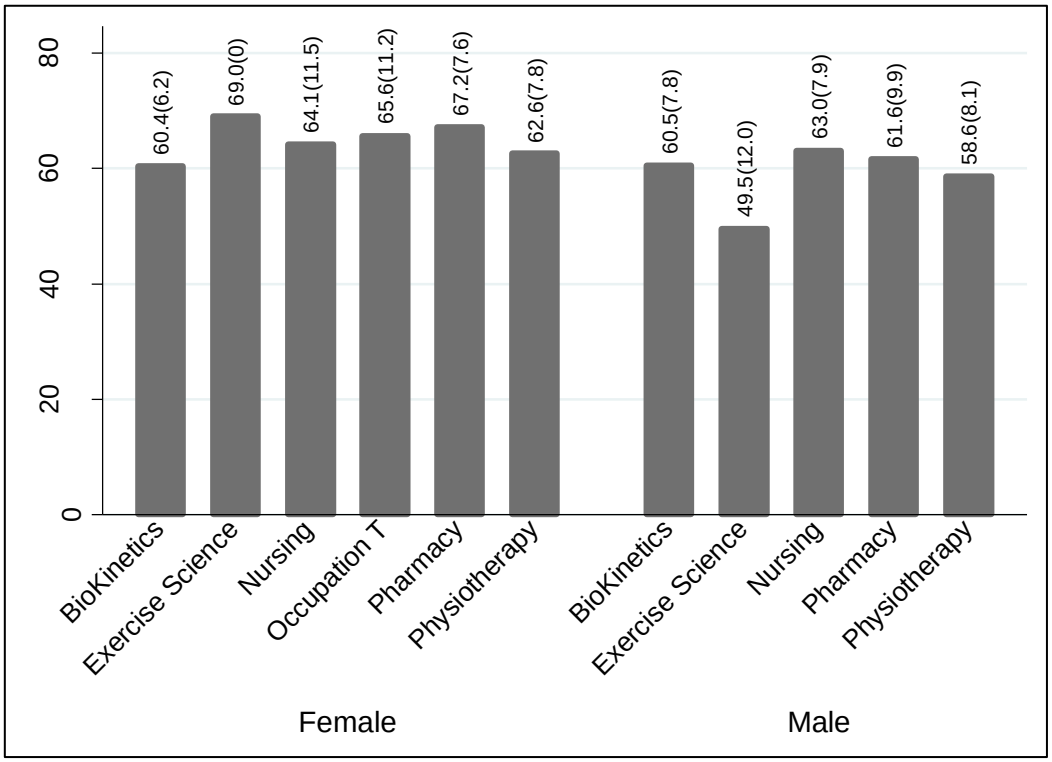


Figure 4.3 Health Care Providers` Pain and Impairment Relationship Scale (HC-PAIRS) mean scores by gender and programme of study

4.3.1 The relationship between the Neurophysiology of Pain Questionnaire (NPQ) and the Health Care Providers` Pain and Impairment Relationship Scale (HC-PAIRS)

Figure 4.4 shows a statistically significant inverse relationship between knowledge of neurophysiology of pain and attitudes and beliefs towards patients with chronic low back pain. An increase in HC-PAIRS-score was correlated with a decrease in NPQ-scores.

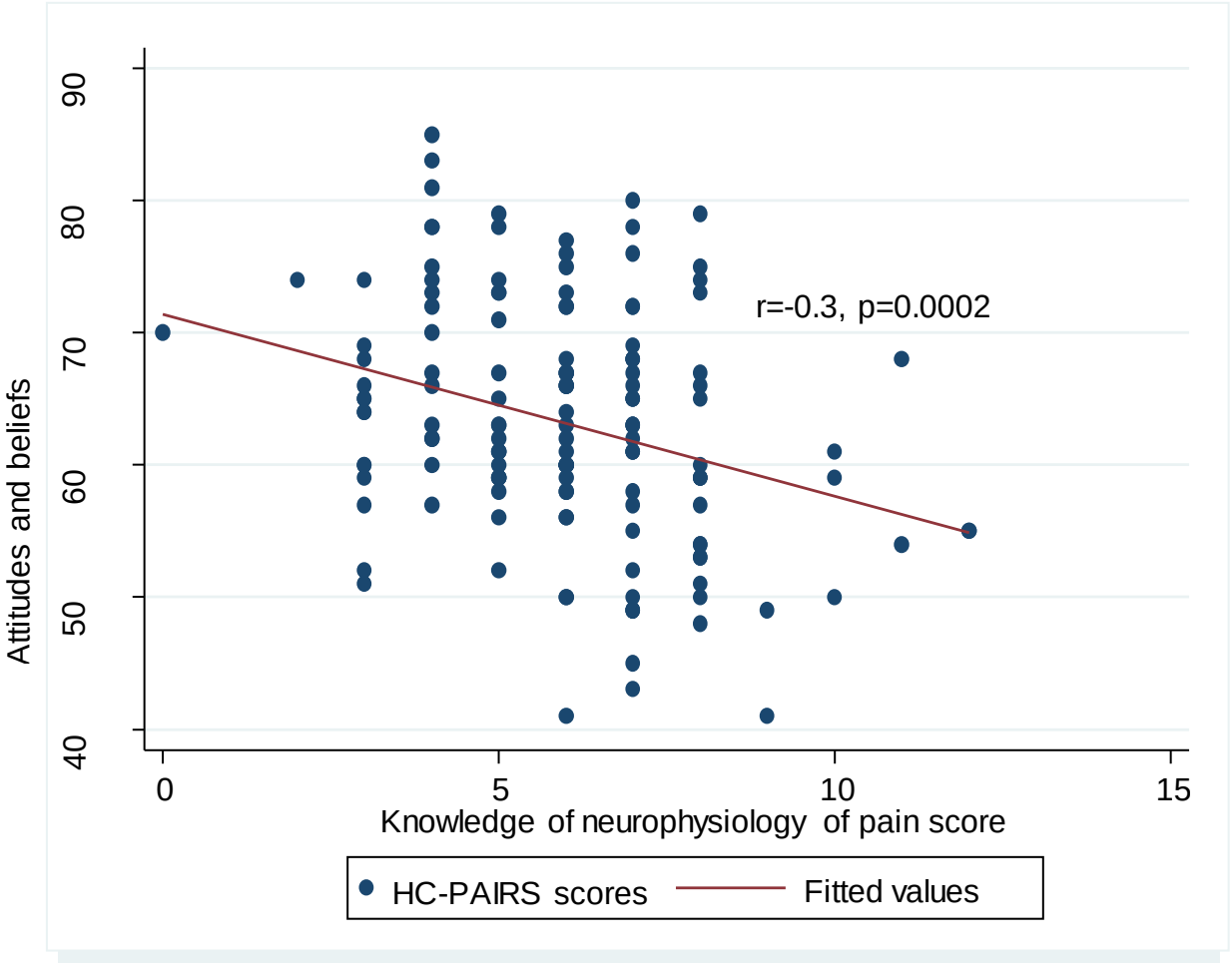


Figure 4.4 Neurophysiology of Pain (NPQ) & Health Care Providers` Pain and Impairment Relationship Scale (HC – PAIRS): Pair-wise correlation scatter plot

4.4 Summary

The study shows that there is an overall average knowledge of the neurophysiology of pain among the students. Gender and programme of study are significantly associated with the knowledge of the neurophysiology of pain among School of Therapeutic Science students. Gender had a significant relationship with attitudes and beliefs towards patients with chronic low back pain. Knowledge of the neurophysiology of pain has an inverse correlation with attitudes and beliefs towards patients with chronic low back pain.

CHAPTER 5. DISCUSSION

In this chapter, the results from this study are discussed in detail considering the four objectives in perspective to related studies.

5.1 Objective 1: demographic details

Majority of the participants were females n = 115 (79.3%). Many studies done on undergraduate health sciences students show that females dominate in terms of enrolment at the universities (Duke et al., 2013; Ferreira et al., 2004; Kennedy et al., 2014; Ryan et al., 2010). The studies have found that gender gap could be influenced by both cognitive and non-cognitive factors. The non-cognitive factors are admission policies which favour females; behaviour problems i.e. attention deficit hyperactivity disorder which are high in males than females, increase in the age at first marriage in females and an increase in the expectations of future labour force in females; while the cognitive factors include males performing poorly in class compared to female students leading to high late of dropping out of male students (Goldin et al., 2006; Jacob, 2002). However, it is not known whether these factors also apply to the students at the School of Therapeutic Sciences at the University of the Witwatersrand. Therefore, further studies are needed to elaborate these factors on this population.

In this study, there was 71% prevalence of past history of low back pain and 42% prevalence of the current history of low back pain (Table 4.1). Other studies, also report a high prevalence of low back pain in the fourth year of undergraduate course compared to junior years (Videman et al., 2005). In a study by Videman et al. (2005), nursing students had a low back pain prevalence increase from 34% to 82% at the end of their undergraduate course. However, this is contrary to what was found among other nursing students who were followed for a period of 20 months (Klaber Moffett et al., 1993). Low back pain prevalence in that study was high at 9 to 12 months of their course and dropped substantially thereafter. The increased prevalence of these two groups were associated with an increase in physical demands like lifting and transferring patients during clinical work (Nyland and Grimmer, 2003). Since the current study was done among the final year students who have had a clinical exposure, their physical demand could have increased

during their program of study and contributed to the increase in the prevalence of low back pain. However, more specific question i.e. previous history of low back pain occurred during the study at the University, would have helped to clarify whether the past history of low back pain occurred before or after they were enrolled in the various program of study.

5.2 Objective 2: Knowledge of the neurophysiology of pain

In this study, the final year undergraduate students got an overall NPQ-mean score of 6.0(SD 1.9) out of 12, which indicate an average knowledge of the neurophysiology of pain. However, undergraduate health science students are reported to have a better understanding neurophysiology of pain in their final year than in first year of study (Adillón et al., 2015). This is because final year students would have already learnt about the neurophysiology of pain during their programme of study. Adillón et al.(2015) conducted his study among 285 first and final year undergraduate students in order to determine their level of knowledge of the pain. The study used the neurophysiology of pain questionnaire for data collection. Although final year students showed higher percentage of the level of knowledge (58%) compared to first year students (42%), the author concluded that the students had a deficit in knowledge of pain.

Studies reports that new graduates and some experienced health care providers have poor knowledge of the neurophysiology of pain (Clenzos et al., 2013; Moseley, 2003; Strong et al., 1999). Clenzos et al. (2013) conducted with the aim of understanding the level of knowledge of pain among 207 South African physiotherapists. .This indicates that even after learning about pain, health care providers still have a deficit in their knowledge of the neurophysiology of pain. Therefore, reviewing the pain curricula content of health science programmes is vital.

In this study, there was a statistical difference of NPQ-mean scores across the programme of study. This indicates that, the knowledge of the neurophysiology of pain is different across different programmes of study. Physiotherapy students had significantly higher knowledge of the neurophysiology of pain than nursing and occupational therapy students. Adillón et al., (2015) and Ryan et al., (2010) found similar results when comparing

knowledge of the neurophysiology of pain among health science students, i.e. physiotherapy students were found to have greater knowledge of the neurophysiology of pain. In a systematic review by Ung et al., (2016), physiotherapy students also had better knowledge of the neurophysiology of pain, while nursing and medical students had generally poor knowledge of pain. Other studies report similar results (Strong et al., 1999; Ung et al., 2016). The difference in the scores could be due to difference in the curriculum content on the knowledge of the neurophysiology of pain for each programme and can be improve by either adding the neurophysiology of pain content or conducting an interdisciplinary pain education to all health science programmes (Colleary et al., 2017; Watt-Watson et al., 2004).

Studies found that the level of knowledge of the neurophysiology of pain is generally poor, when each programme of study is assessed individually (Alshami and Albahrani, 2015; Clenzos et al., 2013; Strong et al., 1999). Similar results were observed in a cross-sectional study done on South African physiotherapists (Clenzos et al., 2013). This deficit in knowledge is observed among physiotherapy, nursing, occupational therapy, medicine and pharmacy (Clenzos et al., 2013; Strong et al., 1999). Studies have not been done to assess the level of knowledge of the neurophysiology of pain of among biokinetics, and exercise science students.

5.3 Objective 3: Attitudes and beliefs towards patients with chronic low back pain

In this study, the students had relatively negative attitudes and beliefs towards patients with chronic low back pain. These results suggest that students from the School of Therapeutic Science strongly agree that pain justifies limitation to activity in patients with chronic low back pain, and are likely to give advice which follows biomedical approach, i.e. bed rest and avoiding painful movements (Briggs et al., 2013). In general, students pursuing health science courses have positive attitudes and beliefs towards patients with chronic low back pain on an HC-PAIRS questionnaire compared to non-health science students (Morris et al., 2012, 2011; Ryan et al., 2010). Across the course of a programme, senior year students have positive attitudes and beliefs than junior year students (Alshami and Albahrani, 2015; Burnett et al., 2009; Kennedy et al., 2014; Latimer et al., 2004; Morris et al., 2012; Ryan et al., 2010).

In this study, it was observed that occupational therapy students had slightly high HC-PAIRS-mean score while physiotherapy had a low HC-PAIRS-mean score; however the difference was not statistically significant. This shows that students from different Therapeutic Science programmes have relatively similar attitudes towards patients with chronic low back pain. This is contrary to the evidence that report different attitudes and beliefs across students from different health science programmes (Briggs et al., 2013; Burnett et al., 2009). This difference could be because the current study recruited students in their final year of the programme and all of them had been exposed to low back pain education while Burnett et al. (2009) recruited students from second year to final year in which a majority of the students would have not had the exposure to low back pain education and also not have attended clinical sessions where patients with chronic low back pain were managed. Although many studies report pharmacy students as having the most negative attitudes and beliefs towards patients chronic low back pain, it is not the same for this study (Briggs et al., 2013; Ryan et al., 2010). Other studies report different results where nursing students had the most negative attitudes and beliefs (Burnett et al., 2009).

5.4 Objective 4: Association between the demographic characteristics and the tools

5.4.1 Neurophysiology of Pain Questionnaire (NPQ) and demographics

In this study, age and history of low back pain had no association with knowledge of the neurophysiology of pain. Programme of study had a direct relationship with knowledge of the neurophysiology of pain which could be attributed to different low back pain curriculums among the programmes. Further study regarding the pain education would help to elaborate how much they differ and how they contribute to students attitudes towards patients with chronic low back pain. This concurs with another cross-sectional study done by Adillón et al. (2015) among health science students in Spain. Gender also had a direct relationship with knowledge of the neurophysiology of pain; where male students had significantly higher knowledge of the neurophysiology of pain compared to females. Although the proportion of male students in this study was small, their relationship with knowledge of the neurophysiology of pain is similar to the study by Adillón et al. (2015) where the number of male students(33%) were disproportion to that of female

students(67%). This may indicate that male students have a better understanding of pain concepts. However, the results should still be used with caution because this might not be a true representation of the male students' level of knowledge of pain since their proportion was small.

Studies report that knowledge of the neurophysiology of pain improves significantly after an exposure to pain education (Colleary et al., 2017; Domenech et al., 2011; Duke et al., 2013; Latimer et al., 2004; Morris et al., 2012). This shows that if pain knowledge content is revised for health science undergraduate curriculum, their NPQ scores may improve.

5.4.2 Health Care Providers` Pain and Impairment Relationship Scale (HC-PAIRS) and demographics

The findings of this study indicate that Therapeutic Science students have negative attitudes and beliefs towards patients with chronic low back pain. This is indicated by an overall high HC-PAIRS mean score of 63.1(8.9). The attitudes and beliefs of undergraduate health science students are reported to be more positive regarding patients with chronic low back pain than that of the non-health science students (Morris et al., 2012, 2011). However, studies done among health science students only, show that students from different programme of study had negative attitudes and beliefs of chronic pain (Briggs et al., 2013).

In this study, female students had the highest mean score on HC-PAIRS questionnaire compared to male students. This shows that, females have negative attitudes and beliefs towards patients with chronic low back pain compared to males. The results concur with other studies that report that gender have a direct relationship with attitudes and beliefs (Kennedy et al., 2014; Magalhães et al., 2012). However, another study did not find any significant difference between males and females (Ryan et al., 2010). There is still no consensus in evidence on whether females have negative attitudes towards patients with chronic low back pain (Kennedy et al., 2014; Magalhães et al., 2012). The results could be due to the difference in the different methodologies. Kennedy et al., (2014) conducted his study on Irish undergraduate students, had poor response rate and used BBQ and FABQ-

PA as outcome measures; while Magalhães et al., (2012) did his study on qualified Brazilian physiotherapists and used PABS-PT and HC-PAIRS as the outcome measures.

There was no significant difference in HC-PAIRS-mean score by history of low back. Current and previous history of low back pain are reported to have no effect on attitudes and beliefs of the Brazilian physiotherapy students (Ferreira et al., 2004; Latimer et al., 2004). This is contrary to what Jesus. et al., (2015) found, where history of pain of physiotherapy students were significantly associated with their attitudes and beliefs. This could be because Jesus conducted the study on students who have never been exposed to low back pain teaching and had never managed a patient with low back pain. This suggest that, students with a history of low back pain and have never received education about low back pain are prone to having negative attitudes and beliefs about patients with chronic low back pain. The role of education about low back pain cannot be underestimated in changing attitudes and beliefs of students.

5.4.3 Neurophysiology of Pain Questionnaire (NPQ) and Health Care Providers` Pain and Impairment Relationship Scale (HC-PAIRS)

This study found a correlation between knowledge of the neurophysiology of pain and attitudes and beliefs towards patients with chronic low back pain. In a study by Colleary et al., (2017), it was reported that an increase in the knowledge of the neurophysiology of pain improved the attitudes and beliefs towards patients with chronic low back pain among physiotherapy students after going through training. In another study, physiotherapy students were assigned to receive either biomedical training or biopsychosocial training in-order to observe their effect on attitudes and beliefs towards patients (Domenech et al., 2011). Those that received biopsychosocial training improved their attitudes towards patients. Education about the neurophysiology of pain cannot be underestimated in changing the attitudes and beliefs of students towards patients with chronic low back pain.

5.5 Summary

The literature supports the findings that undergraduate students still have a deficit in the knowledge of the neurophysiology of pain which correlate with their attitudes and beliefs towards patients with chronic low back pain. Improving knowledge of pain could be used to improve the attitudes and beliefs of the undergraduate students.

CHAPTER 6. CONCLUSION

6.1 Main findings

This study has shown that the School of Therapeutic Sciences is largely dominated by female students. They have an average level of knowledge of the neurophysiology of pain and relatively negative attitudes towards patients with chronic low back pain.

Knowledge of the neurophysiology of pain changed significantly across programme of study. Physiotherapy students had a high NPQ-mean score while occupational therapy students had a low NPQ-mean score. There was also a difference in NPQ-mean scores by gender. Female students had poor knowledge of the neurophysiology of pain compared to males.

The level of knowledge about the neurophysiology of pain was found to be associated with the attitudes and beliefs towards patients with chronic low back pain. Hence, improving knowledge about pain may also improve attitudes and beliefs towards patients with chronic low back pain which could help to employ the biopsychosocial approach during their clinical practices.

As much as the management recommendations for chronic low back pain are shifting from the biomedical approach to the biopsychosocial approach, the final year students at the School of Therapeutics Sciences at the University of the Witwatersrand have negative attitudes and beliefs towards patients with low back pain. This indicates that they are more likely to give advices which favour the biomedical approach.

6.2 Implications of the study

This study shows that undergraduate final year students of the Therapeutic Sciences at the University of the Witwatersrand have negative attitudes and beliefs towards patients with chronic low back pain. This implies that they strongly believe the relationship between impairment and disability and that their management to patients with chronic low back pain is likely to follow biomedical approach.

The results of the study also show an association between knowledge of pain and attitudes and beliefs of students towards patients with chronic low back pain. Therefore, changing the attitudes of students would require improving their knowledge of pain by updating their curriculi for chronic pain content with the current management recommendations. Different health science programmes showed different levels of knowledge of pain. This could also be dealt with by conducting an interdisciplinary neurophysiology of pain education to all health science programmes.

6.3 Strengths

The response rate was high (65%) in this study compared to studies done by Adillón et al., (2015) and Kennedy et al., (2014) who found 51% and 29% respectively. This is the first study to include students from biokinetics and exercise science programmes in order to determine their level of knowledge of pain and their attitudes and beliefs towards patients with chronic low back pain. This study has never been done in South Africa.

6.4 Limitations

This study used HC-PAIRS questionnaire to assess the level of attitudes and beliefs towards patients with chronic low back pain. Its validity and reliability have been confirmed among health professionals, but not established among students. This questionnaire does not have a definition of the actual scores that represent negative or positive attitudes towards patients with chronic low back pain. Therefore, in this study, the interpretations of attitudes were made based on the available evidence. Additionally, being a cross-sectional study, the interpretations of results were limited in terms of association between variables. There may be other demographic details that were not captured in the demographic questionnaire, which could influence the level of knowledge, attitudes and beliefs towards patients with chronic low back pain i.e. personality type and socioeconomic status of the students.

6.5 Recommendations for future research

Further studies should focus on research in the following areas:

- Comparing the curriculum content of the physiology of pain for different undergraduate health science programmes with the possibility of updating the curriculum where applicable.
- Establishing validity and reliability of HC-PAIRS questionnaire among the students.
- Establishing a clear definition on the scores that represent positive and negative attitudes on HC-PAIRS questionnaire.
- Developing other tools that can assess attitudes and beliefs towards patients with chronic low back pain among students.
- Determining if other demographic characteristics i.e. personality type, socioeconomic status and previous clinical experience could be contributing factors to the level of attitudes and beliefs towards patients with chronic low back pain.
- To determine if there is a bidirectional relationship between knowledge, attitudes and beliefs about patients with chronic low back pain.

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APPENDICES

Appendix A: Health Care Providers` Pain and Impairment Relationship Scale (HC-PAIRS)

Please rate how you feel about the following statements by **circling** on the scale below each question which corresponds to your belief about each statement(Rainville et al., 1995).

	Completely Disagree	Disagree	Disagree somewhat	Neutral	Agree somewhat	Agree	Completely agree
1. Chronic back pain patients can still be expected to fulfil work and family responsibilities despite pain.	1	2	3	4	5	6	7
2. An increase in pain is an indicator that a chronic back pain patient should stop what he is doing until the pain decreases.	1	2	3	4	5	6	7
3. Chronic back pain patients cannot go about normal life activities when they are in pain.	1	2	3	4	5	6	7
4. If their pain would go away, chronic back pain patients' would be every bit as active as they used to be.	1	2	3	4	5	6	7
5. Chronic back pain patients should have the same benefits as the handicapped because of their chronic pain problem.	1	2	3	4	5	6	7
6. Chronic back pain patients owe it to themselves and those around them to perform their usual activities even when their pain is bad.	1	2	3	4	5	6	7

7. Most people expect too much of chronic back pain patients, given their pain.	1	2	3	4	5	6	7
8. Chronic back pain patients have to be careful not to do anything that might make their pain worse	1	2	3	4	5	6	7
9. As long as they are in pain, chronic back pain patients will never be able to live as well as they did before.	1	2	3	4	5	6	7
10. When their pain gets worse, chronic back pain patients find it very hard to concentrate on anything else.	1	2	3	4	5	6	7
11. Chronic back pain patients have to accept that they are disabled persons, due to their chronic pain.	1	2	3	4	5	6	7
12. There is no way that chronic back pain patients can return to doing the things that they used to do unless they first find a cure for their pain.	1	2	3	4	5	6	7
13. Chronic back pain patients find themselves frequently thinking about their pain and what it has done to their lives.	1	2	3	4	5	6	7
14. Even though their pain is always there, chronic back pain patients often don't notice it at all when they are keeping themselves busy.	1	2	3	4	5	6	7
15. All of chronic back pain patients' problems would be solved if their pain would go away.	1	2	3	4	5	6	7

Appendix B: Neurophysiology of Pain Questionnaire (NPQ)

Please state (√) whether the following statements are T, true; F, false; or U, undecided

ITEM		T	F	U
1	When part of your body is injured, special pain receptors convey the pain message to your brain			
2	Pain only occurs when you are injured.			
3	The timing and intensity of pain matches the timing and number of signals in nociceptors.			
4	In chronic pain, the central nervous system becomes more sensitive to nociception.			
5	The brain decides when you will experience pain			
6	Nerves adapt by increasing their resting level of excitement			
7	Chronic pain means that an injury hasn't healed properly			
8	Worse injuries always result in worse pain.			
9	Second-order nociceptor post-synaptic membrane potential is dependent on descending modulation.			
10	When you are injured, the environment that you are in will not have an effect on the amount of pain you experience.			
11	It is possible to have pain and not know about it.			
12	When you are injured, chemicals in your tissue can make nerves more sensitive			

Abbreviations: T, true; F, false; U, undecided

Appendix C: Demographic details

Please complete the following

☐ Age:

Tick the option that best describes you (√)

Sex: Male ☐

Female ☐

Programme of study

a) Physiotherapy ☐

b) Pharmacy ☐

c) Occupational therapy ☐

d) Nursing ☐

e) Exercise science and sport medicine ☐

Current history of low back pain: Yes ☐

No ☐

Previous history of low back pain: Yes ☐

No ☐

Appendix D: Ethical clearance letter

R14/49 Miss Grace Mukoka

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M170615

NAME: (Principal Investigator)	Miss Grace Mukoka
DEPARTMENT:	Physiotherapy Wits School of Therapeutic Sciences
PROJECT TITLE:	Knowledge, Attitudes and Beliefs about Chronic Low Back Pain among Fourth-Year School of Therapeutic Science students at the University of Witwatersrand - a Cross-Sectional Descriptive Study
DATE CONSIDERED:	30/06/2017
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Prof Benita Olivier and Mrs Sadiya Ravat
APPROVED BY:	Professor P. Cleaton-Jones Chairperson, HREC (Medical)
DATE OF APPROVAL:	21/08/2017

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004,10th floor, Senate House/3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/We fully understand the conditions under which I am/we are authorised to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in June and will therefore be due in the month of June each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

Date 2017/08/24

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix E: Permission Letter from the University Deputy Registrar

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

OFFICE OF THE DEPUTY REGISTRAR

17 August 2017

Ms G Mukoka
Student number 1622481

TO WHOM IT MAY CONCERN

"Knowledge, attitude and beliefs about chronic low back pain among final-year school of Therapeutic Science students at the University of the Witwatersrand-A cross sectional study"

This letter serves to confirm that the above project has received permission to be conducted on University premises, and/or involving staff and/or students of the University as research participants. In undertaking this research, you agree to abide by all University regulations for conducting research on campus and to respect participants' rights to withdraw from participation at any time.

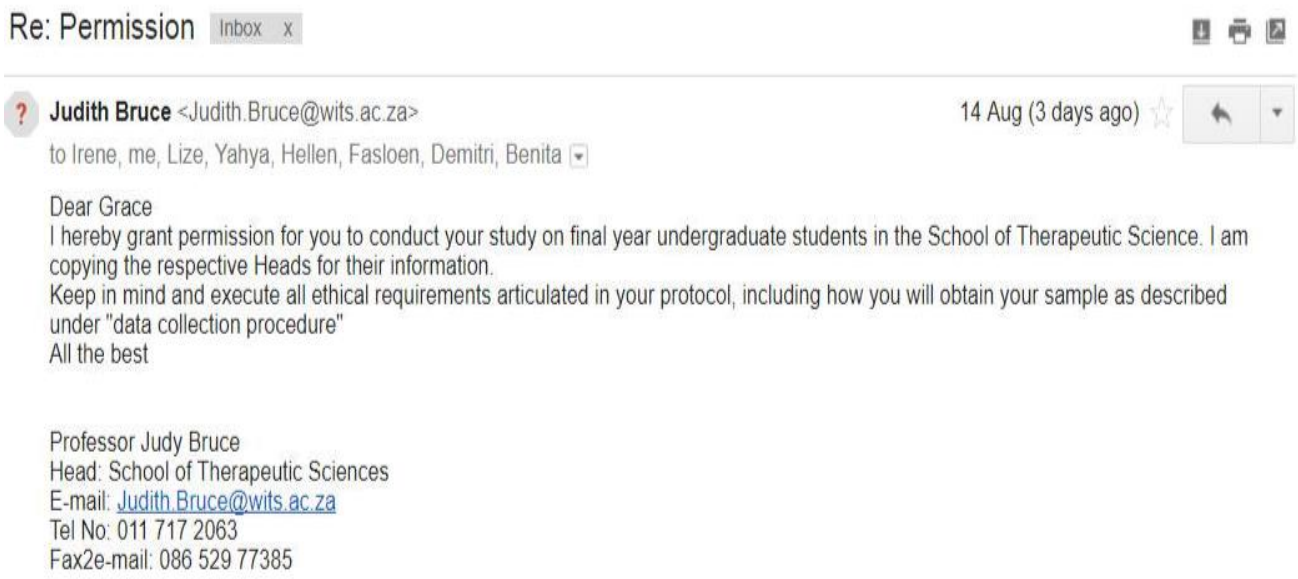
If you are conducting research on certain student cohorts, year groups, courses or with academic staff within specific Schools and within the teaching term, permission must be sought from Heads of School or individual academics.

Research can only commence once final ethical clearance has been obtained. Please provide us with a copy of the ethics certificate.

Nicoleen Potgieter
Deputy Registrar

Private Bag 3, Wits, 2050, South Africa | T +27 11 717 1284/8 | F +27 86 553 2271 | www.wits.ac.za

Appendix F: Permission letter from the head of the School of Therapeutic Sciences



Re: Permission Inbox x

Judith Bruce <Judith.Bruce@wits.ac.za> 14 Aug (3 days ago)

to Irene, me, Lize, Yahya, Hellen, Fasloen, Demitri, Benita

Dear Grace
I hereby grant permission for you to conduct your study on final year undergraduate students in the School of Therapeutic Science. I am copying the respective Heads for their information.
Keep in mind and execute all ethical requirements articulated in your protocol, including how you will obtain your sample as described under "data collection procedure"
All the best

Professor Judy Bruce
Head: School of Therapeutic Sciences
E-mail: Judith.Bruce@wits.ac.za
Tel No: 011 717 2063
Fax2e-mail: 086 529 77385

Appendix G: Permission letters from the Head of Departments involved in the study

PERMISSION TO CONDUCT A STUDY AMONG FINAL-YEAR SCHOOL OF THERAPEUTIC SCIENCE STUDENTS AT THE UNIVERSITY OF WITWATERSRAND

Dear Grace

I hereby support your request.

Wishing you every success with your studies

Professor JE Maree



Fasloen Adams <Fasloen.Adams@wits.ac.za> 16 Aug (1 day ago)

to me, Sadiya, Benita

Dear Grace,

I hereby give permission for you to conduct this research project with our students as participants.

However, it might be difficult, as our students are not really on campus often and we will struggle to find an additional thirty minutes in the program to spare. Would you consider an electronic distribution?
I would also recommend that this has to be done before the last week of fieldwork, before the examination period starts.
Regards,

Fasloen Adams

Dr. Fasloen Adams
Head of Department
e-mail: fasloen.adams@wits.ac.za
tel: +27 (0)11 717 3703/1

Department of Occupational

FACULTY OF

Re: Permission Inbox x

Judith Bruce <Judith.Bruce@wits.ac.za> 14 Aug (3 days ago)

to Irene, me, Lize, Yahya, Hellen, Fasloen, Demitri, Benita

Dear Grace
I hereby grant permission for you to conduct your study on final year undergraduate students in the School of Therapeutic Science. I am copying the respective Heads for their information.
Keep in mind and execute all ethical requirements articulated in your protocol, including how you will obtain your sample as described under "data collection procedure"
All the best

Professor Judy Bruce
Head: School of Therapeutic Sciences
E-mail: Judith.Bruce@wits.ac.za
Tel No: 011 717 2063
Fax2e-mail: 086 529 77385

Yahya Choonara <Yahya.Choonara@wits.ac.za> 4 Aug (13 days ago)

to Lisa, me, Benita, Sadiya

Dear Grace

Thank you for your email. Permission is hereby granted based on the approved protocol.

You may contact Prof. Lisa du Toit who is our 4th year coordinator.

Good luck and please share the results/conclusion of this interesting study with us.

Yahya

With Best Regards, *Yahya*

Prof. Yahya E. Choonara
Chairman and Head | Pharmacy and Pharmacology
Senior Scientist and Manager | Wits Advanced Drug Delivery Platform (WADDP)
University of the Witwatersrand
7 York Road, Parktown 2193
Johannesburg, South Africa
Tel: +27-11-717-2499
Fax2email: +27-86-553-4744
Email: yahya.choonara@wits.ac.za

Seeking permission to conduct a study among final-year Physiotherapy students Inbox x

Grace Mukoka To: The Head of Physiotherapy Department Seeki... 4 Aug (13 days ago)

Hellen Myezwa <Hellen.Myezwa@wits.ac.za> 15 Aug (2 days ago)

to me, Benita, Sadiya

Dear Grace

Permission is granted . I wish you well in your study.

Prof Myezwa

Demitri Constantinou <Demitri.Constantinou@wits.ac.za> 14 Aug (3 days ago)

to me, Benita, Sadiya

Dear Grace

Thank you for the email and the information. I am happy that you may approach our Honours Biokinetics students to be invited to participate in your study.
Best of luck and best regards

Prof Demitri Constantinou
Adjunct Professor: Sport and Exercise Medicine
Director: Centre for Exercise Science and Sports Medicine
e-mail: demitri.constantinou@wits.ac.za
tel: +27 (0)11 717-3372
fax:+27 (0)11 717 3379/+27 (0)86 6363 173
address: Wits Education Campus,
27 St Andrew's Road, Parktown,
Johannesburg, South Africa.

Centre for Exercise Science and Sports Medicine
School of Therapeutic Science | Faculty of Health Science

Appendix H: Information sheet

Title of the study: Knowledge, attitude and beliefs about chronic low back pain among final year school of Therapeutic Science students at the University of the Witwatersrand-A cross sectional study.

Dear Participant

My name is Grace Mukoka. I am a master`s student in physiotherapy at the School of Therapeutic Science, University of the Witwatersrand. I am currently conducting a study on the above-mentioned title and I would like to invite you to participate in this study. This information sheet will help you understand the purpose of the study, the procedure, benefits, risks and your rights in this study. It is recommended that you read and understand the provided information before deciding to participate in this study.

The purpose of this study is to understand the level of knowledge, attitudes and beliefs about chronic low back pain among Therapeutic Science students at the University of the Witwatersrand. In this study attitude is a feeling or opinion about something or someone, or a way of behaving while belief is the feeling of being certain that something is true.

The final year students from the school of Therapeutic Sciences are potential participants in this study. Participants will be required to fill two questionnaires and the demographic details, which will take a maximum of 20 minutes. The participants will be invited to put the completed questionnaires into a sealed box. Completion of the questionnaire indicates consent and incomplete or blank questionnaire would indicate the reluctance to participate.

Please note that participation is voluntary and you have the right to withdraw at any time. All information from the participants will be anonymous and to be used for this study purpose only. There are no physical or psychological risks involved in this study and there are no incentives given for participating in this study.

For further enquiries, please contact the researcher on mobile number: 0832434220; email address: 1622481@students.wits.ac.za and questions concerning ethics of the

research should be forwarded to the Chairperson of the ethics committee Prof P Cleaton Jones; Tel: 011-717-2700; email address: peter.cleaton-jones1@wits.ac.za.

Thank you very much for your time

Grace Mukoka

Appendix I: Turnitin report

KNOWLEDGE, ATTITUDES AND BELIEFS ABOUT PATIENTS WITH CHRONIC LOW BACK PAIN AMONG FINAL YEAR SCHOOL OF THERAPEUTIC SCIENCES STUDENTS AT THE UNIVERSITY OF THE WITWATERSRAND

ORIGINALITY REPORT

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SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

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5	Bishop, A.. "Health care practitioners' attitudes and beliefs about low back pain: A systematic search and critical review of available measurement tools", Pain, 200711 Publication	1%
6	Sanja Totic, Dragan Stojiljković, Zorana Pavlovic, Nenad Zaric et al. "Stigmatization of 'psychiatric label' by medical and non-medical students", International Journal of Social Psychiatry, 2011 Publication	<1%
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	The Clinical Journal of Pain, 01/2004 Publication	
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11	schuerer-hoffmann.de Internet Source	<1 %
12	Fischbein, Rebecca, Kenelm McCormick, Brian A. Selius, Susan Labuda Schrop, Michael Hewit, Kristin Baughman, and James Meeker. "The assessment and treatment of back and neck pain: an initial investigation in a primary care practice-based research network", Primary Health Care Research & Development, 2014. Publication	<1 %
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67	Magalhães, Mauricio O., Leonardo O. P. Costa, Cristina M. N. Cabral, and Luciana A. C. Machado. "Attitudes and beliefs of Brazilian physical therapists about chronic low back pain: a cross-sectional study", Brazilian Journal of Physical Therapy, 2012.	<1 %

Publication

68	Monticone, Marco, Simona Ferrante, Barbara Rocca, Paola Baiardi, Fulvio Dal Farra, and Calogero Foti. "Effect of a Long-lasting Multidisciplinary Program on Disability and Fear-Avoidance Behaviors in Patients With Chronic Low Back Pain : Results of a Randomized Controlled Trial", Clinical Journal of Pain, 2013. Publication	<1 %
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