



**Identification and management of yellow flags in chronic
low back pain by Chiropractic Master's students at a
University of Technology teaching clinic**

By

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Technology in Chiropractic in the Faculty of Health Sciences at the Durban University
of Technology

I, Shameez Egumbo, do 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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ABSTRACT

BACKGROUND

Chronic low back pain (CLBP) is one of the leading causes of disability worldwide, preventing many people from performing day to day tasks. Low back pain is the third most common reason for visits to the doctors, right after skin disorders and osteoarthritis. Even though doctors of chiropractic treat more than just back pain, many patients initially visit a chiropractor looking for relief from this pervasive condition. Yellow flags are psychosocial issues that can be indicative of long-term chronicity in low back pain. It is therefore appropriate for chiropractors to know how to manage yellow flags in patients with low back pain, since the two are related. The aim of this study, therefore, is to investigate the identification, knowledge, and the management of yellow flags at teaching clinic by chiropractic master's students.

AIM AND OBJECTIVES OF THE STUDY

The aim of the study was to explore and describe the identification and management of yellow flags in chronic low back pain by chiropractic master's students at a university of technology teaching clinic.

METHODOLOGY

A qualitative, exploratory, descriptive study was conducted. Master's degree chiropractic students, who had been clinically active for five months and treated a minimum of five low back pain patients were interviewed to establish their identification and management of yellow flags in CLBP. Semi-structured interviews were conducted in English, which were then transcribed to a Microsoft Word document. The transcripts were analysed using Tsech's eight steps of thematic analysis to establish the themes, categories and codes.

RESULTS AND DISCUSSION

This qualitative, descriptive study explored 10 chiropractic master's students' identification and management of yellow flags in their chronic low back pain patients. It was found that the chiropractic master's students had limited understanding of

psychosocial factors. Their lack of information and clinical expertise lead to uncertainty pertaining to the identification, assessment and management of yellow flags. The participants acknowledged their shortcomings and suggested numerous limitations to the integration of psychosocial assessments as part of routine practice. The lack of formal education in the theory, assessment and management was the most frequently cited barrier among those raised by the participants.

The review of the chiropractic curricula was outside the purview of this study. Nevertheless, considering the comparable findings reported in the literature further supported this, it may suggest a need for chiropractic education of yellow flag assessment and management to be reviewed and strengthened.

CONCLUSIONS

This is the first South African study that had been conducted on registered master's degree chiropractic students' identification and management of yellow flags in chronic low back pain. This study will add to the existing literature and enable other registered master's degree students and new graduate chiropractors to have a better understanding of the of the management of yellow flag patients.

Key words: yellow flags; psychosocial risk factors, chiropractic students, clinical practicum, chronic low back pain

DEDICATION

I dedicate this study to my mother and role model, Monika Johannes, for always believing in me and breathing life into my dreams. I am eternally grateful for all that you have done to get me here, and all that you still do to ensure that I am able to live out my dreams.

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GLOSSARY OF TERMS

Chronic low back pain: Chronic back pain is defined as pain that continues for 12 weeks or longer, even after an initial injury or underlying cause of acute low back pain has been treated (Back Pain Fact Sheet 2020).

Yellow flags: “Kendall and colleagues coined the term “yellow flags” to encompass psychological risk factors and social and environmental risk factors for prolonged disability and failure to return to work as a consequence of musculoskeletal symptoms” (Nicholas 2018).

Chiropractic: “Chiropractic is a healthcare profession that cares for a patient’s neuromusculoskeletal system — the bones, nerves, muscles, tendons, and ligaments. A chiropractor helps manage back and neck pain through the use of spinal adjustments to maintain good alignment” (Brennan 2021).

Clinical practicum: According to Merriam-Webster, it is the course of study designed especially for the preparation of teachers and clinicians that involves the supervised practical application of previously studied theory.

Biomedical model: “The biomedical model of health focuses on purely biological factors and excludes psychological, environmental, and social influences. It is considered to be the leading modern way for health care professionals to diagnose and treat a condition in most Western countries” (Porter 1999).

Biopsychosocial model: “An interdisciplinary model that looks at the interconnection between biology, psychology, and socio-environmental factors. The model specifically examines how these aspects play a role in topics ranging from health and disease models to human development. This model was developed by George L. Engel in 1977 and is the first of its kind to employ this type of multifaceted thinking” (Engel 1977).

ABBREVIATIONS AND ACRONYMS

| | |
|------|-------------------------------------|
| AIDS | Acquired immune deficiency syndrome |
| ALBP | Acute low back pain |
| BMI | Body mass index |
| CDC | Chiropractic Day Clinic |
| CLBP | Chronic low back pain |
| DUT | Durban University of Technology |
| GP | General practitioner |
| HIV | Human immunodeficiency virus |
| KZN | KwaZulu-Natal |
| PT | Physiotherapist |
| LBP | Low back pain |
| SA | South Africa |
| WHO | World Health Organization |

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION AND BACKGROUND OF THE STUDY

Low back pain (LBP) is a leading cause of disability (Wu *et al.* 2020). It occurs to similar extent in all cultures, interferes with quality of life and work performance, and is the most common reason for medical consultations (Wu *et al.* 2020). Among all chronic pain problems and spinal pain conditions, LBP is the most common clinical and public health problem (Wong 2017). The aetiology of LBP varies: few cases of LBP are due to specific aetiologies, but most cases are non-specific (Samini *et al.* 2014). Acute back pain is the most common presentation and is usually self-limiting, lasting less than three months regardless of treatment (Hall and Mcintosh 2011). Chronic back pain is defined as pain that persists for 12 weeks or longer, even after an initial injury or underlying cause of acute LBP has been treated (Hall and Mcintosh 2011). According to the National Institute of Health, about 20% of people affected by acute LPB develop chronic low back pain (CLBP) with persistent symptoms in one year.

Yellow flags are risk factors associated with chronic pain or disability (Linton 1998) (Nicholas 2011). They are subjective and have a significant psychosocial predominance. Examples include negative coping strategies, poor self-efficacy beliefs, fear-avoidance behaviour, and distress (Nicholas 2011). Psychosocial factors contribute greatly to the aetiology of back pain in terms of stress, anxiety, work satisfaction and economic status. By identifying the psychosocial factors or “yellow flags” with the use of disability questionnaires at an early stage, it assists clinicians in trying to prevent back pain before it becomes chronic (Nicholas 2011). This assists with preventing chronic spinal pain and disability and allows clinicians to manage the patients using a biopsychosocial approach (Bath and Grona 2015).

1.2 PROBLEM STATEMENT

Chronic LBP is one of the most common complaints in clinical practice (Oliveira *et al.* 2018). Yellow flags are a contributing component to the development of chronicity (Nicholas 2011). The use of yellow flags has become widespread in clinical practice, as means to identify patients with LBP who might not respond favourably to physical treatment (Stewart, Kempenaar and Lauchlan 2015). Since yellow flags are an integral component in the presentation of chronic LBP, the yellow flag management and treatment remains as important when approaching chronic LBP. The chiropractic master's students at the DUT treat a variety of musculoskeletal cases, with LBP being one of them. It is therefore important that the chiropractic master's students understand, approach, and manage yellow flags when treating chronic LBP. As chiropractic education is based on the biopsychosocial model, and therefore provides holistic care, it is therefore important that yellow flags are addressed in patients (Gliedt *et al.* 2017). Although yellow flags are taught to students at a theoretical basis, the application in clinical practice is not known and, hence, investigation into the knowledge of yellow flags would be beneficial at a training level.

1.3 AIM OF THE STUDY

The aim of this study was to explore and describe the identification and management of yellow flags in CLBP by chiropractic master's students at a university of technology teaching clinic.

1.4 OBJECTIVES OF THE STUDY

The objectives of this study were to:

- Explore the master's students' ability to identify yellow flags in CLBP patients.
- Identify the perceived knowledge on yellow flags by master's students.
- Explore the management protocol of yellow flags by master's students.

1.5 SIGNIFICANCE OF THE STUDY

LBP is one of the most common clinical complaints seen in practice and the most common cause of job-related disability (Martel 2016). Most of the LBP episodes occur because of injury, such as muscle sprains or strains due to sudden movements or poor body mechanics (Martel 2016). Acute LBP lasts a few days after the onset of pain to approximately two weeks, while chronic LBP is pain that lasts longer than three months (Martel 2016). According to Stewart, Kempenaar and Lauchlan (2015), there are several factors that lead to the development of chronicity in LBP, but one major factor that is commonly overlooked are yellow flags. 'Yellow flag' is a term used to describe the psychosocial prognostic factors for the development of disability following the onset of musculoskeletal pain (Linton *et al.* 2011). Factors that can be classified as yellow flags include many aspects of thoughts, feelings and behaviours. Some common examples include catastrophizing, finding painful experiences unbearable, avoiding helpful beliefs about pain and work, fear of movement and of re-injury.

Hippocrates described that the psychological, social and physical elements variously combine and contribute to a person's health. Addressing all three components contributing to health is called a biopsychosocial approach (Vining 2017). The biopsychosocial model of health is now used in chiropractic, to have a more holistic approach to provide effective patient care (Gliedt 2017). Moving toward a biopsychosocial approach means increasing psychological and social awareness to inform relevant clinical activities. Hence, at the Durban University of Technology (DUT), the undergraduate level students are taught and equipped with necessary skills in psychology modules which contribute to their identification of yellow flags. Here, the students are equipped with the knowledge on the factors that may contribute to common psychosocial conditions that they will encounter after their studies. The significance of this study is to establish and explore the chiropractic master's students' ability to identify, and their management protocol of yellow flags in chronic low back pain.

1.6 OUTLINE OF THE DISSERTATION

Chapter 1: The background, context and research problem are described. The aim, research questions and the significance of the study are also presented in this chapter.

Chapter 2: The relevant literature review pertaining to the topic is extensively described in this chapter.

Chapter 3: The research design and methodology, the collection and analysis of the data are comprehensively described in this chapter. The chapter concludes with the research rigor and ethical principles followed in this study.

Chapter 4: Chapter 4 portrays the results gathered from the research process.

Chapter 5: This chapter outlines the discussion and analysis of the results.

Chapter 6: The final chapter gives the conclusion of the study and any further recommendations for any future studies.

1.7 SUMMARY OF THE CHAPTER

This chapter presented the background and context of the study. It also discussed the aim and the objectives of the study, and overview of the significance of the study.

The next chapter will present the literature that was reviewed.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

LBP is a very common problem worldwide affecting all age groups, from children to adults, and is a frequent reason for medical consultations (Hoy 2014). The lifetime prevalence of non-specific LBP is estimated at 60% to 70% in industrialized countries (Hoy 2014). In Africa, the prevalence of LBP is rising and is of major concern (Morris *et al.* 2018). In Africa, the average annual prevalence of LBP among adolescents was 33% and among adults was 50% (Morris 2018).

2.2 EPIDEMIOLOGY OF LOW BACK PAIN IN SOUTH AFRICA

In South Africa, chronic LBP is usually occupation related. There is a high prevalence of cases found in manual laborers, such as steel plant and manganese workers (Morris 2018). Raphela (2017) investigated the prevalence of LBP among workers at a Bloemfontein, South African, welding company. The results of the study revealed that 60.2% of the participants had LBP and more males had LBP than females. The prevalence of LBP was significantly higher among welders and fitters than office workers, and was 69.0% and 43.3%, respectively (Raphela 2017).

Docrat (1999) investigated LBP in an Indian and a Coloured community in South Africa. A population-based epidemiological survey was carried out in which 1 000 subjects were interviewed. The lifetime incidence of LBP was found to be 78.2% in Indian and 76.6% in Coloured people. The prevalence was found to be 45% among Indians and 32.6% among Coloured people. Docrat (1999) found that the following factors were found to be significantly related to the severity of low back pain in both the race groups: number of children, number of pregnancies, level of education, driving for long periods and job vulnerability.

According to Dlungwane (2018), the point prevalence of LBP was 59% among nurses at a regional hospital in KwaZulu-Natal. The recruitment and retention of

nurses is a challenge, and the nursing shortage has been exacerbated by the burden of occupational injuries such as LBP and related disabilities. The physiotherapy clinical records revealed that caseload of nurses presenting for the management of LBP was increasing (Dlungwane 2018). The prevalence and factors associated with LBP were unclear. Various studies have shown that the main occupational risk factors associated with LBP in nurses are lifting and moving patients, sustained postures, job organization, poor ergonomic structures, improper work design, low social support, poor job satisfaction, staff shortages and poor working conditions (Ghilan *et al.* 2014). Consequently, LBP is associated with absenteeism and decreased productivity of the nurses at hospitals (Dlungwane 2018).

An epidemiological study on long-distance bus drivers was done by Morris, Louw and Daniels (2018), revealing a 44% prevalence of upper back pain followed by a prevalence of 42% lower back pain. Long-distance driving involves repetitive tasks, such as handling, bending and prolonged sitting, which may place excessive stress along the kinetic chain and affect the driver's personal and social life (Morris, Louw and Daniels 2018).

2.3 EPIDEMIOLOGY OF LOW BACK PAIN INTERNATIONALLY

Despite several peer-reviewed published studies on the prevalence or incidence of LBP, there is little consensus regarding its epidemiology and its risk factors. For example, Hoy *et al.* (2014) reported a global point prevalence estimate of LBP that ranged from 1.0 to 58.0%. A review of 56 studies from Walker (2013) also indicated that the real-world point prevalence of LBP was between 12.0 and 33.0. The included studies reported prevalence data from Canada, United States of America (USA), Sweden, Belgium, Finland, Israel and Netherlands (Fatoye, Gebrye and Odeyemi 2019).

2019). The prevalence of LBP in high-income countries was estimated at 30.0%, which is higher than low-income countries at 18.0% (Limon 2004). The 1-year incidence of people who have any episode and first ever episode of LBP ranged from 1.5 to 36.0%, and 6.3–15.4%, respectively (Fatoye, Gebrye and Odeyemi

2019). It has been suggested that the prevalence or incidence of LBP is increasing with age (Limon 2004).

2.4 AETIOLOGY OF LOW BACK PAIN

Aetiology refers to the cause of a disease or the science that deals with such causes (White 2020). In LBP, the aetiology can be multifactorial (Rose-Dulcina *et al.* 2018). Mechanical issues and soft-tissue injuries are the most common causes of LBP (Edelson 2016). Donally *et al.* (2022) has revealed that these injuries include damage to the intervertebral discs, compression of nerve roots, and improper movement of the spinal joints.

2.4.1 Common Causes of Chronic Lower Back Pain

The exact source of LBP is often difficult to identify. Non-specific back pain is thus a major problem for diagnosis and treatment (Chou 2019). LBP can be produced by different tissues including muscles, soft connective tissue, ligaments, joint capsules cartilage, and blood vessels (Duthey 2017). Pain is considered chronic once it lasts for more than three months and exceeds the body's natural healing process. Chronic pain in the low back often involves a disc problem, a joint problem, and/or an irritated nerve root (Chou 2019). Low back pain can be due to several factors, including individual characteristics; working conditions, such as heavy physical work; awkward static and dynamic working postures, as well as manual handling and lifting; lifestyle factors; and psychological factors. A minority of cases of LBP results from trauma to the back, osteoporosis or prolonged corticosteroid use (Duthey 2017).

2.4.2 Less Common Causes of Low Back Pain

While considerably less common, LBP may also be caused by a spinal infection, also called osteomyelitis, which is rare but can cause severe pain and is life threatening if left untreated (Chou 2019). LBP can be caused by surgical procedures, injections, or spread through the blood stream. Patients with a compromised immune system are more susceptible to developing an infection in the spine (Morris *et al.* 2018). Most spinal tumours start in another part of the body and metastasize to the spine. The most common tumours that spread to the spine start

from cancer in the breast, prostate, kidney, thyroid, or lung. Any new symptoms of back pain in a patient with a known diagnosis of cancer should be evaluated for possible spinal metastasis. Back pain is also a possible symptom associated with autoimmune conditions, such as ankylosing spondylitis, rheumatoid arthritis, lupus, Crohn's disease and fibromyalgia (Duthey 2017).

2.5 RISK FACTORS OF DEVELOPING LOW BACK PAIN

There are many risk factors for back pain, including aging, genetics, occupational hazards, lifestyle, weight, posture, pregnancy, and smoking. However, back pain is so prevalent that it can strike even if a person has no risk factors at all (Parreira 2018).

Patients with one or more of the following factors may be at risk for back pain:

2.5.1 Ageing

LBP is one of the major disabling health conditions among older adults aged 60 years or older (Wong , Karppinen and Samartzis 2017). While most causes of LBP among older adults are non-specific and self-limiting, seniors are prone to develop certain LBP pathologies and/or chronic LBP given their age-related physical and psychosocial changes. A study by Podichetty, Mazanec and Biscup (2003) suggests that the prevalence of musculoskeletal pain in adults ranges from 65% to 85%, with 36% to 70% of them suffering from back pain.

2.5.2 Educational Status

Batista (2017) conducted a systematic review which aimed to investigate the association between educational level and the occurrence of LBP. The findings suggest that, in a heterogenous sample for prevalence of LBP in all educational levels grouped together, people who attained higher educational levels show lower prevalence rates than people with low or medium educational levels (Batista 2017). A cohort study by Smedley (2005) found low educational levels to be a risk factor for LBP (odds ratio: 1.8; 95% CI, 1.2–2.7) and parental educational level to be a risk factor for LBP in children (odds ratio: 2.0; 95% CI, 1.3–3.1). Therefore, in addition to the individual consequences of LBP, parental educational level also seems to affect the occurrence LBP in children and adolescents (Smedley 2005).

2.5.3 Occupational Hazards

Epidemiological research by Docrat (1999) revealed that if individuals perceived that their job made them vulnerable to developing low back pain, their chance of having low back pain of a severe intensity was high. Occupational low back pain has multifactorial aetiology and elevated incidence and prevalence (Siena 2019). It is characterised by pain of varying intensity and duration and can lead to work incapacity and invalidity. Low back pain causes workers to suffer and increases the costs of employers and social security in healthcare systems (Helfenstein and Goldenfum 2010).

2.5.4 Body Mass Index (BMI)

Su *et al.* (2018) conducted a cross-sectional study with the objective to determine whether there is an association between BMI and the prevalence, severity and frequency of low back pain, and identify other potential patient risk factors for the development of low back pain. The prevalence of low back pain was found to be significantly higher in patients with an elevated BMI compared to those with normal or underweight BMI, and demonstrated a stepwise increase with each BMI category. Approximately 47.4% of patients with normal or underweight BMI complained of low back pain compared with 72.8% of morbidly obese patients ($p < 0.0001$). No association was seen between BMI and the

frequency or severity of low back pain episodes. Osteoarthritis of the back and depression were patient variables found to be associated with all three measures (prevalence, severity, and frequency) of low back pain (Su *et al.* 2018).

A cross-sectional study by Oliveira *et al.* (2018) aimed to investigate the association between obesity and back pain in nine countries. The prevalence of back pain ranged from 21.5% (China) to 57.5% (Poland). In the multivariable analysis, compared to BMI 18.5-24.9 kg/m², significantly higher odds for back pain were observed for BMI ≥ 35 kg/m² in Finland (OR 3.33), Russia (OR 2.20), Poland (OR 2.03), Spain (OR 1.56), and South Africa (OR 1.48); BMI 30.0-34.0 kg/m² in Russia (OR 2.76), South Africa (OR 1.51), and Poland (OR 1.47); and BMI 25.0-29.9 kg/m² in Russia (OR 1.51) and Poland (OR 1.40). No significant associations were found in the other countries (Oliveira *et al.* 2018).

2.5.5 Psychological and Psychosocial Factors and Low Back Pain

Psychological and psychosocial factors have been found to influence the prevalence and incidence of low back pain (Frymoyer *et al.* 1980). A study done by Sadeghian *et al.* (2014) investigated the influences of baseline psychological risk factors on the prevalence of low back pain (LBP) at baseline and follow-up among nurses. At the baseline of the study, 58.9% of nurses reported back pain in the previous 12 months. Age ($p = 0.001$); belief that work causes pain ($p = 0.022$); and somatization tendency ($p = 0.002$) significantly increased risk of LBP. At one year follow-up, the prevalence of LBP was 45.7% and the expectation of back pain at baseline ($p = 0.016$) significantly increased risk of LBP in this phase ($p < 0.05$) (Sadeghian *et al.* 2014).

2.5.6 Pregnancy

Wang (2004) conducted an anonymous survey consisting of 36 questions and distributed it to pregnant women participating in various prenatal care clinics and educational classes in New Haven County, Connecticut. A total of 950 surveys were returned from May 2002 through October 2003. A total of 645 (68.5%; 95% confidence interval [CI] 65–72%) respondents reported experiencing LBP during their current pregnancy. The prevalence was not affected by gestational age ($p=.56$). Low back pain during the current pregnancy was predicted by age (younger women were more likely to develop it; $p=.004$); history of LBP without pregnancy ($p=.002$); during menstruation ($p=.01$) and during a previous pregnancy ($p=.002$). Most respondents reported that LBP during pregnancy caused sleep disturbances (58%; 95% CI 54–62%) and impaired daily living (57%; 95% CI 53–62%).

According to Carvalho (2017), interviews with 97 pregnant women to investigate the prevalence and incidence of low back pain reported the frequency of low back pain at 68%. The mean age was 26.2 years and the median gestational age was 30 weeks. Most were married or living in a common-law marriage (88.6%), 56 of them worked outside the home (57.7%), and 71 had completed high school (73.2%). Low back pain was more frequent during the second trimester of pregnancy (43.9%), referred to as a "burning" sensation in 37.8% of patients, with intermittent frequency in 96.9% of the women. The symptoms became worse at night (71.2%). Resting reduced low back pain in 43.9% of pregnant women, while a standing position for a long time worsened it in 27.2% of patients.

2.5.7 Smoking

Much controversy exists in the literature regarding smoking as a risk factor for developing low back pain. Many studies have found a positive association between smoking intensity and low back pain, while others have reported no direct association (Green 2016). People who smoke are more likely to develop back pain than those who do not smoke (Peng 2018). Green (2016) conveyed a cross-sectional study to assess if a greater exposure to smoking cigarettes was associated with a greater prevalence of back pain. The results found that back pain increased with increased smoking exposure. Back pain was present in 23.5% of never-smokers, 33.1% of former smokers, and 36.9% of current smokers (Green 2016). Former smokers had a higher prevalence of low back pain compared with never smokers, but a lower prevalence of low back pain than current smokers (Shiri 2010). In a cohort study done by Feldman (2010), both former smokers had an increased incidence of low back pain compared with non-smokers. In contrast, Van der Meulen (1997) reported that no significant association could be demonstrated between any of the above factors (smoking habit, intensity of smoking and duration of smoking) and low back pain prevalence.

2.6 SYMPTOMS OF LOWER BACK PAIN

LBP has a wide variety of symptoms. It can be mild and merely nagging, or it can be severe and debilitating. LBP may start suddenly, or it could start slowly, and gradually get worse over time (Wheeler 2019). Depending on the underlying cause of the pain, symptoms can be experienced in a variety of ways, for example:

- Pain that is dull or achy, contained to the low back.
- Stinging, burning pain that moves from the low back to the backs of the thighs, sometimes into the lower legs or feet; can include numbness or tingling.
- Muscle spasms and tightness in the low back, pelvis and hips.
- Pain that worsens after prolonged sitting or standing.
- Difficulty standing up straight, walking, or going from standing to sitting.

In addition, symptoms of lower back pain are usually described by type of onset and duration:

Acute pain: This type of pain typically comes on suddenly and lasts for a few days or weeks, and is considered a normal response of the body to injury or tissue damage. The pain gradually subsides as the body heals (Qaseem *et al.* 2017).

Subacute LBP: Lasting between six weeks and three months, this type of pain is usually mechanical in nature (such as a muscle strain or joint pain) but is prolonged. At this point, a medical workup may be considered, and is advisable if the pain is severe and limits one's ability to participate in activities of daily living, sleeping, and working (Peloza 2017).

Chronic back pain: Usually defined as lower back pain that lasts over three months, this type of pain is usually severe, does not respond to initial treatments, and requires a thorough medical workup to determine the exact source of the pain (Shiban 2019).

2.7 TYPES OF LOW BACK PAIN

There are two common types of LBP, namely mechanical pain and radicular pain.

2.7.1 Mechanical Low Back Pain

By far the most common cause of low back pain, mechanical pain (axial pain) is pain primarily from the muscles, ligaments, joints (facet joints, sacroiliac joints), or bones in and around the spine. This type of pain tends to be localised to the lower back, buttocks, and sometimes the top of the legs. It is usually influenced by loading the spine and may feel different based on motion (forward/backward/twisting), activity, standing, sitting, or resting (Stoppler 2016).

2.7.2 Radicular Pain

The definition of acute lumbosacral radiculopathy is a diffuse disease process that affects more than one underlying nerve root, causing pain, loss of sensation, and motor function depending on severity (Alexanders 2020). Muscle strength is often preserved in the case of radiculopathy because muscles often receive innervation from multiple roots. There is built-in redundancy to human anatomy, despite a potentially significant injury to a single nerve root. Thus, muscle strength is often only affected in severe cases of radiculopathy. Lumbosacral radiculopathy is very common (Dydyk 2020). Most cases of lumbosacral radiculopathy are self-limited.

The most common symptom in radiculopathy is paraesthesia (Das 2019). Sensory loss or paraesthesia into the lower extremity, back pain radiating into the foot, with a positive straight leg raising test are a common presentation of lumbar radiculopathy. The most common cause of lumbar radiculopathy is a herniated disc. A herniated disc can cause nerve root compression. This process can be acute or can develop chronically over time. Imaging is not always a helpful modality in diagnosis (Chou *et al.* 2011).

There are many additional sources of pain, including claudication pain (from stenosis) myelopathic pain, neuropathic pain, deformity, tumours, infections, pain from inflammatory conditions (such as rheumatoid arthritis or ankylosing spondylitis), and pain that originates from another part of the body and presents in the lower back (such as kidney stones, or ulcerative colitis) (Peloza 2017). It is also possible for LBP to develop with no definitive cause. When this happens, the primary focus is on treating the symptoms (rather than the cause of the symptoms) and the patient's overall health. For subacute and chronic lower back pain, a thorough diagnosis is important to lay the foundation for appropriate treatment and rehabilitation. Lower back pain treatment reduces the likelihood of recurrent back pain flare-ups and helps prevent the development of chronic lower back pain (Alexander 2020).

2.8 GENERAL MANAGEMENT OF LOW BACK PAIN TREATMENT

There are various forms of treatment modalities that are utilised for the treatment of low back pain. These include both pharmacological and non-pharmacological options. Pharmacological treatments include analgesics, anti-inflammatory drugs, muscle relaxants and other medications can be used to help control chronic back pain. However, most come with unwanted side effects and are not intended for prolonged use. Nava (2018) recommends that "Opioid medications generally shouldn't be used as the first, the only or the long-term line of treatment for chronic back pain". Opioids should be prescribed only after a thorough exam by a specialist and if other drugs have failed to provide relief. If patients find themselves relying on opioids to get through the day, it may be time to seek a second opinion (Nava 2018). Mathieson (2017) suggests that there is moderate-quality evidence of a small

benefit from opioid analgesics in managing CLBP in the short term (less than three months after commencing).

One of the most common non-pharmacological treatments for LBP is physiotherapy (PT). Research suggests that PT may offer modest relief for acute back pain that does not improve with self-care. It can also help patients avoid a recurrence of pain (Shipton 2018). In a major study conducted in Sydney with 30 850 participants over a 12-month period, researchers discovered that patients who engaged in a variety of exercise lessened their risk of lower back symptoms by 35% (Palma 2016).

2.9 LOW BACK PAIN TREATMENT BY CHIROPRACTORS

Back pain is one of the most common-and debilitating-ailments people face and finding the right pain relief is not easy, according to the Spine Journal (Mugdha 2012). An estimated 27 million Americans are evaluated and treated by a chiropractor each year, mostly for back pain relief, according to a 2015 National Institutes of Health report. The hallmark therapy of chiropractic care is spinal manipulation. A 2011 Cochrane review examining various interventions found that spinal manipulation slightly improved chronic low back pain and disability in the short term but the researchers reported that there was no evidence as to whether manipulation is better than other therapies, such as physical therapy, pain-relief drugs, and exercise (Rubinstein *et al.* 2011). Chiropractors perform spinal manipulation by using their hands or a device to apply a small amount of force, or a more forceful thrust, to readjust the bones in the spine and neck. Spinal manipulation is typically most effective when combined with more traditional therapies to treat back pain, such as heat and cold therapies, massage, relaxation techniques, electrical stimulation or ultrasound exercise, stretching, and patient education (Shmerling 2019).

2.9.1 Understanding Yellow Flags: Psychological Indicators

Yellow flags are psychosocial indicators suggesting an increased risk of progression to long-term distress, disability and potential drug misuse. Psychosocial flags have been subdivided over the years to reflect the different interactions that can affect recovery (Kendall 1997; Shaw 2019). As a result, they are now referred to as yellow, blue and black flags. The concept was introduced by Kendall et al. (1997) and

examined factors that identified patients who were at risk of developing chronic disability and did not recover as was expected for their condition. Psychosocial factors determine outcomes, such as activity levels and participation and work, but appear to be less relevant to the reporting of symptoms.

Yellow flags include the patient's attitudes and beliefs, emotions, behaviours and family and work-place factors. Below is a brief explanation on how these factors can affect one's life.

Work-place: The patients have a belief that all pain must be abolished before attempting to return to work or normal activity; there is expectation/fear of increased pain with activity/work; unsupportive work environment.

Social/family: Overprotective partner/spouse; socially punitive partner/spouse; lack of support to talk about problems.

Behaviours: Passive approach to rehabilitation; use of extended rest reduced activity with withdrawal from activities of daily living; avoidance of normal activity; impaired sleep because of pain increased intake of alcohol or similar substances since the onset of pain.

Affective/emotions: Depression; feeling useless; irritability; anxiety about heightened body sensations (Bill 2018).

Yellow flags are also seen as obstacles, not only in the healing of an acute patient, but also as it delays and effects the treatment and management plan of a particular condition that it co-exists in. These obstacles are commonly overlooked. Yellow flags include many aspects of thoughts, feelings and behaviours. Some common examples include:

- Catastrophising – thinking the worst.
- Finding painful experiences unbearable, reporting extreme pain disproportionate to the condition.
- Having unhelpful beliefs about pain and work – for instance, 'if I go back to work my pain will get worse'.
- Becoming preoccupied with health, over-anxious, distressed and low in mood.
- Fear of movement and of re-injury.

- Uncertainty about what the future holds.
- Changes in behaviour or recurring behaviours.
- Expecting other people or interventions to solve the problems (being passive in the process) and serial visits to various practitioners for help with no improvement.

Yellow flags enable health practitioners to work from a biopsychosocial model and give a framework for assessment and planning. These flags are not a diagnosis or a symptom, but an indication that someone may not recover as expected and may need additional support to return to work (Gray 2013).

2.10 YELLOW FLAGS IN CHRONIC LOW BACK PAIN

CLPB patients with psychosocial, psychological and social risk factors are known to have poorer outcomes and increased management costs (Linton 2000). The term “yellow flags” was originally used to describe psychosocial risk factors that predict disability in LBP patients. These risk factors are predictors of return to work and disability in CLBP patients (Linton 2000). The risk factors can be identified using a questionnaire or a clinical diagnosis when assessing a patient with LBP (Linton and Thomas 2019). Questions regard beliefs that are associated with delayed return to work and disability and include fears about pain, injury, recovery and being despondent or anxious (Macphail 2017). It is suggested that having a few strongly held negative beliefs or several weaker ones could be used to identify at risk patients.

2.11 YELLOW FLAGS IN MUSCULOSKELETAL DISORDERS

Musculoskeletal disorders have a multifactorial aetiology that includes not only physical stressors but also psychosocial risk factors, such as job strain, social support at work, and job dissatisfaction (Menzel 2007). These have been termed “yellow flags” and this term is now commonly used by different medical professionals. Psychosocial factors are many and varied and include people’s beliefs about what has happened to them, beliefs about their pain and their beliefs about how work will affect their pain (Innes 2015). The assessment and

management of yellow flags has been found to improve outcome when included in physical treatment and rehabilitation in both acute and chronic LBP (Parker 2015). Once an injury has occurred, psychosocial factors, such as depression and maladaptive pain responses, are pivotal in the transition from acute to chronic pain and the development of disability (Menzel 2007).

Huang (2017) identified several psychological risk factors for disability and work loss. These psychological risk factors include fears about pain or injury; unhelpful beliefs about recovery; and distressed affect, for example anxiety. Other risk factors included workers' perceptions that the workplace is unsupportive, and overly supportive health care providers. Research into yellow flags provides a guide to the assessment of yellow flags that includes a clinical interview and a psychosocial screening questionnaire (Main 2013). This approach assumed that individuals at risk for poor outcomes could be identified based on either a small cluster of highly salient factors or the cumulative combination of several factors. Because many of these factors are potentially modifiable, the screening questionnaire also contained additional advice on how to incorporate cognitive-behavioural change principles into early management (Huang 2017).

2.12 TREATMENT OF YELLOW FLAGS

2.12.1 Yellow Flag Management by Chiropractors

In 2003, the World Federation of Chiropractic's 7th Biennial Congress was hosted by European leader in musculoskeletal medicine, Professor Stephen Linton. Professor Linton is an expert in psychosocial aspects of back and neck pain patients, and he pioneered the identification of risk factors of chronicity and reactivation treatments with a cognitive-behavioural emphasis, a guideline that chiropractors could follow. A patient with a high yellow flags score is either experiencing abnormal illness behaviour or is at risk for it (Linton 2014). Diagnosis should be oriented toward avoiding labelling the patient with an injured back or degenerative condition, since coincidental structural pathology is so common. Treatment should reduce dependency on medication and other passive forms of treatment (including manipulation) and encourage the development of self-treatment skills. In certain cases, specialist referral for behavioural medicine

counselling regarding affective and cognitive issues is required. It is important to realize that yellow flags are not patients' fault, but they suggest that management strategies need to be altered to maximize the likelihood of recovery (Linton 2014).

Silva et al. (2022) showed that in susceptible individuals, there is discordance between pain expectancies and pain intensity with activity. However, these are unknown to the patients. In order to decrease fear-avoidance behaviour, Silva (2015) suggests that patients should be gradually and incrementally exposed to perceived painful activities. Professor Linton (2014) also suggested that the clinician should guide and teach patients that their expectations are not accurate. Reducing anxiety and pain expectations associated with the specific movements that the patient is most afraid of should become the goal of care. Linton (2014) states that patient education is an intricate part of treating patients presenting with yellow flags in CLBP. Patient education should focus on the fact that normal activities can be resumed (such as walking, swimming, biking) safely, while informing the patient about simple activity modifications to reduce biomechanical strain (such as hip hinge, cats, and abdominal bracing). Patients should be advised to stay as active as possible; to gradually increase their physical activities; that it is safe to do so if the pain is not peripheralizing; and that hurt does not necessarily equal harm, but is just a sign they are mobilizing stiff areas (Geneen 2017).

2.12.2 Yellow Flag Management by Other Primary Health Care Providers

Regarding the issue of who should assess psychosocial flags, guidance suggests that this could be performed by the patient's general practitioner (GP) or therapist (Alexanders 2015). Physiotherapists are often the primary assessors for many individuals affected by back pain. It is, therefore, essential that physiotherapists integrate psychosocial evaluations of yellow flags into their routine practice. Internationally, there have been several advocates for the integration of psychosocial assessment into the routine physiotherapy management of back pain (Alexanders 2015).

Multiple studies have shown that psychological factors may be more strongly associated with change in pain intensity, number of physician visits, and physical disability than physical factors such as strength and range of motion (Lentz *et al.* 2016). Yet, despite this consistent evidence, the assessment of pain-associated

psychological distress (yellow flags) is not routinely performed as a standard part of orthopaedic physical therapy practice. This may be related to the considerable confusion amongst physiotherapists about which specific psychological factors should be assessed and how to best incorporate findings from the initial and follow-up assessments into clinical decision-making processes (Alexanders 2015). For example, identifying the presence of depressive symptoms could indicate the need for referral to another health care provider (psychologist). However, more common in orthopaedic physical therapy practice is that elevated pain-associated psychological distress indicates the need for a modified treatment approach to prevent delayed recovery or transition to chronicity and not necessarily referral.

Physiotherapists highlighted numerous barriers to the assessment and management of psychosocial factors in clinical practice. These barriers include limited training and education, lack of readily accessible and targeted tools and interpersonal issues (such as in some instances being uncomfortable to raise psychosocial issues with patients) (Kumar 2015).

The physiotherapists who participated in Kumar's (2015) research reported that they would have had training in psychosocial factor assessment and management. Yet, as clinicians, they were unsure how to identify their relevance or what to do with the presenting psychosocial factors, ending with calls for more training. As a result, physiotherapists feel as if they have a limited role in managing cognitive, psychological and social factors associated with low back pain. Some also feel as if they would be exceeding their scope of practice if they had to treat yellow flags, and as a result, maintain the biomedical treatment of patients with musculoskeletal conditions and yellow flags (Synott 2015). The default position of many physiotherapists seemed to involve yielding to these patient expectations and administering passive treatments and, hence, overlooking yellow flags.

LBP is a common reason to visit general practitioners. Psychosocial factors, including beliefs about injury, movement and recovery, are important in the development of chronic back pain and disability (Karstens *et al.*2015). Numerous clinical guidelines, based upon a biopsychosocial model, have been developed to improve patient outcomes and decrease costs. Care, which is consistent with these guidelines, produces better patient outcomes at lower cost. Evidence suggests that the current practice of GPs is inconsistent with these guidelines. Patient expectation

and the desire to avoid conflict in the patient-doctor relationship seem to have an important yet negative influence on guideline adherence (Karstens *et al.* 2015).

There is strong evidence that health professionals' beliefs are associated with their patients' beliefs about back pain, as well as their own guideline adherence. Clinicians influence their patients' understanding of the problem and their recovery expectations, and many messages received from clinicians reinforce patient perceptions that their back is vulnerable and needs protection. GPs' conceptual framework, and how they communicate this to patients, needs to be better understood to optimise management of acute LBP (Traeger *et al.* 2017).

While previous qualitative studies have highlighted the importance of patient expectations and maintaining doctor-patient relationships, most qualitative research has focused on CLBP. Many people who consult their GP for a new episode of back pain do not return for further consultation, despite continuing to experience pain and disability. Regardless of the reason for this, it indicates that GPs may only interact once with most patients experiencing an episode of LBP and the information received during this consultation may need to inform long-term self-management (Traeger *et al.* 2017).

It is therefore important to understand GP management during consultations for acute back pain. GPs' reliance on the biomedical model has decreased confidence in their ability to explain and manage acute back pain. (Darlow *et al.* 2014) Tissue injury is associated with a natural history of healing, and GP feel they do not possess sufficient understanding of anatomy and biomechanics to explain or influence this process. Some GPs felt they could not influence outcomes and consequently referred the patients to other health professionals (Piccoliori *et al.* 2017). Currently, the main treatment goal for LBP by most GPs is to control the pain, maintain function and prevent exacerbation. Therefore, LBP is being treated with analgesics such as paracetamol, NSAIDs or weak opioids. The difficulty is to manage pain when it becomes chronic because of the side effects of these medicines and the presence of psychosocial risk factors (Duthey 2013).

2.13 EDUCATION OF YELLOW FLAGS

The biomedical model of health and disease dominates in current medical practice (Farre and Rapley 2017). The model assigns key roles to biological determinants and explains disease as a condition caused by external pathogens or disorders in the functions of organs and body systems. Such an approach has its historic justification and has proved effective in the control of massive infectious diseases. However, now that chronic non-infectious diseases prevail, its efficacy has not only become questionable, but also the issue has been raised of its economic justification. The extension of biomedical approach and attribution of equal importance to psychosocial factors have become an imperative in the improvement of treatment efficacy and disease control, together with the humanization of relations between health staff and patients (Farre and Rapley 2017). A new biopsychosocial model has been suggested that considers all relevant determinants of health and disease and that supports the integration of biological, psychological and social factors in the assessment, prevention and treatment of diseases. It does not diminish the significance of biological factors, but extends a rather narrow approach (Halveka and Lucanin 2009).

2.13.1 The Biomedical Model

The biomedical model of medicine is the current, dominant model used by physicians in the diagnosis of disease (Strickland 2014). This model mainly focuses on the physical processes, such as the pathology, the biochemistry and the physiology of a diseases. The biomedical model does not consider the role of a person's psychology or society in the cause of disease and its treatment. By ignoring the patient's psychology, the care provider might see only a 'patient' or a 'case', and not the real person behind it. This is because of the assumption that all illness has a single underlying cause, which is disease and that removal or attenuation of the disease will result in a return to health. However, evidence exists that this assumption is wrong (Wade and Halligan 2004; Strickland 2014).

Although the biomedical model is effective in the diagnosis of a disease and in developing treatment strategies and surgical procedures, the limitations of the medical model cannot be denied. The model does not effectively incorporate psychological, psychosocial, or spiritual factors. In order to be a truly useful model

it should be radically changed so that it incorporates the above factors. There is a need to transform the biomedical health-care system to one based on the biopsychosocial model, which recognizes psychological and social factors (Strickland 2014).

2.13.2 The Biopsychosocial Model

The biopsychosocial model is an interdisciplinary model that looks at the interconnection between biology, psychology, and socio-environmental factors (Mitchell *et al.* 2017). The model specifically examines how these aspects play a role in topics ranging from health and disease models to human development. This model was developed by George L. Engel in 1977 and is the first of its kind to employ this type of multifaceted thinking (Mitchell *et al.* 2017). The biopsychosocial model has received criticism about its limitations but it continues to carry influence in the fields of psychology, health, medicine, and human development.

The biopsychosocial model has many uses in health and medicine. As proposed by Carrio (2004), it helps physicians better understand their whole patient. Considering not only physiological and medical aspects but also psychological and sociological well-being. Furthermore, this model is closely tied to health psychology. Health psychology examines the reciprocal influences of biology, psychology, behavioural, and social factors on health and illness (Mitchell *et al.* 2017).

Psychology education has evolved to be a critical section in education in various medical disciplines, such as physiotherapy, chiropractic and allopathic health system. The reason for this is because, although the link between physical health and mental health is widely accepted, many health professionals have reported being underprepared to manage both the physical and the mental health needs of patients (van der Kluit, Goossens and Leeuw 2013). Synott et al. (2015) conveyed a study to determine if physiotherapists (PTs) may stigmatize or feel unprepared to treat people with LBP and psychosocial factors that influence recovery. PT students have been found to have relatively evidence-based attitudes and beliefs about pain compared to other healthcare students Synott et al. (2015). PTs increasingly receive training in treatment packages that take into account cognitive, psychological and social factors in LBP; however, it is unclear as to whether such training adequately

equips them with the requisite skills to change patient management and outcomes (van der Kluit, Goossens and Leeuw 2013).

A recent review of several different study designs concluded that, whilst PTs theoretically support a biopsychosocial approach to LBP, in practice, very few are doing so adequately, despite training in cognitive behavioural principles. It is possible, then, that physiotherapists may rely on their own personal experiences, stereotypes, and prejudices to guide their interactions with and to help or hinder holistic management of all their patients (van der Kluit, Goossens and Leeuw 2013). The results of Synott's study found that only a small group of PTs who had received post-graduate training paid attention to psychological factors in their initial examination of patients. PTs were comfortable in utilizing a biomedical approach in treating patient caseload and often negatively stereotyped those presenting with non-specific LBP as attention seeking (Synot *et al.* 2015). PTs lacked confidence in their training to implement the recommended biopsychosocial approach. Similar perceptions could be found in chiropractic master's students about treating patients with psychosocial factors and, hence, investigation into their knowledge and management is warranted.

2.14 YELLOW FLAG EDUCATION IN CHIROPRACTIC

At DUT, the students are exposed to modules such as social studies and psychopathology in the 2nd and 3rd year of the course, where they are equipped with knowledge on common psychosocial conditions that they will encounter after their studies. The reason behind this could be that, over last few decades, there has been considerable attention and acceptance of psychosocial influences in health, exemplified by the biopsychosocial model (Gliedt *et al.* 2017). Moving toward a biopsychosocial approach means increasing psychological and social awareness to inform relevant clinical activities. This medical model intertwines biological, psychological, and sociological factors and looks at the patient holistically, and not only in a biomedical manner (Green *et al.* 2016).

The chiropractic approach has many traditional characteristics that are also common to the biopsychosocial model of care (Gliedt *et al.* 2017). It is however

unclear whether students use this education when entering the clinical practicum of the course.

2.15 CLINICAL PRACTICUM OF CHIROPRACTIC

The Merriam-Webster dictionary defines clinical practicum as “a course of study designed especially for the preparation of teachers and clinicians that involves the supervised practical application of previously studied theory”. The reason why health students may find it difficult to transition from academic coursework to the clinical application of their education could be due to the different clinical experiences that they have during their clinical practicum (Opoku, Khuabi, and Niekerk 2021). Clinical experience is an ideal setting for transferring knowledge from a classroom to the clinical context, bridging the gap between theory, and it also simulates the real world (Dagne and Tebeje 2021). The experiential learning theory is used when entering the clinical practicum of a course. According to Kolb (1984), this type of learning can be defined as “the process whereby knowledge is created through the transformation of experience (Mcleod 2017). Knowledge results from the combinations of grasping and transforming the experience”. According to Eyler (2009), experiential education, which takes students into the community, helps students to bridge classroom study and life in the world and to transform inert knowledge into knowledge-in-use.

2.16 CONCLUSION OF THE CHAPTER

This chapter examined the literature on yellow flags and CLBP to construct a conceptual framework of the facets that master’s students should be able to identify, in order to manage patients effectively. An explanation of chiropractic and its scope, and chiropractic education at the DUT and in South Africa was also provided.

To date, there are only few studies performed internationally to note the ability of interns to identify yellow flags, within the biomedical field of education. No such studies have been performed in South Africa, or at the DUT. Thus, this study attempts to contribute to the limited body of literature in chiropractic clinical education.

The next chapter will present the methodology used to execute this study.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter discusses the methodology used to design and execute this study. It clarifies various aspects of the research procedure, including sample size and population, ethics and research rigor, and the process of data collection.

3.2 RESEARCH DESIGN

A qualitative, exploratory, descriptive design was used to guide the study (McLeod 2017). This design was used to gain an understanding of underlying reasons, opinions, and motivations (DeFranzo 2011). It also provided insights into the problem or for potential quantitative research (DeFranzo 2011).

3.2.1 Qualitative Research

Qualitative research is multimethod in focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study people and issues in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them (McLeod 2019). The main aim of qualitative research is to facilitate understanding of social constructs and to allow for the exploration of subjective matter, such as views, perceptions, opinions, attitudes and experiences. This method was the best manner to investigate the identification and management of yellow flags in chronic low back pain patients.

3.2.2 Exploratory Research

Exploratory research is research conducted for a problem that has not been studied more clearly (George 2022). It is intended to establish priorities, develop operational definitions and improve the final research design. Exploratory research helped determine the best research design, data-collection method and selection of subjects (Shields *et al.* 2013). Exploratory research is used to acquire new insight into it to form a more precise problem and, hence, it was used in this study.

3.2.3 Descriptive Research

Descriptive research aims to accurately and systematically describe a population, situation or phenomenon (McCombes 2019). It is useful when a researcher attempts to investigate the “who, what and where” of events, and how these aspects relate to or influence the research topic (Sandelowski 2000). It is useful when not much is yet known about the topic or problem. Before one can research why something happens, one needs to understand how, when and where it happened; this study design achieved this (McCombes 2019). This study design was applicable to this study since the knowledge and management of yellow flags by chiropractic master’s students were investigated. The best way to have collected this data was to do an interview and to follow the principles of this study design as explained.

3.3 SETTING

The research setting is the location where the research takes place (Given 2008). Data were collected from the chiropractic master’s students at the research room of the Faculty of Health Sciences, DUT. The research room was quiet and secure where the interviewees were comfortable enough to express themselves.

3.4 POPULATION

A research population is generally a large collection of individuals or objects that are the main focus of a scientific query (David 2017). The population was the chiropractic master’s students at DUT. There were 36 master’s students at the time of data collection, and 10 master’s students participated in this study. Participants were not coerced to participate in the study. This study sample meets Terre-blanche *et al.* (2008:94) minimum standard.

3.5 SAMPLING PROCESS

Purposive sampling was used to select the study participants. Purposive sampling is a non-probability sample that was selected based on characteristics of a population and the objective of the study (Palinkas 2015). A purposive sampling of

a minimum of 10 registered master's chiropractic student interns who were selected and interviewed. Data collection was guided by data saturation. On completion of data collection, 10 master's chiropractic interns were interviewed as data saturation was reached. Purposive sampling was best for this study as it ensures that the population will be evenly sampled and, as a result, reliable conclusions could be drawn (Stephanie 2015). Data saturation was a term used in research to indicate that no new information should be added that will enhance or change the findings of a study (Saunders *et al.* 2018).

3.5.1 Inclusion Criteria

- Master's students who were in the CDC for at least 5 months.
- Master's students who had treated at least five chronic lower back pain cases.

3.5.2 Exclusion Criteria

- Master's students who were not in the CDC for at least 5 months.
- Master's students who have not treated at least five chronic lower back pain cases.

3.6 DATA COLLECTION PROCESS

The researcher contacted the relevant potential participants to determine their willingness to participate in the study. The researcher set up the interview at the convenience of the participants who agreed to participate in the research study. Once the participant had read and signed the letter of information (Appendix 4) and the consent (Appendix 5), the researcher conducted the interview with the participant. The meaning of yellow flags was explained to those participants who were unclear of the meaning. To ascertain the demographic details of the participants, a demographic data guide was used to collect data from the participants (Appendix 6a). The interview guide was used to facilitate the discussion (Appendix 6b). The researcher facilitated the interview discussions. Permission to record the interview was obtained from the participants prior to the interview and the interview was then recorded with a Dictaphone.

3.7 DATA ANALYSIS

The data collected during the interviews through audio recordings were transferred onto a Microsoft Word document. The name of the interviewer, interviewee, time, date and location where it took place were transcribed on a Word document, documenting every word that the interviewer and the interviewee said.

There are various approaches to conducting thematic analysis, but the most common form follows a six-step process:

1. Familiarization.
2. Coding.
3. Generating themes.
4. Reviewing themes.
5. Defining and naming themes.
6. Writing up (Caulfield 2019).

Themes were developed to analyse the data. Thematic coding is a form of qualitative analysis which involves recording or identifying passages of text or images that are linked by a common theme or idea allowing the researcher to index the text into categories and, therefore, establish a framework of thematic ideas about it (Archer *et al.* 2017).

3.8 TRUSTWORTHINESS

The trustworthiness of a qualitative study is the demonstration that the evidence for the results reported is sound and when the argument that based on the result is very strong. There were four criteria to ensure valid interpretation: truth value/ credibility, applicability, consistency and neutrality (LaBlanca 2010). The establishment of rigor in qualitative research involves analysing and presenting data in the manner experienced by the participants. In order to ensure trustworthiness in this study, the four criteria were credibility, dependability, confirmability and transferability.

3.8.1 Credibility

Credibility is having an adequate engagement in the research setting so that recurrent patterns in data can be identified properly and verified (LaBlanca 2010). The credibility means establishing that the results of the research are believable. This is an important technique that qualitative researchers use to establish credibility. The data, interpretations, and conclusions were shared with the participants. This was maintained as it allowed the participants to clarify what their intentions were, correct any errors and provide additional information if necessary (LaBlanca 2010).

3.8.2 Dependability

Dependability involves the sturdiness of the data over a period, such as throughout the interview process (Polit and Beck 2006). The technique used to ensure dependability is called an external audit. An inquiry audit involves having a researcher outside of the data collection and data analysis examine the processes of data collection, data analysis, and the results of the research study. This ensures the accuracy of the study (Polit and Beck 2006). The technique used to ensure dependability is also called an external audit (Moon 2016). This was done in this study to confirm the accuracy of the findings and to ensure the findings were supported by the data collected.

3.8.3 Confirmability

Confirmability refers to a correlation in the data when reviewed by two or more independent researchers (Polit and Beck 2006). The external researcher attempts to understand the series of events throughout the research process (Krefting 2014). This involves making sure that researcher bias does not affect the interpretation of what the research participants say to fit a certain narrative (Polit and Beck 2006). The technique that is utilised to ensure the confirmability of this study is called an audit trail. This is the most popular technique used to establish confirmability because it is useful when writing up the results chapter. An audit trail is when a qualitative researcher details the process of data collection, data analysis, and interpretation of the data. (Polit and Beck 2006). Therefore, in order to maintain confirmability, the researcher detailed the process of data collection, data analysis, and the interpretation of the data.

3.8.4 Transferability

Transferability allows the readers to be able to apply the findings of the study to their own situations (LaBlanca 2010). This can be avoided by carefully selecting participants through a panel of judges (Krefting 1991). Furthermore, additional participants from outside the sample population are interviewed to ensure that there are no differences, in order to ensure transferability in this study. (LaBlanca 2010). Transferability is established by providing readers with evidence that the research study's findings could be applicable to other contexts, situations, times, and populations and, hence, a copy of the research is made available to the participants. To achieve transferability in this research, a description of the participants and research process enabled the reader to assess whether findings were transferable to their own setting (Korstjens and Moser 2018: 122).

3.9 ETHICAL CONSIDERATIONS

Permission from the Institutional Research and Ethics Committee (IREC) at DUT was granted to conduct this research study (IREC 005/20) (Appendix 1). Permission was sought and granted by the University Gatekeeper Permission Committee (Appendices 1a and 1b). Thereafter, permission was sought and granted by the Head of Department of Chiropractic (Appendices 2a and 2b). The four principles of research ethics, namely autonomy, justice, beneficence and non-maleficence, were applied in the study (Creswell 2009).

3.9.1 Autonomy

Autonomy is a term used to describe a person's or government's ability to make decisions, or speak and act on their own behalf, without interference from another party (Gelling 2015). To ensure the autonomy of this study, the participants were given freedom to speak when raising their opinions and the researcher did not interfere with the participant's responses. There was no pressure from the researcher that could have influenced the potential participants to participate. The participants had the full right as to whether they wanted to participate in the study or not.

3.9.2 Justice

Justice refers to the concept of involving fairness, equality, and equitable treatment (Gelling 2015). To ensure justice, the researcher was always fair to the participants when conducting this research and the needs of the participants always came before the objectives of this study.

3.9.3 Beneficence

Beneficence is a concept in research ethics which states that researchers should have the welfare of the research participant as a goal of the research study (Gelling 2015). This study did not expose the participant to any harm by discussion of traumatic experiences or private experiences that the participants might not wish to discuss, or by breaching of confidentiality and privacy. A copy of the thesis was also made available in the institutional repository. The findings of the study were made available to participants upon request, which may be of benefit to the participants.

3.9.4 Non-Maleficence

Non-maleficence means non-harming or inflicting the least harm possible to reach a beneficial outcome (Gelling 2015). To ensure this principle, the researcher protected the participants from exploitation. Any information provided by the participants were protected. The information that the participants provided was stored on a hard drive and secured with a confidential password.

3.10 SUMMARY OF THE CHAPTER

This chapter explained the research protocol used in this study and clarified how data were obtained and analysed.

The next chapter presents the findings of this study.

CHAPTER 4

PRESENTATION OF FINDINGS

4.1 INTRODUCTION

This chapter presents the results obtained from the thematic analysis of 10 semi-structured interviews of the registered sixth year, master's students of 2022 at DUT, who participated in this study.

4.2 GENDER, AGE AND ETHNICITY OF THE PARTICIPANTS

10 Chiropractic master's students participated in this study. Half of the participants in the study were females ($n=5$; 50%) and the remainder of participants were males ($n=5$; 50%). There was a diverse ethnic range in the study with four Indian participants (40%), one white participant (10%), three black participants (30%), one coloured participant (10%) and one Asian participant (10%).

The age group of participants was between 23 to 33 years of age and the mean age of the participants was 26 years. Standard deviation of the age of the participants is 3.2.

4.3 THEME ONE: IDENTIFICATION AND MANAGEMENT OF YELLOW FLAGS

For management to be effective, it would be beneficial for chiropractic students to be able to recognize yellow flags. There is no perfect definition of 'psychosocial factors' available in the literature (Sanders *et al.* 2013) and this might be the justification for the inadequate definition that the participants use.

4.3.1 Limited Description of the Term "Yellow Flags"

Although most participants believed they could identify patients' psychosocial elements right away, it became clear from additional conversation that their comprehension of what psychosocial factors actually are, was limited. The majority

of research participants in this study only described the psychological elements as stress, depression and anxiety that could attribute to a patient's pain. Most did not mention anything about the beliefs, appraisals, judgements regarding their patients' pain.

When asked to identify the meaning of yellow flags, the participants delineated the following:

Okay so yellow flags are similar to red flags but less severe. (Participant 8)

Okay so for me I think it's basically like psychosocial problems patients present with especially when they come in for treatment, a lot of them don't realise they have them I think we pick it up because like when we treat patients and stuff we are able to pick up what yellow flags they have etcetera. (Participant 9)

Okay so a yellow flag is like the psychosocial aspect of a patient so it's gonna be your stress anxiety and depression or even factors at home or based in the treatment itself. (Participant 5)

Only one participant mentioned one the most important factors of yellow flags – that they contribute to the chronicity of an acute patient when left untreated:

A yellow flag are psychosocial issues that have an impact on a person's chronic condition and can cause an acute one to become chronic. (Participant 3)

4.3.2 Uncertainty Pertaining to Meaning of the Term Yellow Flags

Many were uncertain and used words such as “*I think*” and “*I don't really know but...*” when asked to describe the meaning of a yellow flag. Some views of the participants were as follows:

Okay so for me I think it's basically like psychosocial problems patients present with especially when they come in for treatment, a lot of them don't realise they have them I think we pick it up because like when we treat patients and stuff we are able to pick up what yellow flags they have etc. (Participant 9)

So, I think a yellow flag is something to do with psychosocial factors for example depression and anxiety and that kind of stuff. (Participant 2)

I don't know how to put it but I think they are just psychological issues that patients deal with, but then they are also things that are commonly overlooked when treating a patient. (Participant 1)

4.4 THEME TWO: ASSESSMENT AND MANAGEMENT OF YELLOW FLAGS

4.4.1 The Use of Yellow Flag Assessment Tools

Multidimensional screening tools, such as the SBT and OSPRO-yellow flags are useful prognostic indicators of long-term disability and the presence of yellow flags that may be contributing to patient presentation, respectively (Van Wyngaarden, Noehren and Archer 2019). This can guide both the treatment and administration of specific, unidimensional psychosocial assessment tools. This interview revealed that participants only use their intuition to assess the patient. They also looked at non-specific patient behaviours and verbal cues that they patients demonstrated. This is similar to a study on physiotherapists, where the participants reported that they did not conduct any formal psychosocial assessment (Singla et al 2014). Instead, they reported a tendency to merely sense a psychosocial problem when the patient walks into the room, by examining the way they sit, the way they talk and the way they behave. When the participants were asked to describe their assessment of yellow flags, the following views were expressed:

I have done a certificate in psyche before so I kind of draw on that to help me see things in the consult. I see their body language, the way they talk about their pain, the way they carry themselves. (Participant 5)

So visually I would obviously see if they are stressed or appear nervous uhm if they have a short attention span or if they are constantly on edge. On the actual case history, I would note if there's any changes in the family history or background or where they stay that could affect them. Things like having a handle bar in a home will help them mentally. So those are things to note. So those are the visual ques. Then verbal cues would be things like noting when they complain about the patient. (Participant 7)

So on history I take note of psychosocial. If you ask about home situation and daily life and they start talking about my son is giving me this problem or I lost my job so when we start to unravel each question they start to open up. With the physical exams people are fidgety and can't sit still and we take note.
(Participant 9)

4.4.2 Management of Yellow Flags Based on Intuition

There is increasing evidence that psychosocial factors play an important role in musculoskeletal presentations/conditions, particularly in the maintenance of musculoskeletal symptoms and disability (Singla *et al.* 2015). It is therefore pertinent that chiropractic students know how to address low back pain in the different ways that it presents. When asked to describe the management protocol of yellow flags the chiropractic master's students delineated the following:

Recently I had a stroke patient. The left side was paralysed and then. So it was the stress that came with the whole thing of my patient being immobile now. So it was an issue of the wife having to deal with dressing the patient, so the patient feels like he is burden to his wife. Yes, I did suggest to them that maybe it would be wise to just see someone or someone that they would want to talk to about their issues. (Participant 1)

It always depends on the patient. So every patient is slightly different right. So, we can't just apply blanket treatment style. So that is one thing I have learnt on my own and what makes treating patients with yellow flags slightly differently. So you have to address them uniquely because the yellow flag constellation is different to another patient's yellow flag constellation. So you have to factor that in when you approach the patient. (Participant 7)

I just let them talk but it does not change the way that I would manage them. (Participant 8)

So it's a choice so I try not to say okay I think you should get needles so if they don't want to do something I just respect that because at the end of the day it will help with their treatment. It is very mental so if they don't think that something will help I just respect it. So I use alternative forms of treatment so I think ischaemic compression works just as well as dry needling and even patients who don't like adjustments and don't like the clicks so I just mobilise

and use an activator just to give them that same motion and trying to put back motion into the joints. So I don't try and convince them otherwise because at the end of the day they will come back and say you know you made me do this this this and it didn't help me so what is the point. Even though we are taught that for example needling will help somebody is also able to think "okay this will help me". A lot of them I feel like when they talk it helps a lot and talking is therapeutic to them. and I just allow them to talk. I just put myself in their shoes and tell them to just take each day as it comes. Also stress is a part of life it's how you deal with it and encourage them to do things that will take their mind off things like invest in a hobby or go for a run or walk, they don't have to do big things. Because the stress contributes to a lot of panic. (Participant 9)

I just empathized with her and kind of motivated her to do a bit of exercise and to not be scared of doing activities and that they wouldn't cause pain. I would motivate her to come in for few treatments so that we could relax her muscles and help with the musculoskeletal pain. So I just motivated the patient to be more active. (Participant 10)

One participant also stated that they would refer a patient if they were unable to treat them themselves:

I would obviously speak to them and motivate them. If that doesn't help, then I would obviously want to refer out to a psychiatrist if that was severe. But honestly it is dependent on the patient. (Participant 2)

4.4.3 Documentation of Yellow Flags on the SOAPE Note

Clinical record keeping is an integral component in good professional practice and the delivery of quality healthcare (Mathioudakis *et al.* 2022). Regardless of the form of the records, good clinical record keeping should enable continuity of care and should enhance communication between different healthcare professionals (Mathioudakis *et al.* 2021). At the DUT CDC, the chiropractic students draw up a SOAP note, detailing subjective, objective, assessment, and the management plan. When asked to detail their approach to recording of yellow flags, contrasting views were expressed by the participants:

I have never written it in my soap note because we don't have a section where we can address such things. So it's not something that I would write. (Participant 1)

To be honest, no. I might tell them but if it's not significant, which for me it hasn't been, so I don't write it down in my SOAP note. It's a very benign thing to me. (Participant 2)

I think I've written like highly stressed. One of the patients "his mom got shot in front of him" so that's obviously very significant. Or people that I need to refer for further. (Participant 5)

Yes, I will write it down. So what I do is I have a main diagnosis and I'll put differentials, just to note that there are possible yellow flags that the patient might be dealing with. And if I am able to tackle... certain things as chiropractors we aren't able to tackle, and others we are. So if I can I just advise the patient based on that kind of that. So it is part of the treatment, although it is not treatment that we do. (Participant 7)

No I don't record things like that. Only musculoskeletal stuff. (Participant 8)

4.5 THEME THREE: LIMITATIONS AND OTHER CHALLENGING FACTORS PERTAINING TO THE TREATMENT AND MANAGEMENT OF LOW BACK PAIN PATIENTS WITH YELLOW FLAGS

4.5.1 Educational Limitation in the Management of Low Back Pain Patients with Yellow Flags

The majority of the participants expressed their views that they do not have enough theoretical knowledge when it comes to treating and managing a low back pain patient presenting with yellow flags. The participants described the theoretical knowledge as limited, and they said that they should be exposed to relevant education earlier in the chiropractic course. Having only one module that touched lightly on the presentation of yellow flags only provided the foundation thereof. When the participants were asked about the theoretical component of the psychology module, the following views were expressed:

The only knowledge I have regarding yellow flags are what I have been taught in 5th year. That they are psychological issues and that they are commonly overlooked and that they are important factors, since it can affect the treatment outcome of a patient. Like their prognosis won't necessarily be good because there are underlying issues that have been overlooked. (Participant 1).

In fourth year, I was first introduced to yellow flags when I was doing CPP4 in 2020. We didn't go in depth we just brushed through it briefly and left it and we were mainly taught about anxiety depression and stress and that kind of stuff. We weren't really taught how to manage such a patient in clinic. (Participant 2).

...am not well equipped and advise them because I don't have enough knowledge to give proper advise to them... (Participant 10)

4.5.2 Practical Limitation in the Management of Low Back Pain Patients with Yellow Flags

The clinical practicum of healthcare students is a critical aspect of their career (Mathioudakis *et al.* 2022). When the participants were asked to emphasize the clinical practical aspect of the yellow flag module, there were conflicting views on the knowledge that was gained and the clinical application of the knowledge. They also stated that their inadequate psychosocial assessment and management skills steered them away from looking at psychosocial factors. Some master's students also suggested that they preferred to refer these patients to other health professionals, especially if the patient elicited signs of self-harm rather than assessing them themselves. The views towards the practical aspect were as follows:

We weren't really taught how to manage a patient with low back pain, but it was just theoretical topic on its own. So not having that experience really limited me. I don't always know what to say to my patients. (Participant 1)

Because I'm not a professional psychologist it is very hard to address those issues. So no. I lend an ear but I wouldn't say I manage those issues how they are meant to be managed. Even though we do social studies and psychopathologies in second and third year it is very hard to decipher what

the problem is. If the patient doesn't disclose, then it is hard to tell what exactly is wrong. And if the patient opens up to me I can advise them for example tell them to exercise or take a walk to decrease the stress levels because studies have proved that exercise produces endorphins so that it decrease the stress with to cope with whatever it is that they need to cope with because life is stressful on a day to day basis. (Participant 2)

Because I'm not well equipped and advise them because I don't have enough knowledge to give proper advice to them. So I notice these things but I tend not to give too much advise to them. But if I happen to see something that is really alarming, I would refer them to a psychologist because I am not well, sort of, knowledgeable. (Participant 10)

I have referred out some patients and even to the internal DUT counselling for some of the students that I treat if I feel like it's beyond me. (Participant 5)

4.5.3 Clinical Instructor Interest in the Management of Patients with Yellow Flags

Most of the participants narrated that that they do not discuss any yellow flag findings with the clinical instructor because they felt as if the clinicians were not interested in any yellow flags. Below are three of the participant's views:

I don't discuss it with a clinician because it is not their point of interest, I don't know. Because they don't find it relevant. It's something that they aren't keen to discuss with you. They are interested in what you will treat at that point in time. (Participant 1)

You have to be practical. I don't think clinicians are very much interested in how stressed my patient is. Maybe if they had severe depression then the clinicians would be more interested, but I don't think they generally care about work related stress that my patients are experiencing so they don't really care much. (Participant 2)

No I don't find the need to we only focus on severe symptoms like biomechanical stuff. (Participant 8)

Another participant said they were able to open up about yellow flags and patient management since a clinical instructor exhibited an interest in them.

I remember for my post stroke that we spoke about, I had a chat with the clinician that had an interest with auxiliary therapies and they were recommending TENS. So that kind of discussion went quite well. So, every clinician has a field of interest that they do so they bring their uniqueness of how to tackle a situation. So depending on who the clinician is and knowing their interest help me to open up to them regarding yellow flags and how to manage that patient. (Participant 7)

4.6 SUMMARY OF THE CHAPTER

The themes have shown that the chiropractic master's students had a general overview of how chronic low back pain patients with yellow flags present, and the management towards them. The chiropractic master's students had similar responses on how to manage a yellow flags patient during their clinical practicum. In terms of the practical knowledge and experience, the participants in this study explained that they lacked clinical experience in the management of CLBP patients with yellow flags and, therefore, their confidence was reduced. With regards to the theoretical components of yellow flag patients, the participants responded that there were difficulties in their application of their theoretical knowledge to the clinical setting. The chapter that follows describes these findings with those from relevant literature.

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

This chapter discusses and interprets the findings of the study in the context of the identification and management of yellow flags in chronic low back patients by registered master's degree chiropractic students. There were 36 registered master's degree chiropractic students. A small sample size in qualitative research is used to capture the fundamental case orientated analysis (Sandelowski 1995). As a result, the recommended participants were 10 and 10 participants were interviewed as data saturation was reached.

5.2 AIM

The aim of the study was to explore the identification and management of yellow flags in chronic low back pain patients by registered chiropractic master student interns.

Three main themes were identified:

Theme One: The identification and knowledge of yellow flags.

Theme Two: Assessment and management of yellow flags.

Theme Three: Limitations and other challenging factors pertaining to the treatment and management of yellow flags.

The themes and subthemes were interpreted and discussed below.

5.3. THEME ONE: IDENTIFICATION AND MANAGEMENT OF YELLOW FLAGS

It is critical for chiropractic student interns to be able to recognize yellow flags, so as for it to be managed effectively. There is no perfect definition of 'psychosocial

factors' available in the literature (Saunders *et al.* 2018) and perhaps this serves as the reason for the limited definition that the participants choose.

5.3.1 Limited Description of the Term “Yellow Flags”

Although most participants believed they could identify patients' psychosocial elements right away, it became clear from additional conversation that their comprehension of what psychosocial factors actually are, was limited. Singla *et al.* (2014) conducted research pertaining to the physiotherapy students' assessment of psychosocial and found similar results, where many participants in this research limited their description of psychosocial factors to the factors that cause delay in recovery or the chronicity of the condition. Some related psychosocial factors only to the compensable state of patients such as work cover or insurance (Singla *et al.* 2014).

5.3.2 Uncertainty Pertaining to Meaning of the Term Yellow Flags

The purpose of medical terminology is to create a standardized language for medical professionals (VirtualCollege 2015). This language helps medical staff communicate more efficiently and makes documentation easier. This standardized use of medical language helps to avoid errors especially when documenting a patient's condition and medical needs (Medical Translation in all Major Business Languages, 2022). Heming and Nandagopal (2014) stated that comprehending English medical terms represents a major obstacle for medical students, especially the non-native English-speaking learners that might lead some of them to failure sometimes. When asked to describe the meaning of a yellow flag, many participants were uncertain and used words such as “I think” and “I don't really know but...” Singla *et al.* (2014) conducted a similar study on physiotherapy students to obtain understanding regarding the physiotherapists' knowledge regarding yellow flags. One of the participants in Singla's study narrated the following: “I am still unclear about what 'psychosocial' means. I didn't think that is very clear.” This coincides with the responses of the chiropractic master's students.

5.4 THEME TWO: ASSESSMENT AND MANAGEMENT OF YELLOW FLAGS

5.4.1 The Use of Yellow Flag Assessment Tools

For individuals with musculoskeletal pain, psychological distress brought on by pain has a negative impact on functional outcomes and is a predictor of impairment and use of medical services (Vargas-Prada and Coggon 2015). Numerous studies have demonstrated that, compared to physical parameters, such as strength and range of motion, psychological factors may be more strongly associated with changes in pain intensity, the frequency of doctor visits, and physical disability (Keeley *et al.* 2008)

Despite this consistent data, orthopaedic physical therapy practice does not always include routinely assessing pain-associated psychological distress (also known as yellow flags) (Lentz *et al.* 2022). This may be connected to the widespread uncertainty regarding which precise psychological elements ought to be examined and how findings from the initial and subsequent assessments ought to be effectively incorporated into clinical decision-making procedures (Alexanders, Anderson, and Henderson 2022)

For instance, recognizing the presence of depressed symptoms may signal the requirement for a referral to a different healthcare professional (such as a clinical psychologist) (Nicholas *et al.* 2011).

Although there are many yellow flags assessment tools available, none of the participants in this study used these to assess their patients.

5.4.2 Management of Yellow Flags Based on Intuition

Using semi-structured interviews with private musculoskeletal practitioners, Pincus *et al.* (2014) conducted qualitative study that revealed that although physiotherapists were aware that psychosocial factors could pose challenges to recovery, they did not believe it was their responsibility to offer guidance on these issues. This is in contrast with the findings of this study since the master's students in this study stated that they always offer advice. The majority of the participants in this study also mentioned that they use their intuition and what they feel is the "right" thing to say to their participants in this study.

5.4.3 Recording of Yellow Flags on the SOAP Note

The Subjective, Objective, Assessment and Plan (SOAP) note is an acronym representing a widely used method of documentation for healthcare providers (Gogineni, Aranda and Garavalia 2019). The SOAP note gives healthcare professionals a tool to organize and structure their documentation (Gogineni, Aranda and Garavalia, 2019). The SOAP note helps guide healthcare workers use their clinical reasoning to assess, diagnose, and treat a patient based on the information provided by them. SOAP notes are an essential piece of information about the health status of the patient as well as a communication document between health professionals (Podder and Ghassemzadeh 2022). Likewise, the chiropractic master's students at DUT also take this documentation approach when presenting patient cases to the clinical instructor. Only a few master's students reported that they documented the yellow flag findings in this study.

5.5 THEME THREE: LIMITATION AND OTHER CHALLENGING FACTORS PERTAINING TO THE TREATMENT AND MANAGEMENT OF LOW BACK PAIN PATIENTS WITH YELLOW FLAGS

5.5.1 Educational Limitation in the Management of Low Back Pain Patients with Yellow Flags

Healthcare education is meant to equip a healthcare student with the understanding of how diseases present and the ability to make an accurate diagnosis of that disease. (Naidoo 2021). Tez and Yildiz (2017: 550) state that medical textbooks are important in medical training but it is a disadvantage when a student recites the information, rather than understanding how a patient will present in front of them.

The registered chiropractic student interns learn a module focusing on the different types of yellow flags and the presentation thereof. Most of the participants expressed the opinion that they lacked sufficient theoretical knowledge when it comes to managing and treating a patient with low back pain who exhibits psychosocial flags. The participants felt that they needed more exposure to pertinent information early in the chiropractic course because they felt that their theoretical

understanding was lacking. The presentation of yellow flags was only briefly discussed in one module, which simply served as the foundation. Singla *et al.* (2013) conducted a qualitative descriptive study on the physiotherapists' assessment of patients' psychosocial status where it appeared that their participants had limited understanding of what the psychosocial factors entailed. This agrees with the results of this study and the existing literature, that there is a gap within the theoretical knowledge and application of it, thereby impacting a student's management towards a low back pain patient with yellow flags.

Hashemiparast, Negarandeh and Theofanidis (2019: 405) conducted a study on nursing students in Iran and established that, due to the lack of a supportive learning environment, students were unable to apply their theoretical knowledge to a clinical setting during their studies. This also agrees with the results of this study, and the existing literature, that there is a gap within the theoretical knowledge and application of it, thereby impacting students' management towards a low back pain patient presenting with yellow flags.

5.5.2 Practical Limitation in the Management of Low Back Pain Patients with Yellow Flags

According to the literature, practical experience is a key component of clinical training (Saarikoski 2017). This study has demonstrated that the master's students' studies of the yellow flags only gave them limited amount of practical knowledge. Participants acknowledged that their ability to adapt their knowledge of yellow flag patients to a clinical training setting was constrained. Practical training plays a vital role in the studies for healthcare professionals as it assists a student to specialize in a field of interest (Anjum 2020).

According to research, medical students must use proactive learning strategies throughout their studies in order to acquire the clinical expertise they will need for their future careers as practitioners, and to meet the demands of providing patients with the best possible care with the minimal risks (Cho *et al.* 2017).

According to Thomas (2019), resources in the healthcare profession should include social and educational contexts for students to develop the skills necessary to deliver high-quality healthcare during the academic and clinical preparations. Therefore, this study has demonstrated that a student interns' clinical decision-

making and patient management are in doubt when they lack practical knowledge and the application of academic information.

Although participants acknowledged the value of practical training during their research, they placed a lot of emphasis on the limited management abilities they had learned for low back patients with yellow flags. In a study of recently graduated physiotherapist, Parker et al. (2015) found that the inability to apply information in a clinical context led to a loss of confidence in the physiotherapists' future careers, which also supports the findings of this study. This raises questions about a student intern's capacity for making clinical judgments in private practice. For a student to achieve the best learning outcome through their duration of studying, the student needs to be able to integrate the knowledge into different scenarios and be able to actively participate in discussions (Carstensen *et al.* 2020:2).

5.5.3 Clinical Instructor Interest in the Management of Patients with Yellow Flags

The transitional journey of a student intern into a qualified practitioner brings together different experiences that influence the professional life of student. Becoming a registered practitioner comes with responsibilities and challenges, such as coming from a relatively protected environment to being expected to function competently on their own, thus resulting in work challenges such as stress, distress and burnout, amongst others, in new graduates (Sitobata and Mohammadnezhad 2021). Student resilience may be impacted by positive educator-student interactions (Froneman, Du Plessis and Koen 2016).

Many qualities define a positive relationship and create ways on how to create a powerful student teacher relationship. These can be seen to include good communication; a safe learning environment and mutual respects; a positive and patient attitude; student equality; and timely praise (Lee 2022).

The majority of the participants narrated that that they do not discuss any yellow flag findings with the clinical instructor because they felt as if the clinicians were not interested in any of their yellow flag findings. Protective factors, such as caring relationships, high expectations and opportunities to participate and contribute, improve not only students' academic performance but also strengthen their

resilience (Gizir and Ayden 2009). A few participants also mentioned that they only spoke to the clinicians regarding yellow flags if they showed interest.

A study by Plaut and Baker (2011), on the role of teacher-student relationships in medical education, found students who often feel too intimidated to express concern about discomfort, discrimination or psychological harm, and prevent the students from making appropriate clinical judgement. Although not to the same extent, the participants expressed discomfort when approaching the clinicians.

5.6 SUMMARY OF THE CHAPTER

The participants expressed similar views with regards to the management of CLBP patients with yellow flags. Each participant expressed the importance of knowing how a yellow flags patient presents to incorporate the biopsychosocial model of patient care in routine practice. Therefore, each yellow flags patient is unique and should be managed individually. The participants of this study explained that it was challenging to manage a CLBP patient with yellow flags with their own limited practical knowledge and the application of their clinical skills. The participants discovered that the management of yellow flags in CLBP patients is peculiar and complex and, therefore, integrating the management of CLBP holistically is a key aspect of the profession.

CHAPTER 6

CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

This study was aimed at addressing the identification and management of yellow flags in CLBP of the registered master's degree chiropractic students. This chapter discusses the strengths and limitations of the study, the conclusions drawn from the study and the recommendations based on the findings of the study.

6.1 RESEARCH POSITIONING

As a chiropractic student, the researcher was able to understand and empathize with the responses of the participants. The researcher was familiar with the clinical experiences of the participants during the management of yellow flag patients in their clinical practicum. This enabled effective interactions with the participants and therefore influenced comprehensive interpretations of the data.

6.2 SUMMARY OF THE STUDY

The aim of this study was to describe and explore the identification and management of yellow flags in CLBP. The responses received from the participants to the interview questions have been explained in chapters four and five respectively.

6.2.1 Research Question 1: Describe Your Understanding of a Yellow Flag

Although most participants believed they could identify patients' psychosocial elements immediately, it became clear from additional conversation that their comprehension of what psychosocial factors actually are, was limited. The majority of research participants in this study only described the psychological elements as stress, depression and anxiety that could attribute to a patient's pain. Most did not

mention anything about the beliefs, appraisals and judgements regarding their pain. Only one participant mentioned one the most important factors of yellow flags; that it contributes to the chronicity of an acute patient when left untreated.

All participants reflected on the reasons behind their limited knowledge of psychosocial factors and lack of clear understanding of the process of psychosocial assessment for their patients. The most common reason cited by participants as a barrier for conducting an effective psychosocial assessment was limited education they had received, whether it was in undergraduate and postgraduate courses or lack of professional guidance while working as professionals. This shows that there is a lack of in-depth understanding of yellow flags.

6.2.2 Research Question 2: Explain Your Knowledge Regarding Yellow Flags

Many were uncertain and used words such as “I think” and “I don’t really know but...” when asked to describe the meaning of a yellow flag. Many participants expressed that they were not very knowledgeable when it comes to yellow flags. The reason behind it was that they felt that the education they received regarding yellow flags were very minimal. The master’s students attested that it was not a module that was done in depth, which could be the justification for their reduced knowledge regarding yellow flags.

While the participants in this study identified broad factors such as compensable status, work and chronicity, they did not appear to have a means to judge the contribution of such factors to individual patients' disability and did not consider or have ways to evaluate other important personal and environmental components of psychosocial factors, such as education, work and family attitudinal and support influences. The limited knowledge of chiropractic master’s students in this study may be related to the varied quality of definitions and explanations of psychosocial factors provided in the chiropractic literature and to limitations in chiropractic education regarding psychosocial assessment and management.

6.2.3 Research Question 3 and 4: How Have You Addressed and Managed Yellow Flags in a Chronic Low Back Pain Patient?

In this study, the participants expressed that they address yellow flags in CLBP patients based on their intuition and what they feel is best to say to the patient at that particular point. The participants reflected that that the reason behind them

taking this approach was the fact that they did not have formal theoretical or practical training as to how to manage such patients. This caused the master's students to draw from their own empathetic nature during the management of such a patient.

The master's students delineated that the most important factor for them was allowing the patient to talk, and attentively listening when needed. A few participants also stated that they would and have referred a patient to counselling and psychology for proper management, since they felt that they were not knowledgeable to tackle

6.2.4 Research Question 5 and 8: Describe the Factors That Have Impacted Your Management of a Patient with Yellow Flags and How Did You Overcome Them and What Challenges Did You Face?

The participants in this study expressed that they felt very unknowledgeable with regard to the management of yellow flags and felt that it limited their management protocol. It was also noted that most of the master's students expressed the importance of the biopsychosocial model but the biomedical model, which was taught to them, allowed them to focus mainly on treating the physical pain of the patient.

6.2.5 Research Question 6 and 7: Describe the Kind of Information That You Pay Special Attention to in the History and Physical Examination in Order Determine the Presence of Yellow Flags

The interviews revealed that participants only use their intuition to assess the patient. The study also investigated non-specific patient behaviours and verbal cues that they patients demonstrated. This is similar to a study on physiotherapists, where the participants this study reported that they did not conduct any formal psychosocial assessment (Singla *et al.* 2014). Instead, they reported a tendency to intuitively sense a psychosocial problem when the patient walks into the room, in the way they sit, the way they talk, the way they behave. The participants reflected on the reasons behind their limited knowledge of psychosocial factors, and lack of clear understanding of the process of psychosocial assessment for their patients. The most common reason cited by participants as a barrier for conducting an effective psychosocial assessment were limited education they had received, whether it was

in undergraduate and postgraduate courses, or lack of professional guidance by clinical instructors, while working student interns at the CDC.

6.2.6 Research Question 9: Upon Completion of the Necessary Examinations, Explain How You Record Your Findings in the SOAPE Note with Regard to Yellow Flags

At the DUT CDC, the chiropractic students draw up a SOAPE note. It is a practice of good record keeping instilled into the master's students, detailing subjective, objective, assessment, and the management plan. When asked to detail their approach to recording of yellow flags, contrasting views were expressed by the participants. Some reported that they did not find the need to record yellow flags, since they did not actively treat them.

6.2.7 Research Question 10: When Do You Find It Relevant and Necessary to Discuss Yellow Flag Findings with the Clinician on Duty in the Clinic, or When Do You Not See the Need to Discuss Those Findings?

This research study revealed that most master's students expressed their yellow flag concerns to a clinical instructor (clinician), only if they showed interest. The participants also delineated that most clinical instructors are only interested in the biomedical treatment of a patient.

6.3 STRENGTHS OF THE STUDY

Future registered chiropractic master's degree students will benefit from this study when they begin their clinical practicum. The researcher had the opportunity to acquire detailed responses from the participants on the management of CLBP patients with yellow flags during their clinical practicum. While this study focused on the management of CLBP patients with yellow flags, some aspects of this study gained insights into the knowledge and the skills acquired while managing yellow flags and the application of the psychology module to a practical environment during students' clinical practicum. Furthermore, the study population was first time, clinical practicum, registered, master's degree chiropractic students, which will prove valuable to future chiropractic students as they would be able to visualize, interpret and apply the clinical experiences with respect to managing yellow flags patients.

6.4 LIMITATION OF THE STUDY

This study was done at the DUT CDC. There were 36 registered master's degree chiropractic student. The findings of the study are limited to the participants of this study. The sample size was low, but this is in line with sample sizes for qualitative research. The factors resulting in the management of yellow flags in CLBP patients in this study may not be generalised to a wider context in terms of other parts of South Africa and internationally.

6.5 RECOMMENDATION

The chiropractic programme is responsible for addressing and ensuring that chiropractic students are competent in the theoretical knowledge of managing a CLBP patient with yellow flags, the application of clinical skills and the challenges they may experience during the management of an CLBP patient. Therefore, it is important for the registered master's degree chiropractic students to primarily focus on the information they are taught about yellow flags throughout their chiropractic training and conduct adequate research on the challenges faced in the management of CLBP patient.

6.6.1 Recommendations for the Chiropractic Programme at the Durban University of Technology

1. Post-qualification guidance on the management of CLBP patients should be incorporated into the master's year to prepare students for the management and challenges of a yellow flag patient in private practice.
2. The psychosocial module should incorporate a more detailed practical component, case base studies and talks and presentations focused on the clinical skills required and challenges faced in the management of an CLBP patient with.

6.6.2 Recommendations for Further Research

3. A study on this topic should be conducted at the other chiropractic school in South Africa, the University of Johannesburg, as this will prepare the first-

time registered master's degree students clinical experiences of the management in an CLBP patient with yellow flags. This can result in a comparison between the two institutions.

4. Further investigations on the management of CLBP patients with yellow flags by complementary and alternative practitioners can be done.
5. A study could be conducted on newly graduated chiropractors on the challenges they face during the management of CLBP patients with yellow flags in private practice.
6. A comparative study at the University of Johannesburg, reviewing the registered master's degree chiropractic students' perceptions on the practical training from both South African institutions of higher education could be conducted.

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APPENDICES

Appendix 1: DUT Ethical Clearance



Appendix 2a: Letter to the Gatekeeper Permission Committee

39 Bell Grove

Durban

4000

[Date]

Request for Permission to Conduct Research

Dear Gatekeeper Permission Committee

My name is Shameez Egumbo, a Chiropractic Masters student at the Durban University of Technology. The research I wish to conduct for my Master's dissertation which involves the identification and management of yellow flags in chronic low back pain by students at the Durban University of Technology Chiropractic Day Clinic

I am hereby seeking your consent to conduct research at the Chiropractic Day Clinic at Durban University.

I have provided you with a copy of my proposal which includes copies of the data collection tools and consent and/ or assent forms to be used in the research process, as well as a copy of the approval letter which I received from the Institutional Research Ethics Committee (IREC).

If you require any further information, please do not hesitate to contact my supervisor, Dr A. Abdul-Rasheed, email: ashuraa@dut.ac.za

Thank you for your time and consideration in this matter.

Yours sincerely,

.....

Shameez Egumbo

Durban University of Technology

Email: segumbo1@gmail.com

Cell no: 083 684 9092

Appendix 2b: Approval Letter from The Gatekeeper Permission Committee



Appendix 3: Letter of Information for Interview Participants



Dear Participant

Thank you for agreeing to participate in the study

Title of the Research study: Identification and management of yellow flags in chronic low back pain by students at the Durban University of Technology Chiropractic Day Clinic.

Principal Investigator/s/researcher: Miss Shameez Egumbo, (M. Tech: Chiropractic Candidate).

Co-Investigator/s/supervisor/s: Dr A. Abdul – Rasheed (M. Tech: Chiropractic) and Prof M.N. Sibiyi (D. Tech: Nursing).

Brief Introduction and Purpose of the Study: Yellow flags are common risk factors for the development of chronicity in low back pain. The aim of this study is to explore and describe the identification and management of yellow flags in chronic low back pain by student interns at the DUT Chiropractic teaching clinic.

Outline of the Procedures: You are invited to participate in a one-on-one interview that will take approximately 30-45 minutes. Interviews will be conducted at the research room of the Faculty of Health Sciences. The room is quiet and secure where you will be comfortable to express yourself. I will facilitate the interview discussion. For record purposes, I kindly request to audio-record the interview discussion.

Risks or Discomforts to the Participant: There are no anticipated risks or discomforts for participating in this study.

Benefits: The study will stimulate thought processes regarding your perception on management and identifying yellow flags.

Reason/s Why the Participant May Be Withdrawn from the Study: You may withdraw from the study at any time of the study. There will be no adverse consequences should you choose to withdraw from the study.

Remuneration: There is no remuneration for participating in this study.

Costs of the Study: You will not be required to pay any costs towards the study.

Confidentiality: Your name will not appear in the research documents including the interview guide. Codes instead of your name will appear in the research documents.

Research-related Injury: There is no anticipated research-related injury that is associated with this study.

Persons to Contact in the Event of Any Problems or Queries: Please contact the researcher on 083 684 9092 or my supervisor on 031 373 2102 or the Institutional Research Ethics Administrator on 031-373 2375. Complaints can be reported to the DVC: Research, Innovation and Engagement Prof. S. Moyo on 031-373 2577 or moyos@dut.ac.za

Appendix 4: Consent



Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Ms Shameez Egumbo 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 research, I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

| | | | |
|---------------------------------|-------------|-------------|------------------------------------|
| Full Name of Participant | Date | Time | Signature/ Right Thumbprint |
|---------------------------------|-------------|-------------|------------------------------------|

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

| | | |
|--------------------------------|-------------|------------------|
| _____ | _____ | _____ |
| Full Name of Researcher | Date | Signature |

| | | |
|---|-------------|------------------|
| _____ | _____ | _____ |
| Full Name of Witness (If applicable) | Date | Signature |

| | | |
|--|-------------|------------------|
| _____ | _____ | _____ |
| Full Name of Legal Guardian (If applicable) | Date | Signature |

Appendix 5A: Demographic Data

Participant Code:

Date of interview:

SECTION A: DEMOGRAPHIC DATA

Age _____

Gender _____

Race _____

Level of study _____

Appendix 5b: Interview Guide

SECTION B: INTERVIEW QUESTIONS

Main Questions:

- 6 Describe your understanding of a yellow flag.
- 7 Explain your knowledge regarding yellow flags.
- 8 How have you addressed yellow flags in a chronic low back pain patient?
- 9 Describe your management approach of patients with chronic low back pain and concomitant yellow flags.
- 10 Describe the factors that have impacted your management of a patient with yellow flags and how did you overcome them.

Sub-questions:

- 11 Describe the kind of information that you pay special attention to in the history and physical examination in order determine the presence of yellow flags.
- 12 During your consultation and interaction with a patient, what factors do you look out for that aid you in identifying yellow flags in a patient?
- 13 What challenges have you experienced in addressing yellow flags in a chronic low back pain patient?
- 14 Upon completion of the necessary examinations, explain how you record your findings in the SOAPE note with regard to yellow flags.
- 15 When do you find it relevant and necessary to discuss yellow flag findings with the clinician on duty in the clinic, or when do you not see the need to discuss those findings?

Appendix 6: Sample of a Transcript

Main Questions:

1. Describe your understanding of a yellow flag.

Okay so yellow flags are more like psychological problems or like indications that a patient presents with like depression or fear or fearful behaviours or like if they are fearful to walk around or to work. So things that may like sort of affect how they perceive their pain, and how that may affect them getting better.

2. Explain your knowledge regarding yellow flags.

It is different from red flags in the sense that it is not always life threatening all the time but can escalate or get to that point so it is something to note when you yourself treat the patient or in a multidisciplinary style of treating a patient, when you have to talk to your colleagues and come up with a plan or refer them to other disciplines to help them.

3. How have you addressed yellow flags in a chronic low back pain patient?

I have come across one that presented with yellow flags. So what they would do is exaggerate the kind of pain that they had. And would kind of not want to go to work and wanted an attendance letter to miss work, and would come to clinic to not to go to work. She had issues with sitting too long, her back would hurt. But each time the patient came for treatment and after re-examining the patient I could see that she had improvement. Her joint movements improved, her muscle spasms and trigger points got better but they kept complaining that their pain would just get worse and worse instead of getting better. I eventually sent her for some x-rays and they came back fine. When she came after the x-rays the patient said that it was bad and that there were terrible things going on but when you looked at the x-rays it wasn't so bad. There was just normal wear and tear of the joints. So how that patient perceived it just seemed that it was the worst thing that could ever happen to her.

4. Describe your management approach of patients with chronic low back pain and concomitant yellow flags.

I just empathised with her and kind of motivated her to do a bit of exercise and to not be scared of doing activities and that they wouldn't cause pain. I would motivate her to come in for few treatments so that we could relax her muscles and help with the musculoskeletal pain. So I just motivated the patient to be more active.

5. Describe the factors that have impacted your management of a patient with yellow flags and how did you overcome them.

It always depends on the patient. So every patient is slightly different right. So, we can't just apply blanket treatment style. So that is one thing I have learnt on my own and what makes treating patients with yellow flags slightly differently. So you have to address them uniquely because the yellow flag constellation is different to another patient's yellow flag constellation. So you have to factor that in when you approach the patient.

Sub-questions:

1. Describe the kind of information that you pay special attention to in the history and physical examination in order determine the presence of yellow flags.

Okay so I would ask about their home situation so things about who they stay with, if they show any indications about depression feeling blue or they just talk negatively about the future or anything that is going on in their lives. That's the main and then in the case history I see if they just exaggerate the pain as if they are dying but also we would confirm that on the physical exam with certain test that we would do to see if they got. Some of them would say that they got pain going down the arm or legs but when you do the physical exam you are unable to elicit what you should be finding.

2. During your consultation and interaction with a patient, what factors do you look out for that aid you in identifying yellow flags in a patient?

Okay so the way they dress themselves could be pointers as to whether they have depression and if they appear as if they have anxiety

3. What challenges have you experienced in addressing yellow flags in a chronic low back pain patient?

Since we are more into musculoskeletal I can't really address said factors or see what is actually bothering them because I'm not well equipped and advise them because I don't have enough knowledge to give proper advice to them. So I notice these things but I tend not to give too much advise to them. But if I happen to see something that is really alarming I would refer them to a psychologist because I am not well, sort of, knowledgeable.

4. Upon completion of the necessary examinations, explain how you record your findings in the SOAPE note with regards to yellow flags.

I have never written down yellow flags in my SOAPE note. I guess we don't really learn about a yellow flag other than it was an extra thing that we might come across but it's something I may discuss but I won't say it on my SOAPE note.

5. When do you find it relevant and necessary to discuss yellow flag findings with the clinician on duty in the clinic, or when do you not see the need to discuss those findings?

I see the need if the pain isn't improving and there's no improvement cause its gonna affect the patient's pain and for how long it may go for so yeah. It is important but I don't always discuss it.

Appendix 7: Certificate of Proofreading by a Professional Editor



Helen Bond

IMPELA EDITING SERVICES

impelaediting@gmail.com

079 395 5873

30 August 2022

CERTIFICATE

Shameez Egumbo

shameezegumbo1@gmail.com

Dear Shameez

Thank you for using Impela Editing Services to edit your Master's dissertation entitled "*Identification and management of yellow flags in chronic low back pain by Chiropractic Master's students at a University of Technology teaching clinic*".

I have proofread for errors of grammar, punctuation, spelling, syntax and typing mistakes. I have formatted your work and checked the references (this means checking the formatting), as according to the format specified by Frontier and Harvard referencing. I believe your work to be error free.

PLEASE NOTE: Impela Editing accepts no fault if an author makes changes to a document after a certificate has been issued.

I wish you the very best in your submission.

Kind regards

Helen Bond (Bachelor of Arts, HDE)

Appendix 8: Turnitin Report

Shameez Egumbo Thesis

ORIGINALITY REPORT

| | | | |
|-------------------------------|-------------------------------|---------------------------|-----------------------------|
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