

Barriers and Facilitators of Activity Normalisation for People with Chronic Low Back Pain in Saudi Arabia

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Abstract

Background

Low back pain (LBP) is a debilitating condition affecting 7.8 million people in the United Kingdom. A third of people with LBP develops chronic low back pain (CLBP). Individuals experiencing CLBP appear to encounter issues with managing their pain. Importantly, returning to normal activity, or normalisation, after physiotherapy has become a major concern among Saudi Arabian people experiencing CLBP. CLBP patients and healthcare professionals appear to possess various perceptions and beliefs about returning to normal activity, which may serve as barriers to or facilitators of recovery. Furthermore, the degree to which patients in Saudi Arabia achieve activity normalisation after physiotherapy interventions for CLBP is little understood and under-researched.

Aims

The aims of this study were i) to identify which psychosocial factors limit or enhance patients' return to normal activities and/or participation; ii) to explore the experiences, attitudes, beliefs and perceptions of healthcare professionals (physiotherapists and orthopaedic surgeons) and people with CLBP in Saudi Arabia regarding the barriers and enablers to activity normalisation after physiotherapy; and iii) to investigate how beliefs about physiotherapy influence how people with CLBP in Saudi Arabia return to normal activities and participation.

Methods

This programme of research comprised three studies: (i) a systematic review of the literature investigating the psychosocial factors that affect return to normal activities and/or participation by people with CLBP; (ii) a qualitative study exploring patients' and physicians' views, perceptions and experiences of the barriers and enablers to normalisation after physiotherapy; and (iii) a cross-sectional survey investigating how physiotherapy beliefs influence how Saudi Arabian people with CLBP return to normal activities and participation.

Results

The systematic review found that fear-avoidance beliefs (physical and work), kinesiophobia and catastrophising were associated with poor functional status and disability. Depression, anxiety, pain severity, widespread pain, chronic pain grade and bothersomeness were associated with disability, functional outcomes and return to work. Positive physician–patient relationships might have positively influenced patients' health outcomes.

In the qualitative study, both patients and clinicians highlighted factors hindering recovery and activity normalisation: a lack of reassurance, encouragement, education and awareness regarding CLBP itself; fear of pain and recurrence of injury; conflicting diagnoses; ambiguous advice; and the complexity of exercises. Psychosocial support from different sources helped improve patient outcomes and recovery, as reported by both patients and clinicians. Patients and clinicians stated that the Saudi healthcare system hindered timely treatment due to a poor referral system and a lack of specialised clinics and clinical guidelines related to CLBP management.

The cross-sectional survey revealed that socioeconomic factors were negatively correlated with patients' beliefs about fear of pain and pain coping. LBP duration, pain intensity and pain interference in normal everyday activities were positively correlated with conflicting diagnoses, patients' beliefs about pain coping, fear of pain and the quantity and complexity of exercise. Psychosocial factors were positively correlated with conflicting diagnoses, conflicting advice, patients' beliefs about the importance of clinical guidelines, coping with pain, fear of pain and the quantity and complexity of exercise.

Conclusions

Patients in Saudi Arabia require education on the fact that engaging in physical activity is unlikely to increase disability but, instead, acts to help patients better manage their condition and reduce pain. Consequently, there is a need for patients with CLBP to be informed of the benefits of sustained exercise and rehabilitation to improve their physical function. As suggested by both patients and clinicians, healthcare professionals should focus on interventions that address these beliefs during rehabilitation to improve patients' physical functioning by offering psychosocial support, which has the potential to lead to activity normalisation and overall patient recovery. Finally, clinical guidelines and pathways should be created to guide healthcare practitioners in how to holistically address the needs of patients. With both clinicians and patients in Saudi Arabia citing communication as an issue, creating a care pathway could enhance the quality of communication between healthcare practitioners and their patients. Promoting a multidisciplinary team approach is critical to management of CLBP.

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Chapter 1 Introduction

1.1 Definition of chronic low back pain

As early as the 16th century, non-specific pain in the lower back was identified as a debilitating condition and was termed *lumbago*, from Latin meaning 'weakness in the lower back and joints' (Simpson and Weiner, 2015). In contemporary medicine, this has been replaced with the more descriptive name *chronic low back pain* (CLBP). Chronic pain is defined as pain that persists beyond the normal healing time (Treede et al., 2015; Maher et al., 2017, Van Erp et al., 2018). Current clinical guidelines describe CLBP as pain or discomfort that is localised between the crease of the buttocks and the inferior border of the lower rib, usually in spinal region L1–S1, and may or may not include referred leg pain (National Institute for Health and Clinical Excellence [NICE], 2016). A key fundamental feature of the condition is its non-specific nature, with fewer than 15% of cases having identified causes.

The lack of defined causation makes diagnosis and treatment of CLBP problematic (Airaksinen et al., 2006; Maher et al., 2017; Hartvigsen et al., 2018). Imaging modalities such as magnetic resonance imaging (MRI) and X-rays are of little use and, at best, can only rule out other diseases, such as ankylosing spondylitis (Airaksinen et al., 2006; NICE, 2016; Maher et al., 2017; Hartvigsen et al., 2018). In the absence of a clear pathology, a key diagnostic criterion for this condition is persistent pain for a minimum of 12 weeks (Airaksinen et al., 2006, Brunner et al., 2013; Maher et al., 2017; Hartvigsen et al., 2018), although shorter episodes that recur within a 12-month period may also classified as CLBP (Hoy et al., 2010). There are three categories of low back pain (LBP): (1) serious spinal pathology; (2) neurological involvement; and (3) non-specific

LBP, which includes the majority of LBP sufferers (Waddell, 2004; Dionne et al., 2008; Maher et al., 2017). Non-specific LBP is defined as 'LBP not attributed to recognisable or known specific pathology, or a physical disorder resulting in pain and disability, [although] neither pain is as a direct physical consequence of dysfunction, nor does the pain automatically result in reduced function or disability' (Brunner et al., 2013, p.2).

Since the 1990s, a flag system has been developed to identify and categorise LBP (Leerar et al., 2007; Kendall et al., 2009; Main and George 2011 a, b; Nicholas et al., 2011; Maher et al., 2017). The flag system utilises a biopsychosocial model and provides explanations for why some patients do not recover as expected. In this framework, red flags are clinical indicators of potentially serious underlying conditions requiring further medical interventions, while yellow flags are psychosocial indicators suggesting increased risk of progression to long-term distress, disability and/or pain (Leerar et al., 2007; Kendall et al., 2009; Main and George 2011 a, b; Nicholas et al., 2011; Maher et al., 2017).

1.2 Epidemiology of chronic low back pain

Assessing the prevalence of CLBP is challenging as rates depend on the assessment timescale. In a review of 165 studies, Hoy et al. (2012) attempted to overcome this issue by classifying studies based on the assessment timescale. The results indicated that CLBP is very common, with a point prevalence of 18.3%, a monthly prevalence of 30.8%, a one-year prevalence of 38.0% and a lifetime prevalence of 38.8%. CLBP also appears to be moderately more common in women than men (35.3 ± 18.8% versus 29.4 ± 18.5%). It is more prevalent

in high-income countries where sedentary lifestyles predominate than in low-income countries (32.9 ± 19.0% versus 16.7 ± 15.7%). There is evidence of a significant ageing effect, with increasing rates throughout midlife and early old age (40–79 years old). Authors have also noted the relative paucity of data from non-English-speaking countries and the Middle East, in particular, and have called for more region-specific research on CLBP in such areas (Hoy et al., 2012).

In Europe, the lifetime incidence of LBP has been reported to be as high as 80%, albeit with wide confidence intervals (CI; Hoy et al., 2014; Hartvigsen et al., 2018). In the United Kingdom, around five million people per year develop CLBP, as found in the National Pain Audit (2012). Changing lifestyles appear to be responsible for the increase in CLBP prevalence over time (Waxman et al., 2000; Hartvigsen et al., 2018). Recent data indicate that CLBP accounts for the largest proportion of work-related musculoskeletal disorders (Health and Safety Executive, 2018). The prevalence is lower in age groups < 35 years old but increases thereafter, remaining high until retirement age (Health and Safety Executive, 2018).

1.3 Causes of chronic low back pain

Establishing the cause of CLBP is a major challenge for healthcare professionals. For the majority of patients presenting with CLBP, there is no relationship between imaging data and the presence or location of their discomfort. For this reason, NICE does not recommend X-rays or MRI for non-specific CLBP (NICE, 2016; Foster et al., 2018). In the majority of cases, patients have no identifiable underlying pathology (Hoy et al., 2012; Foster et al., 2018; Hartvigsen et al., 2018). The rest of cases can be attributed to

compression fractures, spondylarthropathies, spinal deformities (e.g. scoliosis and kyphosis) and spinal infections and neoplasms (Maher et al., 2017; Hartvigsen et al., 2018).

1.4 Risk factors of chronic low back pain

Given the difficulty determining underlying causes for most individuals with CLBP, establishing clear risk factors is a key objective in preventive medicine. Epidemiological data have clearly established advancing age as a risk factor (Hoy et al., 2012; Waterman et al., 2012; Hartvigsen et al., 2018). However, it is less clear if it is intrinsically due to age or is of a mechanical origin due to disuse atrophy, which accompanies the sedentary lifestyles common in older individuals. The physical factors related to the overall risk of CLBP have been widely investigated. Although the association among height, weight/body mass index (BMI) and CLBP incidence appears to be negligible (Shiri et al., 2010; Brooks et al., 2013; Hartvigsen et al., 2018), some studies have reported that high BMI increases CLBP risk (Chou and Shekelle, 2010; Heuch et al., 2013). Research has revealed that physical activity has a protective effect that can halt development of CLBP (Hendrick et al., 2011; Lin et al., 2011; Coenen et al., 2014; Hartvigsen et al., 2018). Higher risk of CLBP was found in blue-collar workers and those involved in labour-intensive jobs (Chou and Shekelle, 2010; Coenen et al., 2014; Hartvigsen et al., 2018). Smoking, multiple functional symptoms of other diseases and history of back pain are additional risk factors (Airaksinen et al., 2006; Burton et al., 2006; Shiri et al., 2010; Hartvigsen et al., 2018).

1.4.1 Psychosocial risk factors of chronic low back pain

The World Health Organization (WHO) broadly defines a psychosocial factor as any issue that influences the ways in which people manage the demands and challenges of daily life or that affects individuals' mental well-being and behaviour within their unique social and cultural contexts (WHO, 1994; Ramond et al., 2011). This concept was applied to CLBP in the 1990s, revising the understanding of what had been regarded as an entirely biological or mechanical condition (Ramond et al., 2011). Since then, a number of studies have identified psychosocial factors associated with increased risk of CLBP: socioeconomic status, education level, job satisfaction, occupational risks (Chou and Shekelle, 2010; Yang et al., 2016; Hartvigsen et al., 2018), depression, anxiety, pain control, fear-avoidance behaviour (FAB) and social judgement (Chou and Shekelle, 2010; Coole et al., 2010; Bunzli et al., 2013; Campbell et al. 2013a; Wertli et al., 2014 a, b; Pinheiro et al., 2015; Hartvigsen et al., 2018). These factors can be grouped into three broad categories: social and socio-occupational factors (e.g. education level and job satisfaction); psychological factors (e.g. anxiety and depression); and cognitive and behavioural factors (e.g. FAB and pain control).

Of these, social and socio-occupational factors have been recognised to be unrelated to CLBP outcomes, whereas some (but not all) aspects of psychological and behavioural factors have been found to be related (Ramond et al., 2011). In the UK, Foster et al. (2010) examined 20 psychological factors and their influence on clinical outcomes premised on fear-avoidance beliefs, illness perceptions, coping, self-efficacy beliefs, depression and anxiety among patients with LBP in general practice. The results revealed that only four

psychological factors (self-efficacy, personal control, illness identity and timeline chronic or acute cases) were associated with clinical outcomes, while other factors such as fear avoidance, catastrophising and depression were found to be insignificant (Foster et al., 2010). Although it must be noted that measurement of psychological factors is significant predictor of LBP outcomes, there are conceptual overlaps among the psychological measures used in research and clinical practice to assess psychological factors related to LBP, which most measures consider to be patients' emotional distress (Campbell et al., 2013b).

A consistent relationship between psychosocial factors and development of CLBP has been established, although the precise mechanism linking them is unclear. Higher risk of CLBP has been linked to job dissatisfaction, pay level, job insecurity, long working hours, employment status and litigation for previous back pain (Fayad et al., 2004; Chou and Shekelle, 2010; Pinheiro et al., 2015; Yang et al., 2016; Hartvigsen et al., 2018). Other risk factors include depression and poor self-rated health (Hoogendoorn et al., 2000; Burton et al., 2006; Pinheiro et al., 2015; Hartvigsen et al., 2018).

1.5 Economic impacts of chronic low back pain

The economic burden of CLBP is two-fold, including the overall cost to the economy and the cost of healthcare. The economic cost of CLBP is well documented: in the UK, the Office of National Statistics (ONS) reported a total of 700 cases of back pain per 100,000 workers (Health and Safety Executive, 2015). With an average absence of 14 days, this equated to 2,200,000 lost working days in 2017/18 (Health and Safety Executive, 2018). Ekman et al. (2005) estimated that the

indirect cost of CLBP to the Swedish economy is approximately €17,500 per case, six times greater than the direct healthcare costs.

1.6 Social impacts of chronic low back pain

A few researchers have examined the social impact of CLBP. In a meta-synthesis of 28 qualitative studies, Snelgrove and Liossi (2013) identified deleterious effects of CLBP on patients' social identity, interactions with healthcare professionals, social relationships with family and friends and coping with the consequences of their condition. According to a synthesis by Bunzli et al. (2013), the social context of CLBP results in emotional conflict between patients' beliefs and legitimate needs for support and the perceived failure of biomedical treatments to follow the expected 'diagnosis-treatment-cure' model. As a result, patients frequently seek opinions from multiple healthcare practitioners, which exacerbates the emotional conflict, manifested as disenchantment with medical treatment and simultaneous hope for effective recovery. More recently, Bailly et al. (2015) underlined patients' feelings of shame and frustration regarding their need for help with activities of daily living (ADL). Overall, patients experience a significant loss of social identity and feel that the lack of an evident cause of their disease increases misunderstanding of CLBP as a benign disease. A further social consequence of CLBP is that sufferers feel stigmatised due to the societal view of CLBP as a disease easily faked to obtain secondary gains (Bailly et al. 2015). Patients with CLBP have reported feelings of being unvalued by society and viewed solely as burdens (Smith and Osborn, 2007) or frauds (Coole et al., 2010).

1.7 Management of chronic low back pain

The aim of CLBP management is to enable patients to perform ADL with minimal discomfort. Unlike for other diseases, designing and implementing successful interventions to reveal the underlying mechanisms of CLBP is problematic (Grimshaw et al., 2004; Chou et al., 2007; NICE, 2016; Foster et al., 2018). However, successful rehabilitation is possible, and the available literature has clearly demonstrated that, regardless of their mechanism of action, physical activity and psychosocial counselling are effective, both individually and in combination (Moffett and McLean, 2006; Koes et al., 2010; Kamper et al., 2014; Chou et al., 2016; NICE, 2016; Maher et al., 2017; Foster et al., 2018; Van Erp et al., 2018).

Physiotherapy is a common treatment for CLBP and comprises therapeutic exercise, thermal modalities, education and advice (Kumar and Jim, 2010; Qaseem et al., 2017; Maher et al., 2017; Stochkendahl et al., 2018). These interventions encourage patients to return to normal function and aid in lessening their fear of physical activity. A stepped-care approach is frequently recommended, initially offering less-intensive interventions such as patient education, followed by more intensive interventions when required (Von Korff and Moore, 2001; Qaseem et al., 2017; Stochkendahl et al., 2018). Regardless of the treatment level, physiotherapists play vital roles in encouraging active self-management of CLBP and the associated pain (Moffett and McLean, 2006; Koes et al., 2010; Maher et al., 2017; Foster et al., 2018).

1.7.1 Physical management

Healthcare practitioners play critical roles in facilitating activity normalisation for patients with CLBP. Clinical guidelines for CLBP management (Grimshaw et al., 2004; NICE, 2016; Qaseem et al., 2017; Foster et al., 2018) recommend that healthcare practitioners advise their patients to return to work, avoid bed rest, stay active and practice self-management. These recommendations are similar to the European clinical guidelines for non-specific LBP in primary care, which propose a multi-disciplinary approach for patients with CLBP (Oliveira et al., 2018). In 2016, NICE expanded these recommendations to incorporate regular exercise, which might include the offer of organised classes for a 12-week period in aerobic exercise, resistance exercise, stretching, postural control and movement instruction. The evidence for the efficacy of physical exercise for CLBP symptom improvement is clinically meaningful, although a meta-analysis found a small effect size, with a pooled mean improvement of only 7.3 points (95% CI, 3.7–10.9 points) for pain outcomes and 2.5 points (95% CI, 1.0–3.9 points) for function (Hayden et al., 2005a).

Additionally, there is evidence supporting structured training programmes that incorporate strengthening exercise and stretching. In an analysis of 43 studies utilising exercise programmes delivered via a variety of modes, Hayden et al. (2005b) reported significantly more improved pain scores for methods that had some degree of supervision (e.g. group classes and supervised home training) than home training alone (5.9 points [CrI: 2.1–9.8 points]). Additionally, they detected a dose response, with those performing the greatest amount of exercise experiencing more benefits than participants in

low-dose exercise programmes (1.8 points [CrI: -2.1–5.5 points]). However, the meta-regression demonstrated a small to moderate effect size. Similarly, Chou et al. (2007) reported good evidence supporting exercise as moderately effective CLBP therapy. More recently, a randomised controlled trial (RCT) conducted on young adults with LBP demonstrated the benefits of a gradual, nine-week exercise programme for the pain and physical dimensions of health-related quality of life (Rodríguez-Romero et al., 2018).

1.7.2 Alternative management

While it has been claimed that certain therapies improve CLBP symptomatology, the evidence for their efficacy is either scarce or weak. Such therapies include psychological treatments (e.g. cognitive behavioural therapy) and manual therapy, including chiropractic manipulation, transcutaneous electrical nerve stimulation (TENS), massage, acupuncture, interferential therapy, low-level laser therapy, lumbar support, shortwave diathermy, superficial heat, ultrasonography and traction (Burton et al., 2006; Maher et al., 2017; Qaseem et al., 2017; Foster et al., 2018; Stochkendahl et al., 2018). Of these, NICE (2016) has recommended only psychological treatments and manual therapy (including spinal manipulation) as effective for CLBP. Evidence on the effectiveness of acupuncture indicates a small analgesic effect at best (Madsen et al., 2009; Chou et al., 2007). In a comparison of the effectiveness of various interventions at reducing disability and pain and promoting long-term function in patients with CLBP, Van Middelkoop et al. (2011) found that exercise, behavioural therapy and multidisciplinary treatment delivered poor results, while there were no discernible benefits for low-level laser therapy, back-pain schools, traction, patient education,

TENS, lumbar support and massage. The authors suggest these findings were due to the heterogeneous nature of the comparison groups and interventions. Chiropractic manipulation has also been investigated. While there is a greater body of evidence for spine manipulation (Wilkey et al., 2008), studies in this area tend to have low participant numbers with no effective blinding (Chou et al., 2007), and interventions are often more expensive than exercise therapies (Niemistö et al., 2005). Heat therapy has been shown to be effective for acute phases of LBP (French et al., 2006).

1.7.3 Multidisciplinary management

The potential additive effects of combined therapies utilising different mechanisms of action have been investigated. For example, Chou et al. (2007) reported evidence for the effectiveness of high-dose interdisciplinary interventions, especially for follow-up times of less than one year, while lower-intensity interdisciplinary interventions were no better than monotherapy. Consequently, NICE (2016) recommended that practitioners provide combined exercise and psychological treatment for >100 hours over a maximum of eight weeks. In a more recent systematic review of 83 RCTs, van Middelkoop et al. (2011) found that multidisciplinary treatment groups experienced greater reductions in pain intensity and disability than no-treatment and control groups. A Cochrane review by Kamper et al. (2015a) demonstrated that multidisciplinary interventions were superior to standard medical treatment for pain (standardised mean difference: 0.21, 95% CI 0.04–37) and disability (standardised mean difference: 0.23, 95% CI 0.06–0.40) but not for reducing work absenteeism (odds ratio 1.04, 95% CI 0.73–1.47). A recent systematic review of 943 studies confirmed the efficacy of

multidisciplinary biopsychosocial interventions for patients with CLBP, particularly interventions providing patient training and education on coping styles, pain management, unhelpful thoughts and goal-setting (Van Erp et al., 2018). Taken together, these results support the use of multidisciplinary and biopsychosocial approaches for CLBP rehabilitation and alleviation of chronic conditions.

1.8 Activity normalisation and chronic low back pain: Definition of activity normalisation

Return to normal activity can be defined as patients' ability to resume work, normal daily activities and physical functioning or to perform household chores (WHO, 2002). While physical activity involves exercise, not all physical activity is exercise. Exercise is an organised, repetitive activity aimed at improving or maintaining physical fitness (WHO, 2010). Physical activity is any bodily movement that requires expending energy, including any movement made during daily activities (e.g. walking to class and work, taking the stairs and cleaning the house; WHO, 2010).

CLBP management is hindered by clinicians' inability to understand why and how pain develops and becomes chronic. As a result of this knowledge gap, much of CLBP treatment is focused on relieving symptoms, with few attempts to address the causative pathology. Multidimensional approaches intended to address patients' physiological deficits (e.g. low core strength and levels of physical conditioning) and to treat the psychosocial determinants of the condition (e.g. FAB, low self-efficacy and depression) are favoured (Van Middelkoop et al., 2011; Oliveira et al., 2018; Van Erp et al., 2018). An essential aspect of both treatment modalities is re-

introducing patients to previously avoided ADL (e.g. walking and stair climbing). Doing so requires that practitioners reacquaint patients with particular physical activities to boost their self-belief in their ability to complete activities, thereby reducing fear (Spenkelink et al., 2002; Perruchoud et al., 2014). This process is termed 'normalisation of physical activity' (Van Weering et al., 2009), indicating that patients are transforming their belief in their ability to perform ADL. This means that patients are able to return to work and perform normal ADL and physical functioning (e.g. walking, engaging in sports or doing household chores) without debilitating pain and disability (WHO, 2002). In full recovery, return to normal activities and/or participation means that patients have recovered in all three pain, disability and work-status outcomes: patients have returned to work in their previous capacity, have no disability and are free of pain (de Vet et al., 2002; Ostelo and de Vet, 2005; Costa et al., 2009).

1.9 Barriers and facilitators of activity normalisation

1.9.1 Chronic low back pain patients

In patients with CLBP, the normal fight-or-flight response to fear can misfire due to repeated conditioning. As a result, individuals present with a fear response when subjected to similar but non-painful experiences (Rainville et al., 2011). Patients come to associate movement with pain onset and exhibit FAB as a central element of their condition (Asmundson et al., 1999; Crombez et al., 1999; Vlaeyen and Linton, 2000; Grotle et al., 2005; Rainville et al., 2011). Consequently, FAB is an important barrier to activity normalisation, which can exacerbate patients' level of disability, and must be overcome if they are to return to regular ADL (Rainville et al., 2011).

Individuals' FAB are related to their belief that physical activity can result in further pain and harm to their spine (Crombez et al., 1999; Linton 2000; Pincus et al 2002; Geisser et al 2003; Boersma and Linton, 2006; Pincus et al 2006; Leeuw et al., 2007a; Iles et al., 2008; Lakke et al 2009; Ramond et al 2011; Verkerk et al 2012; Zale et al 2013; Wertli et al 2014a). Excessive pain catastrophising has been found to predict severe CLBP and disability (Turner et al., 2000; Picavet et al., 2002; Geisser et al 2003; Grotle et al., 2005; Smeets et al., 2006; Wertli et al 2014b). In patients with both catastrophising and kinesiophobia behaviours, extreme FAB reinforces their belief that they should abstain from physical activity, further hindering activity normalisation. A meta-synthesis of qualitative studies (Snelgrove and Liossi, 2013) indicated that the primary coping mechanism in most patients with CLBP incorporates medication, physiotherapy and avoidance behaviours. The combination of physiotherapy and avoidance behaviours underpins patients' common belief that their recovery is not within their own influence. Furthermore, a recent cross-sectional study demonstrated that patients with CLBP present a range of inter-personal problem behaviours as a result of their high utilisation of healthcare resources, as well as their pain intensity and psychological problems experienced (Borys et al., 2018).

A further barrier to activity normalisation patients with CLBP is related to self-efficacy. Low self-efficacy underpins patients' perceived lack of ability to continue their ADL and may exacerbate psychological distress. Self-efficacy appears to be a critical function for overcoming disability and maladaptive psychological functioning and sustaining treatment outcomes (Arnstein 2000; Ayre and Tyson, 2001; Geisser et al 2003; Denison et al. 2004; Meredith et al., 2006; Hilfiker et al.,

2007; de Moraes Vieira et al., 2014; Jackson et al 2014). Turk and Okifuji (2002) described a biopsychosocial model of chronic pain in which improved self-efficacy was associated with lower disability and improved post-intervention outcomes. They also reported that high self-efficacy among patients regarding their ability to alleviate pain and other symptoms was correlated with more rapid return to activity normalisation. A European RCT examining the effectiveness of treatment processes, such as exposure therapy and cognitive behavioural therapy (Schemer et al., 2018), confirmed that incorporating strategies aimed at enhancing self-efficacy reduced disability and FABs in patients with CLBP.

Several reviews have reported that the associations between functional limitations and psychological aspects and found these to be an important obstacle to recovery (Foster and Delitto, 2011). The investigated factors include perceived persistence risk (Henschke et al., 2008), depression (Grotle et al.,2005; Henschke et al., 2008), expectations (Waddell, 2004; Hilfiker et al., 2007; Iles et al., 2008; Iles et al., 2009), beliefs about the future (Symonds et al., 1996) and perceived illnesses related to back problems (Foster et al., 2008). This body of research thus has demonstrated that improving self-efficacy, expectations, depression and beliefs about the future while also reducing FAB, catastrophising, illness perceptions and perceived risk of persistence can facilitate activity normalisation and recovery in CLBP.

1.9.2 Healthcare professionals' beliefs

Several studies have reported an association of health care professionals' pain fear, attitudes, beliefs and treatment orientations

with advice to patients and choice of interventions that increase fear over time (Rainville et al., 1995; Fritz et al., 2001; Linton et al., 2002; Ostelo et al., 2003; Daykin and Richardson, 2004; Houben et al., 2004; Coudeyre et al., 2006; Poiraudeau et al., 2006; Bishop et al., 2007; Leeuw et al., 2007a; Rainville et al. 2011). Rainville et al. (2000) found that general practitioners (GP) who recommended rest and avoidance of physical activity to patients with CLBP tended to do so even when presented with a variety of patient scenarios. Furthermore, Coudeyre et al. (2006) showed that a significant number of GPs scored high on the Fear-Avoidance Beliefs Questionnaire (FABQ; Waddell et al., 1993) despite their clinical training. High FABQ scores among GPs were correlated with failure to recommend maintenance of maximum bearable activities for patients and a tendency to recommend sick leave during periods of pain.

In a survey of almost 2,000 physiotherapists in the Netherlands Physiotherapist Association (NPA), practitioners were asked about their interest, experience, treatment modalities and knowledge of the national clinical guidelines for LBP (Houben et al., 2005a). Biomedically oriented practitioners who believed that pain and disability were signs of tissue damage perceived daily activities as potentially leading to more harm for patients and were more likely to advise patients to remain off work. In contrast, practitioners with a biopsychosocial orientation placed more emphasis on psychological and social factors and were more likely to advise patients to return to normal activity and work (Houben et al., 2005b). This finding was supported by Bishop et al. (2005), who also reported that biomedically oriented practitioners were more likely to give advice contrary to current guidelines. A Finnish survey highlighted the complexity of the situation: primary care physicians were broadly

aware of psychological factors but inconsistently incorporated them into clinical decision-making, so treatment was procedurally dominated by biomedical principles (Valjakka et al., 2013). In the UK, a cross-sectional survey of 580 physiotherapists and 442 GPs showed that both sets of practitioners based their assessment of functional disability on their perceptions of tissue damage rather than functional performance. Both groups consistently advised bed rest, which was in line with guidelines, while their advice on work and physical activity was less than optimal (Bishop et al., 2008).

A systematic review by Rainville et al. (2011) highlighted that high levels of FAB among healthcare practitioners were associated with delayed recovery and increased risk of disability for patients. Further support of this conclusion was provided by Bunzli et al. (2013) in a meta-synthesis of 28 qualitative studies in which patients commonly reported that GPs encouraged passivity and avoidance of painful situations and activities. Together, these studies suggest that healthcare practitioners' FABs and personal beliefs and attitudes regarding pain, along with their medical and behavioural orientation, can influence the type of advice they provide to patients with CLBP, which, in turn, can help or hinder activity normalisation.

1.10 Factors affecting return to normal activity after physiotherapy

Due to the complex, multi-faceted nature of CLBP, it is best understood using a biopsychosocial model in which physical dysfunction, distress, illness behaviour, beliefs, coping and social interactions are all considered to facilitate treatment and management (Waddell, 2004; Sanders et al., 2013; Kamper et al.,

2015a; Hartvigsen et al., 2018). The underlying principle of this model is that physical disorders are inextricably linked to their emotional contexts and effects, and pain cannot be artificially divided into physical or psychogenic, organic or non-organic, real or imaginary states. In the vast majority of cases, back pain has a physical cause, but stress (an emotional reaction to pain and disability) and illness behaviour (presentation of distress to carers) may become predominant and affect and be affected by patients' social interactions (Sanders et al., 2013; Kamper et al., 2015a; Hartvigsen et al., 2018).

Multi-disciplinary biopsychosocial rehabilitation involves a combination of physical, psychological, education and/or work-related components and is often delivered by a team of healthcare providers with expertise in different fields. The psychosocial model has broadened the narrow medical view on CLBP as a mechanical problem of the spine to a definition encompassing factors such as distress, accompanying illness behaviours and the social worlds in which patients live and work. Within this framework, the primary patient outcomes assessed in CLBP are pain, disability and work absenteeism, while the secondary outcomes are psychological functioning, adverse events, health service utilisation and quality of life (Waddell, 2004; Kamper et al., 2015a; Hartvigsen et al., 2018). The biopsychosocial model is not widely used in practice, particularly in primary care, with only one or two elements being incorporated in treatment (Pincus et al., 2013). Not all primary care practitioners have adequate experience identifying psychological factors that contribute to the development or persistence of disability-related pain, which may explain why primary-care psychological treatments have not achieved huge impacts. In secondary and tertiary care, however, there, is

evidence of the practice of psychologically oriented pain management (Eccleston et al., 2009).

1.10.1 Exercise and adherence to treatment

Exercise has been shown to be effective at resolving CLBP that does not dissipate naturally over several weeks (Van Middelkoop et al., 2010; Steffens et al., 2016; Foster et al., 2018). Patients are advised to continue their normal activities even through the initial pain and discomfort as doing so has been shown to support rapid recovery (Malmivaara et al., 2015; Pedersen and Saltin, 2015; Shaw et al., 2018). In contrast, bed rest (longer than two days) and other forms of immobilisation have been found to have negative effects on recovery and to slow return to normal activities (Vlaeyen and Linton, 2000). To control painful symptoms, analgesics are often recommended (New Zealand Guidelines Group, 2004). Analgesics have been shown to provide more effective pain control when used regularly than as needed by patients (Chaparro et al., 2014; Shaheed et al., 2016; Foster et al., 2018).

Gradual increasing activity is recommended for managing CLBP (Koes et al., 2010; Oliveira et al., 2018; Rodríguez-Romero et al., 2018). Patients can assist recovery by practising different types of exercise, including walking (Malmivaara et al., 2015) and stabilisation exercises, such as yoga (Wang et al., 2012; Smith et al., 2014). However, a lack of adherence to exercise programmes is a common problem (Middleton, 2004; Medina-Mirapeix et al., 2009; Escolar-Reina et al., 2010; Jack et al., 2010). Clinicians have to accept that, for different reasons, many patients will not undertake the suggested exercises and should consider this when recommending exercise

programmes (Kolt and McEvoy, 2003; Jack et al., 2010; Oliveira et al., 2018).

1.10.2 Patient education and awareness

Patient education can support a return to normal activity with CLBP (Hildebrandt et al., 2004; Foster et al., 2018) and improve patients' prognosis (Engers et al., 2008). A number of normative frameworks are available to guide patient education initiatives on CLBP. The European Guidelines Group highlights that patient education that encourages patients to return to normal activities can be as effective as standard physiotherapy and aerobic exercises at improving chronic back pain (Oliveira et al., 2018). The most commonly recommended measure is patient education, followed by spine manipulation and exercise. The purpose of education is to keep patients active and functional. Supervised exercise therapy is recommended as first-line treatment for CLBP. Yellow flags have been found to predict rehabilitation outcomes in CLBP (Glattacker et al., 2018) and should be addressed as part of preventive strategies (Frost et al., 2004; Hildebrandt et al., 2004; Hartvigsen et al., 2018). The New Zealand Guidelines Group (2004) and European guidelines for primary care (Oliveira et al., 2018) recommend that clinicians explain the issue, reassure patients and encourage them to perform normal activities, including work, as the first step in assisting returning to normal activity. Maintaining a positive outlook and a reassuring attitude towards patients are also key recommendations.

Practitioners should identify patients developing psychosocial barriers to recovery and provide reassurance, explanation and education to encourage early normalisation. Physiotherapists should

provide rehabilitation interventions, such as exercise and manual therapy (Moffett and McLean, 2006). Clinicians need to reassure patients that being active will not cause further injury (Traeger et al., 2015). Hasenbring and Pincus (2015) and Holt et al. (2015) recommended giving implicit reassurance through building relationships and explicit reassurance through providing individually tailored information that clearly addresses patients' concerns.

1.10.3 Psychosocial factors

The impact of CLBP on patients' well-being, work and social functioning cannot be overemphasised (Stannard et al., 2009; Van Middelkoop et al., 2011). A systematic review demonstrated that chronic pain and its psychosocial correlates affect up to half of the UK population (Fayaz et al., 2016). Globally, studies on severe chronic pain have revealed decreased mobility, avoidance behaviours, depression and anxiety, sleep problems, social isolation, lost identity, poor quality of life and adverse effects on daily activities (Andrew et al., 2014; Ojala et al., 2015).

Psychosocial factors have greater significance to the development of CLBP than biomedical factors (Linton, 2000) as they can hinder patients' return to normal activity, influence persistent symptoms and affect response to treatment and rehabilitation (Turk and Okifuji, 2002; Pincus et al., 2002; Pincus et al., 2006; Linton and Shaw, 2011, Brunner et al., 2013; Synnott et al., 2015; Hartvigsen et al., 2018). Identification of risk factors can lead to appropriate interventions in CLBP management. Yellow flags include psychosocial risk factors, while red flags include physical risk factors (Glattacker et al., 2018). Red flags require immediate medical or surgical

intervention, and yellow flags require cognitive and behavioural management. The New Zealand Guidelines Group (2004) identified four yellow flags that serve as psychosocial barriers to recovery and may increase patients' risk of disability:

1. A belief that CLBP is harmful and possibly even severely disabling
2. FAB and reduced activity levels
3. Increased low mood and social withdrawal
4. A belief that passive treatment will be recommended rather than active participation

First, patients' attitudes and beliefs about back pain can either help or hinder their progress towards activity normalisation (Pincus et al., 2006). Modern CLBP management models focus on reframing these beliefs and attitudes, allowing patients to welcome the introduction of individually tailored advice and exercise programmes and better understand the physical and emotional impacts of CLBP (Gardner et al., 2017; Shaw et al., 2018).

Second, a body of research shows that patients' fears and concerns can act as a barrier to recovery and, therefore, need to be screened (Thompson et al., 2016; Hartvigsen et al., 2018). Several psychosocial factors, including catastrophic thinking and depression, have been shown to result from fear-avoidance beliefs and to constitute obstacles to activity normalisation (Picavet and Vlaeyen, 2002; Boersma and Linton, 2006; Henschke et al., 2008; Dawson et al., 2011; Hartvigsen et al., 2018). Catastrophic thinking is a type of negative appraisal of pain and its consequences, which has been shown to hinder recovery from CLBP (Borys et al., 2018). Some

patients limit their movements as a direct response to these fear-avoidance beliefs and behaviours (Vlaeyen and Linton, 2000; Aung et al., 2014; Hartvigsen et al., 2018).

Third, fear avoidance has been demonstrated to lead patients to withdraw from social activities and to contribute to low mood, frustration, irritability, depression (Vlaeyen and Linton, 2000; Hartvigsen et al., 2018) and problematic behaviours (Borys et al., 2018). Family support has been shown to be important as a lack of it, or even overprotective and solicitous behaviour from family members, can hinder activity normalisation (Shaw et al., 2013; Hemphill et al., 2016). Support from employers and workplace inclusion can also contribute to patients' return to normal activities, including work. Research has demonstrated that social support at work aids recovery and the initial return to work (Campbell et al., 2013a; Hartvigsen et al., 2018; Ree et al., 2018). Both organisational support and spousal support influence the functional limitations caused by CLBP (Shaw et al., 2013; Williams, 2014; Matsudaira et al., 2018; Ree et al., 2018). In contrast, unsupportive work environments and low interest from employers hinder patients' return to work (New Zealand Guidelines Group, 2004).

Fourth, patients' preference for passive treatment rather than active participation is likely to hinder their return to normal activities as there is insufficient evidence that passive modalities, such as ultrasound, electrical stimulation and hot and cold packs, lead to improvement (Hildebrandt et al., 2006; Pedersen and Saltin, 2015). Greater interest in passive treatment among patients may be problematic for treatment adherence. Consequently, the ways in which diagnosis and treatment are undertaken and communicated to

patients are as important as the reassurance, advice and education imparted, as discussed (Hasenbring and Pincus, 2015; Holt et al., 2015; Oliveira et al., 2018).

Clinicians might engage in other behaviours that can also hinder patients' return to regular activity, including:

1. Sanctioning disability and not providing interventions to improve function and a quick return to normal activities
2. Presenting conflicting diagnoses, explanations and advice regarding CLBP, ultimately confusing patients
3. Using language that causes patients to become fearful
4. Supporting dependency on and continuation of passive treatments. (The New Zealand Guidelines Group, 2004)

One way to tackle the complex, multi-faceted nature of CLBP management is to create multidisciplinary care teams. Research has shown that patients with CLBP who receive rehabilitation from multidisciplinary teams focused on biopsychosocial factors are less likely to experience pain and chronicity than those receiving standard care and physical treatment (Kamper et al., 2015a; Foster et al., 2018).

1.11 STarT Back Screening Tool

The STarT Back Screening Tool (SBST) is a multi-dimensional screening tool consisting of a nine-item questionnaire used to identify non-specific LBP patients with modifiable prognostic indicators, especially for poor outcomes and potential disability (Hill et al., 2008). According to Hill et al. (2010), the SBST was developed to categorise

patients into risk groups based on cut-off scores for baseline factors instead of potential outcomes. This tool was also intended to facilitate decision-making processes related to primary care and first-contact care. The SBST was developed based on findings from literature reviews, RCTs and prospective studies conducted in primary-care settings in the UK (Dunn and Croft, 2005; Hay et al., 2005). The SBST design includes key constructs and strong independent predictors of future LBP related to disability (Hill et al., 2008). The items included in the SBST are grouped into two major domains (physical and psychological) made of eight constructs: referred leg pain, comorbid pain, disability (two items), fear avoidance, anxiety, catastrophising, depression and back-pain bothersomeness, with the latter five comprising psychological subscale (Hill et al., 2008).

The SBST is not only quick but also easy to utilise. The total score (range: 0–9) is obtained by summing all the positive responses, and higher scores show greater risk (Hill et al., 2008). The psychological score ranges from 0 to 5. Patients are categorised into subscales based on the risk levels of the target treatment, with each following a specific care pathway. According to Hill et al. (2008), few negative prognostic indicators are associated with the low-risk group, so primary care management relying on analgesics, advice and education is most appropriate. In the medium-risk group, unfavourable prognoses are associated with higher levels of physical prognostic indicators, making physiotherapy interventions appropriate (Hill et al., 2008). The high-risk group also has unfavourable prognoses but with high indicators of psychological prognoses, which can be addressed through a combination of physical management and cognitive-behavioural approaches.

In line with evidence-based guidelines, patients with LBP, especially those with high risk, must be screened to find any indicators of poor prognosis. Doing so can ensure effective patient-centred care and utilisation of healthcare resources, resulting in improved outcomes and cost effectiveness (Hill et al., 2011; Foster et al., 2014; Michaleff et al., 2014; NICE, 2016; Steffens et al., 2016; Foster et al., 2018; Stochkendahl et al., 2018).

1.12 Chronic low back pain management models

1.12.1 Biopsychosocial model of chronic low back pain

The ways in which people experience pain vary according to their individual physiology, circumstances, knowledge and prior experience of pain (Turk and Okifuji, 2002; Cederaschi and Allaz, 2005; Linton and Shaw, 2011). Usually, the extent of physical damage is not directly correlated to the reported level of disability or pain. It, therefore, is important to move from a purely biomedical pain model to an evidence-based biopsychosocial model that accounts for individual reactions to pain (e.g. emotional responses, thought processes and behaviours) and the impacts of individuals' social environments (Vlaeyen and Morley, 2005; Gatchel and Turk, 2008). Disability and pain are part of this model and, therefore, should be considered when formulating treatment plans (Brunner et al., 2013). In this context, biopsychosocial models are essential not only for understanding the development of CLBP but also for making clinical decisions (Oliveira et al., 2018).

It is worth noting that psychological responses to pain are anticipated and normal (Eccleston et al., 2013) and should not be

confused with mental illness (Main and George, 2011 a, b). It is not easy to ignore the experience of pain (Linton and Shaw, 2011), and humans are programmed to react to it (Williams, 2002). After severe injury, particular behaviours, such as rest and evasion of activities, may be adaptive (Turk and Okifuji, 2002). However, persistence of pain can render these actions maladaptive (Turk and Okifuji, 2002; Linton and Shaw, 2011). Attention to pain is also adaptive as it aids in motivating humans to act on it (Linton and Shaw, 2011). However, hypervigilance to pain, particularly when nothing can be done to lessen its intensity, may result in more fear, anxiety (Turk and Okifuji, 2002) and disability (Crombez et al., 2012). Psychological experiences and factors associated with pain are not pathological, but at times, they require modification so that patients can manage to recover their functioning and capacity to carry out daily activities.

According to the biopsychosocial model, CLBP arises from intricate relationships among social, psychological and biological factors (Gatchel et al., 2007, Foster et al., 2018; Hartvigsen et al., 2018). The medical model perceives disability as an immediate consequence of a disease process that necessitates intervention or treatment, whereas the psychosocial model postulates that individual (e.g. mental and emotional processes) and environmental (e.g. physical, social and political environment) factors affect how one experiences disability. The biopsychosocial model views disability as multi-dimensional, comprising personal dynamics (e.g. gender and age), changes in body structure and functionality (e.g. disease and injury), activity restrictions (e.g. trouble undertaking physical duties) and participation limitations (e.g. difficulty sustaining participation in everyday accomplishments; Jelsma, 2009; Foster et al., 2018; Hartvigsen et al., 2018).

In a study conducted in 2011, Damsgård et al. (2011) reported that two criteria affect activity normalisation: the advantages of physical activity and the likelihood of recommencing a social life. According to the biopsychosocial model, pain is a significant barrier to adherence to physical activity programmes by patients with CLBP. A lack of apparent improvement during exercise is another barrier in this model. Healthcare providers for CLBP sufferers have an information deficit regarding the benefits of activity normalisation. Improving patient communication about the benefits of physical activity can help address these barriers. For example, it should be clarified that exercise therapy does not minimise pain but, instead, reduces incapacity through improved functionality. To enhance functional improvement, patients should be made aware that the objective of exercise is not to alleviate their pain but to teach them how to maintain physical activity in spite of it.

1.12.2 Fear-avoidance model and chronic low back pain

The fear-avoidance paradigm suggests that fear of pain triggers escape mechanisms, causing people with CLBP to avoid physical activity (Vlaeyen and Linton, 2000; Leeuw et al., 2007b; Crombez et al., 2012; Vlaeyen and Linton, 2012; Wideman et al., 2013). Although lack of movement is acceptable during acute pain (e.g. to allow healing of injury), long-term avoidance of physical activity can impair functionality, increase disability levels and promote negative moods. However, according to the fear-avoidance model of CLBP, the psychological barriers are greater than the physical ones: pain-related fear can be negatively reinforced by evasive behaviours, which may intensify the response to fear in the long-term. In summary, the fear-

avoidance paradigm predicts that the combined reinforcement effects of evasive behaviour and pain-associated fear may fuel and promote disability. This paradigm is evolving and undergoing revision. For instance, while the intensity of pain was not initially recognised as an aspect of the fear-avoidance model, recent studies have proven that greater pain can foster evasive tendencies and predict long-term disability (Vlaeyen and Linton, 2000; Leeuw et al., 2007b; Crombez et al., 2012; Vlaeyen and Linton, 2012; Wideman et al., 2013).

1.12.3 Disability prevention management model and chronic low back pain

Studies have revealed that disability is not caused solely by patients' physical and psychosocial traits but also by the responses of stakeholders (e.g. employers, compensation system and healthcare providers related to the disability; Loisel et al., 2001; Loisel and Durand, 2005). Consequently, the disability prevention management model of CLBP has been proposed to replace the disease treatment model, especially for people with chronic and sub-acute back pain, potentially curbing the development of long-term incapacitation. A number of factors contribute to activity normalisation in the workplace. Occupation, working hours and conditions can all affect individuals' ability to return to work after episodes of LBP (Ree et al., 2018; Matsudaira et al., 2018). Support from family, employers and organisational inclusion are also important factors (Shaw et al., 2013; Williams, 2014; Hartvigsen et al. 2018, Ree et al., 2018).

Healthcare facilitated by workers' compensation is costlier and is less effective at producing desirable health outcomes than care offered via the general healthcare system (Loisel et al., 2001; Loisel

and Durand, 2005). The legal actions generated by the compensation system have also been proven to have damaging effects and to delay activity normalisation (Loisel et al., 2001; Loisel and Durand, 2005). The healthcare system, too, plays a crucial role in the physical activity of patients with CLBP. Unnecessary tests and prolonged, unnecessary treatment by healthcare providers may have negative consequences on patient recovery. In addition, employers' failure to communicate with patients can affect recommencement of work (Loisel et al., 2001; Loisel and Durand, 2005). Workers' compensation boards, healthcare providers and employers, therefore, should welcome the idea of an inter-organisational dialogue that facilitates activity normalisation within the disability prevention management model of CLBP.

1.12.4 Central sensitisation and chronic low back pain

A number of studies have found that central sensitisation (CS) is a major factor underlying the pathophysiological mechanisms causing chronic pain disorders, such as CLBP (Petersel et al., 2011; Woolf, 2011; Smart et al., 2012; Nijs et al., 2015; Sanzarello et al., 2016). In earlier categorisations, these disorders were variously labelled as somatisation, functional and psychosomatic disorders, as well as unexplained disorders at the border of physical and mental health (Woolf, 2011; Petersel et al., 2011; Smart et al., 2012; Nijs et al., 2015; Sanzarello et al., 2016). Operationally, CS has been defined as intensification of neural signalling in the central nervous system (CNS), causing pain hypersensitivity. In this context, CS-related pain is viewed as completely distinct from all mechanism-based forms, such as peripheral neuropathic pain and nociceptive pain (Lidbeck, 2002; Smart et al., 2011; Sanzarello et al., 2016).

CS is a CNS condition linked to the development and maintenance of chronic pain. When CS occurs, the CNS goes through a process known as 'wind-up', in which it is persistently regulated in a state of high reactivity that maintains pain even after the factor causing pain has ceased (Woolf, 2011; Petersel et al., 2011; Smart et al., 2012; Nijs et al., 2015; Sanzarello et al., 2016). Two main characteristics define CS: hyperalgesia, or sensation of touch, and allodynia, or heightened sensitivity. Hyperalgesia occurs when a typically painful stimulus is perceived as more painful than it is, while allodynia occurs when a person feels pain even in instances when no pain is felt in normal circumstances (Woolf, 2011; Petersel et al., 2011; Smart et al., 2012; Nijs et al., 2015; Sanzarello et al., 2016).

Researchers have investigated the changes in experimental pain procedures related to processing of LBP (Giesecke et al., 2004, Giesecke et al., 2006; O'Neill et al., 2007, Schliessbach et al., 2013; Sanzarello et al., 2016). However, it must be noted that effective identification of CS in patients suffering from CLBP is not easy, primarily due to a lack of physical and specific injury. When diagnosing the degree of spinal cord damage using X-ray, CT or MRI, it is evident that such damage is not associated with the severity of pain, so imaging cannot be used to guide treatment. Nonetheless, in addition to CLBP, a number of musculoskeletal disorders are triggered by CS (Woolf, 2011; Petersel et al., 2011; Smart et al., 2012; Roussel al., 2013; Nijs et al., 2015; Sanzarello et al., 2016).

The literature investigating patients with CLBP has identified physiological alterations in the CNS. For instance, imaging studies of CLBP have revealed neuroplastic changes causing an increase in cortical activity and expansion of the cortical sensory area in the lower

back. Patients with CLBP subjected to same pressure as a control group of healthy individuals have displayed altered pain processing, more pain and increased neural activity in the pain-related cortical areas. In instances of decreased pressure, patients with CLBP have experienced widespread hyperalgesia and have frequently been referred to treatment due to exposure to the pain stimulus (Woolf, 2011; Petersel et al., 2011; Smart et al., 2012; Roussel al., 2013; Nijs et al., 2015; Sanzarello et al., 2016). Studies have indicated that some patients with CLBP manifest CS features (Nijs et al., 2010; Mayer et al., 2012; Smart et al., 2012). Publications in this area have also reported that a number of patients with CLBP have hyperalgesia, altered temporal summation, and pressure or allodynia for electrical and heat stimuli in regions away from the primary painful region. However, some results for patients with CLBP are inconclusive, particularly in relation to malfunctioning of the descending anti-nociceptive mechanism (Nijs et al., 2010; Mayer et al., 2012; Smart et al., 2012).

Patients suffering from CLBP must undergo assessments to identify illness behaviours and maladaptive psychological features (Nijs et al., 2015; Sanzarello et al., 2016). These factors are stronger indicators of outcomes than pain characteristics and the findings from physical examinations. According to Roussel et al. (2013), mental health disorders, high anxiety levels, negative self-efficacy and disturbed mood can be challenges to treatment. In patients who have CS, the broader clinical picture should be considered, as well as modulation of the severity of pain and treatment responses. Consequently, clinicians must be able to identify cases of CS in patients with CLBP to ensure effective treatment (Woolf, 2011; Nijs et al., 2015; Schliessbach et al., 2013; Roussel et al., 2013).

1.13 Low back pain management in the Saudi healthcare system

Healthcare in Saudi Arabia is primarily delivered by the Ministry of Health (MOH), although the private sector has some involvement. The MOH provides health services at three levels: primary, secondary and tertiary (MOH, 2010). According to Almalki et al. (2011) and MOH (2017) statistics, the MOH has 2,325 primary-care centres and 244 hospitals, while the private sector operates 2,218 primary-care centres and 152 hospitals, mostly in urban areas. Government primary-care centres offer both preventive and curative services and refer those who require rehabilitation to secondary care at public hospitals. More complex cases are referred to the tertiary level of care in specialised hospitals and centres of excellence (Al-Ahmadi and Roland, 2005; Walston et al., 2008; Almalki et al., 2011).

Challenges to the development of national health care arise from the Saudi government's prioritisation of all three levels of healthcare services and the absence of national health information systems, clinical guidelines, national crisis management policy and pathways of care. In addition, the MOH plays numerous roles and has inadequate finances. Other challenges come from variations in disease patterns, high demand for free services, insufficient healthcare professionals and difficult access to some healthcare facilities (Al-Ahmadi and Roland, 2005; Walston et al., 2008; Almalki et al., 2011).

International guidelines stress that most LBP cases are not medical emergencies, so primary care is the best level for them (Foster et al., 2018). However, there are no clinical guidelines or

agreement on the best pathway for LBP patients in Saudi Arabia. The Saudi Spine Society (2017) is developing national guidelines for clinicians. Established clinical guidelines and pathways of care will allow treating LBP patients at primary-care centres. Currently, GPs refer patients for more specialised care (orthopaedic and spine) and physiotherapy services not available at the primary-care level, such as physiotherapy, laboratory testing and advanced imaging. Some LBP patients pay to see orthopaedic and spine specialists at private hospitals to be referred to private physiotherapy service. Figure 1 shows the process of accessing physiotherapy care.

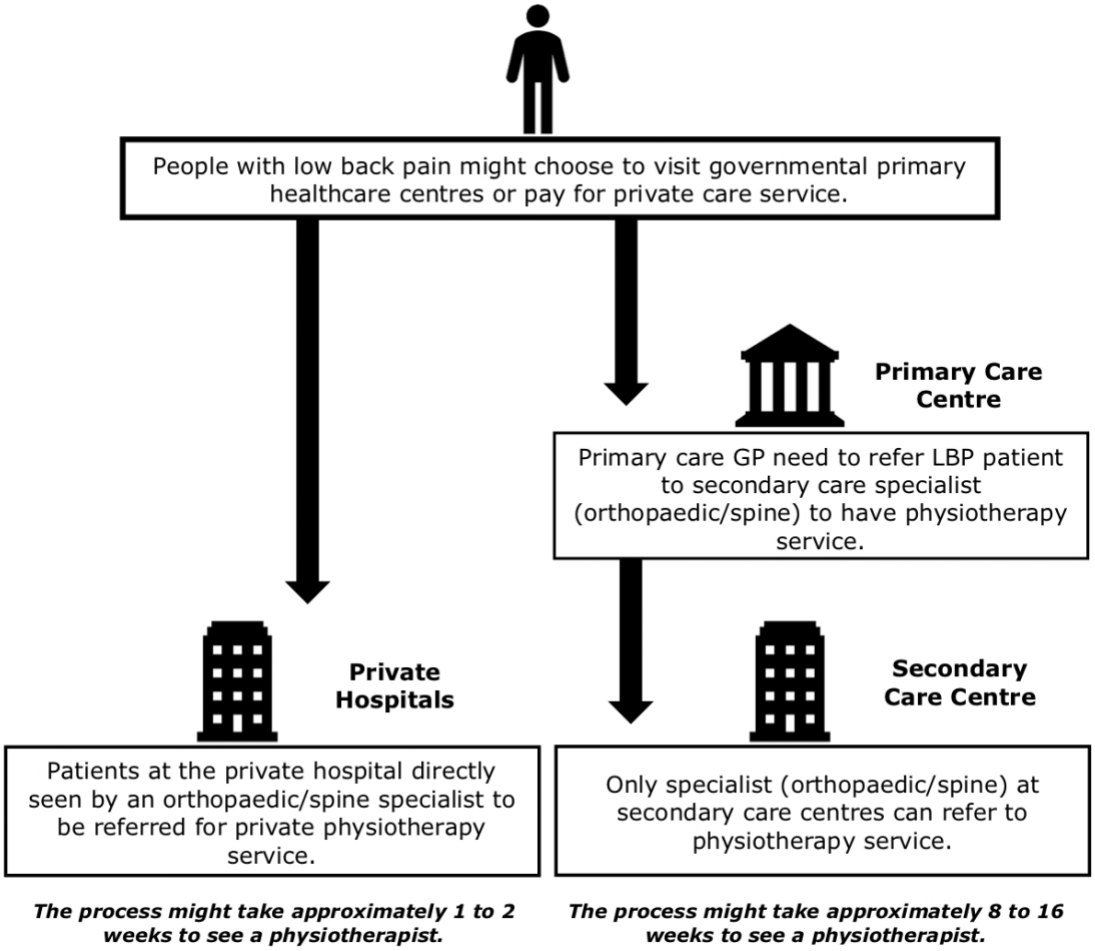


Figure 1. Illustration of the process to access physiotherapy service

Rehabilitation services are provided at the secondary and tertiary levels, so there is a lack of data on LPB management in primary care. Investigating primary healthcare accessibility, Al-Ahmadi and Roland (2005) and Alzaied and Alshammari (2016) found that urban facilities were more easily accessed than their rural counterparts. However, as stated, the care pathway for LBP patients at the primary level has not been studied. Recent research on GPs, though, has indicated that management of LBP patients at the primary level is inadequate. Examination of 80 GPs in Riyadh, Saudi Arabia, found that 68% were aware of the red flag tool as a screening tool for LBP (Alsaleh et al., 2016). Earlier research found that 61% of the same number of GPs referred LBP patients to secondary and tertiary levels of care, possibly due to the absence of LBP guidelines and care pathways (Alsaleh et al., 2015). These studies suggest that essential care of LBP patients is imperfect, and this level of referral may be overloading hospitals and specialist units.

1.14 Gaps identified in the current literature and rationale for need for this study

Affecting people of all ages, CLBP is recognised as one of the most common and disabling disorders worldwide (Woolf and Pfleger, 2003). It is classed among the top ten global conditions that can lead to a significant number of disability-adjusted life years (Vos et al., 2012). In Europe and North America, the estimated prevalence of non-specific LBP is 60%–70%, with the condition emerging on average during the ages of 35–55 years (Woolf and Pfleger, 2003; Hartvigsen et al., 2018). The prevalence of LBP increases with age, and the condition mostly affects older people. Consequently, as older

populations increase worldwide, the prevalence of CLBP will continue to rise. As a recurring condition, LBP can develop into a chronic disorder, leading to reduced quality of life, increased work absences and limited activity (Vos et al., 2012; Hartvigsen et al., 2018). Unmanaged LBP has the potential to impose high economic burdens not only on individuals but also on families, communities and governments (Rubin, 2007; Hartvigsen et al., 2018). Although the incidence of CLBP in North America and Europe has been researched (Maher et al., 2017), there is insufficient information on the number of people with CLBP in Saudi Arabia and how this condition affects them, how they are treated and their outcomes from any treatment.

In a recent systematic review of 83 RCTs, Van Middelkoop et al. (2011) compared multiple treatments and therapies to determine their effectiveness at reducing pain and disabilities and achieving long-term functional improvements for patients with CLBP. The therapies analysed included exercise therapy, low level laser therapy, TENS, back school, patient education, behavioural treatment, multidisciplinary treatments and traction. Van Middelkoop et al. (2011) found that exercise therapy helped reduce pain intensity and disability and improved long-term function. In addition, compared to waiting list or treatment controls, behavioural therapy was shown to be effective at reducing perceived pain intensity during short-term follow-up. Similarly, compared to no-treatment or waiting-list controls, multidisciplinary treatment was found to reduce pain intensity and disability. However, the level of evidence presented in the RCTs was judged to be low, indicating that weak evidence supported the effectiveness of exercise therapy at reducing pain intensity and disability in CLBP. Moreover, the evidence supporting behavioural and multidisciplinary treatments was also weak. Due to

the heterogeneous nature of the comparison and intervention groups and samples, the study failed to draw firm conclusions on the effects on CLBP from low-level laser therapy, back schools, traction, patient education, TENS, lumbar support and massage.

While clinical guidelines (e.g. NICE, 2016) indicate best practices for CLBP management, there appears to be low adherence to physiotherapy among people with this condition. This could prevent people with CLBP from undertaking treatment/intervention to achieve normalisation in daily activities. There is evidence that some interventions for CLBP work, as suggested by Van Middelkoop et al. (2011). However, adherence to physiotherapy interventions is not always optimal (Alexandre et al., 2002; Bassett, 2003; Iversen et al., 2003; Kolt and McEvoy, 2003; Medina-Mirapeix et al., 2009). Consequently, there may be both facilitators and barriers to activity normalisation in individuals with CLBP. The degree to which patients in Saudi Arabia adhere to these interventions or can achieve activity normalisation after physiotherapy for CLBP is little understood and under-researched. There is also a paucity of literature on whether people with CLBP believe that physiotherapy can help them return to normal daily activity. In addition, there are few studies on what healthcare practitioners perceive as barriers and facilitators to activity normalisation in their patients. Exploring the experiences of people with CLBP and their perceived barriers and enablers to activity normalisation may inform physiotherapists, orthopaedic surgeons and other healthcare practitioners about suitable interventions to promote activity normalisation among these patients. In addition, exploring patients' beliefs about the ability of physiotherapy to help them return to normal activities could aid healthcare practitioners in identifying

fears and anxieties evoked by rehabilitation interventions directed at achieving patients' activity goals.

While the CLBP incidence in North America and Europe has been established, there is less information regarding CLBP treatment in other countries. In particular, there is little data on the prevalence, treatment and outcomes of CLBP in regions such as the Middle East (Hoy et al., 2010). Countries such as Saudi Arabia commonly perceived as 'newly industrialised' or 'semi-developed' have different social structures and healthcare systems than are evident in Western economies. However, rapid growth means they face similar health and medical challenges as their Western counterparts. Due to the lack of available data, it is not possible to establish the CLBP prevalence in countries such as Saudi Arabia. There is insufficient information on the number of CLBP cases and its effects on these individuals. The degree to which patients in Saudi Arabia achieve activity normalisation after physiotherapy for CLBP is little understood and remains under-researched.

Of particular concern, it is unclear whether biopsychosocial models of CLBP treatment conceived and refined using patients in developed Western societies can be directly transferred to Middle Eastern patients and clinicians. In addition, there are no data on the relevance of the social factors affecting CLBP in Western countries to Saudi patients, who might experience very different social challenges. There is a lack of literature on Saudi Arabian patients' attitudes towards CLBP management and beliefs about the potential of physiotherapy treatment to help them return to normal activity and/or participation. Moreover, there are few studies on what healthcare practitioners perceive as enablers and facilitators of activity

normalisation in patients. Exploring the experiences of people with CLBP and their perceived barriers and enablers of activity normalisation will help inform healthcare practitioners, including physiotherapists and orthopaedic surgeons, about how best to promote activity normalisation and what interventions can promote such change. Similarly, exploring patients' beliefs regarding the ability of physiotherapy to help them return to normal activities may benefit healthcare practitioners by identifying patients' fears and anxieties prompted by rehabilitation interventions that may hinder them from achieving their activity goals. Exploring physiotherapists' and other healthcare practitioners' perceptions of enablers and facilitators to activity normalisation may also improve practice.

1.15 Research aims and objectives of the study

The first phase of this research was a systematic review of the literature investigating the psychosocial factors affecting return to normal activities and/or participation in people with CLBP. For this study, the evidence available on the topic was selected, synthesised and critiqued. By collecting and interpreting a large body of data and critically appraising its quality, this systematic review can aid decision-making by healthcare practitioners and researchers, as well as future research in this area, by describing the interventions needed to facilitate return to normal activities and/or participation in this patient population.

In the second phase of the research, a mixed-method, sequential exploratory study was conducted to explore patients' and physicians' views, perceptions and experiences of the barriers and enablers to normalisation after physiotherapy in Saudi Arabia. In

addition, how beliefs about physiotherapy influence return to normal activities by patients with CLBP in Saudi Arabia was investigated. The first qualitative stage of this work involved collecting data from focus groups and interviews with physiotherapists, orthopaedic surgeons and people with CLBP. The second quantitative staged administering a survey developed based on insights gained from the systematic review and the qualitative data. The final findings were based on integration of both datasets. The strategy followed by this multi-method study is shown in Figure 2.

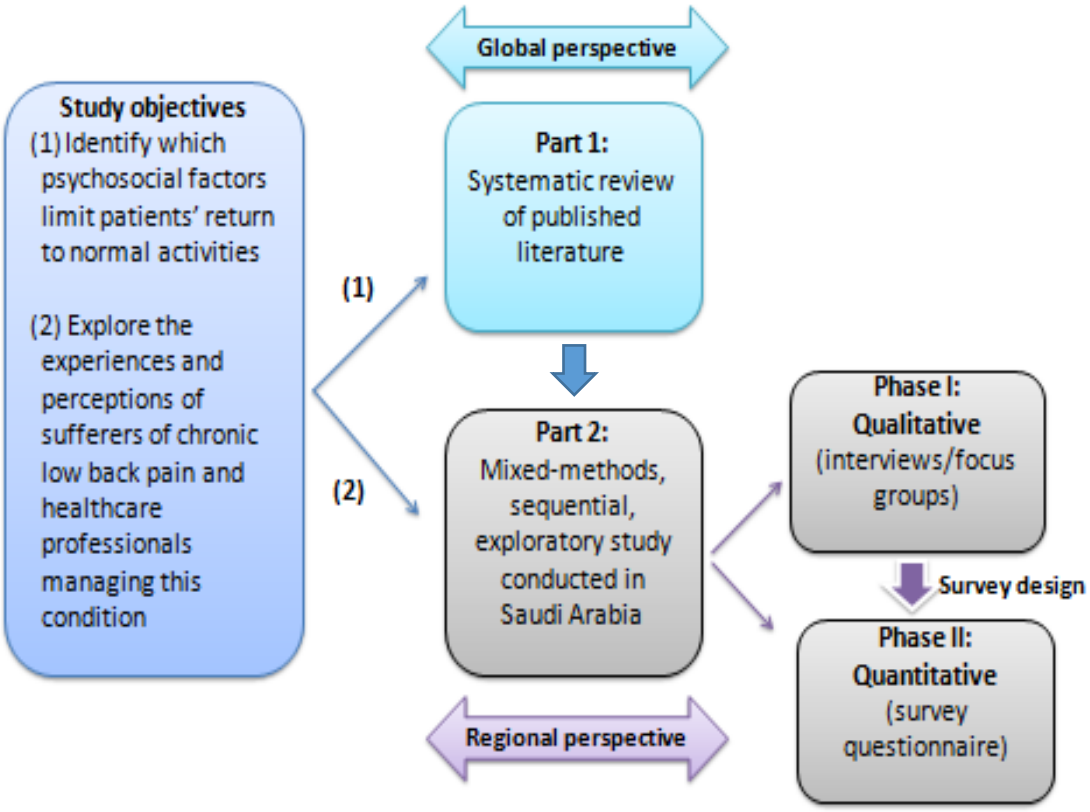


Figure 2. Study objectives mapped in the research design

The present project was aimed at answering the following research questions:

1. What psychosocial factors influence return to normal activities and/or participation by people with CLBP?
2. What do patients, physiotherapists and orthopaedic surgeons perceive as barriers and facilitators to activity normalisation after physiotherapy interventions for CLBP?
3. Do what patients with CLBP believe about physiotherapy can influence a return to normal activity and/or participation?

The project was aimed at achieving certain objectives utilising two different research approaches. The objectives of the systematic review were to:

1. Identify which psychosocial factors limit and enhance patients' return to normal activities and/or participation.
2. Investigate how these psychosocial factors affect the health and wellbeing of patients with CLBP.
3. Determine how these psychosocial factors influence patients' responses to CLBP.

The objectives of the mixed methods study were to:

1. Explore the experiences, attitudes, beliefs and perceptions of healthcare professionals (physiotherapists and orthopaedic surgeons) and people with CLBP in Saudi Arabia regarding the barriers and enablers to activity normalisation after physiotherapy.
2. Investigate how beliefs about physiotherapy influence how patients with CLBP in Saudi Arabia return to normal activities and participation.

Chapter 2 Psychosocial factors influencing participation in people with chronic low back pain: a systematic review

2.1 Chapter overview

LBP is a debilitating condition that affects 7.8 million people in the UK, and a third of those with LBP eventually develop CLBP. While various factors are associated with return to normal activities and/or participation after LBP, psychosocial factors' impacts on recovery have gained attention. However, it is unclear which psychosocial factors affect return to normal activities and/or participation by people who have developed CLBP. This chapter, therefore, is aimed at identifying the psychosocial factors that influence return to normal activities and/or participation by people with CLBP.

2.2 Background

CLBP is a significant health issue, in part, due to its impacts on individuals, families, healthcare systems, work performance and wellbeing (Stannard et al., 2009; Van Middelkoop et al., 2011). In a meta-analysis of population studies, Fayaz et al. (2016) conducted a systematic review of chronic pain in the UK to gain a more comprehensive understanding of how many people in the UK are affected by chronic pain and its variable effects. Their research found that chronic pain affects between one-third and one-half of the UK population, a figure that likely will increase in future. These findings validate investigations into chronic pain and its variable affects.

Regarding understanding of chronic pain, it is currently recognised as pain that persists longer than the normal healing time (Treede et al., 2015). CLBP, in particular, consists of pain lasting at least three months (Airaksinen et al., 2006). In the UK, the National Pain Audit (2012) reported that approximately five million people

develop LBP each year, of whom a third develop CLBP. Despite the LBP incidence in the UK, only 1 in 4 patients visits a GP (Hestbaek et al., 2003; Dunn and Croft, 2005). The majority of patients who visit GPs do so only for up to three months, and 60%–80% of these patients continue to experience LBP (Dunn and Croft, 2005).

Severe chronic pain is a debilitating condition especially important in patient care. An important consideration comes from research finding that severe chronic pain has adverse effects on individuals' daily activities, including reduced mobility, falls, depression, anxiety, sleep impairment, isolation, lost identity, avoidance of activity and low quality of life (Bates and Rankin-Hill, 2002; Wood, 2010; Marmo and Fowler, 2010; Andrew et al., 2014; Ojala et al., 2015; Reid et al., 2015). Consequently, it is evident from research that both the psychological and physical effects of chronic pain should both be addressed as part of patient treatment programmes.

It should also be noted that when treating LBP, recovery is often slow, and those who do not recover at an early stage are likely to advance to CLBP. Recovery from CLBP is signified by a return to normal activities or participation in daily living (Van Tulder et al., 2006). In this study, participation in normal activities refers to performing ADL, such as returning to work and engaging in physical activity. Menezes Costa et al. (2009) suggested that at least 35% of patients with CLBP completely recover after nine months, while another 41% do so after 12 months.

Guidelines from the American College of Physicians and the American Pain Society (Chou et al., 2007) and European primary-care

guidelines on non-specific LBP (Van Tulder et al., 2006) recommend screening patients with LBP for evidence of psychosocial issues as some issues may present obstacles to patient recovery and be potentially modifiable through interventions. Based on the results from a controlled trial of 20-70 year olds suffering with CLBP in the US and a comparison with non-specific CLBP over 2012–2014, Turner et al. (2016), for example, looked at how mindfulness-based stress reduction can yield significant benefits for patients with chronic pain by increasing pain acceptance thresholds.

These findings have been supported by a range of other research demonstrating that increased mindfulness and self-efficacy can improve chronic pain in a number of areas of medical research (Wong et al., 2011; Chiesa and Serretti, 2011; Cherkin et al., 2016). Fear can also be an important contributing factor related to chronic pain management. Pincus et al. (2006) investigated the impacts of fear-avoidance on recovery. The systematic review by Pincus et al. (2006) found that, despite the prevalent focus on fear pain in the early stages of back pain, very little evidence links this fear of pain with potentially poor prognosis. In addition, Pincus et al. (2006) found that fear may contribute when pain becomes persistent.

The complexity of CLBP allows for multiple physical, psychological and social factors to contribute to prolonged disability and poor recovery time (Bekkering et al., 2003; Koes et al., 2010; Gardner et al., 2017). Consequently, most clinical practice guidelines recommend that evaluation of biopsychosocial factors be considered when making decisions about patient management (Gardner et al., 2017). Indeed, despite this focus on ensuring that biopsychosocial factors are considered in patient management, some researchers

have argued that contemporary research literature still has not fully established how these psychosocial factors influence patient recovery or return to daily activities by conducting robust, comprehensive trials assessing a range of psychosocial issues at the same time. Instead, many previous studies on CLBP have focused on one psychosocial factor at a time to determine how it affects recovery.

An example of this is seen in a recent prospective cohort study (Foster et al., 2010) on 1,591 patients with LBP from eight general practices in the UK. The study examined 20 psychological factors and investigated their influence on clinical outcomes through illness perceptions, fear-avoidance beliefs, coping, anxiety, depression and self-efficacy beliefs. The results indicated that only four psychological factors (timeline acute/chronic, illness identity, personal control and pain self-efficacy) were associated with clinical outcomes. However, Foster et al. (2010) did not investigate how these factors influenced return to normal activities in patients with CLBP. Furthermore, the authors focused solely on psychological factors and patients with LBP, making it unclear whether these psychological factors also influenced participation by patients with CLBP. Patients with CLBP endure pain for prolonged periods of time compared to those with acute LBP, so their experiences of which psychosocial factors influence return to normal activities and participation in daily living might differ. Conducting a systematic review of psychosocial factors that influence the participation of people with CLBP in normal activities, therefore, could help identify which specific psychosocial factors are associated with recovery and return to normal activities and thereby inform clinical practice.

2.2.1 Aims

This study was aimed at systematically reviewing primary studies in the literature to (1) identify which psychosocial factors limit and enhance participation in normal activities; (2) investigate how these psychosocial factors affect the health and wellbeing of patients with CLBP; and (3) determine how these psychosocial factors influence responses to CLBP.

2.3 Method

2.3.1 Protocol and registration

A systematic review protocol was registered with the PROSEPERO database (CRD42015026058; Alotaibi et al., 2015) and published (Alotaibi et al., 2016). This review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009; Appendix 1).

2.3.2 Eligibility criteria

Studies published from 1 January 2005 to 30 September 2015 were reviewed first, and the search was later updated from 1 October 2015 to 28 February 2017. Although excellent, landmark studies on psychosocial factors and their influence on health outcomes were conducted earlier than 2005, the search was limited to these years as arguably, physiotherapy management of CLBP changed considerably after the publication of Loisel and Durand's (2005) model and Zale and Ditre's (2015) review, discussing how greater levels of pain-

related fear contribute to more severe disabilities in chronic pain suffers.

The primary outcome measures assessed return to normal activities and/or participation by return to work (e.g. impairment of work performance and return to work in good health), pain intensity (e.g. Visual Analogue Scale [VAS] and McGill Pain Questionnaire) and disability (e.g. Roland-Morris Questionnaire [RMDQ] and Oswestry Disability Index [ODI]). This means that patients or participants are able to return to work and perform normal daily activities and physical functioning, such as walking, engaging in sports and doing household chores, without debilitating pain and disability (WHO, 2002). Full recovery and return to normal activities and/or participation mean that patients are recovered in all three outcomes of pain, disability and work status (de Vet et al., 2002; Ostelo and de Vet, 2005; Costa et al., 2009). The WHO (2002, 2007) defined disability as the lack or any limitation of the capacity to carry out any activities considered to be normal person. The International Classification of Functioning, Disability and Health conceived of disability as an umbrella term encompassing three broad themes of health: body functions and structures, activity limitations and participation restrictions (WHO, 2002, 2007).

Inclusion criteria:

- Studies published from 1 January 2005
- Primary research studies published in the English language
- Participants' age ≥18 years
- Participants' LBP of duration ≥3 months

- Studies with mixed patient groups, such as those with acute LBP and CLBP, were considered for inclusion if separate data on patients with CLBP available
- Studies investigating the association of one or more psychosocial factors with participation in activities of daily living and/or return to normal activities
- For studies including a mixture of modifiable and non-modifiable social and environmental factors, only the modifiable factors were included in the analysis

Exclusion criteria:

- Qualitative studies (which typically explore patient perceptions of specific health issues rather than associations between variables)
- Studies exploring *non-modifiable* social and environmental factors that influence participation in activities of daily living and/or return to normal activities (*It was considered that many social and environmental factors which are non-modifiable factors*, *e.g. age, gender, ethnicity, education levels, income, marital status, cultural background, work exposure, workplace and co-workers*) (Hecke et al., 2013; Synnott et al., 2015; Wong et al., 2017)

The psychosocial factors considered were cognition (e.g. catastrophising, self-efficacy, expectations, perceived risk of persistence, beliefs about the future and patients' perceptions of their LBP), mood (e.g. depression and worry), behaviour (e.g. fear avoidance) and socio-occupational factors (e.g. work status, education level, social status, job satisfaction, compensation issues,

social support and stress at work). It was recognised that some constructs related to more than one factor (e.g. fear avoidance) and could be seen as cognitive or behavioural factors, depending on whether the cognitive style or the resulting behaviour was assessed. However, the broad thematic structure of the factors allowed for a greater focus on, and pool of, pertinent psychosocial factors.

2.3.3 Information sources

PubMed, Medline, CINAHL, PsycINFO, ProQuest and EBSCO were searched for studies published from 1 January 2005 to 30 September 2015 to obtain research over ten years. The search was later updated to include 1 October 2015–28 February 2017. The references lists of the included studies were reviewed in a hand-search to find studies that might have been missed during the electronic search. Citations of the included studies were also reviewed using Google Scholar's citation-search function to find studies that might have been missed during the electronic search. The search strategy was developed using relevant keywords: chronic low back pain, low back pain, psychosocial factors, return to normal activities, participation, recovery, catastrophising, depression, worry and fear avoidance. These keywords were combined using the Boolean operators 'AND' and 'OR' (Appendix 2). The literature search was conducted without using medical subject headings (MeSH) terms. The search strategy was developed using the following two steps:

- Studies related to CLBP population identified using the following keywords: chronic low back pain, low back pain. These keywords were combined with the "OR" function.

- Studies including psychosocial outcomes were identified using the following keywords: psychosocial factors, return to normal activities, participation, recovery, catastrophising, depression, worry, fear avoidance. These keywords were combined with the "OR" function.

Both these steps were combined with the "AND" function.

2.3.4 Study selection

Three reviewers (MA, KR and RdN) independently scanned the titles and abstracts of the studies retrieved from the database search. Titles and abstracts that did not include any psychosocial factors were immediately excluded. If the information in an abstract did not clearly indicate that the study met the inclusion criteria, the full-text copy of the article was retrieved and reviewed. If uncertainty arose about whether an abstract should be excluded, the full-text copy of the article was retrieved and reviewed. Studies were only included once the two independent reviewers achieved consensus. Any disagreements were resolved by the third reviewer. Records of studies excluded from the review and the rationales for exclusion were kept.

2.3.5 Data collection process

The data extracted from the studies in the final inclusion group included the study title, authors, stated objectives, study design, start and end dates, participation duration, study setting context and description, inclusion and exclusion criteria, recruitment methods, participants' comorbidities, descriptions of the populations from which the participants were drawn, total number and demographics of the

study participants, severity of their CLBP and the study outcomes, conclusions and reported limitations. The psychosocial variables collected included cognition (e.g. catastrophising, self-efficacy, expectations, perceived risk of persistence, beliefs about the future and patients' perceptions of their LBP and problems), mood (e.g. depression and worry), behaviour (e.g. fear avoidance) and socio-occupational factors (e.g. work status, education level, social status, job satisfaction, compensation issues, social support and work stress). Data on the associations between psychosocial factors and outcomes, (e.g. participation in ADL, physical activity and return to work) were also collected. The strengths of the associations between the psychosocial variables and the outcomes identified in the review were extracted. Three reviewers independently (MA, KR and RdN) provided feedback on the search strategy and the list of included studies.

2.3.6 Risk of bias in individual studies

The three reviewers independently assessed the risk of bias and the quality of the selected studies using the Critical Appraisal Skills Programme (CASP; 2013 a, b), tools for RCTs and cohort studies and Coughlan et al.'s (2007) tool for cross-sectional studies. All the reviewers were blinded to the others' assessments. Where there was disagreement, all reviewers met together to discuss and clarify the papers inclusion, and arrive at a consensus.

The CASP guidelines (CASP, 2013 a, b) provide a clear, consistent approach to the critical appraisal of scientific research. Each CASP checklist includes a set of well-defined questions probing the validity, significance, relevance and applicability of the study examined (CASP, 2013 a, b). Some questions are designed to help

readers identify potential sources of bias, including blinding, subject assignment to treatment groups, study power and sample size issues, calculation of treatment effects and reporting of results. The CASP tools have been validated and are commonly used to appraise the quality of different types of investigations (e.g. systematic reviews, RCTs, cohort and qualitative studies). By using CASP, readers are equipped with the necessary tools to develop their critical thinking skills and capacity to evaluate new scientific information within a consistent, rational framework (Public Health Resource Unit, 2006; National Collaborating Centre for Methods and Tools, 2011).

In the present work, we[1] used the CASP checklists to critically appraise the validity, reliability and relevance of the RCT, prospective cohort and quasi-experimental studies selected for analysis. In addition, for the RCTs, we assessed whether allocation concealment was observed, whether each participant had an equal (or pre-defined) chance of selection for the intervention or control group and whether the participants and personnel were blinded in the studies. In the cohort and quasi-experimental studies, we investigated whether confounding factors were detected and whether follow-up was conducted. We also determined whether the outcome data were complete or incomplete and whether the study authors selectively reported the findings.

Coughlan et al. (2007) provided a stepwise approach to critiquing scientific research that was originally designed for a nursing readership but has broad applicability within the medical community.

[1] Here, I use the term 'we' to denote that two others supported the review (KR and RdN, my supervisors); however, I led and managed the review process.

The authors outlined and expanded a set of guidelines for evaluating quantitative and qualitative studies, starting with the believability and robustness of the research, study aims and objectives, research hypothesis and scientific question(s) examined. Coughlan et al. (2007) also proposed a set of criteria for appraising the research methodology, such as the sample size and composition, study design, data collection and analysis, and selection, validity and reliability of methodological instruments. Further recommendations include critically appraisal of the discussion and conclusions drawn from the available data and the significance and context of the study findings, as well as a discussion of study strengths and limitations (Coughlan et al., 2007).

In the present systematic review, we used this stepwise approach (Coughlan et al., 2007) to critically appraise cross-sectional studies. In addition to studies' robustness, methodology and relevance, we investigated potential sources of bias by examining how participants were recruited and whether sufficient numbers of participants were included in surveys. The associations between variables were also investigated.

2.3.7 Summary measures

The quasi-experimental studies included in this review used differences in the means between groups to determine the health outcomes of patients before and after interventions. In RCTs, differences between the means of the health outcomes of patients in the intervention and control groups were determined.

2.4 Results

2.4.1 Study selection

A total of 8,040 articles was retrieved from the electronic databases, along with an additional 10 articles from a manual search. After removing duplicates, the remaining 2,618 articles were limited to keywords found in only the titles or abstracts. The titles of the remaining 1,006 articles were reviewed to ensure they met the inclusion criteria, and 972 titles were excluded. The abstracts for the remaining 34 articles were read, and of these, 23 were excluded as they failed to either include participation in daily activities (e.g. physical activity and return to work) as a health outcome or investigate the relationship between the psychosocial factors and health outcomes of the study population. After this process was complete, we extracted data from 11 full-text primary research articles (Figure 3). A report on the extraction of the literature (Appendix 2) and a summary of the search conducted in the ProQuest database can be found in Appendix 3.

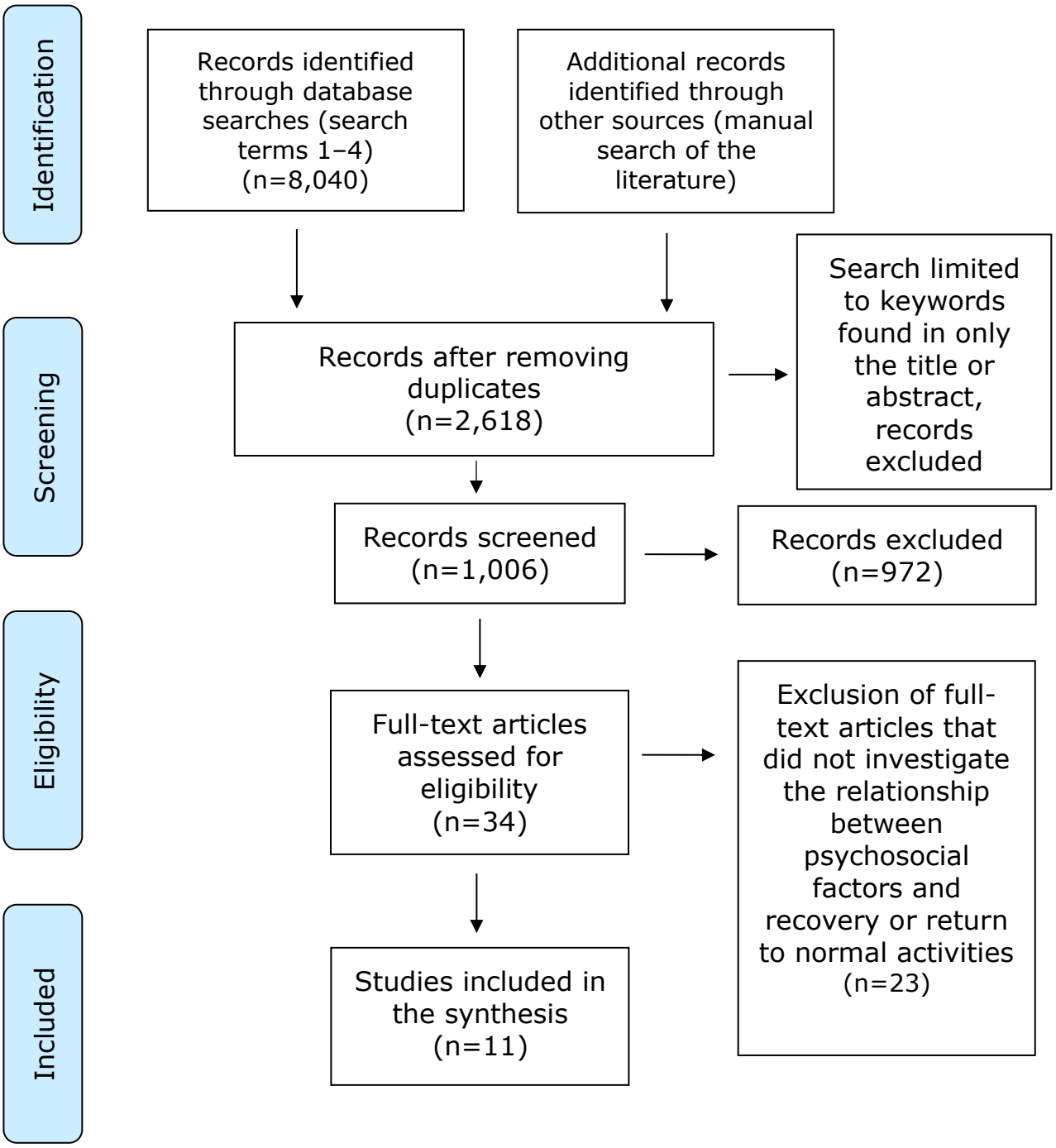


Figure 3. Summary of the search strategy

2.4.2 Study characteristics

The 11 studies examined in this review investigated the influence of psychosocial factors on participation or return to normal activities in 3,704 people with CLBP (Table 1).

Table 1. Study characteristics

Study authors	Study origin	Study design	Sample size (n)	Age mean (SD, years)
Thomas et al. (2010)	France	Cross-sectional	50	50.26 (11.48)
Schiphorst Preuper et al. (2008)	Netherlands	Cross-sectional	92	38.5 (8.7)
Elfering et al. (2009)	Switzerland	Cross-sectional	264	51.6 (15.2)
Guclu et al. (2012)	Turkey	Cross-sectional	105	37.50 (12.19)
Camacho-Soto et al. (2012)	United States	Cross-sectional	200	73.9 (5.8)
Hart et al. (2011)	United States	Prospective cohort	323	48.7 (13.4)

Grotle et al. (2010)	United Kingdom	Prospective cohort	668	46 (9)
Farin et al. (2013)	Germany	Prospective cohort	688	51.0 (11.2)
Dionne et al. (2007)	Canada	Prospective cohort	1,007	38.7 (10.6)
Riipinen et al. (2005)	Finland	Randomised controlled trial	204	37.6 (5.5)
Nisenzon et al. (2014)	United States	Quasi-experimental	103	40.48 (13.84)

A balanced distribution of women (52.2%) and men (47.8%) was noted across 10 studies, while one study did not report the participant distribution by gender (Riipinen et al., 2005). The mean age of the study population was 46.9 years (SD±10.9). The study sample sizes ranged from 50 to 1,007, with a mean sample size of 328.27 (SD±313.6).

None of the studies specified the ethnicity of the participants. Three studies recruited patients from specialist back pain or rehabilitation clinics (Schiphorst Preuper et al., 2008; Thomas et al., 2010; Hart et al., 2011), four recruited patients from a department of rheumatology and physical medicine (Dionne et al., 2007; Grotle et al., 2010; Farin et al., 2013; Nisenzon et al., 2014), and one recruited patients referred to a neurosurgery outpatient clinic (Guclu et al., 2012). Moreover, some studies recruited patients through

advertisements, while others utilised cross-sectional studies of the population with CLBP (Riipinen et al., 2005; Elfering et al., 2009; Camacho-Soto et al., 2012).

The studies measured the primary outcome identified for this systematic review (an inclusion criteria): patients' ability to participate in daily activities, return to work and perform household chores and physical functions (e.g. walking and engaging in sport and leisure activities; WHO, 2002). However, not all studies investigated other outcomes, such as quality of life, fear-avoidance beliefs, anxiety and depression. All the studies investigated the level of disability of patients using the RMDQ. The VAS was used to assess pain, while the Beck Anxiety and Depression inventories assessed the levels of anxiety and depression of patients. The Fear Avoidance Belief Questionnaire (FABQ) was employed to assess participants' fear-avoidance beliefs.

2.4.3 Risk of bias within studies

The majority of the studies used cross-sectional and prospective cohort study designs. Only one study (Riipinen et al., 2005) used an RCT design. Response bias was present in a few studies due to low response rates and relatively large numbers of participants lost to follow-up. Four studies displayed participant selection bias (Dionne et al., 2007; Grotle et al., 2010; Hart et al., 2011; Farin et al., 2013), ranging from small sample sizes, selection of participants with particular conditions (e.g. LBP and lumbar spine syndromes) and selection of only returning patients, which may have affected the results (Hart et al., 2011). Participant selection bias was present in the study by Hart et al. (2011), which was a secondary analysis of

patient data gleaned from a prospective, longitudinal observational cohort study. From the original data set on 39,529 patients, Hart et al. (2011) selected only 323 patient datasets that contained complete sets of psychosocial variables and information on pain levels, physical activity and functional status. The remaining patient data sets were missing details on the psychosocial variables and patients' functional status. It is uncommon for clinicians in rehabilitation clinics to record multiple psychosocial variables, which explains the relatively small datasets examined by Hart et al. (2011). Some patients were lost in follow-up studies, and dropout rates were relatively high in some studies (Grotle et al., 2010; Farin et al., 2013), which might have skewed the results. Furthermore, Farin et al. (2013) used only questionnaires to assess the relationships between physicians and patients instead of directly observing this relationship, which could imply a kind of measurement bias (Aveyard, 2014).

Selection bias may have been present in the study by Dionne et al. (2007), which might have affected the results. It can be hypothesised that patients lost during follow-up were more exposed to risk factors associated with poor recovery and return to work in good health, although this hypothesis needs to be confirmed. Eligible patients who chose not to participate in the study and those lost during follow-up might have resulted in a response bias affecting the interpretation and results reported by Dionne et al. (2007). Ideally, patients would have been interviewed immediately after their medical consultation. However, the time needed to identify prospective participants and obtain their informed consent created a three-week delay between the medical consultations and the baseline interviews. Recall bias might have been present as some measures, particularly pain and functional limitations, could have changed, and participants

might not have accurately recalled pain levels and functional status after rehabilitation. Most studies also relied on highly subjective self-report measures to identify the severity of back pain and psychosocial variables associated with disability, which could differ depending upon how prompts were worded or how respondents felt at a particular time. However, self-report may have been the best method to capture some factors, such as mood.

The majority of the participants were recruited from large hospitals, community services and outpatient and rehabilitation clinics while undergoing interventions for back pain. The length of time between the LBP diagnoses and the interventions might have affected their recall of the pain level before the intervention and completion of questionnaires measuring fear-avoidance beliefs and other psychosocial variables.

As stated, only one investigation used an RCT design (Riipinen et al., 2005), and it was difficult to determine whether the findings could be generalised to a larger group of people with CLBP. However, the relatively large sample size of participants recruited from rehabilitation clinics for cross-sectional studies might have mitigated some issues with generalisability (Aveyard, 2014). It was apparent that randomisation method in the study by Riipinen et al. (2005) was adequate. However, the treatment allocation was not concealed. Blinding of assessors and patients in the interventions could have improved the rigour of the study and prevented reporting bias (Aveyard, 2014). The dropout rate was described and was acceptable (Aveyard, 2014). The report was also free of selective reporting of outcomes, and all the participants were analysed in the groups to

which they were allocated. The timing of outcome assessment was similar in the intervention and control groups.

2.4.4 Results of individual studies

Most studies examined in this review found associations between the different psychosocial variables and functional status, disability or recovery (Table 2).

Table 2. Associations of psychosocial variables with physical function, work performance and activities of daily living

Studies	Psychosocial factors	Outcome measures
Thomas et al. (2010)	Kinesiophobia	Kinesiophobia associated with physical function (RMDQ, r=0.60, p<0.01)
	Catastrophising	Catastrophising associated with physical function (RMDQ, r=0.46, p=0.01)
	Anxiety	Anxiety associated with physical function (RMDQ, r=0.45, p<0.01)
	Depression	Depression associated with physical function (RMDQ, r=0.30, p<0.03)
Dione et al. (2007)	Fear-avoidance beliefs (physical)	Fear-avoidance beliefs (physical) associated with inability to return to work in good health (adjusted odds ratio=1.98, CI=1.01–3.89)

	Fear-avoidance beliefs (work)	Fear-avoidance beliefs (work) associated with inability to return to work in good health (adjusted odds ratio=3.01, CI=1.14–7.91)
Camacho-Soto et al. (2012)	Fear-avoidance beliefs (physical)	Fear-avoidance beliefs (physical) associated with physical function (RMDQ, regression coefficient =0.97±0.17, p<0.01)
Hart et al. (2011)	Fear-avoidance beliefs (work)	Fear-avoidance beliefs (work) associated with functional status outcomes (odds ratio=0.05)
Grotle et al. (2010)	Kinesiophobia	Kinesiophobia associated with physical function (RMDQ) at 12-month follow-up (standardised beta=0.08, p=0.01)
	Catastrophising	Catastrophising associated with physical function (RMDQ) at 12-month follow-up (standardised beta=0.11, p=0.01)
	Widespread pain	Widespread pain associated with physical function (RMDQ) at 12-month follow-up (standardised beta=0.12, p<0.01)
	Chronic pain grade	Chronic pain grade associated with physical function (RMDQ) at 12-month follow-up (standardised beta=0.09, p=0.01)

Guclu et al. (2012)	Fear-avoidance beliefs (physical)	Fear-avoidance beliefs (physical) negatively associated with physical function (RMDQ, r=-0.29, p<0.01)
	Fear-avoidance beliefs (work)	Fear-avoidance beliefs (work) negatively associated with physical function (RMDQ, r=-0.29, p<0.01)
	Anxiety	Anxiety negatively associated with physical function (RMDQ, r=-0.29, p<0.01)
	Depression	Depression negatively associated with physical function (RMDQ, r=-0.26, p<0.01)
	Fear of pain	Fear of pain negatively associated with physical function (RMDQ, r=-0.48, p<0.01)
Nisenzon et al. (2014)	Fear-avoidance beliefs (work)	Fear-avoidance beliefs (work) associated with physical function (RMDQ, r=0.42, p<0.01)
	Anxiety	Anxiety associated with physical function (RMDQ, r=0.25, p<0.05)
Farin et al. (2013)	Fear-avoidance beliefs (physical)	Fear-avoidance beliefs (physical) associated with physical function (ODI, regression coefficient=1.12, p=0.01)
	Fear-avoidance beliefs (work)	Fear-avoidance beliefs (work) associated with physical function (ODI, regression coefficient=1.42, p<0.01)

	Fear of pain	Fear of pain associated with physical function (ODI, regression coefficient=0.03, p<0.01)
	Anger	Anger associated with pain intensity (VAS, regression coefficient=0.02, p=0.01)
Riipinen et al. (2005)	Fear of pain	Pain associated with physical function (ODI), significantly reduced at 12-month follow-up (ODI=34.47 at baseline, 15.41 at 12-month follow-up)
Schiphorst Preuper et al. (2008)	Kinesiophobia	Kinesiophobia associated with physical function (r=-0.24, p<0.05 in the functional capacity evaluation, r=0.33, p<0.05 for RMDQ)
Elfering et al. (2009)	Fear-avoidance beliefs (physical)	Fear-avoidance beliefs (physical) associated with impairment of work performance (r=0.38, p<0.01)
	Fear-avoidance beliefs (work)	Fear-avoidance beliefs (work) associated with impairment of work performance (r=0.43, p<0.01)

Kinesiophobia is an irrational or debilitating fear of physical movement stemming from belief in fragility and vulnerability to re-injury (Knapik et al., 2011). Thomas et al. (2010) suggested that functional disability in patients with CLBP was correlated with kinesiophobia (r=0.60, p<0.01), pain catastrophising (r=0.46,

p=0.01) and the Hospital Anxiety and Depression Scale (r=0.47, p=0.01).

Fear-avoidance beliefs about work were associated with inability to return to work in good health (adjusted odds ratio: 3.01, CI: 1.14–7.91) and fear-avoidance beliefs about activity (adjusted odds ratio: 1.98, CI: 1.01–3.89; Dionne et al., 2007). Fear-avoidance beliefs about work were positively associated with impairment of work performance (r=0.43, p<0.01), and fear-avoidance beliefs about work were positively associated with impaired work performance (r=0.38, p<0.01) and predicted higher levels of physical impairment. Patients who espoused beliefs about the inevitability of LBP were also more likely to experience poor recovery from CLBP (Elfering et al., 2009). In a study with patients aged 65 years and older, fear-avoidance beliefs regarding physical activity were significantly associated with performance-based and self-reported disability (regression coefficient: 0.97±0.17, p<0.01; Camacho-Soto et al., 2012). These findings were supported by Hart et al. (2011). Elevated fear-avoidance beliefs regarding work activities (odds ratio: 0.05, CI: 0.03–0.69) predicted functional status outcomes.

Grotle et al. (2010) associated several psychosocial variables with disability (as measured by the RMDQ) and poor recovery at 12 months based on baseline data collected through consultations with patients. These variables included catastrophising, widespread pain, bothersomeness, high pain levels (as measured by chronic pain grade), depression and anxiety (as measured by HADS). The study also found that fear of movement was a prognostic indicator of long-term disability in people with CLBP. This sub-group's mean RMDQ was 15.04 (SD=3.67) at baseline and 10.55 (SD=6.91) at 12 months.

Widespread pain (standardised beta=0.12, p<0.01) was significantly associated with RMDQ and disability at 12 months. Chronic pain grade (standardised beta=0.09, p=0.01), fear of movement (standardised beta=0.08, p=0.01) and catastrophising (standardised beta=0.11, p=0.01) were significantly associated with disability at the 12-month follow-up for patients with CLBP.

Guclu et al. (2012) found a significant weak-moderate negative correlation (r=-0.48, p<0.01) between fear-of-pain scores and physical function, suggesting that as the severity of pain increases, the physical function of patients decreases. Similarly, a significant weak-moderate negative correlation was found between Beck Anxiety Inventory (r=-0.29, p<0.01) and Beck Depression Inventory (r=-0.26, p<0.01) scores and the physical function of patients, indicating that physical function decreases as anxiety and depression levels increase. Significant weak-moderate negative correlations were also observed between physical function and fear-avoidance (physical) beliefs (r=-0.29, p<0.01) and between fear-avoidance (work) and physical function (r=-0.29, p<0.01). According to these results, when fear-avoidance beliefs regarding work and physical mobility increase, physical function decreases. Duration of pain was found to be significantly longer in women than men; however, no significant differences in pain severity between men and women were reported.

Nisenzon et al. (2014) found significant relationships between gender and fear-avoidance beliefs regarding work and functional status (as assessed by the RMDQ; r=0.42, p<0.01) and between anxiety and functional status (r=0.25, p<0.05). T-test revealed significant differences in the means of pain intensity of the men and women in the study (t=27.7, p<0.01). Significant differences were

also found between the means of functional statuses (as measured by the RMDQ) for men and women ($t=2.1$, $p<0.01$), with women reporting higher RMDQ and pain intensity scores than men. However, pain duration for men and women was not established in this study. The results of multiple regression analysis showed that anger variables did not predict pain intensity ratings during follow-up; however, performance-based impairments occurred in the presence of psychosocial symptomatology. Among the psychosocial variables, work-related fear-avoidance beliefs had the greatest impact on patients' performance-based impairment.

Similar to Nisenzon et al. (2014), Farin et al. (2013) noted gender differences in health outcomes after rehabilitation for CLBP. Farin et al. (2013) found that functional disability (ODI) in patients with CLBP was correlated with fear-avoidance beliefs (physical; regression coefficient=1.12, $p=0.01$), fear-avoidance beliefs (work; regression coefficient=1.42, $p<0.01$) and fear of pain (regression coefficient=0.03, $p<0.01$). This indicated that the risk factors for poor health outcomes and disability were being a woman, low income, higher age, low treatment motivation, comorbidity, fear-avoidance beliefs and social external locus of control. However, they also found that positive patient–physician relationships might mediate the effects of these predictors. The patient–physician relationship was significantly associated with health outcomes, particularly when patients had undergone at least six months of rehabilitation for CLBP.

Similarly, Riipinen et al. (2005) suggested that patients with dysfunctional profiles were more likely to respond to treatment for CLBP without psychosocial factors being present. Dysfunctional profiles were characterised by higher pain severity, high affective

distress, low activity levels, marked inference of pain in everyday life and low perceptions of life control. Among patients with dysfunctional profiles, decreased acceptance of pain and pain-related anxiety were predictors of sensitivity to treatment. Patients categorised with dysfunctional profiles had the highest pre-treatment levels of disability, as assessed by the ODI (34.47, SD=12.28). These scores fell to 17.52 (SD=12.72) and 15.41 (SD=11.92) at five- and 12-month follow-up, respectively, after rehabilitation. Significant differences in ODI scores were noted when the patients with dysfunctional profiles were compared to the adaptive copers and those who were interpersonally distressed (both constructs assessed by the Multidimensional Pain Inventory).

A non-existent or weak relationship between the psychosocial variables and disability in patients with CLBP was noted in a study by Schiphorst Preuper et al. (2008). Even though the investigators relied on a self-report measure for disability and a performance-based assessment of disability, the results were consistent. For instance, a significant correlation was established between kinesiophobia and physical functioning. A number of psychological factors, such as anxiety and depression, also correlated with physical disability and functioning (as measured by the RMDQ), with correlations ranging from r=0.33 to r=0.25. However, with Bonferroni corrections ($p<0.01$), the correlations between these variables and the functional capacity evaluation and RMDQ were no longer significant.

2.4.5 Synthesis of the results

Almost all of the included studies showed associations between the psychosocial variables and functional status, disability and

recovery. Among these variables, fear-avoidance beliefs (physical or work), kinesiophobia and catastrophising were associated with disability and poor functional status. Depression, anxiety, pain severity, widespread pain and chronic pain grade had weaker associations with disability, functional outcomes and return to work in good health. Anger also influenced pain intensity but was not associated with disability or functional status. Positive physician–patient relationships might also influence health outcomes (Table 3).

Table 3. Synthesis of the associations of psychosocial variables with physical functioning, work performance and activities of daily living

Psychosocial factors	**Studies**	**Participation outcomes**
Fear-avoidance beliefs (work)	1. Dione et al. (2007) 2. Hart et al. (2011) 3. Guclu et al. (2012) 4. Nisenzon et al. (2014). 5. Farin et al. (2013) 6. Elfering et al. (2009)	▪ Roland-Morris Disability Questionnaire ▪ Functional status ▪ Physical functioning ▪ Oswestry Disability Index ▪ Impaired work performance
Fear-avoidance beliefs (physical)	1. Dione et al. (2007) 2. Camacho-Soto et al. (2012) 3. Guclu et al. (2012) 4. Farin et al. (2013)	▪ Roland-Morris Disability Questionnaire ▪ Functional status

	5. Elfering et al. (2009)	▪ Physical functioning ▪ Oswestry Disability Index ▪ Impaired work performance
Fear of pain	1. Grotle et al. (2010). 2. Guclu et al. (2012). 3. Farin et al. (2013). 4. Riipinen et al. (2005).	▪ Physical functioning ▪ Roland-Morris Disability Questionnaire ▪ Oswestry Disability Index
Kinesiophobia	1. Thomas et al. (2010) 2. Grotle et al. (2010) 3. Schiphorst Preuper et al. (2008)	▪ Physical functioning ▪ Functional capacity evaluation ▪ Roland-Morris Disability Questionnaire
Anxiety	1. Thomas et al. (2010) 2. Guclu et al. (2012) 3. Nisenzon et al. (2014)	▪ Physical functioning ▪ Roland-Morris Disability Questionnaire
Catastrophising	1. Thomas et al. (2010) 2. Grotle et al. (2010)	▪ Physical functioning

		▪ Roland-Morris Disability Questionnaire
Depression	1. Thomas et al. (2010) 2. Guclu et al. (2012)	▪ Physical functioning ▪ Roland-Morris Disability Questionnaire
Anger	1. Farin et al. (2013)	▪ Pain intensity ▪ Visual Analogue Scale

2.5 Discussion

The main purpose of this study was to examine the psychosocial factors influencing participation and/or return to normal activities by people with CLBP. The primary finding was that greater fear-avoidance beliefs were associated with higher chances of delayed recovery, poor functional status and disability in people with CLBP. The presence of fear-avoidance beliefs also strongly affected patients' health and wellbeing. Most of the studies suggested that patient recovery was influenced by the fear that engaging in physical activity would promote disability and worsen LBP. The results, therefore, suggest that fear-avoidance beliefs may influence patients' functional status. The results indicate that clinicians should identify patients who have high fear-avoidance beliefs at the start of rehabilitation programmes as this psychosocial measure has been associated with poor functional status outcomes and poor self-reported quality of life. Changes in patients' fear-avoidance beliefs should be monitored from

intake into rehabilitation programmes until discharge. Specifically, patients who have high levels of fear of physical activity and of work should be identified early, as patients with these beliefs are likely to have poor functional outcomes. Appropriate strategies and/or therapies can be used with patients who demonstrate high fear-avoidance beliefs to achieve better health outcomes through rehabilitation.

Other important factors associated with poor functioning, disability and health outcomes include kinesiophobia and catastrophising. In most studies reviewed, these two psychosocial factors were reported to have strong associations with poor functional status and disability. Pain levels were also associated with disability, and anger was correlated with pain but not directly related to poor functional status.

The findings from this review have important implications for healthcare professionals caring for patients with CLBP. The presence of these psychosocial factors can indicate that patients will have poor recovery and need interventions to manage fear-avoidance beliefs, kinesiophobia and catastrophising. The impacts of patient–physician relationships on patients' disability after rehabilitation are also important as positive physician–patient relationships have been associated with better health outcomes for patients. This finding has been supported by studies suggesting that patient expectations and needs can be met through positive communication and relationships with healthcare providers (Shaw et al., 2011; Kamper et al., 2015b).

The analyses may have been affected by the missing data in some primary studies. In the longitudinal cohort studies, loss during

follow-up may have led to patient selection bias in the present analysis through exclusion of subjects who had perhaps recovered and were no longer interested in the study (as they wanted to get on with their lives). In the cross-sectional studies, selection bias could have occurred if the sample size was not adequate for the required level of precision or if the sample was not fully representative of the population studied and thus not supportive of reliable conclusions. Missing patient records and errors in data reporting, collection and analysis in the primary studies may have affected the overall results and conclusions of this analysis (response bias). Non-response has been recognised as a problem in cross-sectional studies, particularly if non-responders have different characteristics than the respondents, which could further contribute to response bias (for a detailed discussion on the risk of bias in study results, section 2.4.3).

The results of this review, therefore, should be interpreted with caution. In the extraction and review of the 11 studies, it would have been beneficial to have had complete data on all the psychosocial variables for the entire sample of 3,704 patients in the review. However, while analysing the included studies, we realised that collecting multiple psychosocial variables is not a routine practice by healthcare practitioners. This is not unusual as physiotherapists involved in the rehabilitation of patients with CLBP typically do not fully assess psychosocial variables as part of routine assessments or sufficiently utilise this information when it is available (Linton and Shaw, 2011). In the analysis, depression and depressive symptoms were associated with disability. This suggests that psychosocial assessments are often as important as physical assessments, despite its continued reference in many studies as a peripheral cause.

Notably, the findings of the review revealed that anger was associated with higher levels of pain intensity but not directly associated with functional status. However, high pain levels tended to delay patient recovery. Investigating this variable in future studies might help healthcare practitioners initiate appropriate strategies for managing patients with CLBP who exhibit anger. In addition, there is a need to determine effective interventions for managing these psychosocial variables to help healthcare professionals make informed decisions regarding patient care. When CLBP persists and does not respond to physical factors, more certainly can be done to address the potential psychosocial contributions to the pain patients are feeling. Pain is often subjective, and chronic pain, in particular, (in comparison to more acute LBP, for example) has more psychosocial impacts and effects. This is referenced in many clinical practice guidelines (e.g. NICE, 2016) that suggest that patients suffering from chronic pain should receive more counselling strategies to reduce its effects.

2.5.1 Limitations

A total of 11 studies (n=1 RCT, n=4 prospective cohort studies, n=5 cross-sectional studies, n=1 quasi-experimental study) was selected for inclusion in this review. Polit and Beck (2014) explained that RCTs reduce selection bias as participants are randomly assigned to the intervention and control groups. Cohort studies follow sample populations over time to record the outcomes after interventions. Consequently, RCTs can establish causal relationships, but cohort studies can only establish associations between variables (Polit and Beck, 2014). Cross-sectional studies are relatively straightforward to conduct and allow for simultaneous measurement of multiple outcomes, so they are a good fit for descriptive analyses and reviews.

However, these studies' response rate and recall bias can limit their reliability, validity and potential to generate meaningful generalisations based on the selected sample (Greenhalgh, 2014; Polit and Beck, 2014).

Several factors may have contributed to selection bias in this review. The identification and selection of relevant studies was subject to potential bias through the chosen screening criteria. Only primary studies in English were included, and the search was limited to studies published over a 10-year period. While relevant to the area of focus (the relationship between psychosocial factors and recovery or return to normal activities by patients with CLBP), the set of keywords used in the search strategy may have been restrictive and may have impacted on the number and types of studies retrieved. In addition, the literature search did not use MeSH terms and included different study designs. The relatively low number and variability of the primary studies retrieved could be further sources of potential bias.

In the present review, we screened for studies conducted in the complex setting of CLBP, with the specific requirement that they investigated the relationship between psychosocial factors and recovery or return to normal activities. These stringent criteria may explain the relatively small number of primary sources retrieved as the impacts of psychosocial factors have not been routinely quantified in CLBP. Furthermore, the primary studies retrieved were of variable size and quality and comprised heterogenous patient populations, so tasks such as synthesising results and drawing conclusions and inferences were not straightforward. The lack of internal consistency within the data made it difficult to carry out scientifically rigorous comparisons, and while we performed an extensive appraisal of the

quality of the evidence, we, for the aforementioned reasons, did not set out to carry out a meta-analysis of these studies. Nevertheless, our review is well designed to qualitatively inform best practices for interventions supporting recovery and return to activity in patients with CLBP, although well-designed meta-analyses are needed to develop the evidence-based framework for such recommendations.

In another identified limitation, the analysed cross-sectional studies relied on self-report questionnaires. While the study samples were representative of patients with CLBP, there was a risk of reporting bias as most outcomes were measured by self-report questionnaires. Although the reliability and validity of the questionnaires used to assess the psychosocial variables, functional outcomes and disabilities were established, some patients might have over- or under-reported pain levels and other psychosocial variables and health outcomes. Only one study used an RCT design (Riipenen et al., 2005), but its small sample size could have affected its generalisability and transferability to larger, more heterogeneous groups of patients.

In addition, prospective studies that lacked patient data and possible patient selection bias might have influenced the analysis. Caution, therefore, should be taken when applying the findings of these studies to practice. The missing data might be related to the interests of the healthcare practitioners who conduct baseline and follow-up assessments of patients in rehabilitation programmes. Healthcare practitioners' ability to interpret and use data on psychosocial variables might affect the inclusion of psychosocial variables during such assessments.

2.6 Conclusions

Based on examination of the different psychosocial variables that might affect patients' functional status, disability and recovery, fear-avoidance beliefs (physical and work) are associated with functional status and disability outcomes, followed by kinesiophobia and catastrophising. To a lesser extent, depression, anxiety, pain severity, widespread pain, chronic pain grade and bothersomeness are also associated with disability, functional outcomes and return to work in good health. The results also indicate that anger influences pain intensity but is not associated with disability or functional status. Positive physician–patient relationships might also influence the health outcomes of patients.

To apply these findings in practice, we recommend that, at the start of rehabilitation, healthcare professionals assess, at a minimum, the presence of fear-avoidance beliefs regarding work and physical activity and fear of re-injury or kinesiophobia in order to address these fears and optimise patient health outcomes. Future reviews should determine effective interventions for managing these psychosocial factors to help healthcare professionals make informed decisions regarding the care of their patients.

Chapter 3 Barriers and facilitators of activity normalisation for people with chronic low back pain: perspectives of patients and healthcare professionals

3.1 Chapter overview

The systematic review (Chapter 2) highlighted the decision-making of healthcare practitioners and researchers and described the interventions needed to facilitate the return to normal activities and/or participation by people with CLBP. In Saudi Arabia, physiotherapists use a variety of approaches to treat CLBP aimed at helping patients return to performing fulfilling activities. There are several known barriers and facilitators for people with CLBP to return to normal activities, including work. This study, therefore, was aimed at exploring these barriers and facilitators of returning to normal activities from the perspective of patients and healthcare professionals in Saudi Arabia. This qualitative study was developed and constructed based on the findings from the systematic review (Chapter 2).

3.2 Background

LBP involving the muscles and bones of the back is a common condition in the modern world. The Global Burden of Disease 2010 report noted that LBP ranks among the top ten high-burden diseases and injuries reported globally, and in the United States alone, its prevalence is 8%–57% of the population (Vos et al., 2012). Epidemiologists have estimated that nearly 29% of people worldwide experience LBP with the capability to disable them at some stage in their lives (Manchikanti, 2000). LBP thus is a major complaint brought to GPs by people younger than 65 years old (Vos et al., 2012), and activity-limiting LBP has a worldwide annual prevalence of 38%. It affects women of 40–80 years old, in particular (Hoy et al., 2012). While the prognosis for these patients is usually good, those who do

not recover within three months generally have poor rehabilitation outcomes (Hoy et al., 2012). Thus, although the majority of acute episodes of back pain ultimately resolve, back pain may become chronic problems for patients and the healthcare systems supporting them (Simpson et al., 2006). Only a minority of those suffering back pain progress to CLBP, but these patients account for approximately two-thirds of the demand on the healthcare system, which has attendant impacts on both the economy, in terms of the diminished workforce, and social welfare, in terms of the increased public burden (Brunner et al., 2013).

CLBP can manifest as a complex condition that involves persistent anatomical and functional changes in the CNS and structural changes in the back (Deyo et al., 2014; Synnott et al., 2015). Individuals suffering from back pain thus view recovery in different ways, including improving their quality of life and their capacity to perform a broad scope of self-defined functional activities, such as work (Hush et al., 2009). Little is known about the epidemiology of LBP management in Saudi Arabia; however, growing research attention is now being focused on this topic (Awaji, 2016).

Many interventions, including pharmacological and non-pharmacological approaches, are used to treat CLBP in different areas of the world. In Saudi Arabia, physiotherapy options continue to dominate treatment programmes. This research focused on physiotherapy, a common non-invasive, non-pharmacological treatment for CLBP (Brunner et al., 2013). Physiotherapy is an important treatment option in Saudi Arabia, with research suggesting that, in comparison with other countries, including Australia and Brazil, Saudi physiotherapists are more strongly focused on the idea

that CLBP ultimately leads to impairment and disability (Alshami and Albahrani, 2015).

Physiotherapists use a variety of approaches to treat CLBP in Saudi Arabia, all with the aim of helping patients return to performing fulfilling activities (Alshami and Albahrani, 2015). There are several known barriers and facilitators for people with CLBP returning to normal activities (e.g. work). This study was aimed at exploring these barriers and facilitators of returning to normal activities from the perspective of patients and healthcare professionals in Saudi Arabia. Most commonly, in Saudi Arabia, physicians refer patients to physiotherapists, although physiotherapists are sometimes the first line of contact (Moffett and McLean, 2006). Close working relationships among physiotherapists, physicians and surgeons, therefore, are important for effectively treating CLBP (Kamper et al., 2015b), so the views of both physiotherapists and physicians were examined.

3.3 Aims

The aim of the study was to explore the experiences, attitudes, beliefs and perceptions of healthcare professionals (physiotherapists and orthopaedic surgeons) and people with CLBP in Saudi Arabia regarding the barriers and facilitators of activity normalisation following physiotherapy.

3.4 Method

3.4.1 Research approach

Qualitative research involves 'the systematic collection, organisation and interpretation of textual material' (Malterud,2001, p.483) originally obtained from discourses or observations to explore the meanings of social phenomena in the natural contexts in which people experience them (Guba and Lincoln, 1994; Malterud, 2001; Flick, 2009; Ritchie et al., 2013). Qualitative research can be described as a naturalistic standard (Tobin and Begley, 2004) that describes observed lived experience (Charmaz, 2004). Among these characteristics, contextualisation indicates a clear understanding of the contexts from which the data come and links the accounts of individuals to theories justifying them. Generalisability is limited by pluralism, as well as the possibility that settings are unique. The knowledge of the researcher might also be a constraint on what can be understood and expressed, requiring precise communication methods for discoveries (Sutton, 1993; Guba and Lincoln, 1994; Ritchie et al., 2013). In contrast to quantitative research that answers the question of how many, qualitative research provides answers to questions of what, why and how (Coyle, 1998; Ritchie et al., 2013).

Qualitative research paradigms can be described as worldviews guiding researchers in the selection of qualitative research methods and the conjectures regarding the ontological and epistemological assumptions to be considered (Guba and Lincoln, 1994; Coyle, 1998; Flick, 2009). An etic paradigm can be described as viewing a phenomenon from the outside, which differs completely from the perspective of an emic insider (Guba and Lincoln, 1994; Flick, 2009).

Qualitative research is idiographic as the knowledge it generates can be ascribed to a few people. In contrast, quantitative methods are naturally etic as the researcher determines the findings. The quantitative findings are also nomothetic as they can be generalised to large groups of people (Coyle, 1998; Morrow, 2007).

Most qualitative research is understood to be an inductive method as it commences with research questions instead of hypotheses (Guba and Lincoln, 1994; Morrow, 2007; Ritchie et al., 2013). Induction can be described as a bottom-up method of building knowledge through observations of the world and formation of the foundations for theories and hypotheses. Deduction, by contrast, involves a top-down method commencing with formulating hypotheses or theories and then testing them against observations to confirm or refute them (Ritchie et al., 2013). Nonetheless, there is the possibility that pure induction and deduction might not serve in qualitative research questions and analyses, and interpretations might be influenced by the known facts and the literature in the research field (Ritchie et al., 2013). In addition, it is possible that the theories and hypotheses that form the starting point of quantitative inquiry might have been generated by induction (Ritchie et al., 2013). Thus, there is the possibility that research methods might be best viewed as existing on a continuum between induction and deduction (Gale et al., 2013).

In qualitative research, validity is guaranteed through clinical significance, reflexivity, data collection and analysis methods, triangulation of the methods and findings, validation of the responses and transferability within the sampling limits (Malterud, 2001; Ritchie et al., 2013). Qualitative inquiry can provide clinical relevance

through insights into the emotional and experiential features of illnesses that might not be revealed by quantitative research, such as patients' and their families' views on illnesses and the attitudes and behaviours of patients, their families and clinicians (Giacomini et al., 2000; Ritchie et al., 2013). To validate the responses, the participants confirm the qualitative data obtained. Triangulation involves corroboration of qualitative results by different information sources, such as observation, interviews, well-established theories and independent research by members of the research team (Giacomini et al., 2000; Flick, 2009; Ritchie et al., 2013). The credibility and transferability and qualitative research are tested or maximised by triangulation and are dependent on the ability and efforts of the researcher. Quantitative research, in contrast, is more dependent on the measures of the results (Golafshani, 2003; Flick, 2009; Ritchie et al., 2013). Qualitative research provides an explanation of why reflexivity, which involves exposing the researcher's presuppositions and experiences, is fundamental in qualitative research (Golafshani, 2003; Flick, 2009; Ritchie et al., 2013).

This study used a qualitative research method intended for 'describing, interpreting, and generating theories about social interactions and individual experiences as they occur in controlled natural settings, rather than experimental situations' (O'Brien et al., 2014, p. 1245). Qualitative research is useful in cases when researchers want to examine people's experiences and perspectives (O'Brien et al., 2014). Qualitative methods were thus chosen as they enable generating textual data on behaviours, rather than using numbers to describe them, and thus allow participants to speak for themselves (Kuper et al., 2008). Qualitative research can also aid examination of questions not easily addressed by quantitative

research. In this case, it facilitated generating information on the experiences, attitudes and perspectives of healthcare professionals and patients regarding LBP and its management in Saudi Arabia (Mays and Pope, 1995; Green and Britten, 1998; Flick, 2009).

3.4.2 Reflexivity and the role of the researcher in qualitative research

In qualitative research, researchers' backgrounds, experiences and stances constitute explicit knowledge rather than observed obstacles, as in quantitative methods (Flick, 2009; Ritchie et al., 2013). A central characteristic of qualitative research is that it makes it possible for the researchers to expose their presuppositions, preferences, experiences and actions during the research process (Ortlipp, 2008). The validity of qualitative research is ensured through acknowledgement of the subjectivity of the researchers and the participants (Coyle, 1998; Morrow, 2007; Flick, 2009). 'Bias' only occurs when the researchers' influence is overlooked (Charmaz, 2004); therefore, preconceptions are not considered to be bias, except when the researchers fail to mention them (Malterud, 2001; Flick, 2009).

Reflexivity makes it possible to understand the phenomenon studied and the research process and helps the researchers develop a sense of what is taking place in the field and in their own minds (Watt, 2007). Identification of the researchers' social positioning relative to the participants enables the researchers to understand their relative power and throws light on how the researchers see the participants and the phenomenon of interest (Coyle, 1998; Morrow, 2007). Researchers' background affect what they decide to study,

what research method they judge to be the most suitable and the results they considered to be the most relevant, as well as their conclusions and manner of communication (Malterud, 2001). It is possible for researchers to maintain reflexivity by observing the data and interpretations for challenging conclusions while bracketing their internalised views on reality (Charmaz, 2004).

3.4.3 Participants

The participants were chosen from a subgroup of the population based on a non-random sampling strategy. Maximum variation sampling based on variables, such as gender, age and educational background, was used to yield a diverse sample that maximized variation in relation to the study aims (Llewellyn et al., 2004; Bryman, 2015). This was achieved by using patient lists provided by the physiotherapy and orthopaedic outpatient departments for patients diagnosed with CLBP and who had received physiotherapy. The lists included the patients' gender, age and education background, thus enabling participants to be identified according to a predetermined sampling frame and recruited one at a time with maximum variation. Purposive, maximum variation sampling was best suited to this qualitative study, as it enabled diverse perspectives to be obtained and enhanced the reliability of the sampling process (Creswell, 2013). Following Llewellyn et al. (2004) and Bryman (2015), the variation in perspectives included gender, age and education background (school level education or graduate education). Two groups were identified using this sampling method: patients with CLBP and healthcare professionals, including physiotherapists and orthopaedic surgeons.

The patient and healthcare professional participants were chosen based on the following inclusion and exclusion criteria.

Patients:

- Patients 18–65 years old as older adults are less likely to report pain, possibly due to cognitive impairment, stoicism or the belief that LBP is a normal consequence of ageing (White and Katz, 2012)
- CLBP defined as pain, muscle tension or muscle stiffness localised below the costal margin and above the inferior gluteal folds, with or without leg pain or sciatica, that had persisted for more than 12 weeks
- Patients who had had CLBP in the previous two years as diagnosed by a physician and supported by imaging and other diagnostic tests according to patient records
- CLBP patients who had had physiotherapy interventions in the past

Healthcare professionals:

- Physiotherapists and orthopaedic surgeons who dealt with and had experience in management of people with CLBP during the course of their normal clinical practice

In both groups, the participants needed to be willing to consent to take part in the study. Patients were not included in the study if they had been diagnosed with LBP for fewer than 12 weeks or were currently receiving physiotherapy interventions. Those with other comorbidities, such as a previous history of trauma to the area,

history of spinal tumours and/or infection or fractures, were also excluded.

3.4.4 Recruitment

3.4.4.1 Patient group

As the principal researcher, I obtained permission from King Fahad Medical City (Riyadh), which included ethical approval and the authority to invite patients in the hospital's physiotherapy and orthopaedic outpatient departments to participate in the focus group. These patients had been diagnosed with CLBP and had received physiotherapy. Informed written consent was obtained from all the participants.

These patients were approached by the clinical team using phone numbers provided by the hospital. All the participants were provided with the information sheet (Appendix 4), consent form (Appendix 5), confidentiality statement and information about the research, including its aims, objectives, rationale and use of the information collected. A data sheet (Appendix 6) was also included to collect information on the participants' demographic characteristics, such as age, gender, marital status, educational attainment and medical and social histories.

3.4.4.2 Clinician group

After obtaining permission from King Fahad Medical City, I invited physiotherapists and orthopaedic surgeons who had experience managing patients with CLBP to participate in the study.

The clinicians were given an information sheet (Appendix 7) and consent form (Appendix 5) about the study by their department heads before being contacted and approached personally by me. The clinicians received information about the study's confidentiality, purpose, rationale and use and distribution of data. Their informed consent was sought. A data sheet (Appendix 8) was also included to collect information on the participants' demographic characteristics, such as age, gender, marital status, educational attainment and medical and social histories.

For both groups, I emphasised that I was interested in obtaining their perspectives, both positive and negative, on activity normalisation in patients with CLBP. The patients and clinicians who expressed interest in participating in the study were provided further information, including contact details and a more detailed sheet on the likely use of the results and preservation of anonymity, before being scheduled for interview and focus group discussions.

3.4.5 Data collection

Qualitative researchers generally collect data using individual interviews, focus group discussions, observations, documents and other written artefacts (Kuper et al., 2008). For the purposes of this research, data were collected using both individual interviews and focus group discussions. Semi-structured individual interviews were conducted with several orthopaedic surgeons, while two focus group were conducted with the patients and physiotherapists.

A topic guide (Table 4) and semi-structured questions (Appendix 9) for both the focus groups and interviews were developed

and constructed by the researcher based on the findings from the systematic review (Chapter 2) and a disability prevention management model (Loisel et al., 2001). To ensure that the interviews and focus group discussions resulted in the acquisition of rich, detailed information, the researcher paid particular attention to the development and testing of topic guides. Based on discussion with the researcher's supervisors, comprehensive, inclusive items and semi-structured questions were created to probe more important aspects of the topic.

The topic guides and semi-structured questions for the interviews and focus group discussions were developed. This enabled gathering feedback on the structure of the questions, guaranteed coverage of pertinent topic areas and ensured the suitability of the questions asked. This topic guide originally written in English by the researcher and was then translated into Arabic, with strict adherence to qualitative research protocols (Brislin, 1970; Chen and Boore, 2010; Regmi et al., 2010; Van Nes et al, 2010). The process involved consultation, back-translation and collaboration by an independent researcher, who was a native Arabic speaker and bilingual in English and Arabic). The Arabic and English versions were then modified appropriately to develop the final versions.

Table 4. Content of the topic guides

Patients with chronic low back pain	Physiotherapists	Orthopaedic surgeons
▪ What do you think would enable or prevent you from resuming your former activities? ▪ What factors enable or prevent people with CLBP from getting on with their normal daily activities? ▪ What has prevented you from getting on with your usual activities? ▪ What has helped you get back to your usual activities? ▪ Can you describe your experiences of seeking help from healthcare professionals? ▪ What kind of management have you had regarding your LBP? ▪ Do you think the healthcare system has helped your recovery and return to normal activities? ▪ Has your LBP affected your performance at work? ▪ Have your co-workers shown any understanding and/or support regarding your LBP? ▪ What kind of assistance did you get from your employer or manager regarding work modifications? ▪ Are you aware of any LBP laws, regulations or guidelines implemented in your area? ▪ Have these laws, regulations or guidelines helped you in any way to return to your normal activities?	▪ What factors do you think enable or prevent them from resuming their former activities? ▪ What stops or prevents patients from getting back to their usual activities? ▪ What helps patients get back to their usual activities? ▪ In your opinion, what are the best ways to manage LBP? ▪ Do you think the healthcare system affects the chronicity of LBP? ▪ What do you think might improve the management of people with CLBP in returning to normal activities?	▪ What factors do you think enable or prevent them from resuming their former activities? ▪ What do you think prevents patients from getting back to their usual activities? ▪ What helps patients get back to their usual activities? ▪ What do you think are the best ways to manage LBP? ▪ Do you think the healthcare system affects the chronicity of LBP? ▪ What do you think might improve the management of people with CLBP in returning to normal activities?

3.4.5.1 Interviews

Interviews were conducted with orthopaedic surgeons as it was anticipated that their schedule would create difficulty arranging a focus group with them. Effort was made to align their schedules and conduct a focus group with them, but this proved difficult. Interviews, therefore, were deemed suitable to collect data reflecting the aim of this study. Among the several types of interviews, semi-structured interviews were felt to best suit this study. These interviews permit use of an interview schedule concerning the areas that should be covered. The method, however, is sufficiently flexible to allow pursuing new topics of interest (Bryman, 2015). In addition, semi-structured interviews give participants opportunities to control the areas of focus and prevent the researcher from taking full control of the discussion and its direction (Barbour, 2014). New information not considered previously can emerge from semi-structured interviews (Offredy and Vickers, 2010).

In the interviews, there should be a balance between the researcher's agenda and opportunities for the participants to give their opinions (Barbour, 2014). Their aim is to enable the participants and the researcher to deeply understand social phenomena in contrast to purely quantitative measures like questionnaires (Silverman, 2010). According to Gill et al. (2008), semi-structured interviews help elicit detailed insights from participants.

The recommended number of participants for individual interviews is 6 to 10 (Patton, 2002; Starks and Trinidad, 2007; Creswell, 2013; Hagaman and Wutich, 2017). However, Guest et al. (2006) argued that the required number depends on the level at

which saturation is reached (see section 3.4.6 for details about data saturation).

The interviews with the orthopaedic surgeons were conducted in quiet rooms chosen by the physicians. To build rapport, each interview started with a casual conversation about unrelated topics. Next, the researcher provided a general background including the objectives of the interview and a review of what the study, including its purpose, significance and implications for practice. The locations and times of all the interviews were recorded as part of the collected data.

Once the interview proper commenced, the researcher began to gradually explore the subject matter. A list of questions and topics to be covered was prepared before the interviews, and probing questions for following up on important concepts were suggested. These questions and prompts generated from the literature served as a framework for incorporating areas of interest in the topic. The open-ended questions enabled the physicians to freely explore and share their opinions and explore topics, including CLBP, activity normalisation, barriers and facilitators, on both a general level and the level of their own unique experiences. The interviews thus provided opportunities for the orthopaedic surgeons to disclose detailed information. By engaging the orthopaedic surgeons in such interviews, the researcher prompted conversations that explored areas relevant to the study. The orthopaedic surgeons were able to relay their experiences and perspectives in their own words and to use the phrases they typically employed in describing such experiences.

3.4.5.2 Focus group discussions

A focus group involves a collective group interview in which participants are requested to share some experiences and characteristics associated with the topic of interest (Patton, 2002; Krueger and Casey, 2015). One advantages of using focus groups is that they enable researchers to gather and collect viewpoints from different participants (Wills et al. 2009; Davidson et al., 2010). According to Kitzinger (2005) and Barbour (2014), participant interactions play key roles in focus groups. It should be noted that the topic is discussed by the participants themselves and not exclusively to the researcher (Barbour, 2007). Focus groups can generate abundant relevant data as the participants interact (Bradbury-Jones et al., 2009). The participants responses to each other's views may generate more points that would not have been expressed in one-on-one interviews (Patton, 2002).

Through focus groups, a particular topic can clearly be understood, and valuable ideas generated (Kidd and Parshall, 2000; Mitchell and Branigan, 2000), making them an ideal data collection method for this study. Focus groups, therefore, were a potential source of detailed data for this study to generate and patterns of physiotherapists' and patients' perspectives on the facilitators and barriers of CLBP activity normalisation.

The recommended number of participants for a focus group is 4 to 10 (Patton, 2002; Carlsen and Glenton, 2011; Bryman, 2015; Nyumba et al., 2018). In addition, guidelines point out that it is necessary for focus group studies to have a minimum of two focus groups sessions (Kitzinger and Barbour, 2001; Ulin et al., 2005;

Barbour, 2007; Carlsen and Glenton, 2011; Krueger and Casey, 2015; Guest et al., 2017; Nyumba et al., 2018). The lack of a guarantee that everyone recruited will attend focus groups is the main weakness of the method. However, this can be overcome by recruiting an excess of 10%–25% of participants (Rabiee, 2004).

Two separate focus groups were conducted with the patients and physiotherapists. The focus group discussions were conducted in a similar fashion to the interviews. The focus groups were held in a quiet, private room on the hospital premises. The discussions began with the researcher introducing the study background, including its purpose and implications, possible uses of the information gathered and reasons why the discussion was being conducted and why the participants had been selected. The participants were then asked to share a little information about themselves with the group. The locations, times and environments of the group sessions were also noted.

The patients and physiotherapists were asked to verbally describe their experiences with LBP (for patients) or the experiences with managing LBP (for physiotherapists). The guide questions were initially utilised; however, there were opportunities for the participants to share more general experiences and topics. The researcher welcomed such developments and pursued each individual experience for greater understanding. The discussions thus went freely in all directions, and further questions were generated based on the participants' leads. The focus group discussions proved to be a very useful method of collecting detailed information and were appropriate for this research to find patterns and generate models of

patients' and clinicians' perspectives on the barriers and facilitators of activity normalisation in CLBP.

3.4.6 Data saturation

The concept of data saturation has seemingly become a gold standard used to determine sample sizes for qualitative research, such as individual interviews and focus groups (Guest et al., 2006; Guest and MacQueen, 2008; Carlsen and Glenton, 2011; Guest et al., 2017). However, the use of the concept as a reference when estimating sample sizes is problematic as many studies require such estimation before their implementation (Cheek, 2000; Carlsen and Glenton, 2011; Charmaz, 2014; Guest et al., 2017). Saturation can only be determined during or after data analysis. However, saturation may be conceptually anticipated as the end point of data collection (Guest et al., 2006; Guest and MacQueen, 2008; Carlsen and Glenton, 2011; Guest et al., 2017). According to Francis et al. (2010), the establishment or optimisation of data saturation has no agreed method. In this study, therefore, the full transcript of each individual interview and focus group was listened to twice. The researcher did so to gain familiarity with the data, recognise recurrent themes using the topic guide and fully understand the data in order to optimise data saturation.

3.4.7 Data management

Interviews and focus group discussions were conducted in the Arabic language and were digitally recorded. Verbatim transcription was performed for each recording by a third-party professional transcriptionist. Each transcript was then compared and checked to

the original recording to ensure consistency. The data were collected over four months and kept secured on a password-protected laptop.

All the interviews and focus group discussions were transcribed verbatim in Arabic. All the interview and focus group transcripts were assigned identification codes after anonymisation. The Arabic transcripts were then forward translated to English by the researcher, who is bilingual in English and Arabic and a native Arabic speaker. Translation was carried out as analysis of qualitative data is best done in its source language to minimise loss during translation (Smith et al., 2008; Chen and Boore, 2010). An independent English and Arabic bilingual and native-Arabic-speaking researcher translated it back into Arabic and compared it to the original Arabic transcript to ensure that its meaning was not lost during translation. Nevertheless, qualitative analysis can be negligibly affected by translation if it is carried out in the researcher's native culture and language (Esposito, 2001). In addition, the forward and backward translation processes complied with best practices (Esposito, 2001; Smith et al., 2008; Tsai et al., 2008; van Nes et al., 2010). The English transcript analysis was a pragmatic decision as it allowed the researcher's native-English-speaking supervisors to validate the entire analytical process.

3.4.8 Data analysis

The framework approach was utilised to guide all the qualitative primary data analysis in this study. The framework approach is a qualitative data analysis method developed by Ritchie and Spencer (1994), originally for social policy research. However, more recently, the method has been adopted frequently in healthcare research (Gale et al. 2013). The framework is commonly described as a series of

deductive analyses informed by predefined topics, aims and themes. Nonetheless, the method offers sufficient flexibility for themes to be generated from the data (Mays and Pope, 2000; Srivastava and Thomson, 2009). The analysis procedure should not be restricted by pre-determined foci and areas, and the researcher should make it possible for ideas to emerge from the data (Srivastava and Thomson, 2009). This method of analysis was specifically appropriate for this study due to the presence of pre-defined objectives and issues. Nonetheless, it takes into account the possibility of new features valuable to the project emerging from the data as a result of the phases informing one another. This integrated method of exploration of pre-defined aims or themes makes it possible for areas not previously considered to emerge (Gale et al., 2013).

The framework method consists of a matrix-based method for ordering and synthesising qualitative data (Ritchie et al., 2003). Interrelated steps of framework analysis facilitate qualitative data management and analysis (Ritchie and Spencer, 2002). Traditionally, the framework is described as having five connected steps (Mays and Pope, 2000; Ritchie and Spencer, 2002). The stages are summarised by Ritchie and Spencer (2002). In the first step of ‘familiarisation’, the researchers engross themselves in the data and become completely familiar with the transcripts while noting themes or ideas. Next is the second stage, or ‘identification of a thematic framework’. A thematic framework is constructed from the pre-determined themes or issues and those developed from the data, which facilitates sorting them into early themes. The thematic framework is applied to the data in a procedure known as ‘indexing’. The raw data are annotated with consistent references to the thematic framework. Next is ‘charting’ of the data, or presenting the data using headings and sub-headings

from the thematic framework. At this point, the pertinent heading and case are summarised. This summarisation of data is seen as the major feature of the framework method, in contrast to merely copying the raw data into charts. Nonetheless, the summary must still reflect the participants' language (Spencer et al., 2014). The final stage of 'mapping and interpretation' involves using charts developed for interpretation and observation of the data and searching for patterns and explanations within the data for the development of the final interpretation (Ritchie and Spencer, 2002).

Although the framework has been described in distinct stages, these stages often are not fully followed as researchers shift between them during the analysis (Ritchie and Spencer, 2002). The framework is intended to provide guidance qualitative analysis and not to establish a stringent (Spencer et al., 2014) or a mechanical procedure. The aim is to make creativity and analytical thinking possible (Ritche and Spencer, 2002). This makes the analysis stages accessible to researchers by adhering to a well-documented systematic procedure, allowing analysts to make connections and returning to earlier ideas while developing the final themes (Ritchie and Spencer, 2002). The framework is validated by being rooted in the data (May, 2001; Ritchie and Spencer, 2002). In addition, it makes the review of all the pertinent data systematically clear and allows easy access to the initial material (Ritchie and Spencer, 2002).

This stages of the framework approach, which is considered to be credible, provide a clear audit trail of the data analysis-steps and the way in which the raw data are transformed into the final presentation of the findings (Gale et al. 2013). In addition, framework also makes management of large amounts of data possible (Bowling

and Ebrahim, 2005). The study's phases are dependent on each other, making this method proper. The framework method, as discussed, creates an audit trail of the data-analysis process, from transcription to the final themes. This process increases the confirmability of the findings, allowing readers to observe the data analysis methods used (Shenton, 2004).

Framework analysis has been used in qualitative studies specifically focused on experiences of CLBP (May, 2007; Cooper et al., 2009). Framework analysis was appropriate for this particular study as it makes possible exploring specific questions and pursuing interesting, emerging topics not considered earlier (Ritche and Spencer, 2002). This method's strengths are the strong audit trail from the raw data to final themes, comprehensive understanding of the data, examination of pre-defined aims and flexibility to investigate new data (Ritchie and Spencer, 2002; Gale et al. 2013).

Afters transcription and translation of all the data, the researcher started to become familiar with the data in order to recognise recurrent themes and comprehend the holistic data critical for the succeeding development of themes (Ritchie et al., 2003). The transcripts were initially read in full four times, noting recurrent themes based on the topic guide, allowing the study aims and issues to manifest from the respondents.

The researcher then began developing the thematic framework development and returned to the transcripts several times to refine and contextualise the thematic framework. The flexibility of the stages is one of this method's benefits (Ritchie and Spencer, 2002). The framework was applied to the data, again refining the framework

during this step. Matrix-based charts were used to sort and summarise the data and themes (Ritchie et al., 2003). The researcher's supervisors determined the discourse to guarantee comprehensive and inclusive themes (Pope et al., 2000). The supervisors validated the framework analysis steps and compared their codes and their definitions with the transcripts to ensure that the code reflected the qualitative data. The researcher performed the whole analysis. A detailed description of the phases of the framework method are described in detail in the following.

Familiarisation

Possible areas of inquiry and developing themes within the data were identified through familiarisation, followed by initial thoughts. Fear of pain and the roles of healthcare professionals and the healthcare system were the major findings in this phase.

Thematic framework

Initially, 27 themes emerged from the data. The emerging themes and current themes were merged after the charting phase as the themes were felt to connect well with the present themes rather than stand on their own. This profess left seven original themes, with the subthemes detailed in Figure 4 (section 3.5.2). The use of a priori knowledge and themes in forming the thematic framework is a key feature of framework analysis (Ritchie and Spencer, 2002). Sub-themes emerged from the data. The a priori themes helped focus exploration of the transcripts. Nonetheless, the framework approach is designed to be flexible and allow new, unanticipated themes to emerge (Ritchie and Spencer, 2002).

Charting

During charting, matrix-based charts presenting all the themes and sub-themes in the columns and all the participants in the rows were created. These heading summarised all the data to allow the researcher to get a feel for the data and the participants within each theme (Richie and Spencer, 2002). The data summary captured the participants' statements in an attempt to make the data more manageable (Spencer et al. 2014). Appendix 12 displays a full framework matrix with the themes, sub-themes, codes and descriptive and illustrative quotes.

Developing categories and themes

After charting, interpretation commenced to discover the elements and dimensions within the data and develop the categories and higher-order themes (Spencer et al. 2014). This procedure was intended to keep the final themes or classes as close to the data as possible and to ensure that no important features were missed (Spencer et al. 2014). This procedure progressed from development of the initial descriptive thematic framework to additional analytical themes (Ritchie et al., 2003).

3.4.9 Validity, reliability and rigour

In the current study, triangulation was utilised to ensure validity and to eliminate researcher bias while addressing issues such as a lack of reproducibility and generalisability, following the methods of Yardley (2000). To perform triangulation, the researcher utilised several methods, theories and sources while striving to present vital information to strengthen the study (Hussein, 2009). This approach permitted using different methods to consider the same occurrence in

order to increase the credibility and confidence of the conclusions drawn from the interviews and discussions. To achieve this aim, the researcher compared the perspectives of several patients and clinicians on the barriers and facilitators of activity normalisation in people with CLBP, exploring the similarities and differences between opinions and experiences. The research also offered reasonable explanations for the emergent phenomena, adding to the credibility of the findings. In addition, the utilisation of recorders and verbatim transcription helped ensure accuracy.

The rigour of the study was assessed based on three criteria: credibility (in preference to internal validity), transferability (in preference to external validity) and dependability (in preference to reliability). This approach was in accordance with the work of Anney (2014) and Guba and Lincoln (1994), who suggested it ensures that the findings of qualitative research are robust. One key criterion generally considered is internal validity, which refers to the assurance that the study assesses or addresses what it was intended to. Ensuring the credibility of the study, however, is one of the most important components in establishing reliability. To achieve this credibility, some provisions were made in the study to promote confidence that the researcher accurately recorded the desired information. One provision was the development of rapport between the interviewer/facilitator and participants through preliminary informal talks that allowed for prolonged engagement between the researcher and participants, ensuring that all the parties had sufficient understanding of the activities being conducted and that relationships of trust were established. It should be noted that the interviewer's background as a physiotherapist may have introduced some element of bias into the process.

Another provision implemented to ensure credibility was the use of maximum variation sampling to recruit the participants. The study was primarily based on non-random sampling, but to ensure that the participant selection was free of researcher bias, the physiotherapy and orthopaedic departments provided the list of potential participants. Additionally, strategies to ensure honesty among participants were adopted. For instance, the patients and clinicians were given the opportunity to refuse participation in the study to ensure that the data collection sessions involved only those genuinely willing to take part and freely offer data. At the beginning of each interview and focus group, the participants were encouraged to be candid, and it was made clear that there were no right or wrong answers.

Transferability or external validity refers is the extent to which the findings of a study can be applied to other situations. This qualitative study was specific to a small number of participants, so it could be challenging to apply the findings and conclusions with other situations or populations. To address this challenge, information about the process was collected and recorded in detail throughout the study, including the data collection methods utilised, characteristics of participants, number and length of data collection sessions and time period over which the data was collected.

To further ensure reliability, standard techniques were employed, so that the study could be repeated in the same context, using similar methodologies and the same participants to achieve similar results. A detailed description of the research design and its

implementation, including the operational details of data gathering and extensive description of the field work, thus was created.

3.4.10 Ethical considerations

Ethical approval for the study was obtained from the ethics committee of the University of Nottingham Medical School (Ethics No: OVSB10112015 SoM RHA; Appendix 10) and the local ethics committee of King Fahad Medical City (IRB No: 16-074E; Appendix 11). All the enrolled participants were informed about the aims of the focus group discussions and interviews and provided written consent before starting the study. This study was reported in accordance with the consolidated criteria for reporting qualitative research COREQ guidelines (Tong et al., 2007).

3.5 Results

3.5.1 Participants' characteristics

3.5.1.1 Patient participants

The initial contact list provided by the physiotherapy and orthopaedics outpatient departments included 20 patients managed by the departments at the time of recruitment. Of these, only 10 patients were initially willing to participate, and only seven patients accepted the invitation to come to the focus group discussion.

The average age of the patients was 33 years (range: 25–49 years old). Of the patients who attended the focus group, none had a surgical history, and the duration of participants' LBP ranged from 12

months to 84 months (average: 39 months), with an average pain intensity of 4–7 on a 10-point scale, with 10 defined as the most painful based on subjective reporting over a couple of hours to several days. Three of the seven patients who participated in the patient focus group were women. Other demographic information, including occupation, age, gender, weekly exercise duration and types of exercise undertaken, are presented in Table 5. The focus group discussion lasted for 75 minutes.

Table 5. Patient participants' characteristics

Patient code	Age	Gender	Occupation	Duration of LBP/month	Average pain intensity	Exercise hrs/week	Type of exercise
Pat. 1	37	M	Nurse	60	5	4	Swimming, walking
Pat. 2	26	F	Marketing	12	6	15	Swimming
Pat. 3	35	M	Engineer	84	7	1	Walking, aerobics
Pat. 4	30	F	Administrator	18	5	1	Aerobics
Pat. 5	27	M	Teacher	42	7	0	None
Pat. 6	25	F	Teacher	36	5	0	None
Pat. 7	49	M	Technician	24	4	1	Walking

3.5.1.2 Physiotherapist participants

Ten physiotherapists were initially approached and invited to participate in the focus group discussions. All indicated their willingness to participate, but only eight were able to attend the discussion as scheduled. Equal numbers of men and women physiotherapists participated in the focus group discussions. The average age of the participants was 33 years, and their years of relevant clinical experience ranged from four years to 20 years, with a mean of 9.75 years (Table 6). All the clinicians were musculoskeletal physiotherapists. The focus group discussion lasted for 60 minutes.

Table 6. Physiotherapists' characteristics

Participant code	Age	Gender	Education	Occupation	Experience, years
Pt. 1	49	M	Master's degree	Senior physiotherapist	20
Pt. 2	34	M	Master's degree	Senior physiotherapist	10
Pt. 3	33	M	Master's degree	Physiotherapist	10
Pt. 4	29	M	Master's degree	Physiotherapist	7
Pt. 5	28	F	Bachelor's degree	Physiotherapist	4
Pt. 6	31	F	Bachelor's degree	Physiotherapist	7
Pt. 7	38	F	Master's degree	Senior physiotherapist	15
Pt. 8	28	F	Master's degree	Physiotherapist	5

3.5.1.3 Orthopaedic surgeon participants

Ten orthopaedic surgeons were initially contacted and invited to participate in the semi-structured interviews. All expressed willingness to participate, but only seven were able to take part in the interviews as scheduled. All the orthopaedic surgeons who participated in individual interviews were men, with an age range of 32–45 years (mean: 36 years). Their post-qualification years of experience ranged from four to 10 years, with a mean of 7.4 years (Table 7). The interviews lasted 30–45 minutes each.

Table 7. Orthopaedic surgeons characteristics

Participant code	Age	Sex	Education	Occupation	Experience, years
Phys. 1	32	M	Bachelor's degree	Specialist	5
Phys. 2	35	M	Bachelor's degree	Resident	7
Phys. 3	37	M	Doctorate	Consultant	7
Phys. 4	38	M	Postgraduate diploma	Consultant	9
Phys. 5	39	M	Master's degree	Assistant consultant	10
Phys. 6	45	M	Doctorate	Consultant	10
Phys. 7	30	M	Bachelor's degree	Resident	4

3.5.2 Barriers and facilitators of activity normalisation

Following the interviews and focus group with patients and clinicians, the researcher identified seven themes significant to barriers and facilitators of activity normalisation in people with CLBP:

(1) symptom control; (2) patient education and awareness; (3) adherence to treatment plans; (4) psychological factors; (5) role of clinicians; (6) social support; and (7) issues specific to the Saudi healthcare system. The identified themes and subthemes are shown in Figure 4. A full framework matrix with data charts showing the themes, sub-themes, codes and descriptive and illustrative quotes can be found in Appendix 12.

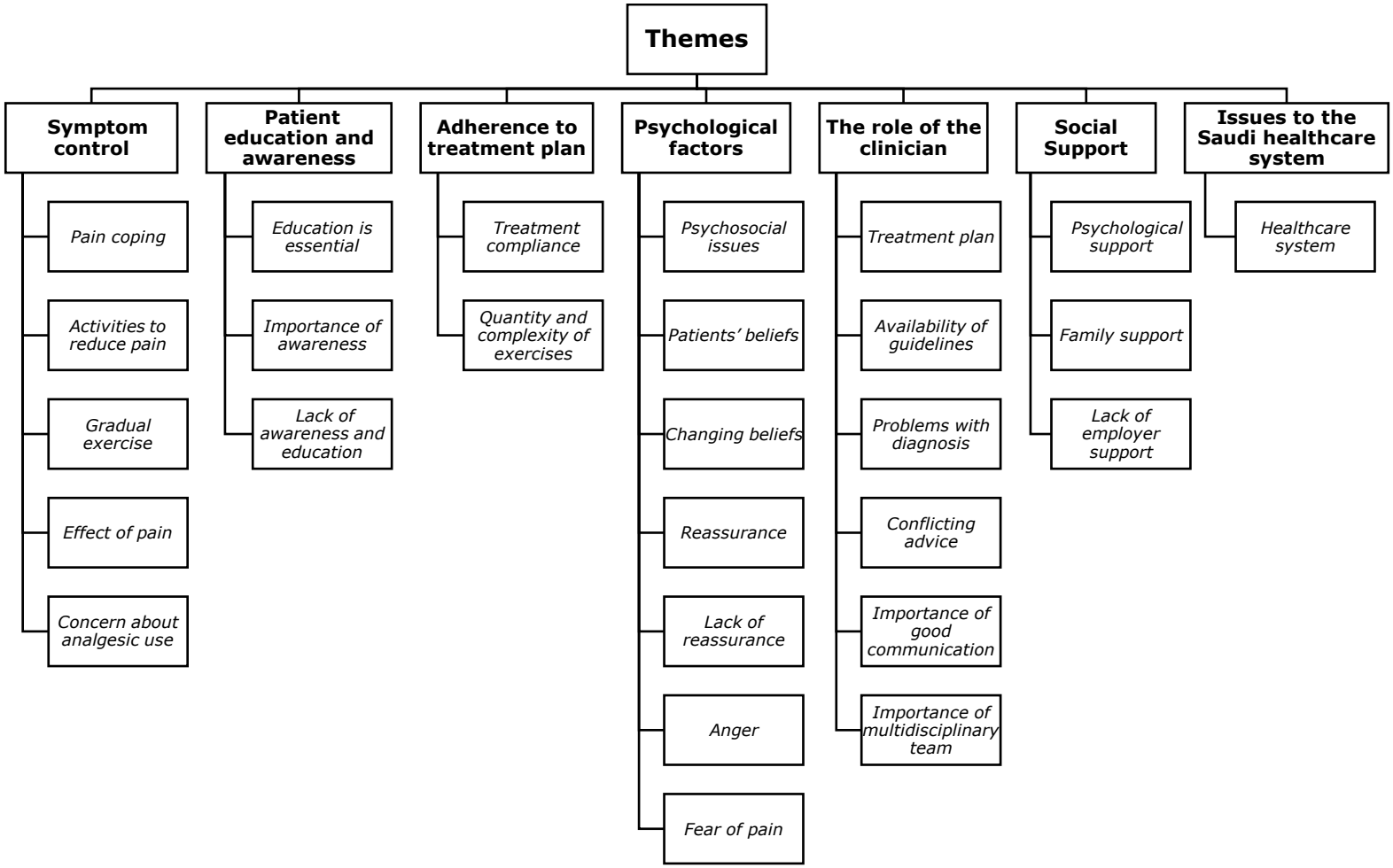


Figure 4. An illustration of the identified themes and sub-themes

3.5.2.1 Symptom control

One theme extracted from the data was symptom control, which influenced the patients' reactions to pain and behaviours compensating for pain. In the discussions, the patients reported that they tended to control pain with behavioural changes, such as reducing activity. The clinicians also reported encouraging symptom control, but their strategies were more active. They suggested behavioural modifications, such as minimal bed rest, and medical treatments, such as the use of analgesics, and encouraged patients to engage in physiotherapy to help them gradually resume normal function.

'I am trying to avoid or minimise movements that require effort, such as standing for a long time, to avoid severe pain'. (Pat. 3)

'I have become cautious in some activities and movements that I have performed before to avoid severe pain as if the pain begins, I will not be able to move and will have to stay in bed'. (Pat. 6)

The clinicians saw pain relief and control as important first steps to recovery:

'We should relieve pain using medication, rest or two or three days of sick leave, and then gradually resume usual activities. We need to make sure that we eliminate the pain to facilitate our patients' return to their normal activity levels'. (Phys. 1)

'Controlling the pain, strengthening muscles and practicing physiotherapy exercises will help patients return to practicing their activities as before'. (Phys. 4)

The clinicians recommended avoiding some movements, but they more generally focused on recommending activities to help

patients reduce their pain and resume normal activities, including continuing physiotherapy, losing weight and increasing exercise, such as swimming, walking and sports. The patients generally favoured these recommendations and agreed that these activities reduced pain and supported recovery.

'Most of the advice was to continue with physiotherapy or was about weight loss, exercises, swimming, walking and sports that would help relieve pain'. (Pat. 1)

'Some instructions were about certain movements that I have to avoid, as well as about avoiding standing for long periods and performing wrong movements, along with the use of painkillers and exercises that are useful'. (Pat.4)

Moreover, the patients preferred a gradual increase in exercise quantity and intensity.

'I think that physiotherapists should start exercise treatment gradually, from the easiest exercises to the most difficult, which will be beneficial and suitable in all cases'. (Pat. 2)

'Physiotherapists are supposed to start therapy with two exercises; then, the number can be increased gradually'. (Pat. 1)

Overall, the patients generally felt hindered in returning to their normal activities by the pain they experienced when undertaking activities. In some cases, the patients could perform such activities but felt that they were unnatural and that the pain persisted.

'When the lower back pain begins, I cannot perform my work duties and daily life activities as the pain affects me. I am trying to resume my activities by using painkillers, but I cannot function as before because of pain'. (Pat. 1)

'My daily life activities are lower than before because of the pain that is preventing me from practicing my activities in a natural way'. (Pat. 2)

This problem was emphasised by concerns about analgesic use. The patients reported a fear of the side effects of prescribed analgesics, so they tried to avoid taking these painkillers.

'The painkillers that relax the muscles cause drowsiness and make me sleep for a long time, so I am trying to avoid taking these painkillers'. (Pat. 4)

'I used to take analgesics when attacked by pain, but the long-time use of such drugs has effects on the kidneys and causes other complications'. (Pat. 1)

3.5.2.2 Patient education and awareness

The amount of education given to the patients by the physicians and physiotherapists was another key factor identified as supporting the patients' recovery and return to normal activity. The clinicians highlighted the importance of education about the patients' specific conditions. The following are some of the patients' responses regarding the necessity for patient education.

'Patients require significant education as physicians do not have time to explain their condition in detail or what they need to improve and to prevent them from making comparisons with other patients'. (PT. 4)

'I think the important thing is education as the level of education given to patients by physicians and physiotherapist is a key factor'. (Phys. 2)

The clinicians also conveyed the importance of education for the general public and society on the role of healthcare professionals in managing LBP.

'I think the general public should be educated about the importance of health, exercise and quality of life, what they need to know about lower back pain, and that they may experience lower back pain once or twice in their lifetime, so that they know how to deal with it and not surrender to the pain'. (Pt. 2)

'We must educate patients and society about the role of physiotherapy and exercise and their effect on resolving their condition, whether through brochures or by following instructions and advice'. (Phys. 5)

The clinicians perceived the patients' general awareness as low and expressed the benefits of patients and society at large having more knowledge about the value of exercise in relation to back pain:

'I think awareness is the most important point. We are trying to raise awareness among patients and direct them towards certain advice and instructions'. (Phys. 5)

'It is very important to initiate a national programme for social awareness about chronic lower back pain and to explain the causes of back pain and prevention methods'. (Phys. 6)

Furthermore, there was agreement about the lack of education about LBP. The clinicians supported implementation of a national awareness programme and discredited the ability of Internet sources to transfer information to the public due to language barriers.

'I think there is community unawareness about approaches to chronic lower back pain. Because of a lack of full awareness, most patients think that lower back is a dangerous condition, uncommon and unknown'. (Phys. 5)

'Patients are unaware about the disease and have insufficient information as most disease information on the Internet is in English. Arabic-language topics are assumptions from other people's experiences'. (Phys. 6)

3.5.2.3 Adherence to treatment plans

The clinicians recommended that the patients return to normal activity as soon as possible, as well as undertake specific exercises. The clinicians pointed out that although the patients practiced their exercises under medical supervision, they did not continue to do so at home, leading to the return of their back pain symptoms.

'Patients should follow the advice and instructions that have been given to them by physiotherapists and physicians to resolve their condition, but very few patients follow the advice and instructions'. (Phys. 5)

'If the advice and the instructions were provided to the patient during the first month were followed, the condition would resolve faster'. (Phys. 6)

'Adherence to treatment plan and advice and following physicians' and physiotherapists' instructions'. (Phys. 3)

The clinicians were aware that the patients were sometimes 'non-compliant with instructions', which slowed their recovery and delayed their return to normal activity.

'Most patients do not practice their treatment exercises at home and depend on doing physiotherapy at the clinic'. (Pt. 5)

'A lot of patients are not compliant with the treatment or with the instructions that are given to them'. (Pt. 4)

The clinicians further conveyed that poor physiotherapy attendance also slowed return to normal activity.

'The main thing is that some of the patients do not continue the physiotherapy programme. even though they stop the home exercises'. (Phys. 2)

'Most of the patients do not attend a sufficient number of physiotherapy sessions—they attend one or two sessions, and therefore, they face difficulty continuing to practice the exercise'. (Phys. 3)

However, the patients expressed that the quantity and complexity of the exercises prescribed made it difficult for them to comply with the treatment regimens.

'The physiotherapist instructed me to perform 15 exercises within one session, which is too many exercises and I may forget them'. (Pat. 1)

3.5.2.4 Psychological factors

The clinicians recognised that psychosocial concerns could affect the patients' return to normal activities. These psychological concerns could either support or hinder such a return.

'I believe that the majority of patients have psychosocial issues, which have an effect on recovery. That's why sometimes we should use some specific scales to determine if the risk of a yellow flag is high'. (Pt. 3)

'There is a psychosocial issue, especially in our culture, and many social demands on the patients sometimes lead to a long time required for recovery'. (Pt. 4)

'I think it is psychological reasons sometimes and also social issues that prevent the patients from going back to their activities'. (Phys. 2)

'I think that psychological factors play a significant role in returning to practicing daily life activities, and this has an impact on daily life in general as most patients have difficulty understanding their case'. (Phys. 5)

Likewise, the patients' beliefs and attitudes could either help or hinder their return to normal activities. In particular, their understanding that back pain did not have to be chronic and their appreciation of the benefits of physiotherapy and medication could be useful in helping them resume normal activity.

'Patients do not belief that physiotherapy is a sufficient intervention, and because they believe that this is not a treatment, they want something more powerful'. (Pt. 2)

'Patients have an incorrect belief that physiotherapy or medication will have an instant effect, like "magic". As physicians, we always explain to the patients that if the condition has persisted for a long time, the treatment period will be longer than the condition period'. (Phys. 3)

The patients tended to compare themselves with others regarding treatment and management.

'Some patients want to get the same treatment as someone else, like their cousin or friend. This is where education has a role—we have to educate them about their condition and about the treatment they should receive'. (Pt. 4)

'The nature of our community depends in a significant way on the experiences of the patients, with the persisting ignorance that each case is different from the others'. (Phys. 5)

Changing the patients' incorrect beliefs about physiotherapy and LBP thus was highlighted as important to facilitating a quick return to normal activities.

'One of the most important matters, particularly between the physician and patient, is the correction of false beliefs, such as that back pain is chronic, and physiotherapy and medication do not have instant benefits'. (Phys. 3)

'Patients must change their beliefs about chronic low back pain and follow pharmacological treatment and physiotherapy that will help them practice their activities of daily life'. (Phys. 5)

Reassurance from the clinicians could help the patients resume activities with greater confidence and take the necessary steps to reduce pain.

'Some patients experience fear, but after being reassured, they resume practicing the activities of their daily life'. (Phys. 4)

'I reassure patients that back pain is not a significant condition and encourage them to lose weight and do sport, such as swimming and physical activities'. (Phys. 6)

However, some patients thought that the clinicians did not always provide enough encouragement or reassurance, which was a hindrance to recovery.

'Most physicians have stated that my case is chronic and that if physiotherapy does not achieve any results, I will have to undergo surgery'. (Pat. 4)

'I felt that some physiotherapists wanted to say, "If you did not gain benefits from these exercises, better not to come again''. (Pat. 3)

One specific psychological issue identified as affecting the patients' pain levels was anger.

'If I become angry, the pain increases'. (Pat. 4)

'If I feel fatigued at work or become angry, the pain is aggravated'. (Pat. 1)

Fear of pain or LBP recurrence was identified by both the patients and clinicians as hindering full return to normal activities.

'I am avoiding practicing any activities because I am afraid that I may feel pain if I perform these activities, so I am trying not to tire myself to avoid the pain'. (Pat. 5)

'My daily life activities have changed now as I am afraid of feeling severe pain, and if the pain begins, I have to take a rest and stop working for a while'. (Pat. 5)

'I think some of the patients have a fear of pain, which can lead to a reduced possibility of recovery'. (Pt. 3)

'I think fear of pain plays a great role in returning to practice daily life activities. Due to fear, the patient becomes afraid of certain movements due to the pain'. (Phys. 5)

'Patients have a fear of the reappearance of the same problem again and of experiencing the same pain'. (Pt. 5)

'Some of the patients are afraid to get back to practicing the daily life activities because of fear of recurrence of pain'. (Phys. 7)

3.5.2.5 The role of the clinician

Clinicians played very important roles in helping the patients return to normal activities. The patients believed that clear, patient-centred treatment plans could facilitate recovery by eliminating confusion for those patients dealing with both physicians and physiotherapists and those dealing with different clinicians on

different visits. This notion was supported by the physicians, who also highlighted the importance of clear treatment plans. They suggested that having clear guidelines for patients would support adherence to treatment plans.

'I think that, if there is a unified plan or guidelines, this will be beneficial for patients and will help eliminate confusion and conflict among physicians and physiotherapists'. (Pat. 2)

'I hope guidelines become available as they will give indications that there is a clear plan to follow'. (Pat. 3)

'A clear treatment plan and instructions from physician as many patients do not get sufficient instructions'. (Phys. 4)

The clinicians called for clear national guidelines to follow in developing treatment plans for the patients, which they believed would help provide better patient care overall.

'All healthcare professionals should follow the guidelines to avoid having chronic patients'. (Pt. 6)

'Evidence-based practice and guidelines will be ideal for both healthcare professionals and patients'. (Pt. 3)

'We need to arrange our system more comprehensively with a unified, clear plan. Following the guidelines will help primary care physicians and physiotherapist resolve patients' conditions more quickly'. (Phys. 4)

'I think if guidelines or a specific plan become available, it would help a large proportion of emergency physicians and primary care providers'. (Phys. 5)

In the current situation, the patients were given different treatment plans by different clinicians as there was no single set of guidelines for the physicians and physiotherapists to follow. This situation confused the patients and thus hindered their recovery and return to normal activities.

'There are no clear guidelines to apply, neither from the side of the physician nor from the side of physiotherapy, and patients say the same thing: "There is no clear plan. I go to the physiotherapist, who gives me exercises that differ from the exercises given by the other physiotherapist"'. (Pt. 2)

'There are no specific guidelines, which may lead to chronicity and worsening of cases'. (Pt. 6)

'There are no guidelines, and no one follows them. Usually, we see patients who need surgery and will follow up on them, while other cases will be discharged and referred to the pain clinic and physiotherapy'. (Phys. 2)

'There is no clear treatment plan or guidelines, so the patients do not trust the physicians'. (Phys. 7)

'There was no unified plan. Each physician prescribed a plan that differed from other physicians' plans, so I became confused about whether to follow the plan of this physician or the other physician'. (Pat. 5)

'The problem is that every two or three sessions, a new physiotherapist gives me new instructions and exercises until I have been instructed to perform approximately 30 or 40 exercises. I have noted that there is a discrepancy between physiotherapists'. (Pat. 6)

The need for clear treatment plans based on national, evidence-based guidelines was supported by the patients' reports of receiving

conflicting diagnoses and inconsistent advice about their CLBP issues and methods of dealing with them.

'The diagnosis may vary from one physician to another, and the same goes for the physiotherapists. Everyone diagnoses your case from their own view'. (Pat. 4)

'Most physicians make different diagnoses based on their perspectives'. (Pt. 2)

'Mostly, it is the same diagnosis but the terms may differ because it was not translated to Arabic in a scientific way, and all of the terms with the same meaning are understood differently between one physician and another, which creates a problem for the patient'. (Phys. 6)

'I have consulted many physicians, some of them at my own expense, and each one has given me a different diagnosis for my condition'. (Pat. 3)

'There is a problem with diagnosing lower back pain. It is complex, not easy, and the diagnosis is often done by a physiotherapist and not a physician, which causes conflict for the patients'. (Pt. 1)

'The problem for the patients is that they go to more than one physician at the same time, and some of the physicians may agree on the same diagnosis, whereas others may differ'. (Phys. 5)

Differing, conflicting and ambiguous advice confused patients and hindered their recovery and return to normal activities. The clinicians agreed on this issue, noting that CLBP was a complex diagnosis on which different clinicians could disagree. Consequently, they might have given different diagnoses to the patients, especially those dealing with both physicians and physiotherapists or different clinicians on different visits.

'The physiotherapists' advice led to some confusion and ambiguity and differed between governmental hospitals and private hospitals. Some advice was positive, but mostly, there was confusion in the advice and exercises given by the physiotherapists'. (Pat. 2)

'Some physicians told me one thing, while the physiotherapists gave me exercises to do that were not related to the physicians' views. Some physiotherapists advised me to stop practicing sport and to keep performing the exercises they prescribed for me, while the others recommended massage'. (Pat. 4)

'Everyone, both physicians and physiotherapists, provide their own instructions to the patients and leave them confused as to which instructions they should follow'. (Phys. 6)

'It differs from one physician to another. Some recommend rest to the patients, and then the patients develop a barrier of fear of returning to daily activities instead of being motivated'. (Phys. 7)

Education and awareness were facilitated by good communication between the patients and clinicians and were seen to motivate the patients.

'Positive communication with the physiotherapist is what supports me to recover by motivating me to do exercises, which have played an important role in my recovery'. (Pat. 5)

'A positive relationship and communication with physicians and physiotherapists is very important as it helps the patient to be relaxed and motivated'. (Pat. 4)

'The relationship and communication between the patient and the physician should not end until the condition has resolved, even if the patient is referred to physiotherapy'. (Pt. 5)

'I try to provide the patient with any information that is beneficial or related to his or her case, and I try to simplify such information'. (Phys. 4)

However, poor communication between the patients and clinicians was an underlying cause of conflicting advice and treatment plans.

'Many physicians have a problem communicating with their patients and dealing with them, so most patients experience difficulty understanding their condition and the instructions provided'. (Phys. 5)

'There is a huge communication gap between the physician and the therapist and sometimes between the therapist and the patient, which usually leads to conflict in the treatment plan'. (Pt. 4)

In addition to supporting greater communication among clinicians, collaboration across disciplines was highlighted as an important developmental point, especially for patients with CLBP. The clinicians recommended that such groups include physicians, physiotherapists, health educators and psychologists. Having access to a multidisciplinary team could help patients with LBP avoid chronicity and make speedier returns to normal activities more quickly by enabling complete, holistic treatment.

'A multidisciplinary team is crucial, especially for chronic patients—they require a complete clinical team that includes a psychologist, physician, physiotherapist and health educator'. (PT. 2)

3.5.2.6 Social support

The physicians highlighted the importance of psychological support from different sources and the ways in which it could help patients recover.

'There is no doubt that all forms of support and psychological support have significant effects on the patients'. (Phys. 4)

'Psychological support, moral support and following the instructions will help patients to return to practicing their daily life activities'. (Phys. 7)

In particular, the clinicians recommended support from spouses, children and friends. The patients also noted that such support was extremely valuable.

'My family's support has played an important role in my recovery and practicing of daily life activities'. (Pat. 5)

'Family support is an important factor. My family has always supported me by advising that I not think negatively about my condition, that I will get better, and the pain will go away, and I will recover to the way I was before'. (Pat. 2)

'It is very important. Primary support should come from the spouse and children as well as from friends and colleagues'. (Phys. 1)

'Family and friends' support is essential for patients during and after treatment'. (Phys. 4)

However, the patients noted low levels of support from employers, seemingly due to a lack of understanding and awareness on the part of the employers. Unsupportive work conditions were

highlighted by the patients and clinicians as hindering full return to normal activities, including work.

'I am an employee in the government sector, which shows no consideration for individuals suffering from lower back pain, as I may be referred first to the medical committee then get retired'. (Pat. 3)

'My employer does not understand my case. When pain attacks me in the morning, sometimes they refuse to give me leave, and in this case, I am forced to apply for emergency leave until I am out of balance as they think that I am making an excuse'. (Pat. 6)

'Some employers may be unsupportive as they are ignorant of the problems from which the patients suffer and due to the impression they have that employees always try to get leave with flimsy excuses, so bad employees create trouble for the good ones'. (Phys. 3)

'I notice that some patients complain about their managers and ask for reports that prove their cases and conditions, and this is proof that their employers are not showing understanding of their cases'. (Phys. 4)

3.5.2.7 Issues specific to the Saudi healthcare system

Both the patients and clinicians highlighted the importance of the Saudi healthcare system as a factor hindering timely treatment and thus the speed at which patients returned to normal activities. Deficiencies in the healthcare system highlighted as undermining patient care included a perceived lack of administration for referrals at the entry level and staff and resources shortages that caused delays in the healthcare system.

'There is a system malfunction. We suffer many problems within the health care system, one of which is the referral system. We have no referral system back to the physician although some patients want to discuss their case with their physician after they have been discharged from the physician's clinic'. (Pt. 1)

'The healthcare system can lead to worsening and aggravation of the patient's condition as it hinders the patient from following the specific steps of his or her treatment plan'. (Phys. 5)

'The shortage of staff and resources causes delays in the primary health care system, causing patients to wait for a specialised physician appointment for up to as long as one and a half years'. (Pt. 4)

'Usually, it may take nine months to get an appointment to see a specialist physician; therefore, the pain may progress into chronic pain'. (Pat. 4)

In addition, the existence of specialised clinics was minimal, limiting access to back pain specialists.

'The role of the clinics is limited as many patients are referred to specialised clinics for which they must wait a long time to be seen'. (Phys. 3)

'Appointments for radiology procedures have a very long waiting time of at least nine months'. (Pat. 1)

3.6 Discussion

This qualitative study used framework method to examine the factors that the patients, physiotherapists and orthopaedic surgeons perceived as acting as barriers and facilitators of activity normalisation after physiotherapy interventions for CLBP (Ritchie et al., 2003; Ward et al., 2013). The main aim of physiotherapy interventions is to help patients resume normal activities insomuch as

possible, as soon as possible (Moffett and McLean, 2006). This research identified seven themes that influence activity normalisation after physiotherapy for patients with CLBP: symptom control, patient education and awareness, adherence to treatment plans, psychological factors, role of clinicians, social support and issues in the healthcare system.

This research showed that while pain relief and control are important first steps to recovery, concerns about analgesic side-effects means that some patients reduce them or remove these from their symptom control regimen. The patients prefer gradual increases in exercise quantity and intensity, and some patients still want to rely on bed rest, while the clinicians recommend physical activity to reduce pain and support recovery. Consequently, the patients use pain as a reason to avoid normal activities, which is problematic as avoiding movement or activity due to heightened anticipation of pain hinders activity normalisation (Vlaeyen and Linton, 2000; Aung et al., 2014); thus, this must be addressed. Patient education and awareness-raising is one key ways in which this can be achieved (Frost et al., 2004; Hildebrandt et al., 2004). However, this research also found that a general lack of awareness about LBP and LBP treatment among patients and the wider community, including employers, serves to hinder patient recovery and activity normalisation.

The clinicians recommend that the patients return to normal activity and participate in exercise even when they feel pain. Similarly, Nguyen et al. (2007) recommended that as long as there are no red flags, patients with LBP should be encouraged to remain as active as possible, with minimal bed rest and appropriate use of anti-

inflammatories or analgesics. However, two issues highlighted in the current research are poor physiotherapy attendance and lack of adherence to treatment plans, which might be due to the quantity and complexity of the exercises recommended and the often conflicting diagnoses and advice often received by the patients. Similarly, in a study by Bishop et al. (2008), patients with the same LBP signs and symptoms received different advice regarding bed rest, return to work, being off work and avoidance of activities. Bishop et al. (2008) attributed this to different providers favouring different treatments and tending to stick to what they are used to in clinical practice. Another reason for conflicting diagnoses and advice matches what was observed by Foster et al. (1999), who argued that it is due to the clinical uncertainty associated with LBP in diagnosis, prognosis and treatment selection. The patients also prefer a gradual increase in exercise, which is not always acknowledged. Following clinicians' advice is important for recovery, while lack of compliance slows recovery (Middleton, 2004); thus, any factors that prevent patients from complying with clinicians' advice must be address.

Both the physicians and physiotherapists acknowledge that psychosocial factors can affect patients' return to normal activities. The patients note that anger intensifies their pain, which accords with previous research showing that anger and anger management styles can aggravate CLBP (Bruehl et al., 2002; Greenwood et al., 2003; Burns et al., 2008). Additionally, both patients and clinicians identify fear of pain and recurrence of LBP as major factors hindering patients' full return to normal activities. These findings support those from Keen et al. (1999), who recommended that, when advocating a return to or increase in physical activity for people with LBP, it is important

that clinicians address fear of pain in the earliest stage in order to tailor advice and reassurance appropriately.

Alshami's (2014) work investigating the physical and psychosocial factors of patients with LBP in Saudi Arabia, demonstrated that moderate stress is a major factor affecting return to normal activity in patients with LBP. This contradicts the findings of this research suggesting that fear of pain and recurrence of pain are the main identified hindrances to activity normalisation. Targeting these psychosocial factors, as well as managing stress (Alshami, 2014), therefore, should help improve management of patients with CLBP.

The patients also like to compare themselves to others, and a lack of specific education and general awareness about CLBP and treatment is evident in their lack of understanding that each case is unique. Further, other patient beliefs have been shown to hinder recovery. For instance, many do not believe that physiotherapy is a sufficient intervention for symptomatic relief, whereas conversely, some think it is a magical intervention that will produce immediate results. Changing patients' beliefs through proper education and awareness, therefore, is an important factor in recovery, agreeing with previous research in this area (Vlaeyen and Linton, 2000; Dawson et al., 2011). Overall, psychosocial factors are important and must be considered individually for each patient, especially those with CLBP, in order to achieve maximum effectiveness (van der Windt et al., 2008; Brunner et al. 2013). Such psychosocial factors influence whether some of those suffering from back pain progress to CLBP, and complainants with LBP maintain a high rate of this globally.

Positive patient attitudes and beliefs can be supported through reassurance from clinicians. Clinicians who do not provide reassurance and encouragement to patients are likely to hinder their progress and return to normal activities. Additionally, patients are likely to benefit from clear, unambiguous information about their diagnosis from clinicians (Dawson et al., 2011; Traeger et al., 2015). These can be supplemented by public health awareness campaigns conveying to the general public positive messages about back pain and how to deal with the issues it raises (Picavet and Schouten, 2003). In Australia, Buchbinder et al. (2001) provided experimental evidence that making information and advice on back pain available to the general population significantly improves beliefs about back pain. Due to negative attitudes, beliefs are vital contributors to disability, resulting in LBP. Education about accurate beliefs is important, behaviourally proper and theoretically effective at reversing the rising epidemic of back pain disability. If such messages become accepted as social norms, then less effort is required for the subsequent maintenance of this position. Monitoring a population's beliefs is important to determine whether the messages are being maintained and whether there is any need for follow-up campaigns. A population-based strategy for the dissemination of positive messages regarding back pain improves the general population's and GPs' beliefs about back pain and seems to influence medical management.

Population-based media campaigns with positive messages about back pain have the ability to successfully change the views of society on this problem (Buchbinder et al., 2001). For instance, Buchbinder et al. (2005) found important, continuous improvements in population beliefs about back pain three years after cessation of a media campaign on optimistic messages on back pain. Further

evidence indicates that changing population beliefs about primary preventive strategies on back pain is a highly efficient method of reducing back-related disability (Buchbinder et al., 2005). A campaign on public and professional health education in the UK resulted in changes in public beliefs, from approximately 55% preferring rest and 40% preferring staying active to approximately 30% preferring rest and 60% preferring staying active. A major change in public beliefs and professional advice took place, although work-related results saw no changes (Waddell et al., 2007).

Public awareness likely helps increase social support for patients, which is vital to promote their return to normal activities, including work (Campbell et al., 2013a; Shaw et al., 2013; Williams, 2014). While the patients generally report family support, several highlight unsupportive employers, seemingly due to their lack of knowledge about the issues surrounding CLBP, indicating that greater general awareness is needed. Advocating a more rounded approach to CLBP therapies should involve a more holistic approach to pain management that encompasses the various domains of the patient, including the workplace (Kendall et al., 2009; Shojaei et al., 2017). Methods targeting public health propose solutions to alter the public's beliefs and behaviours regarding back pain. In the UK and Australia, studies have demonstrated that mass media campaigns have had successful effects on the beliefs of the public, allowing directly accessing the public and better targeting messages (Foster et al., 2018).

From this research, it is clear that if proper awareness of the diagnosis and treatment of this ailment is not made widespread among patients and clinicians, the condition of patients suffering from

LBP will remain the same, with some gradually developing CLBP. This refers to not only the physical conditions and influences of the body but also the psychosocial influences on chronic pain. This is largely supported by the biopsychosocial model of health, which sees such developments as supported by a complex interweaving of biological criteria, social variables and psychological phenomena.

Once patients have developed CLBP, their physical movement may be fundamentally affected by the treatment received within the healthcare system. One issue is that patients' rehabilitation may be detrimentally affected by needless, long-term treatment and tests by healthcare providers. Further, as Loisel et al. (2001) suggested, patients' return to employment may be complicated by ineffective communication with employers.

Disability can be affected by numerous dynamics, including healthcare systems, compensation schemes, work environments and individual factors, such as psychosocial and physical issues, as outlined in the model of Loisel et al. (2001). If disability affecting employment is to be averted, a methodical way to assess these variables is necessary, and the model of Loisel et al. (2001) may be used to effectively assess the issues of healthcare providers and relevant parties. Employees' social bonds, in conjunction with their emotional, cognitive and physical traits, can be considered within an employment rehabilitation strategy utilising the disability model.

Based on these findings, the various types of rehabilitation programmes offered to employees by healthcare systems must be considered in terms of the disability model. The most important factor in this regard is the creation of a comprehensive stakeholder, multi-

organisational, multi-disciplinary group or at least a cross-disciplinary group of medical experts to work in conjunction with the relevant physicians. This work environment poses both challenges and offers opportunities for re-entering work, which should be rigorously assessed and recorded. These can include the external context of the company's activities, the entire structure of the work environment and the employment role of the patient. Finally, as Loisel et al. (2001) suggested, state and private compensation structures and employee relationships should be considered within the disability model.

In the initial stage, healthcare providers' role in relation to patients with CLBP is to exclude the rare chance of a serious ailment being present. Loisel et al. (2001) proposed that, in accordance with the disability prevention management model of CLBP, return to normal activity should next be encouraged through cross-institution communication, which should be embraced by companies, healthcare providers and workers' compensation boards. As a contributor to short- and long-term work absences, it is important that employers receive advice and guidance on how to help manage patients with CLBP. This is becoming more evident in research focused on ensuring that policy mechanisms for disability benefits encourage patients to return to work.

In the UK, the government actively aims to reduce the number of employees out sick each year based on previous work absence and return figures. What is interesting to note is that recent research has suggested that, despite this focus and even when broadly defining occupational health services, only 15% of UK employers provide adequate occupational health support for employees (Bishop et al., 2014). Bishop et al. (2014) discussed patterns of workplace pain in

the UK and suggested that workplace healthcare policies need a more prominent role in vocational case management and primary care to help patients remain on or return to work.

Although CLBP studies have demonstrated levels of work absences and return to work, the figures are highly variable depending on the country, setting, characteristics of the study population, definition of work absence and duration of the pain (Wynne-Jones et al., 2014). Indeed, much of the available literature on returning to work, in particular, remains convoluted and confusing due to the lack of standardisation and consistency in the various definitions used (Hestbaek et al., 2003). Consequently, for understanding how workplace support structures, it is important that standardised methodologies for recording and analysing CLBP absences are developed.

These findings reveal that the ways in which the involved parties in disability-related contexts, including medical care services, compensation bodies and employers, react are significant to causing disability, which is a consequence of more than patients' psychosocial and physical characteristics. As Loisel et al. (2001) emphasised, the prevention of long-term disability caused by sub-acute or CLBP is the main objective of the disability prevention management model of CLBP. This can be problematic in cases in which GPs have insufficient training in CLBP, sickness certification and occupational health, especially when many patients expect sickness certification when attending GPs with this condition (Wynne-Jones et al., 2010). More training for GPs from physiotherapists may help improve this service and identify treatments that can be done along with occupational

health to help patients remain in work during their treatment programme.

Working alongside occupational health professionals and GPs is important to deliver effective treatment for CLBP. This form of vocational advice intervention needs to be delivered early in the treatment programme to have highest chances of success. Research has suggested that it ideally should be implemented before six-months' work absence (Sowden et al., 2018). Training programmes need to involve not only treatment methods but also regular mentoring meetings, and case management approaches should include a range of communication tools, from face-to-face appointments to regular telephone discussions and work accommodation visits, if appropriate (Sowden et al., 2018). This can help ensure that these programmes more effectively integrate issues related to health and work. In addition, early intervention has been shown to reduce the length of sickness and improve the chances of sustained retention in work (Loisel, 2005; Waddell et al., 2008; Sowden et al., 2018).

3.6.1 Limitations

This study is the first to explore the experiences, attitudes, beliefs and perceptions of healthcare professionals (physiotherapists and orthopaedic surgeons) and patients with CLBP in Saudi Arabia about the barriers and facilitators of activity normalisation after physiotherapy. However, a few limitations in the study are evident.

This qualitative research was limited to one Saudi Arabian governmental centre, where the data was collected. The

generalisations were made without considering other geographical areas within the country, creating a limitation. However, the centre selected is a specialist tertiary care centre serving patients from diverse regions throughout Saudi Arabia. There could be differences in the training and approaches used by orthopaedic surgeons and physiotherapists at other centres, influencing the main focus of their discussions and consequently the themes generated and the transferability of findings.

The generalisation of the findings was somewhat limited by the small sample and self-selection of patient respondents. All the participants were well educated and employed, as well as young and middle-aged. However, the Saudi Arabian clinicians expressed a variety of views and experiences. They also highlighted issues relevant to all patients with LBP and their management. In addition, focus groups could not be conducted with the orthopaedic surgeons due to difficulty arranging their schedules to gather them at the same time. Consequently, interviews were conducted.

Data saturation might not have been established or optimised, as is the gold standard. Saturation can only be determined during or after analysis of data. In an attempt to optimise data saturation, the researcher listened to the full transcripts for all the individual interviews and focus groups to recognise recurring themes by using the topic guide.

It is important to note that the interviewer's physiotherapist background might have resulted in bias during data collection and interfered with the focus groups and the interviews as the participants were already aware that the person interviewing them was a

physiotherapist. In an attempt to minimise this limitation, a semi-structured interview format was utilised. Moreover, independent researchers from different backgrounds were involved in data analysis of the focus groups and interviews to ensure that the findings were credible, and multiple perspectives were captured, minimising the researcher's influence. The data collection tools utilised were semi-structured interviews and focus groups, so the extraction of information from the participants relied heavily on the researcher's ability and skill to ask appropriate questions and probe more important aspects of the topic.

The researcher performed the qualitative data analysis, which could have resulted in biased analysis. Therefore, only one physiotherapy perspective was considered in order to influence the focus of the data analysis, even though the framework analysis was used to make a clear audit trail. Multiple discussions and perspectives would have emerged if other researchers had been involved in data analysis, deepening the data interpretation.

3.7 Conclusions

Clinicians play a vital role in helping patients return to normal activities, initially by providing patients with clear treatment plans and clear advice. To do so, clinicians themselves needed clear guidelines, training and involvement in a multi-disciplinary team to ensure utilisation of a uniform management mechanism that can deliver treatment consistently. The lack of clinical guidelines and associated treatment plans contributes to varying diagnoses and ambiguous advice, and these barriers contribute to poor communication between patients and clinicians, which hinders patients' understanding of the

diagnosis and ultimately the therapeutic process itself and how it will benefit CLBP. This situation decreases patient motivation and frustrates the clinical team. Poor communication among clinicians is also evident and may also slow the recovery process and result in conflict diagnoses. Having access to a multidisciplinary team can help patients with LBP learn better management techniques before the issue becomes chronic and can help patients return to normal activities more quickly by enabling greater communication among clinicians and setting clear diagnoses and treatment plans for clients.

The healthcare system can either hinder or support patients' recovery. Specifically, if the healthcare system prevents patients from adhering to their treatment plans, it can contribute to aggravation of their symptoms. Based on the issues identified by both patients and clinicians, the primary healthcare system must be able to meet demand for services in this area and handle less severe cases so that not all patients have to be referred. This is especially important when the referral system for patients who need specialised care is non-functioning, and specialised clinics and physicians are not able to see patients in a timely manner.

Chapter 4 Beliefs and influence of physiotherapy on return to normal activity and participation among patients with chronic low back pain: a survey

4.1 Chapter overview

The systematic review (Chapter 2) and the qualitative study (Chapter 3) demonstrated that psychosocial variables have impacts on the recovery of people with CLBP. In Saudi Arabia, there is a paucity of literature on the relationships among fear avoidance, perceived disability and perceived pain upon movement among people with CLBP. There is also little literature on which domains of patients' physiotherapy beliefs are associated with perceived disability and physical activity among people with CLBP. This study, therefore, was aimed to examining how beliefs about physiotherapy influence Saudi patients with CLBP in their return to normal activity. This survey study was designed based on the findings from the systematic review (Chapter 2) and qualitative study (Chapter 3).

4.2 Background

CLBP is defined as discomfort or pain in the gluteal folds and costal margins with or without accompanying pain in the leg that lasts for more than three months or 12 weeks (Airaksinen et al., 2006). It is a common and frequently disabling musculoskeletal disorder in both developed and developing countries and, as such, is the most common cause of workplace absenteeism from the workplace (Lidgren, 2003; Costa et al., 2009). The Global Burden of Disease study reported that LBP is one of the ten diseases with the highest burden of injuries and diseases. In the majority of cases, acute LBP resolves spontaneously (Costa et al., 2009). In population-based studies, the prevalence of LBP has been estimated to be 70%–85% (Hoy et al., 2010). In Saudi Arabia, population-based studies using cross-sectional surveys have found that the prevalence of LBP ranges

from 53.2% to 79.17% (Awaji et al., 2016). The average disability-adjusted life years for LBP are higher than for tuberculosis, chronic obstructive pulmonary disease, HIV, preterm birth complications and road injuries (Vos et al., 2012).

The aetiology of CLBP may be related to tumours, infections, nerve root compromise and fractures (Burton et al., 2006). The condition is chronic, so its health-related costs and burdens are often under-reported (Vos et al., 2012). In most cases, CLBP is non-specific, which makes treatment and management more challenging (Burton et al., 2006). Managing CLBP is a crucial factor in helping patients return to normal activity or engage in new physical activity. Identifying factors that can help patients return to their normal activities is essential when managing CLBP (Vos et al., 2012). Specifically, fear avoidance and pain-related fear are the psychosocial factors most strongly associated with disability in individuals with CLBP (see Chapter 2; Vincent et al., 2014). Catastrophising in the early stages of rehabilitation and kinesiophobia are examples of psychosocial factors that predict disability and low functional status in patients with CLBP (Vincent et al., 2014). FABs about back pain may also increase experience of pain and decrease self-efficacy in patients with CLBP (Vincent et al., 2014).

In a cross-sectional study of men and women aged 18–45 years old diagnosed with CLBP (n=80) in Mexico (Nava-Bringas et al., 2017), the relationships between FABs and disability and pain were analysed. The results revealed that women had comparatively higher levels of fear-avoidance beliefs than men, and single participants were more likely to have higher levels of FABs than those who were married. The study results also found a positive, significant correlation

of disability and pain with high levels of fear-avoidance beliefs. The study also showed strong relationships among the participants' fear-avoidance belief scores, pain severity and functional disability. George and Stryker (2011) conducted a study of 313 patients (mean age: 45.5 years, men: 37%, women: 73%) interested in outpatient physiotherapy for spine-related LBP complaints. Data from these patients showed that pain severity and high FABQ scores were two important factors negatively affecting patients' physical functioning. Both studies thus showed a strong relationship between FABQ scores and pain intensity, resulting in functional disability in patients suffering from LBP.

Another study with a convenience sample of 432 Chinese healthcare professionals assessed their LBP status, pain-related disability and beliefs about their resulting LBP experience (Tan et al., 2014). The study results also affirmed that those who experienced LBP were more likely to have increased levels of fear-avoidance beliefs. Education level was also identified as a factor influencing fear-avoidance beliefs: people who had completed postgraduate study had fewer FABs than those who had only completed secondary education. The respondents' age was another factor influencing FABs. Younger Chinese healthcare professionals held more negative attitudes and beliefs towards LBP than those in older age groups. Chinese healthcare professionals who had completed postgraduate studies also had lower levels of FABs. These studies all suggested that LBP experience is correlated with increased levels of FABs.

Given the effects of psychosocial variables on the recovery of patients with LBP as demonstrated in studies from Mexico, China and the United States, it is important to examine the impacts of these

variables on patient groups in specific regions. In the current study, Saudi Arabia was selected as the effects of these variables on recovery have not yet been explored in Saudi Arabian populations. Furthermore, it appears that addressing these beliefs during rehabilitation is important to ensure that patients adhere to exercise programmes and thus are enabled to return to normal activities. It is suggested that enabling recovery in this way could help patients with CLBP return to normal activities (Tan et al., 2014). However, there is a paucity of literature on the relationships among fear avoidance, perceived disability and perceived pain upon movement among patients with CLBP in Saudi Arabia. There is also little work in which the domains of the physiotherapy beliefs of patients with CLBP in Saudi Arabia are associated with their perceived disability and physical activity.

Recent increased interest in CLBP is related to the rising prevalence of obesity in Saudi Arabia (Alqarni, 2016). Around 70 percent of people in Saudi Arabia are overweight or obese (Memish, 2014), and being overweight and obesity are serious health problems shown to act as major risk factors in the development of diabetes, hypertension, hyperlipidaemia, obstructive sleep apnoea and osteoarthritis (WHO, 2016). Importantly, obesity has been strongly associated with increased CLBP prevalence and people seeking care for back pain, including treatment and management (Shiri et al., 2010). CLBP is also related to loss of productivity and employment, so this might lead to additional pressures on individuals, families, states and healthcare resources (Shiri et al., 2010; Awaji et al., 2016). Identifying psychosocial factors that influence health seeking-behaviours (e.g. access to physiotherapy), therefore, might help with the development of interventions to enable people with CLBP to return

to their normal activities, potentially including work. Return to work after CLBP is a complex process, but it has been suggested that psychosocial factors such as FABs, social support, self-efficacy and catastrophising can predict return-to-work outcomes (Besen et al., 2015). Examining and evaluating participants' FABs, therefore, could also help healthcare practitioners develop strategies to help patients return to or remain in work.

4.3 Aims

The main aim of this study was to understand how beliefs about physiotherapy influence patients with CLBP in Saudi Arabia in their return to normal activity. Specifically, this study was aimed at addressing the following objectives:

1. To examine the medical history, perceived disability and fear-avoidance beliefs about physical activity and work among Saudi Arabian people with CLBP
2. To investigate whether there are significant differences in physiotherapy beliefs by gender, education level, income level and marital status
3. To determine whether there is a relationship between medical history and physiotherapy beliefs
4. To assess whether there is a relationship between participants' FABs and their disability and physiotherapy beliefs

4.4 Method

The current study used quantitative methods appropriate for examining the relationships between variables and determining

whether demographic variables and characteristics influence the beliefs, knowledge and attitudes of the sample population (Ellis, 2013). A cross-sectional study design allowed researchers to address a study's aims and objectives. A cross-sectional study design collects and analyses data from a target population or representative subset at a specific point in time (Ellis, 2013). Its strengths lie in the relative convenience and ease of collecting data compared with other observational study designs, such as cohort or case-control studies (Melnyk and Fineout-Overholt, 2015). A cross-sectional study also allows investigators to examine multiple variables in a single setting (Ellis, 2016). However, it cannot establish causal relationships as data are only collected at a single point (Greenhalgh, 2014).

In the present study, this design was appropriate to examine the participants' demographic variables, characteristics, medical histories and Fear Avoidance Belief Questionnaire—Physical Activity (FABQ-PA), Fear Avoidance Belief Questionnaire—Work (FABQ-Q), and RMDQ scores. Although causal relationships could not be examined, it enabled examination of the associations between variables, differences between sociodemographic groups' beliefs regarding the different domains of physiotherapy and measurable differences between women and men's physiotherapy beliefs. The influence of education level and marital status on the participants' physiotherapy beliefs was also explored. The use of a cross-sectional design also helped to examine the relationships of medical history, pain intensity, CLBP duration, interference in normal daily activities and number of physiotherapy sessions. Furthermore, the relationships between the FABQ-PA, FABQ-W and RMDQ scores and the different domains of the participants' physiotherapy beliefs were identified.

Two standardised, previously validated questionnaires (FABQ and RMDQ) were used in this study. The FABQ questionnaire examined the respondents' fear-avoidance beliefs about work and physical activity, and higher scores indicated higher levels of fear-avoidance beliefs (Wertli et al., 2014a). For the current study, the FABQ was translated into Arabic. Previous studies (Laufer et al., 2012; Alanazi et al., 2017) validated the Arabic version of the FABQ, and in particular, Laufer et al. (2012) found that the translated questionnaire had acceptable psychometric properties. For the physical activity subscale, a strong ceiling effect has been noted (Laufer et al., 2012), but Alanazi et al. (2017) found no ceiling effect for the FABQ-W components of the questionnaire. Alanazi et al. (2017) also remarked that the adaptation and translation of the FABQ Arabic version had good test-retest reliability, acceptable construct validity and low sensitivity to change.

An Arabic version of the RMDQ was also used to measure the participants' disability. The Arabic version has been found to be culturally and clinically appropriate for Arabic patients. Maki et al. (2014) examined the validity of the Arabic version of the RMDQ and found high acceptability and reliability and good comprehensibility and good internal consistency. The initial questionnaire was vetted and checked by an expert committee of musculoskeletal physiotherapists and then checked for comprehensibility by bilingual LBP patients. The Arabic version thus was found to have good agreement with the English version of the RMDQ (Maki et al., 2014).

A new questionnaire (Appendix 13) was developed to enable mapping of the findings from the qualitative study (Chapter 3) in this larger group of people surveyed. Twelve domains were selected for

inclusion in the questionnaire based on the results of the systematic review (Chapter 2) and the qualitative study (Chapter 3). These were: coping with pain, fear of pain, conflicting diagnoses, patients' beliefs, conflicting advice, treatment compliance, quantity and complexity of exercise, gradual exercise, awareness, communication, guidelines and education. Each of the domains in the questionnaire was based on recurring themes in the qualitative study (Chapter 3). A total of 42 items were developed for inclusion the questionnaire. These were then discussed with the researcher's supervisors to ensure coverage of the identified domains and comprehension.

To increase the validity of the questionnaire, it was originally written in English by the researcher and then translated into Arabic, strictly adhering to the research protocol (Brislin, 1970; Chen and Boore, 2010; Regmi et al., 2010; Van Nes et al, 2010). The process involved consultation, back-translation and collaboration by an independent researcher (a native Arabic speaker bilingual in English). The Arabic and English versions were then modified appropriately to deliver the final version.

4.4.1 Participants

Potential participants were selected from the patients attending the Physiotherapy and Orthopaedics and Spine Clinics at the King Khalid University Hospital and King Fahad Medical City. The participants were recruited over 8 May–31 July 2017 using convenience and consecutive sampling methods. The inclusion criteria were adults ages 18–65 years old who had been diagnosed with CLBP for more than 12 weeks and who had had physiotherapy before recruitment. Clinical team members (physiotherapists) at both

hospitals helped the researcher identify potential participants when they attended clinics for physiotherapy and consultations. An eligible patient was personally approached by the researcher (MA) or a clinical team member and invited to participate in the study. Full disclosure of information about the research study was provided in the questionnaire, and the participants' consent was inferred when they completed and returned the questionnaire. Furthermore, the information sheets provided informed the participants of their rights to refuse or agree to participation in the study (Creswell, 2008). Those who consented were given questionnaires for self-completion.

4.4.2 Sample size

Sample size calculation was not performed as there was no registry in Saudi Arabia recording the total number of people diagnosed with CLBP and who are currently accessing treatment. The availability of such data might have enabled a sample size calculation that guaranteed the necessary number of participants to ensure representation of the Saudi population with CLBP (Aveyard, 2014; Parahoo, 2014; Ellis, 2016). The sample size, therefore, was determined by investigating the number of participants recruited in surveys on CLBP conducted abroad, that is, outside Saudi Arabia. For example, the study on CLBP by Briggs et al. (2011) had a sample size of 36, while for Nava-Bringas et al. (2017), a total of 80 patients took part in the study, and for de Moraes et al. (2014), a total of 215 patients took part.

A larger sample size reduces the risk of selection bias, while increasing the generalisability of findings (Aveyard, 2014): the decision to work with a sample size of 175 participants—in this

present study—depended not only on this finding but also on the following: firstly, the parameters of this study, such as the age range of participants, the duration of the data-gathering phase, and the criteria used to identify a subset of CLBP patients, namely, people with a diagnosis of CLBP for more than 12 weeks and who had had physiotherapy before recruitment. Secondly, variables peculiar to our survey in the Saudi Arabian context, namely the number of patients receiving treatment from King Khalid University Hospital and King Fahad Medical Centre, the professional judgement of physiotherapists in identifying relevant and willing participants for the study, ethical and cultural considerations in approaching and recruiting potential participants and the number of participants agreeing to the study. In view of Aveyard (2014), as with the parameters and context of the study, the researcher determined that a sample size of approximately 175 participants would also suffice when set against comparable international studies on CLBP; Briggs et al. (2011), Nava-Bringas et al. (2017), and de Moraes et al. (2014). Assuming a 50% return, I proposed that at least 350 patients to be approached or invited to take part in the study. According to Parahoo (2014), a 50% response rate is acceptable and will improve the representability of findings to the target population of the study.

4.4.3 Ethical considerations

Ethical approval for the study was obtained from the University of Nottingham Medical School ethics committee (Ethics No: OVSB10112015 SoM RHA; Appendix 10) and from the local ethics committees of King Fahad Medical City (IRB No. 16-074E; Appendix 11) and King Khalid University Hospital (IRB No. 17/0072/IRB; Appendix 14). During the recruitment process, all the participants

were provided with an information sheet to ensure that they understood the main purpose, aims and objectives of the study.

Respecting the participants' rights and informing them of the study's potential benefits were behaviours consistent with the ethical principles of beneficence and non-maleficence (Beauchamp and Childress, 2012). Beneficence refers to acts that benefit an individual or group of individuals, while non-maleficence is defined as doing no harm (Gray, 2009). In the study, both ethical principles were observed: the study benefits were well explained to the participants, and they were informed that their participation would contribute to knowledge on how Saudi patients with CLBP perceive their own pain and how their physiotherapy beliefs influence their actions, particularly seeking medical attention and avoiding work and physical activity. This study was reported in accordance with Strengthening the Reporting of Observational Studies in Epidemiology guidelines (Von Elm et al., 2007).

4.4.4 Data analysis

Statistical analysis to determine if there were significant differences and relationships between variables was planned to address research questions based on a number of pre-determined hypotheses and an accepted significance level is $P < 0.05$. The questions were as follows:

1. Are there any differences in different sociodemographic groups' beliefs regarding the different domains of physiotherapy beliefs (e.g. gender, education and income levels, marital status, occupation and number children)?

2. Is there a relationship between medical history and physiotherapy belief domains (e.g. back-pain duration, pain intensity, surgery, physiotherapy sessions, physical activity, pain interference in normal everyday activities and referrals for physiotherapy)?
3. Is there a relationship between FABQ-PA scores and the different domains of physiotherapy belief domains?
4. Is there a relationship between FABQ-W scores and the different domains of physiotherapy belief domains?
5. Is there a relationship between RMDQ scores and the different domains of physiotherapy belief domains?

All the completed questionnaires were processed, and the data were analysed using Statistical Package for the Social Science (SPSS) version 24. Descriptive statistics were used to describe each participant's sociodemographic variables, medical history and FABQ-PA, FABQ-W and RMDQ scores.

Regarding the survey, Parts A–B sought to establish demographic and historical information about participants, while Parts C-D was concerned with their personal perceptions and experience of CLBP. The focus of Part E was on beliefs about the effect of physiotherapy on CLBP, the scores of which were developed from descriptors and in turn, ranked against an evaluative criterion. The intention here was to capture the subjective beliefs of participants about physiotherapy on their condition. The score of participants for each of the 12 domains (beliefs—pain coping; beliefs—fear of pain; conflicting diagnoses; patient beliefs; conflicting advice; treatment compliance; quantity and complexity of exercises; gradual exercise; beliefs—awareness; communication; guidelines; beliefs—education)

was computed by summing the scores of items in respective domains. The descriptors were employed Likert-scored items that were given numerical values starting from 1 to 5 whereby, strongly disagree= 1, disagree= 2, Neither agree or disagree= 3, agree= 4 and strongly agree= 5. This method was applied to all 12 domains in the questionnaire. Most of the items were scored in the same direction. However, a few items scoring in the opposite direction were reverse scored so that a score of 5 was applied for strongly disagree, down to a 1 for strongly agree. Thus, higher scores are associated with more positive beliefs among the patients about the effect of physiotherapy on CLBP. However, there was no recognised cutoff score for what can be associated with good or poor beliefs about the effect of physiotherapy on CLBP. Since the questionnaire employed Likert-scored items, calculating the summed score on this scale was considered more appropriate than concentrating on the scores of individual items because summed scores are more reliable than the scores of individual items (Sullivan and Antonio, 2013). Moreover, the sum the score of a series of four or more Likert-type items into a single composite score/variable during the data analysis process can be used to provide and represents a quantitative measure of a character or personality trait (Boone and Boone, 2012).

To determine whether parametric or non-parametric tests should be used, Shapiro-Wilk test was performed to test normality (Appendix 15). Data found to be normally distributed were analysed using SPSS' parametric tests, while data not normally distributed were analysed using non-parametric tests (Coolidge, 2006; Wright, 2009). In addition, when the analysis revealed data not normally distributed, log transformations were attempted to transform the data

into a normal distribution; however, the log transformations were unsuccessful (Coolidge, 2006; Wright, 2009).

Mann-Whitney-U test was used to identify significant differences between groups for data not normally distributed, while student t-test was utilised to test for differences in the groups' mean scores for normally distributed data (Wright, 2009; Grove et al., 2013). Kruskal-Wallis test was employed to identify differences in the participants' physiotherapy beliefs, education and income levels, marital status and occupation. Kruskal-Wallis test was thus the non-parametric equivalent of the ANOVA (Coolidge, 2006; Wright, 2009).

Spearman's rho was used to examine the associations between the participants' self-reported back pain intensity and duration and the 12 domains of physiotherapy beliefs. Spearman's rho is an inferential measurement that describes the direction and strength of the relationship between two variables (Wright, 2009; Grove et al., 2013). The same statistical test was further used to examine the relationships of the 12 domains of physiotherapy with self-reported pain interference, surgery, referral to physiotherapy and frequency of physical activity. The relationships between FABQ and RMDQ scores and the 12 domains of physiotherapy beliefs were also measured using Spearman's correlation. Spearman's rho thus was the non-parametric equivalent of Pearson correlation coefficient (Coolidge, 2006; Wright, 2009). The Spearman rank correlation 'cut-offs' were; weak positive (negative) correlation is ≤0.3 (≤ −0.3), moderate positive (negative) correlation is >0.3 (> −0.3) to ≤0.6 (≤ −0.6), and strong positive (negative) correlation is >0.6 (> −0.6) (Coolidge, 2006; Wright, 2009; Grove et al., 2013).

In the present study, hypotheses were tested simultaneously to determine if there were significant differences and relationships between variables. While Bonferroni's correction, which caters for the lowering of *P* values for each test, based on the total number of tests undertaken, is frequently used for reducing problems linked with multiple comparisons (Perneger, 1998; Cabin and Mitchell 2000; Moran, 2003; Nakagawa, 2004; Garamszegi, 2006; Armstrong, 2014), it was not applied in this study, as it has been found to be too strict. However, there is dramatically increased risk of type II errors due to the high risk of an incorrect H0 rejection (Perneger, 1998; Cabin and Mitchell 2000; Moran, 2003; Nakagawa, 2004; Garamszegi, 2006; Armstrong, 2014). Moreover, criticism has been levelled on the Bonferroni correction supplication on the grounds of accuracy and logic (Wright 1992; Benjamini and Hochberg 1995; Perneger 1998; Moran 2003; Nakagawa 2004; Garamszegi, 2006; Minium et al., 2008; Sullivan and Feinn, 2012) as it is not possible to witness Type I errors decrease (the entire point of making adjustments to Bonferroni) without inflating type II errors (the possibility of null hypothesis acceptance when true alternative exists), and type II errors are no less false than type I errors. Power is further reduced as a result of utilising the Bonferroni procedures resulting in the risk of Type II error rising to unacceptable levels, and the possibility of contributing to publication bias and hampering the field's advance (Rothman, 1990; Wright, 1992; Benjamini and Hochberg 1995; Savitz, 1995; Perneger 1998; Moran 2003; Nakagawa 2004; Garamszegi, 2006; Minium et al., 2008; Sullivan and Feinn, 2012).

Apart from examining differences and relationships between variables, effect sizes of these differences and relationships were also determined. Effect size is described as the quantification of the

difference between groups. Knowledge of effect size is particularly important when it comes to analysing statistical power. Standardized effect sizes can be described as the extent to which the degrees of experimental effects have, which can be compared across studies despite different sample sizes (since *P* values do not provide a clear answer to the current degree of experimental effect). Therefore, reporting the observed effect size with precise *P* values, makes it possible for readers to evaluate the results' importance (and statistical implication), and come to a reasonable conclusion without the help of Bonferroni adjustments (Nakagawa and Foster, 2004; Garamszegi, 2006; Nakagawa and Cuthill, 2007; Durlak, 2009; Ellis, 2010; Fritz et al., 2012; Sullivan and Feinn, 2012; Bradley and Brand, 2013; Aarts et al., 2014; Tomczak and Tomczak, 2014). In addition, the use of effect sizes helps to determine the extent of the differences and relationships between variables and whether the effect is great or negligible. Determining the effect size of the relationship between variables is as important as determining if differences are statistically significant (Ellis, 2010; Fritz et al., 2012; Sullivan and Feinn, 2012; Aarts et al., 2014; Parahoo, 2014).

Effect size estimates were calculated using non-parametric tests, with an indication of a small effect being ≤0.3, a medium effect being between >0.3 and ≤0.6, and a large effect is >0.6 (Cohen, 1988; Cohen, 1992; Minium et al., 2008; Sawilowsky, 2009; Fritz et al., 2012; Tomczak and Tomczak, 2014; Kerby, 2014).

Performing multiple linear regression analysis was considered to identify which combination of beliefs on the ways in which physiotherapy influences return to normal activity best predicted FABQ-PA, FABQ-W and RMDQ scores. Multiple linear regression

analysis requires normally distributed data, however, and the acquired data were not normally distributed, so it could not be accomplished (Coolidge, 2006; Wright, 2009).

4.5 Results

4.5.1 Demographic characteristics

A total of 350 persons were approached. Of them, 266 patients met the inclusion criteria, and 178 completed the self-administered questionnaire. The response rate for the survey thus was 66.91%.

4.5.1.1 Age and gender of the participants

The participants had a median age of 37 years (IQR=31–47) and age range of 19–65 years. More than half of the participants (55.6%, n=99) were men.

4.5.1.2 Education background and income

Almost half of the participants had university degrees (39.9%), while 19.2% held high school qualifications (Figure 5).

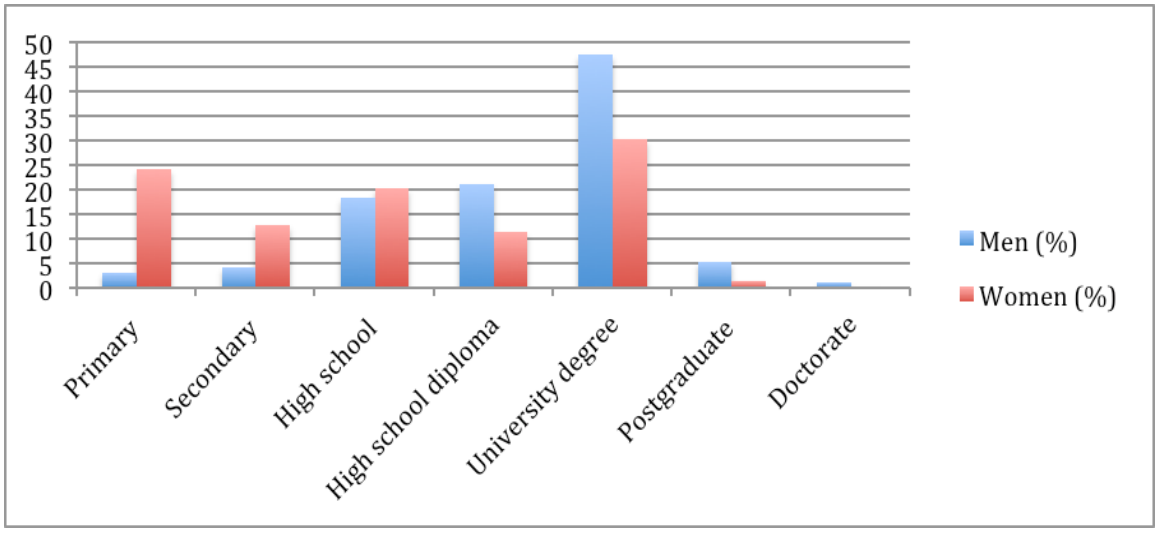


Figure 5. Education level of the participants

The questionnaire was not intended to examine gender differences in the education level between men and women participants. However, when the data were split by gender, the findings showed disparities in education level. The men in this study had higher levels of education than the women. Table 8 shows that while almost half (47.5%) of the men held university degrees, only 30.4% of the women did. Almost a quarter (24.1%) of the women respondents had only completed primary school. Among the men who participated, 68% held diplomas or university degrees, and only 3.0% had left education after completing primary school.

Table 8. Comparison of men's and women's education levels

Education level	Men (%)	Women (%)
Primary	3.0	24.1
Secondary	4.0	12.7
High school	18.2	20.3
Diploma	21.2	11.4
University degree	47.5	30.4
Postgraduate	5.1	1.3
Doctorate	1.0	0

Fewer than a third (20.5%) of the participants earned less than 3,000 Saudi riyal (SR; approximately £600) monthly. Thirty-two (18.0%) earned more than 11,000 SR each month (approximately £2,200; Figure 6).

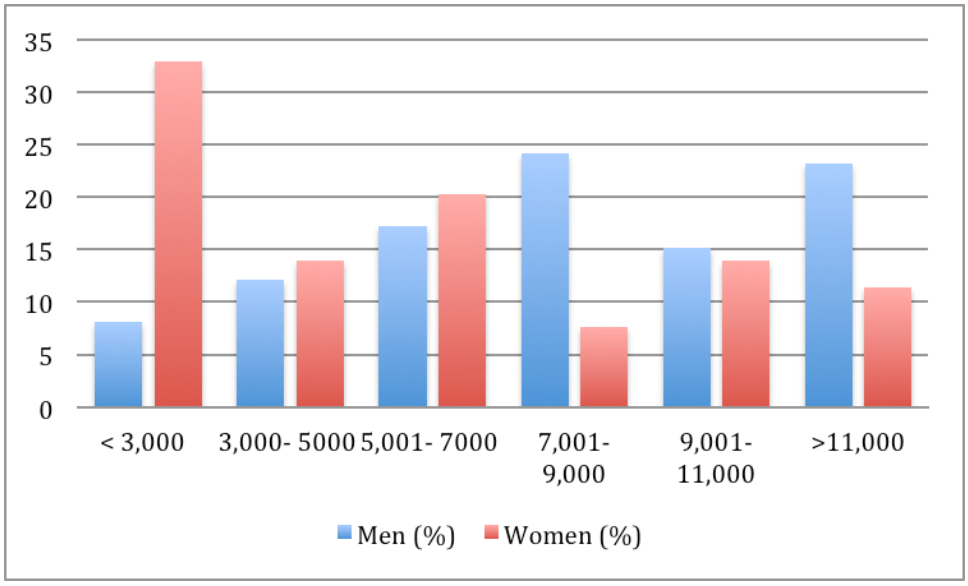


Figure 6. Income levels of the participants

Similar to the results for education, there were disparities in income in the study, with the men generally earning higher incomes

than the women. Almost a third (23.2%) of the men earned more than 11,000 SR each month, while only 11.4% of the women earned this level of income. More than a third of the women (32.9%) earned less than 3,000 SR each month; by comparison, only 8.1% of the men earned less than 3,000 SR monthly (Table 9).

Table 9. Comparison of men's and women's income levels

Income level (SR)/month	Men (%)	Women (%)
< 3,000	8.1	32.9
3,000–5000	12.1	13.9
5,001–7000	17.2	20.3
7,001–9,000	24.2	7.6
9,001–11,000	15.2	13.9
>11,000	23.2	11.4

4.5.1.3 Marital status of the participants

Most participants (n=129, 72.5%) were married, 21.3% (n=38) were single, and the rest were divorced (Table 10).

Table 10. Relationship status of the participants

Relationship status	n	%
Single	38	21.3%
Married	129	72.5%
Divorced	11	6.2%
Total	178	100.0%

4.5.1.4 Number of children

More than one third of the respondents had no children (n=61, 34.3%), but the majority had two or more children (Table 11).

Table 11. The participants' number of children

Number of children	Frequency	%
0	61	34.3
1	17	9.6
2	15	8.4
3	23	12.9
4	12	6.7
5	14	7.9
6	9	5.1
7 or more	27	15.2
Total	178	100.0

4.5.1.5 Occupational status

Most of the participants were employed full time (n=107, 60.1%; Table 12). Thirty-four (19.1%) participants were housewives, while the remainder were students, employed part time, retired or unemployed. Three participants who completed the questionnaires were on medical leave due to ill health.

Table 12. Occupational status of the participants

Occupational status	n	%
Student	5	2.8
Full-time employment	107	60.1
Part-time employment	3	1.7
Retired	17	9.6
Unemployed	9	5.1
Medical leave due to ill health	3	1.7
Housewife	34	19.1
Total	178	100.0

The occupations of the participants are shown in Table 13. After housewives, teachers, administrators and soldiers were the most popular occupational categories.

Table 13. Occupations of the participants

Occupations	Frequency
Housewife	34
Teacher	27
Administrative	22
Soldier	18
Engineer	15
Retired	14
Physician	11
Accountant	10
Unemployed	9
Manager	6
Nurse	5
Customer service	5
Student	2
Total	178

4.5.2 Medical history

4.5.2.1 Duration of low back pain

The median duration of LBP was 20 months (IQR=9.75-36). More than a third (32.6%) of the respondents reported having back pain for at least eight months before the survey, while almost half (42.1%) had experienced pain for at least 12 months. A few (n=7) had experienced back pain throughout the past eight years, and one patient reported having experienced CLBP for the past 12.5 years.

4.5.2.2 Back pain intensity and interference with normal daily activity

The intensity of pain was assessed using the VAS. The participants' median self-reported pain intensity from LBP in the past month was six (IQR=5–7.25). The participants also reported the extent to which pain interfered with their normal daily activities. The graded chronic pain scale was used to determine pain levels during normal daily activity over the past month. The results showed that the median score was six (IQR=5–8).

4.5.2.3 Surgery, referral to physiotherapy, sessions of physiotherapy and frequency of physical activity

Seventeen participants (9.6%) had undergone surgery for LBP. This low incidence might be due to the trauma associated with surgical procedures. Most participants (n=161, 90.4%) had not undergone surgical procedures for pain. The median number of times that the participants had been referred to physiotherapy for LBP was three (IQR=2-4.25). The median number of physiotherapy sessions per referral was four (IQR=2–5). Less than a third (28.1%) of the participants engaged in physical activity at least once a week (Table 14).

Table 14. Frequency of physical activity among the participants

Engagement in physical activity	n	%
Never	46	25.8
Once per week	50	28.1
Twice per week	43	24.2
Three times per week	22	12.4
Four times per week or more	17	9.6
Total	178	100.0

*Physical activity was defined as any body movement and included housework, walking, climbing stairs and walking to and from work and bus stops.

4.5.3 Fear Avoidance Belief Questionnaire—Physical Activity

The participants' median FABQ-PA score was 17 (IQR=12–20), indicating that the participants had moderate levels of physical activity avoidance. The highest possible on the FABQ-PA score was 24.

4.5.4 Fear Avoidance Belief Questionnaire—Work

The participants' median FABQ-W score was 23 (IQR=12-33), indicating that they moderately avoided work-related physical activity due to fear of pain. The highest possible FABQ-W score was 42.

4.5.5 Roland Morris Disability Questionnaire

The median RMDQ score was 12 (IQR=6.50-16). Scores on the RMDQ raged from 0 to 24, with higher scores demonstrating higher levels of perceived disability. These findings indicated that the participants experienced moderate levels of disability due to LBP.

4.5.6 Beliefs about how physiotherapy influences return to normal activity and participation in people with chronic low back pain

Table 15 present the median scores for the 12 domains.

Table 15. Beliefs about how physiotherapy influences return to normal activity and participation in people with chronic low back pain

Domain	n	Min	Max	Median	IQR
Beliefs—coping with pain	178	3	15	12	10–13
Beliefs—fear of pain	178	3	15	11	9–13
Beliefs—awareness	178	4	10	7	6–8
Beliefs—education	178	6	30	23	19–25
Patient beliefs	178	8	20	14	12–17
Conflicting diagnoses	178	2	10	8	6–9
Conflicting advice	178	7	25	17	15–21
Communication	178	9	35	23	21–25
Treatment compliance	178	3	15	9	8–10
Quantity and complexity of exercise	178	2	10	7	6–8
Gradual exercise	178	2	10	8	7–9
Guidelines	178	3	15	13	12–14

4.5.6.1 Differences among the 12 domains of physiotherapy beliefs by gender

Mann-Whitney U test was used to determine whether there were significant differences between men and women in the 12 domains of belief about how physiotherapy influences return to normal activity and participation in people with CLBP. A two-tailed test was used to explore possible relationships between physiotherapy

beliefs and gender in both directions (Ellis, 2016). These results indicated significant differences between men and women's beliefs about coping with pain (p=0.01). Men and women's scores in the other 11 domains of physiotherapy beliefs did not show any significant differences (Table 16).

Table 16. Differences among the 12 domains of physiotherapy beliefs by gender

Domain	Mann-Whitney U	Asymp. Sig. (2-tailed)
Beliefs—coping with pain	2913.000	0.01
Beliefs—fear of pain	2913.000	0.58
Beliefs—awareness	3512.500	0.23
Beliefs—education	3389.500	0.13
Patient beliefs	3803.000	0.75
Conflicting diagnoses	2913.000	0.09
Conflicting advice	3258.500	0.07
Communication	3604.500	0.37
Treatment compliance	3863.000	0.88
Quantity and complexity of exercise	3488.500	0.21
Gradual exercise	3582.500	0.33
Guidelines	3872.500	0.91

The median score for beliefs about coping with pain was 11 for men and 12 for women, indicating that women were more likely to cope with pain and to avoid movements than men (Table 17).

Table 17. Comparison of median scores in the domain of coping with pain by gender

Gender		n	Min	Max	Median	IQR
Men	Beliefs—coping with pain	99	4	15	11	10–13
	Valid N (listwise)	99				
Women	Beliefs—coping with pain	79	3	15	12	10–14
	Valid N (listwise)	79				

4.5.6.2 Differences among the 12 domains of physiotherapy beliefs by education level

Kruskal-Wallis test was used to examine whether there were significant differences by education levels in the participants' median scores for the 12 domains of physiotherapy beliefs. The only domain in which such a difference was manifest was beliefs about coping with pain, where significant differences across the participants' education levels emerged (p=0.01; Table 18).

Table 18. Differences among the 12 domains of physiotherapy beliefs by the participants' education level

Domain	Chi-Square	df	Asymp. Sig.
Beliefs—coping with pain	22.632	6	0.01
Beliefs—fear of pain	9.817	6	0.13
Beliefs—awareness	5.395	6	0.49
Beliefs—education	8.852	6	0.18
Patient beliefs	4.719	6	0.58
Conflicting diagnoses	7.330	6	0.29
Conflicting advice	8.471	6	0.21
Treatment compliance	7.660	6	0.26
Quantity and complexity of exercises	5.105	6	0.53
Gradual exercises	8.289	6	0.22
Communication	7.024	6	0.32
Guidelines	5.844	6	0.44

Further analysis of the data showed that those who completed secondary school had the highest scores (median=13.00) for beliefs about coping with pain, while those with a postgraduate education had the lowest scores (median=10.50; Table 19).

Table 19. Comparison of median scores in the domain of coping with pain by educational status

Education		n	Min	Max	Median	IQR
Primary school	Beliefs—coping with pain	22	9	15	13	12–15
	Valid N (listwise)	22				
Secondary school	Beliefs—coping with pain	14	9	15	13	12–15
	Valid N (listwise)	14				
High school	Beliefs—coping with pain	34	5	15	11.50	9–13
	Valid N (listwise)	34				
Diploma	Beliefs—coping with pain	30	8	14	12	11–13
	Valid N (listwise)	30				
University Degree	Beliefs—coping with pain	71	4	15	11	10–13
	Valid N (listwise)	71				
Postgraduate	Beliefs—coping with pain	6	3	15	10.50	8.25–12.75
	Valid N (listwise)	6				
Doctorate	Beliefs—Coping with pain	1	5	5	5	.
	Valid N (listwise)	1				

4.5.6.3 Differences among the 12 domains of physiotherapy beliefs by income level

Kruskal-Wallis test was used to examine whether there were significant differences in the 12 domains of physiotherapy beliefs

related to the participants' income levels. The results showed significant differences in the domains of coping with pain ($p=0.04$) and fear of pain ($p=0.03$) across income brackets. However, significant differences were not noted in the other 10 domains of physiotherapy beliefs (Table 20).

Table 20. Differences among the 12 domains of physiotherapy beliefs by income

Domain	Chi-Square	df	Asymp. Sig.
Beliefs—coping with pain	11.557	5	0.04
Beliefs—fear of pain	12.611	5	0.03
Conflicting diagnoses	5.426	5	0.37
Patient beliefs	5.100	5	0.40
Conflicting advice	3.189	5	0.67
Treatment compliance	10.823	5	0.06
Quantity and complexity of exercises	2.734	5	0.74
Gradual exercises	6.394	5	0.27
Beliefs—awareness	3.730	5	0.59
Communication	9.360	5	0.09
Guidelines	9.328	5	0.09
Beliefs—education	8.603	5	0.13

The results showed that participants with incomes of less than 3,000 SR (£600) had a median score of 12.50 for coping with pain,

the highest among all the income groups. Participants with incomes of less than 3,000 SR (≈£600), 3,000–5,000 SR (£600–1,000) and 7,000–9,000 SR (£1,400–£1,800) had the highest median scores for the fear of pain domain (median=12; Table 21).

Table 21. Comparison of median scores in the domains of coping with pain and fear of pain by income

Income per month		n	Min	Max	Median	IQR
Less than 3,000 SR	Beliefs—coping with pain	34	6	15	12.50	11.75–15
	Beliefs—fear of pain	34	5	15	12	10–14
	Valid N (listwise)	34				
3,000–5,000 SR	Beliefs—coping with pain	23	8	15	12	10–13
	Beliefs—fear of Pain	23	7	15	12	10–14
	Valid N (listwise)	23				
5,000–7,000 SR	Beliefs—coping with pain	33	6	15	12	10–13
	Beliefs—Fear of pain	33	5	15	11	9–13
	Valid N (listwise)	33				
7,000–9,000 SR	Beliefs—coping with pain	30	5	15	12	10–13
	Beliefs—fear of pain	30	3	15	12	10–13
	Valid N (listwise)	30				
9,000–11,000 SR	Beliefs—coping with pain	26	9	15	11	9.75–12
	Beliefs—fear of pain	26	6	15	9	8.75–12
	Valid N (listwise)	26				
More than 11,000 SR	Beliefs—coping with pain	32	3	15	11	10–13.75
	Beliefs—fear of pain	32	4	15	10.50	9–12
	Valid N (listwise)	32				

(1 British pound=6 Saudi riyal)

4.5.6.4 Differences among the 12 domains by marital status

Kruskal-Wallis test was performed to detect any significant differences by marital status in the median scores for the 12 domains of physiotherapy beliefs. The results showed no significant differences between the scores for married, unmarried and divorced participants in any domain in the physiotherapy beliefs questionnaire (Table 22).

Table 22. Differences among the 12 domains of physiotherapy beliefs by marital status

Domain	Chi-Square	df	Asymp. Sig.
Beliefs—coping with pain	5.933	2	0.10
Beliefs—fear of pain	0.231	2	0.89
Conflicting diagnoses	0.209	2	0.90
Patient beliefs	1.474	2	0.48
Conflicting advice	1.593	2	0.45
Treatment compliance	2.077	2	0.35
Quantity and complexity of exercises	0.140	2	0.93
Gradual exercises	1.116	2	0.57
Beliefs—awareness	0.498	2	0.78
Communication	2.466	2	0.29
Guidelines	0.863	2	0.65
Beliefs—education	3.754	2	0.15

4.5.6.5 Differences among the 12 domains by the participants' occupations

Kruskal-Wallis test was used to examine whether there were significant differences by occupation in the participants' scores in all 12 domains of physiotherapy beliefs. The results revealed significant differences in the coping with pain domain by occupation (p=0.04; Table 23).

Table 23. Differences among the 12 domains of physiotherapy beliefs by occupational status

Domain	Chi-Square	df	Asymp. Sig.
Beliefs—coping with pain	18.712	6	0.04
Beliefs—fear of pain	8.146	6	0.23
conflicting diagnoses	9.134	6	0.17
Patient beliefs	9.998	6	0.13
Conflicting advice	5.968	6	0.43
Treatment compliance	9.777	6	0.13
Quantity and complexity of exercises	8.077	6	0.23
Gradual exercises	7.236	6	0.30
Beliefs—awareness	1.099	6	0.98
Communication	6.771	6	0.34
Guidelines	7.473	6	0.28
Beliefs—education	3.556	6	0.74

A comparison of the participants' occupational status and median scores for the coping with pain domain revealed that those

not working due to ill health had greater median scores for coping with pain than those employed terms of coping, followed by housewives (Table 24).

Table 24. Comparison of median scores in the domains of coping with pain by occupational status

Occupation		n	Min	Max	Median	IQR
Student	Beliefs—coping with pain	5	6	15	10	7.50–13
	Valid N (listwise)	5				
Full-time employment	Beliefs—coping with pain	107	4	15	11	10–13
	Valid N (listwise)	107				
Part-time employment	Beliefs—coping with pain	3	9	14	9	9
	Valid N (listwise)	3				
Retired	Beliefs—coping with pain	17	3	15	12	10–13
	Valid N (listwise)	17				
Unemployed	Beliefs—coping with pain	9	9	15	12	10.50–14.50
	Valid N (listwise)	9				
Medical leave due to ill health	Beliefs—coping with pain	3	11	15	14	11
	Valid N (listwise)	3				
Housewife	Beliefs—coping with pain	34	9	15	13	12–15
	Valid N (listwise)	34				

4.5.7 Relationships between past medical and rehabilitation history and the participants' beliefs about physiotherapy

This section presents the relationships of the 12 domains of physiotherapy beliefs with back-pain duration, pain intensity, pain interference with normal everyday activities, surgery, referrals to physiotherapy, number of physiotherapy sessions, and physical activity. Each of these factors is presented in the following sections of this chapter. Spearman's rank correlations were used to examine whether there were any significant correlations between medical history and physiotherapy beliefs.

4.5.7.1 Relationship between back-pain duration and the participants' beliefs about physiotherapy

The results of the Spearman's rank tests showed that there were no moderate/strong correlations between duration of back pain and participants' beliefs about physiotherapy (Table 25).

Table 25. Relationship between back-pain duration and the participants' beliefs

	Beliefs—coping with pain	Beliefs—fear of pain	Conflicting diagnoses	Patient beliefs	Conflicting advice	Treatment compliance	Quantity and complexity of exercises	Gradual exercises	Beliefs—awareness	Communication	Guidelines	Beliefs—education
Duration of LBP												
Spearman rho	0.27	0.17	0.17	-0.32	0.02	-0.13	0.01	0.04	-0.03	-0.05	0.14	0.05
Sig (2-tailed)	0.01	0.02	0.02	0.67	0.83	0.08	0.89	0.59	0.71	0.51	0.07	0.48
n	178	178	178	178	178	178	178	178	178	178	178	178

4.5.7.2 Relationship between self-reported pain intensity and the participants' beliefs about physiotherapy

There were moderate positive correlations of reported pain intensity with patients' beliefs about coping with pain (Spearman's rho=0.41, p=0.01), fear of pain (Spearman's rho=0.35, p=0.01) (Table 26).

Table 26. Relationship between pain intensity and the participants' beliefs

	Beliefs—coping with pain	Beliefs—fear of pain	Conflicting diagnoses	Patient beliefs	Conflicting advice	Treatment compliance	Quantity and complexity of exercises	Gradual exercises	Beliefs—awareness	Communication	Guidelines	Beliefs—education
Pain intensity												
Spearman rho	0.41	0.35	0.18	-0.05	0.10	0.06	0.20	0.10	0.08	0.12	0.17	0.01
Sig (2-tailed)	0.01	0.01	0.01	0.49	0.18	0.39	0.01	0.19	0.30	0.10	0.12	0.93
n	178	178	178	178	178	178	178	178	178	178	178	178

These findings showed that those with higher levels of pain had higher coping with pain. In addition, those who reported higher levels of pain were more likely to avoid activities they believed might result in further severe pain. These participants were also less likely to return to normal activity due to fear of pain. Likewise, those with longer pain durations may have also been more likely to believe that their physicians and physiotherapists had given different diagnoses for CLBP. The quantity and quality of the respondents' exercise could have been affected, considering that those who reported higher levels of pain mentioned that they were more likely to avoid physical activity and exercises as they could intensify pain.

4.5.7.3 Relationship between self-reported pain interference and the participants' beliefs about physiotherapy

There were moderate positive correlations between reported interference with normal everyday activities and beliefs about coping with pain (Spearman's rho=0.43, p=0.01) (Table 27). These results showed that patients who reported greater pain interference were more likely to believe that engaging in physical activity would result in pain. This group also tended to believe that physical activity would exacerbate existing pain. Thus, patients who reported greater pain interference may have been less likely to engage in additional exercises or those they perceived as strenuous. They were also more likely to believe that physicians and physiotherapists offered conflicting diagnoses regarding their condition.

Table 27. Relationship between pain interference and the participants' beliefs

	Beliefs—coping with pain	Beliefs—fear of pain	Conflicting diagnoses	Patient beliefs	Conflicting advice	Treatment compliance	Quantity and complexity of exercises	Gradual exercises	Beliefs—awareness	Communication	Guidelines	Beliefs—education
Reported pain interference												
Spearman rho	0.43	0.29	0.23	-0.78	0.08	0.02	0.25	0.08	-0.14	0.10	0.14	-0.27
Sig (2-tailed)	0.01	0.01	0.01	0.30	0.27	0.84	0.01	0.28	0.07	0.18	0.06	0.72
n	178	178	178	178	178	178	178	178	178	178	178	178

4.5.7.4 Relationship between reported surgery and the participants' beliefs about physiotherapy

There were no moderate/strong correlations of surgery with participants' beliefs about physiotherapy (Table 28).

Table 28. Relationship between surgery and the participants' beliefs

	Beliefs—coping with pain	Beliefs—fear of pain	Conflicting diagnoses	Patient beliefs	Conflicting advice	Treatment compliance	Quantity and complexity of exercises	Gradual exercises	Beliefs—awareness	Communication	Guidelines	Beliefs—education
Reported surgery												
Spearman rho	0.02	0.09	0.07	-0.12	0.15	0.09	0.19	0.07	0.03	-0.01	0.06	-0.09
Sig (2-tailed)	0.83	0.21	0.35	0.11	0.04	0.25	0.01	0.34	0.73	0.99	0.44	0.21
n	178	178	178	178	178	178	178	178	178	178	178	178

4.5.7.5 Relationship between referrals to physiotherapy and the participants' beliefs about physiotherapy

There were moderate positive correlations of referral to physiotherapy with conflicting diagnoses (Spearman's rho=0.31, p=0.01) (Table 29).

Table 29. Relationship between referral to physiotherapy and the participants' beliefs

	Beliefs—coping with pain	Beliefs—fear of pain	Conflicting diagnoses	Patient beliefs	Conflicting advice	Treatment compliance	Quantity and complexity of exercises	Gradual exercises	Beliefs—awareness	Communication	Guidelines	Beliefs—education
Referral to physiotherapy												
Spearman rho	0.11	0.26	0.31	-0.23	0.29	0.12	0.20	0.04	-0.09	-0.08	0.10	-0.24
Sig (2-tailed)	0.14	0.01	0.01	0.01	0.01	0.10	0.01	0.57	0.21	0.29	0.16	0.01
n	178	178	178	178	178	178	178	178	178	178	178	178

4.5.7.6 Relationship between physiotherapy sessions and the participants' beliefs about physiotherapy

There were no moderate/strong correlations of the number of previous physiotherapy sessions with participants' beliefs about physiotherapy (Table 30).

Table 30. Relationship between physiotherapy sessions and the participants' beliefs

	Beliefs—coping with pain	Beliefs—fear of pain	Conflicting diagnoses	Patient beliefs	Conflicting advice	Treatment compliance	Quantity and complexity of exercises	Gradual exercises	Beliefs—awareness	Communication	Guidelines	Beliefs—education
Physiotherapy sessions												
Spearman rho	-0.14	-.10	-.11	-0.08	-0.01	-0.01	0.12	-.06	-0.21	-0.09	-0.18	-0.11
Sig (2-tailed)	0.07	0.18	0.15	0.31	0.96	0.99	0.10	0.42	0.01	0.25	0.02	0.16
n	178	178	178	178	178	178	178	178	178	178	178	178

4.5.7.7 Relationship between frequency of physical activity and the participants' beliefs about physiotherapy

There were no moderate/strong correlations between the participants' activity levels (frequency of physical activity) and participants' beliefs about physiotherapy (Table 31).

Table 31. Relationship between frequency of physical activity and the participants' beliefs

	Beliefs—coping with pain	Beliefs—fear of pain	Conflicting diagnoses	Patient beliefs	Conflicting advice	Treatment compliance	Quantity and complexity of exercises	Gradual exercises	Beliefs—awareness	Communication	Guidelines	Beliefs—education
Frequency of physical activity												
Spearman rho	-0.10	0.04	-0.04	-0.10	0.05	0.16	-0.11	-0.05	-0.04	-0.06	-0.01	-0.17
Sig (2-tailed)	0.20	0.58	0.59	0.18	0.53	0.03	0.14	0.51	0.62	0.46	0.89	0.03
n	178	178	178	178	178	178	178	178	178	178	178	178

4.5.8 Relationship between FABQ-PA scores and the participants' beliefs about physiotherapy

There were moderate positive correlations of FABQ-PA with beliefs related to coping with pain (Spearman's rho=0.41, p=0.01), fear of pain (Spearman's rho=0.45, p=0.01) and conflicting diagnoses (Spearman's rho=0.31, p=0.01) (Table 32).

Table 32. Relationship between FABQ-PA scores and the participants' beliefs

	Beliefs—coping with pain	Beliefs—fear of pain	Conflicting diagnoses	Patient beliefs	Conflicting advice	Treatment compliance	Quantity and complexity of exercises	Gradual exercises	Beliefs—awareness	Communication	Guidelines	Beliefs—education
FABQ-PA												
Spearman rho	0.41	0.45	0.31	-0.08	0.28	-0.01	0.28	0.12	-0.01	0.01	0.20	-0.08
Sig (2-tailed)	0.01	0.01	0.01	0.31	0.01	0.93	0.01	0.11	0.86	0.88	0.01	0.27
n	178	178	178	178	178	178	178	178	178	178	178	178

4.5.9 Relationship between FABQ-W scores and the participants' beliefs about physiotherapy

There were moderate positive correlations of FABQ-W scores with beliefs about coping with pain (Spearman's rho=0.31, p=0.01), fear of pain (Spearman's rho=0.41, p=0.01), beliefs about conflicting diagnoses (Spearman's rho=0.31, p=0.01) and conflicting advice (Spearman's rho=0.31, p=0.01) (Table 33).

Table 33. Relationship between FABQ-W scores and the participants' beliefs

	Beliefs—coping with pain	Beliefs—fear of pain	Conflicting diagnoses	Patient beliefs	Conflicting advice	Treatment compliance	Quantity and complexity of exercises	Gradual exercises	Beliefs—awareness	Communication	Guidelines	Beliefs—education
FABQ-W												
Spearman rho	0.31	0.41	0.31	-0.10	0.31	0.09	0.21	0.07	-0.04	0.02	0.09	-0.16
Sig (2-tailed)	0.01	0.01	0.01	0.17	0.01	0.22	0.01	0.38	0.62	0.77	0.22	0.03
n	178	178	178	178	178	178	178	178	178	178	178	178

4.5.10 Relationship between RMDQ scores and the participants' beliefs about physiotherapy

There were moderate positive correlations of RMDQ scores with beliefs about coping with pain (Spearman's rho=0.58, p=0.01) and fear of pain (Spearman's rho=0.47, p=0.01) (Table 34).

Table 34. Relationship between RMDQ scores and the participants' beliefs

	Beliefs—coping with pain	Beliefs—fear of pain	Conflicting diagnoses	Patient beliefs	Conflicting advice	Treatment compliance	Quantity and complexity of exercises	Gradual exercises	Beliefs—awareness	Communication	Guidelines	Beliefs—education
RMDQ score												
Spearman rho	0.58	0.47	0.28	-0.06	0.09	0.03	0.18	0.06	0.04	0.13	0.19	-0.01
Sig (2-tailed)	0.01	0.01	0.01	0.41	0.23	0.68	0.02	0.44	0.63	0.08	0.01	0.96
n	178	178	178	178	178	178	178	178	178	178	178	178

4.5.11 Effect size among significant variables

Effect sizes between beliefs about coping with pain and gender, educational level, income, occupational status and back pain duration were small (i.e. ≤0.3) (Table 35). Similarly, effect sizes between beliefs on fear of pain and income, back pain duration, pain intensity, pain interference and referral to physiotherapy were also small. None of the associated variables had large effect sizes (i.e. >0.6). Pain intensity and pain interference had a medium effect on beliefs about coping with pain. Similarly, FABQ-PA, FABQ-W and RMDQ had medium effect on beliefs about coping with pain and beliefs on fear of pain (Table 35).

Table 35. Effect sizes of the significant variables

Effect sizes	Beliefs—coping with pain	Beliefs—fear of pain	conflicting diagnoses	Patient beliefs	Conflicting advice	Treatment compliance	Quantity and complexity of exercises	Gradual exercises	Beliefs—awareness	Communication	Guidelines	Beliefs—education
Gender	0.22	-	-	-	-	-	-	-	-	-	-	-
Education level	0.13	-	-	-	-	-	-	-	-	-	-	-
Income	0.07	0.07	-	-	-	-	-	-	-	-	-	-
Occupational status	0.1	-	-	-	-	-	-	-	-	-	-	-
Back pain duration	0.27	0.17	0.17	-	-	-	-	-	-	-	-	-
Pain intensity	0.41	0.30	0.18	-	-	-	0.20	-	-	-	-	-
Pain interference	0.43	0.29	0.23	-	-	-	0.25	-	-	-	-	-
Surgery	-	-	-	-	0.15		0.19	-	-	-	-	-
Referral to physiotherapy	-	0.26	0.30	0.23	0.29	-	0.20	-	-	-	-	0.24
Physiotherapy sessions	-	-	-	-	-	-	-	-	0.21	-	0.18	-
Physical activity	-	-	-	-	-	0.16	-	-	-	-	-	0.17
FABQ-PA	0.41	0.45	0.30	-	0.28	-	0.28	-	-	-	0.20	-
FABQ-W	0.39	0.41	0.29	-	0.29	-	0.21	-	-	-	-	0.16
RMDQ	0.58	0.47	0.28	-	-	-	0.18	-	-	-	0.19	-

*Significant P value is <0.05
*Effect size: a small effect is ≤0.3, a medium effect is >0.3 and ≤0.6, and a large effect is >0.6

4.6 Discussion

This study was conducted to investigate how beliefs about physiotherapy influence the behaviour of people with CLBP in Saudi Arabia in their return to normal activity and participation. This study also examined the relationship between medical history, fear-avoidance beliefs regarding physical activity and/or work, and the perceived disability of Saudi Arabian patients with CLBP. In addition, this study investigated whether there were significant differences among socio-demographic groups' beliefs regarding physiotherapy. The study was intended to determine whether there were relationships between medical history and physiotherapy beliefs and between the various domains of belief about physiotherapy and the participants' fear-avoidance beliefs related to physical activity (FABQ-PA), work (FABQ-W) and disability (RMDQ).

The survey had a response rate of 66.91%, which can be considered to be good. A reasonable response rate is important to limit bias in the reporting and interpretation of results (Ellis, 2016) and reduce the risk of non-respondents being significantly different from those included in the study (Hutchfield, 2010), which could affect the credibility and reliability of the findings (Hewitt-Taylor, 2011). Moreover, this study was limited to two hospitals and had a limited duration, so these weaknesses could be mitigated only if disproportionate sampling was prevalent in other hospitals over extended time periods.

The results show that fear-avoidance beliefs were related to the participants' self-reported, pain intensity and perceived disabilities. Physiotherapy beliefs were also associated with RMDQ scores and high scores for fear-avoidance beliefs. The median age

of study participants was 37 years old (31-47). Thus, demographics of respondents suggests a relatively young, employed, educated, not very chronic group and yet median scores of 6/10 on the VAS and 12 on the RMDQ reflect relatively high levels of pain and disability. However, this demographic presentation might be due to selection or sampling bias. In comparison, in a study by Nava-Bringas et al. (2017), the mean age of the participants was 34.19 (± 7.65) years. In a US study by George and Stryker (2011), the mean age of the participants was 45.5 years. Thus, the median age in this study was similar to Nava-Bringas et al. (2017) but younger than George and Stryker (2011). However, conclusive comparisons could not be made as the other demographic characteristics of the participants in this study differed from those in studies from other countries.

The reasons why the sample of participants recruited in the present study experienced CLBP at a relatively earlier age remain unclear. Notably, the WHO has stated that the causes of the onset of CLBP have not yet been verified (WHO, 2013). The severity of pain and FABQ scores of the study participants were high, similar to those found by George and Stryker (2011) and Nava-Bringas et al. (2017). The findings of the present study accord with those of these two studies, suggesting strong relationships of FABQ scores with pain severity and functional disability among patients with CLBP. It is interesting to note that George and Stryker (2011) recruited US patients while Nava-Bringas et al. (2017) included Mexican patients. The FABQ scores and their relationships with functional disability are similar for the Mexican, US and Saudi patients recruited in the three studies. Although the generalisability of the three studies should be considered with caution, the initial results suggest that regardless of ethnic background, FABQ scores are related to patients' functional disability. This has important

implications for accessing physiotherapy care and engaging in activities of daily living as high fear-avoidance beliefs scores could have negatively affected the recovery of the patients.

Significant gender differences emerged in beliefs about physiotherapy related to coping with pain. Although the effect size of this difference was small, women reported higher median scores on coping with pain, implying that they were more likely than men to avoid movements perceived to lead to severe pain. The Saudi women in the study were more likely than the men to believe that they could not return to normal activities. These findings are similar to results reported by Nava-Bringas et al. (2017), suggesting that women were more likely to have higher scores on fear-avoidance beliefs than men. In contrast, de Moraes Vieira et al. (2014) found that the male gender was associated with high fear avoidance. These studies have provided conflicting evidence on gender differences in perceptions that returning to normal activities and engaging in physical activity can lead to severe pain. However, the present study shows that Saudi Arabian women had high levels of avoidance of physical activity associated with beliefs that physical activity would only exacerbate their pain and, in turn, likely affect their health-seeking behaviours. These results suggest a need to introduce strategies to challenge beliefs about physiotherapy and the potential of physical activity to worsen pain for both men and women in Saudi Arabia. In the Saudi Arabian context, strategies specifically tailored to women could also be introduced to help them manage CLBP without the fear that physical activity would worsen their pain. For instance, teaching Saudi women that supervised physical activity could help manage CLBP and might encourage them to comply with physiotherapy (WHO, 2013).

The results also show that those with higher levels of education were more likely to believe that physiotherapy could help reduce CLBP through coping with pain. The effect size of this difference was small, but the result suggests that people with higher levels of education may be more likely to seek out more information regarding their condition, which, in turn, leads them to seek treatment for their back pain. In contrast, those with lower levels of education demonstrated beliefs that physiotherapy could not help with managing CLBP. Those with high levels of education reported that physical activity could help reduce CLBP. These findings are consistent with those of de Moraes Vieira et al. (2014) and Tan et al. (2014), identifying income level and education background as factors that might influence beliefs about how physical activity can positively impact CLBP. A number of studies (Burnett et al., 2009; Briggs et al., 2011) has shown that education helps dispel the myth that physical activity exacerbates CLBP. Patients with higher education levels more frequently claim to understand the mechanisms of pain than those with lower levels of education (Briggs et al., 2011).

In addition, Rodrigues-de-Souza and co-workers (2016) found that those with lower education levels are likely to perform manual jobs believed to cause lumbar pain. Patients with lower levels of education, therefore, may have fewer resources for pain management. In the current cross-sectional survey, patients' beliefs about how education level could help them manage pain were not explored. Although it consequently is difficult to fully understand the Saudi Arabian patients' views in this regard, the survey results are comparable with studies exploring the relationships of LBP with education, fear-avoidance beliefs and beliefs about physiotherapy.

The participants' income level also marked significant differences in coping with pain and fear of pain beliefs. The effect sizes of these were small, but the patients with low income levels (<3,000 SR) were most likely to express the belief that movement would result in severe pain. These groups also tended to believe that pain would delay recovery and that engaging in physical activity would only exacerbate pain. These beliefs contrast with those of the participants with higher levels of income. However, these findings were possibly influenced by gender and education levels as those with earning less than <3000 SR were more likely to be poorly educated women. These findings are similar to those of de Moraes Vieira et al. (2014) and Tan et al. (2014), showing that income levels and educational background might influence beliefs about how physical activity can positively impact CLBP.

The findings on the Saudi Arabian patients are similar to the results of a study by Karunanayake et al (2013) showing an association of low income levels with CLBP. It is suggested that those with low income levels have fewer resources to access healthcare services that could help them manage CLBP. Regarding Saudi Arabia, however, it is unclear why patients with low levels of income would develop the belief that pain can affect their recovery when they have free access to healthcare services for CLBP. It is noteworthy that these patients were recruited from clinics in two hospitals providing physiotherapy and rehabilitation services. However, for patients with low education levels, the provision of rehabilitation services should be supported with patient education to help dispel beliefs that pain can affect recovery.

A comparison of the median scores for the domain coping with pain and the occupational status of the participants reveals that those not working due to ill health had the highest median

score, followed by housewives. While the effect size of this difference was small, this finding is not surprising as those who are experiencing CLBP and are unable to work are likely to feel that any additional movement might exacerbate their pain (George and Stryker, 2011). However, job loss due to exacerbated back pain might be more prevalent in some countries and regions than other. It is noteworthy that patients in the study who identified as housewives reported poor pain-coping responses to CLBP and avoided physical activity. The study did not explore the relationship between occupation and education, so it was difficult to establish whether the housewives' education level influenced their beliefs about coping with pain and the need to engage in physical activity.

Only the domains coping with pain, fear of pain and conflicting diagnoses showed significant positive correlations with CLBP duration. However, the effect sizes of these relationships were small (i.e. 0.17 to 0.27 only). These results suggest that patients with back pain of longer duration are more likely to avoid some movements that require effort in order to avoid severe pain. Consequently, they might be more cautious in their physical movements to avoid severe pain. Although these relationships were significant in the present study, the effect sizes were small, suggesting the findings should be interpreted cautiously. Despite these small effect sizes, it was shown that these beliefs also affected perceptions of recovery as those with LBP of longer duration felt that it would be difficult to recover from their condition and return to normal daily activities. In addition, these groups expressed the idea that diagnosing CLBP is difficult and complex and that the diagnoses of CLBP between physiotherapists and physicians often conflict. The beliefs of patients with longer pain duration should be addressed as misinterpretations of pain can start a cycle of pain-related fear, which, in turn, can affect patients'

safety-seeking behaviours and avoidance of normal daily physical activity (Leonhardt et al., 2009). When patients develop avoidance behaviours, disuse syndrome may result as this physical deconditioning results from behavioural avoidance of physical activity (Verbunt et al., 2004). When patients manifest disuse syndrome, they are likely to experience loss of endurance and muscular strength, along with reduced levels of aerobic fitness and loss of muscular strength (Smeets and Wittink, 2007).

The relationship between patients' reports of CLBP intensity and physiotherapy beliefs was also examined. The results show significant correlations of pain intensity with physiotherapy beliefs related to coping with pain, fear of pain, conflicting diagnoses and quantity and quality of exercise. However, the effect sizes of these relationships were small to medium (0.18–0.41). Engaging in physical exercise (whether a therapist-guided exercise programme or self-prescribed exercises) is critical to help patients recover from CLBP and reduce pain levels. However, a systematic review, which included 18 studies and a total of 2495 participants, found that adherence to physical exercise and prescribed physical activity is relatively low in patients with CLBP (Lin et al., 2011). Although these significant relationships were shown in the present study, the effect sizes were small to medium, suggesting more cautious interpretations of the current findings.

The survey findings indicate that patients who report higher levels of CLBP pain intensity are less likely to engage in physical exercises or activity. These findings have important implications for healthcare practitioners, such as physiotherapists and physicians caring for patients with CLBP. The UK NICE guidelines suggest that patients who self-report very high levels of pain should receive counselling and strategies to help address their belief that

engaging in physical exercises can exacerbate their pain (NICE, 2016).

In the present study on patients from Saudi Arabia, the FABQ-PA, FABQ-W and RMDQ scores were significantly associated with beliefs about coping with pain and fear of pain when performing physical activity. Those with higher FABQ-W and FABQ-PA and RMDQ scores were more likely to express fears that any physical activity could exacerbate their back pain, which affected their ability to cope with pain. When effect sizes were examined, the FABQ-PA and FABQ-W and RMDQ scores had medium effects on beliefs about fear of pain and coping with pain. This suggests that among patients in Saudi Arabia, high FABQ and RMDQ scores can have medium effects on their perceptions on pain and ability to cope with pain. The findings have important implications in Saudi Arabia's healthcare context as this study is among the first to provide baseline evidence on how FABQ and RMDQ scores can indicate patients' ability to cope with pain and beliefs that physical activity only exacerbates pain.

The study results thus demonstrate the importance of managing CLBP and providing patient education to help correct the belief that engaging in physical activity exacerbates pain and leads to disability. Consistent with the findings of the systematic review (Chapter 2), the present study also reveals that psychosocial factors influence patients' recovery from CLBP, along with their health-seeking behaviours and participation in physical activity. Specifically, the results show that fear avoidance and pain-related fear are the psychosocial factors most strongly associated with disability in individuals suffering from CLBP, similar to the findings by Vincent et al. (2014). Providing patient education, therefore, is essential to correct these beliefs and help patients regain functional

status. In addition, the findings of the systematic review (Chapter. 2) identify kinesiophobia and catastrophising at the beginning of rehabilitation as additional psychosocial factors that predict disability and reduce the functional status of patients with CLBP. In the present study, these observations were also seen in patients attending physiotherapy. Despite attendance at these sessions, such patients still harboured fear-avoidance beliefs, which, in turn, affected their participation in physical activity, including work, and their likelihood and perceptions of disability.

4.6.1 Limitations

The survey in this study, among the few studies conducted in Saudi Arabia to examine how physiotherapy beliefs influence people with CLBP in their return to normal activities and participation in physical activity, has some limitations. The study had a sample size of 178 and was limited to two Saudi government hospitals, so it was difficult to ascertain if this was representative of the population of patients served by the two hospitals used in this study. It should be noted that the sample did not include patients who had not attended physiotherapy sessions. This element of bias needs to be acknowledged as part of the selection process. Although the survey had a relatively good response rate, sample size calculation was never carried out. Calculation of the sample size could have expanded the generalisability of the findings to more heterogeneous groups of individuals with CLBP, as well as strengthened the findings and increased their transferability to other settings (Parahoo, 2014). The study relied on self-reports from the participants, increasing the risk of over- or under-reporting. Reliance on self-reported surveys also made it difficult to verify whether the responses were truly reflective of the pain the participants felt or their fear-avoidance beliefs.

The participant selection was not random, so the risk of bias was still present despite the high response rate and sample size similar to studies conducted in other countries. As shown in the results, most of the participants were educated and employed. It was difficult to ascertain whether the CLBP experiences of the study participants in general were similar to those who were unemployed or housewives and had low education levels. This study was also conducted in only two hospitals, limiting the findings to the experiences of participants accessing physiotherapy in these hospitals. Conducting a multicentre study in the future could increase the reliability of the findings. However, the lack of a postal service in Saudi Arabia makes accessing people, other than as existing users of health services or online users of support groups, difficult. Both of which are likely to have inherent biases in any samples surveyed.

This survey questionnaire was designed and developed by the researcher, so it was heavily reliant on the researcher's ability and skill to identify variables and items to include in the questionnaire in order to probe other important aspects of the topic. In addition, pre-tests and pilot tests of the survey were not conducted before collecting the data for the main study. Therefore, there remains uncertainty over the measurement properties of individual items and the validity of the tool as a whole.

The present study revealed significant differences and relationships, but they only had small to medium effect sizes, suggesting the need for caution while interpreting the findings. In addition, only 17 respondents had surgery, so the implications of the findings for larger, more heterogeneous groups of participants should be considered with caution.

The increase in the family-wise error rate (type I errors) throughout the reported statistical analysis was another limitation that this investigation failed to control. Overall, this research was considered to be reasonably introductory, and replicating it is encouraged.

The study used a cross-sectional design, so it could not establish any causal relationships, and the surveys used could only measure the relationships between variables. It, therefore, was difficult to examine why patients harboured their physiotherapy beliefs or to determine the root causes of these beliefs. It was also difficult to establish how these physiotherapy beliefs changed over time during patients' physiotherapy as the survey only examined their beliefs and behaviours at a single point in time. Repeating the same study at a different time period could help confirm whether the domains identified and the specific relationships can be extended to the larger Saudi population.

4.7 Conclusions

Beliefs about physiotherapy appeared to influence return to normal activities and participation in physiotherapy sessions among Saudi patients with CLBP attending physiotherapy, spinal and orthopaedic clinics. They had high levels of fear-avoidance beliefs, which appeared to affect their decisions to engage in physical activity and return to normal activities. High levels of FABs also correlated with higher levels of perceived disability, with those expressing high FABs also reporting higher perceived disability. There were significant differences in the physiotherapy beliefs of men and women, with more women demonstrating higher levels of fear avoidance and more reluctance to return to normal activities.

Along with these gender differences, there were significant variations in physiotherapy beliefs based on the participants' education level and economic status. Those with lower education level and economic status were likely to have higher levels of FABs and higher disability scores than those with higher education levels and economic status.

Patients with back pain of longer duration were more likely to express higher levels of fear of pain, have difficulty with coping with pain and report higher levels of perceived disabilities due to their condition. In contrast, those with back pain of shorter duration were more likely to engage in physical activity and perceive themselves as having fewer disabilities. These findings have important implications for healthcare practice, demonstrating the need to educate patients about the importance of physiotherapy and rehabilitation in helping them return to normal activities. Engaging in physical activity and exercise is necessary for patients to achieve better health outcomes. However, if patients' negative physiotherapy beliefs are not addressed, many who could benefit from physiotherapy will not seek treatment, not only increasing the disease burden but also leading to poor patient outcomes and worsening their conditions.

There were significant positive associations between the participants' fear-avoidance beliefs and perceived disabilities with the following domains of physiotherapy beliefs: coping with pain, fear of pain, conflicting diagnoses, patients' beliefs, conflicting advice and quantity and complexity of exercises. Those found to have higher levels of FABs were also likely to express difficulties coping with pain and to fear movement or return to normal activities due to pain. These patients also perceived their physiotherapists and physicians as giving them conflicting

diagnoses. Those with high scores on the disability questionnaire were more likely to report difficulties returning to normal activities due to pain. However, despite the significance of these differences and relationships in the present study, they had only small to medium effect sizes, suggesting that the findings should be interpreted cautiously.

These results suggest that educating patients about the importance of engaging in graded exercises and physiotherapy sessions could help them return to normal activity. However, it is necessary for physiotherapists and physicians to convince patients that attending physiotherapy sessions will not exacerbate back pain and will, in fact, help lessen pain in the long term. It is also important that healthcare practitioners acknowledge these patients' fears and perceptions in order to appropriately address their needs. Recognising patients' perceptions is critical in developing treatment and target goals for patient rehabilitation based on CLPB management.

Chapter 5 Discussion

5.1 Chapter overview

The component studies of this thesis, including the systematic review and the qualitative and survey studies, have been discussed in separate chapters, but they are all interlinked. This chapter discusses the overall key findings, strengths and limitations of the study and its implications for future research and clinical practice. Final conclusions are then drawn.

5.2 Key findings

Systematic review	Qualitative study	Survey
• Fear-avoidance beliefs (physical and work), kinesiophobia and catastrophising were associated with poor functional status and disability. • Depression, anxiety, pain severity, widespread pain, chronic pain grade and bothersomeness were associated with disability, functional outcome and return to work. • Positive physician–patient relationships might positively influence patients' health outcomes.	• Lack of reassurance, encouragement, education and awareness of low back pain; fear of pain and injury recurrence; receiving conflicting diagnoses and ambiguous advice; and being given complex exercises were factors highlighted by both patients and clinicians as hindering recovery and activity normalisation. • Both patients and clinicians believed that psychosocial support from different sources was a factor that improved patient outcomes and recovery. • Patients and clinicians said that the Saudi healthcare system hindered timely treatment due to delays in referrals to and a lack of specialised back-pain clinics, along with an absence of clinical guidelines. • Both groups highlighted that poor communication among patients and clinicians was part of the problem and hindered recovery.	• Socioeconomic factors were negatively correlated with patients' beliefs about fear of pain and pain coping. • Low back-pain duration, pain intensity and pain interfering in normal everyday activities positively correlated with patients' beliefs about pain coping, fear of pain, conflicting diagnoses and the quantity and complexity of exercise. • Psychosocial factors were positively correlated with patients' beliefs about the importance of guidelines, coping with pain, fear of pain, conflicting diagnoses, conflicting advice and the quantity and complexity of exercise.

5.3 Discussion of key findings

The results of the studies presented in this thesis show that socioeconomic factors influence fear-avoidance beliefs in patients with CLBP using Saudi healthcare services. In particular, higher education levels are negatively associated with patients' beliefs about coping with pain. This suggests that patients with higher education levels are likely to have better pain coping mechanisms than those with lower levels of education. In turn, these patients are more likely to report positive physical functioning and engagement in CLBP rehabilitation activities in order to return to work and ADL.

These findings are similar to those from studies conducted elsewhere. For example, Nava-Bringas et al. (2017) recruited a sample of Mexican patients and found that the patients' functionality was inversely correlated with their education level. Those with lower education levels reported higher levels of incapacity than participants with higher education levels. Similarly, the results from a study conducted in Brazil (de Moraes Vieira et al., 2014) showed that those with lower income levels tended to have higher fear avoidance than those with higher income levels (de Moraes Vieira et al., 2014). The level of disability has also been found to be inversely proportional to income level. Hartvigsen et al. (2018) observed an over-representation of LBP among populations with low socioeconomic status, and this condition disproportionately affected those with low education levels (Hartvigsen et al., 2018). These observations support the findings of the current study in Saudi Arabia that socioeconomic factors influence CLBP development.

Addressing these socioeconomic factors is crucial in the context of Saudi Arabia's healthcare system. The MOH (2010) has emphasised the importance of patient education in improving health outcomes. Providing education and counselling on CLBP management is an effective strategy to promote positive patient outcomes. In a study by Godges et al. (2008), patients provided with educational booklets on how to control CLBP and personal, individualised counselling and education from physiotherapists returned to work within 45 days, compared to a control group of patients who only received educational booklets. Individualised counselling and educational booklets could be applied in the Saudi healthcare setting to address patients' lack of education and awareness of CLBP. Introducing individualised education and counselling for patients might help improve health outcomes. However, it is unlikely that one method, such as an educational booklet, will suit all or target those most in need, given the varying education levels reported by the survey participants, the lack of physiotherapy clinics and back-pain clinics in primary care and the delays in referrals to more specialised services. Careful consideration, therefore, needs to be given to the format, delivery and timing of education, which should be tested in further research.

The patients in the studies covered in this thesis also reported that LBP duration and pain intensity influenced their beliefs and hindered recovery. These findings are important as failure to address fear-avoidance beliefs can lead to further disability in patients (de Moraes Vieira et al., 2014). For example, Perez-Fernandez et al. (2015) explained that when these beliefs are not corrected, patients tend to perceive therapeutic exercise as difficult. Most of the participants in the study by Perez-Fernandez et al. (2015) also feared performing exercises.

This fear of movement results in greater perceived levels of difficulty regarding the recommended exercises during rehabilitation. Pain intensity and duration of LBP can influence patients' beliefs, so it is important for patients to have access to specialised LBP clinics or direct access to physiotherapy, for example, in primary care (Perez-Fernandez et al., 2015). Access to these facilities can help patients receive early education and counselling and therapeutic exercise. In Saudi Arabia, no studies have investigated the impacts of waiting time or delays in accessing physiotherapy clinics on patients' CLBP. However, reducing waiting time to access healthcare services has the potential to promote patient satisfaction and improve patient care and outcomes (MOH, 2010).

Despite recognition that CLBP can lead to disability and have negative impacts on healthcare resource utilisation (Bystrom et al., 2013; Verkerk et al., 2013), the Saudi MOH has so far released little clinical guidance on how to manage CLBP. Al-Otaibi (2015) observed that physicians and healthcare practitioners in Saudi Arabia still need to develop evidence-based clinical guidelines for the management and treatment of CLBP. Similarly, rehabilitation programmes have been known to contribute to the management of CLBP but also have limitations (Reese and Mittag, 2013). For example, when patients refuse to participate in rehabilitation programmes, or healthcare practitioners fail to address the psychosocial factors associated with CLBP, current management strategies may be unsuccessful. Consequently, there is a need to provide support and good communication between patients and clinicians to address their fears related to movement, their return to normal activities and their engagement in therapeutic and rehabilitation exercises.

Evers et al. (2017), in a study examining the quality of communication between clinicians and patients with CLBP, found that good communication could reduce pain levels and promote return to normal activities. Patients with CLBP emphasised that they wanted their physicians to show more empathy towards them (Evers et al., 2017). Patients perceived their physicians as empathic when their doctors listened carefully to the patients' needs, got to know them and discovered what was important to their care and recovery. Patients said that they wanted their physicians to understand how pain affected their lives and to validate their experiences of CLBP. Importantly, the patients in the study by Evers et al. (2017) also wanted to be included in decision-making and development of their treatment plans. They desired clear information and diagnosis of CLBP. Similar studies examining patients' beliefs about the level of communication between themselves and healthcare practitioners during CLBP rehabilitation and management need to be conducted in the Saudi healthcare system. The findings could help improve communication between healthcare practitioners and their patients and positively influence patient outcomes.

It is noteworthy that the qualitative results of this thesis research show that the lack of a timely referral system and the shortage of specialised LBP clinics hinder timely treatment for patients in Saudi Arabia. The lack of specialised clinics, clinical guidelines and clear LBP pathway can contribute to the development of chronicity and undermine CLBP management of CLBP in Saudi Arabia (Al-Otaibi, 2015). These issues can be overcome by improving CLBP management policies in Saudi Arabia. It is important to develop evidence-based guidelines. In other countries, specifically in the UK, guidelines are underpinned by

current evidence and are regularly updated to reflect developments in the management of a range of health conditions. For example, UK guidelines and pathways on LBP management (NICE, 2016; 2017) are supported by quality RCTs and similar-quality studies. Development of guidelines that reflect local needs in Saudi Arabia appears to be crucial to improving the health outcomes of patients with CLBP. In Saudi Arabia, there are no physiotherapy clinics in primary-care settings, and research is needed to determine whether the physiotherapy services in hospital settings are successful at promoting recovery, assisting patients in returning to ADL and reducing lost work days due to LBP.

The Saudi MOH (2010) has stressed the importance of a multidisciplinary rehabilitation approach when addressing CLBP. It should be noted that, despite physical rehabilitation and treatments, some patients with CLBP still might not respond positively to these treatments (NICE, 2016). It, therefore, is suggested that a multidisciplinary team approach is needed to address patients with CLBP. For example, mental health nurses and physiotherapists can collaborate to address the psychosocial impacts of CLBP (NICE, 2016). A systematic review (Kamper et al., 2014) showed that, when compared to treatments aimed only at addressing patients' physical problems, multidisciplinary treatment resulted in improvements in daily function and pain in patients with CLBP. The multidisciplinary treatment included counselling to manage depression and anxiety. Although not very large, this difference may be sufficient or significant for patients who have pain symptoms that do not respond to conventional physiotherapy treatments. In addition, the review by Kamper et al. (2014) offered evidence that patients receiving multidisciplinary team treatment are more likely to return to work within 6–12 months of therapy than patients who receive only treatment for physical symptoms.

Incorporating a multidisciplinary team approach for CLBP treatment in the UK, therefore, is considered to be essential to improving patients' health outcomes. All the team members can collaborate to ensure that the psychosocial symptoms associated with CLBP are addressed.

As shown in the findings of this thesis, the level of disability reported by the patients is influenced by their fear of pain and beliefs about coping with pain. Addressing the psychological factors associated with pain management could help address CLBP and encourage patients to return to normal activities. It should be noted that the presence of psychological factors is associated with increased risk of patients with CLBP developing disability (Hartvigsen et al., 2018). However, the exact mechanisms of how self-efficacy, psychological factors, catastrophising and the irrational belief that something is worse than it is are not yet fully understood (Hartvigsen et al., 2018).

Evidence-based guidelines recommend using the SBST to identify non-specific LBP patients with potentially modifiable prognostic indicators, especially for poor outcomes and disability (Hill et al., 2011; Foster et al., 2014; Michaleff et al., 2014; NICE, 2016; Steffens et al., 2016; Foster et al., 2018; Stochkendahl et al., 2018). This tool can help find indicators of poor prognosis, especially for patients with LBP who are prone to risk. In addition, this will ensure prudent use of target healthcare resources to facilitate decision-making processes related to primary and first-contact care and will yield better clinical outcomes or more cost-effective, patient-centred care.

Encouraging patients to return to normal activities and employment is necessary to reduce the social, economic and

workforce impacts of CLBP. In Saudi Arabia, occupational LBP has been shown to affect individuals' capacity to work and can result in high costs for both the economy and the healthcare system (Al-Otaibi, 2015). Although no economic analysis on the impact of CLBP on patients, employers, healthcare and the wider economy has been conducted in Saudi Arabia, it is noteworthy that, in other countries, CLBP results in missed working days, disability and reduced work production (Lou et al., 2004; Ekman et al., 2005). British businesses lost an estimated 30.6 million days to sickness in 2010, and the US lost 290.8 million days to back pain alone (Tome et al., 2017). To reduce the impacts of CLBP on the daily lives of individuals affected by this condition, as well as on employers, the government and the private sector, it is necessary to help patients return to normal activities as early as possible.

5.4 Limitations

While all the studies in this thesis had strengths, they also had some limitations. The systematic review was limited by several factors that may have contributed to selection bias. The identification and selection of relevant studies was subject to potential bias through the screening criteria chosen. Only primary studies in English were included, and the search was limited to studies published over a 10-year period. While relevant to the area of focus (the relationship between psychosocial factors and recovery or return to normal activities by patients with CLBP), the set of keywords used in the search strategy may have been restrictive and clearly affected the number and types of studies retrieved. In addition, the literature search was conducted without using MeSH terms and included different study designs. The relatively small number and variability of the primary studies retrieved were further sources of potential bias.

The qualitative study had a few limitations. The study was limited to only one Saudi government centre, where the data were collected, and generalisations were made without considering other geographical areas within the country. The generalisation of the findings was limited by the small sample and self-selection of the participants, who were generally well-educated, employed and young and middle-aged. A focus group could not be conducted with orthopaedic surgeons due to difficulty arranging their schedules to meet at the same time, so interviews were conducted. The interviewer's physiotherapist background might have resulted in bias during data collection, interfering with the focus group discussions and the interviews. The data collection tools utilised were semi-structured interviews and focus groups, so extraction of information from the participants relied heavily on the researcher's ability and skill to ask appropriate questions and probe more important aspects of the topic. Data saturation might not have been established or optimised as a gold standard as saturation can only be determined during or after analysis of data. The researcher performed the qualitative data analysis, which could have resulted in biased analysis.

The survey also had some limitations. It had a sample size of 178 and was limited to two Saudi Arabian government centres, so it was difficult to determine if this was representative of the population of patients served by the two hospitals studied. Although the survey had a relatively good response rate, sample size calculation was never carried out. Doing so could have increased the generalisability of the findings to a more heterogeneous group of individuals with CLBP. The study relied on self-reports from participants, increasing the risk of over- or under-reporting. The participant selection was not random, so the risk of

bias was still present despite the high response rate and sample size similar to studies conducted in other countries. This study was also conducted in only two hospitals, limiting the findings to the experiences of the participants accessing physiotherapy in these hospitals. Conducting a multicentre study in the future would increase the reliability of the findings. This survey questionnaire was designed and developed by the researcher and so relied heavily on the researcher's ability and skill to identify the variables and items to include in the questionnaire to probe other important aspects of the topic. In addition, a pre-test and pilot test of the survey were not conducted before the data collection of the main study.

The differences and relationships shown in the present study were significant but had only small to medium effect sizes, suggesting a need for cautious interpretations of the findings. The increase in the family-wise error rate (type I errors) throughout the reported statistical analysis was another limitation that this investigation failed to control. The study followed a cross-sectional study design, so it could not establish any causal relationships, and the surveys used could only measure the relationships between variables. It, therefore, was difficult to examine why the patients held their physiotherapy beliefs and to determine the root causes of these beliefs. It was also difficult to establish how these physiotherapy beliefs changed over time during patients' physiotherapy as the survey only examined the participants' beliefs and behaviours at a single point in time. Repeated at a different time period, the same study could help confirm whether the domains and relationships identified can be extended to the larger Saudi population.

5.5 Implications for future research

The findings show that fear-avoidance beliefs remained high for people with low education and income levels. This suggests a social gradient of the fear-avoidance beliefs of patients affected with CLBP. High fear-avoidance beliefs were also directly correlated with disability, as measured in the RMDQ questionnaire. Pain intensity and duration were directly correlated with the patients' beliefs about coping with pain, fear of pain, he quality and complexity of exercise, and receiving conflicting diagnoses. The participants' level of physical activity was positively associated with beliefs about treatment compliance and negatively associated with beliefs about patient education.

Both the qualitative study and the survey findings suggest a need for better communication with and between patients and healthcare providers. Both patients and healthcare teams experience frustration over poor communication, a lack of patient education on back pain mechanisms and healthcare professionals' low knowledge about how best to address the psychosocial factors that affect engagement in rehabilitation and result in worse patient outcomes. Research that explores the experiences of patients and their carers when communicating with healthcare professionals and that identifies their unmet needs seems to be important. There is a paucity of research on the levels and quality of communication between healthcare practitioners and patients with CLBP. Such studies could be important to determine whether patients experience better recovery when consultation with and counselling from their healthcare practitioners improves. When healthcare practitioners do not validate patients' pain beliefs, patients may be more likely to feel that their healthcare practitioners do not empathise with them (Evers et al., 2017). These beliefs are

important as they may lead to patient dissatisfaction and poor-quality care. It is noteworthy that patient satisfaction is an important indicator of the quality of care (Gluyas, 2015). There is also a need to examine the waiting time for patients to receive physiotherapy appointments from hospitals. Significant delays from diagnosis to rehabilitation may exacerbate LBP and promote fear-avoidance beliefs.

5.6 Clinical implications

The results of this study point to the need for clinicians and patients to develop clinical guidelines that meet the local healthcare needs of patients with CLBP. The inclusion of patients and carers in the development of guidelines is important to ensure consideration of patients' voices and experiences (NICE, 2016). Although not all patients would want to be actively involved in policy formation or decision-making regarding their care, inviting this group would ensure that guidelines are holistic and responsive to the needs of the target population (Gluyas, 2015). The development of national guidelines is critical to ensure that care for patients with CLBP is standardised. The use of standardised guidelines, therefore, could provide a general guide or pathway on how to care for patients.

The results of this thesis also show a need for individualised counselling and patient education during rehabilitation. As shown in the qualitative study, the patients felt that their healthcare practitioners did not encourage or reassure them they could self-manage their condition. This lack of validation of the patients' pain beliefs could lead them to perceive that their feelings and perceptions regarding their condition do not matter (Evers et al., 2017). Clinicians, therefore, should receive training on how to

counsel patients regarding pain management, provide patient-centred care and address their condition holistically.

As noted, treatments only focused on managing physical symptoms are less likely to result in positive outcomes than implementing a multidisciplinary approach to care (Kamper et al., 2014). Foster et al. (2018) emphasised the importance of developing evidence-based guidelines and the need to differentiate approaches to treatment and management applied in high-, low- and middle-income countries. In the context of Saudi Arabia's healthcare system, therefore, guidelines should be based on the needs of patients with LBP. Moreover, patients, especially those with LBP and prone to risk, should screened using the SBST to find any indicators of poor prognosis (Hill et al., 2011; Foster et al., 2014; Michaleff et al., 2014; NICE, 2016; Steffens et al., 2016; Foster et al., 2018; Stochkendahl et al., 2018). There is also a need to narrow the gap between evidence and healthcare practice.

Socioeconomic factors have been shown to play a role in the development of CLBP in Saudi Arabia, so it is necessary to recognise that there is no single solution to management of CLBP. Instead, collaborative efforts by policymakers, researchers, clinicians, employers, patients and their family members are needed to address socioeconomic factors that may influence development of CLBP in Saudi Arabia. Finally, clinical guidelines take into account factors in addition to socioeconomics that influence CLBP. As stressed by Buchbinder et al. (2018), the persistence of disability that often accompanies CLBP should be understood in the context of socioeconomic factors and cultural and personal beliefs about CLBP. To reduce the healthcare costs and health burden associated with CLBP, there is a need to increase patients' access to more effective care for LBP.

5.7 Conclusions

Socioeconomic factors, such as education and income level, continue to influence the beliefs about pain coping held by patients with CLBP in Saudi Arabia. Addressing these factors is essential to promoting positive health outcomes. It is suggested that patient education and individualised counselling are necessary to effect positive changes in patients' pain beliefs and ability to self-manage pain. The degree of pain interference in patients' normal everyday activities is associated with their beliefs about pain coping and fear of pain. Addressing these beliefs, along with psychosocial and physical factors, therefore, is an important step in managing CLBP.

However, the lack of clinical guidelines and pathways on CLBP management can reduce the quality of care received by patients in Saudi Arabia. In addition, a lack of evidence-based guidelines might mean that interventions to manage CLBP might not be effective at reducing pain. Patients may be dissatisfied with the care they receive from practitioners. Clinical guidelines and pathways, therefore, should be created to guide healthcare practitioners on how to holistically address the needs of patients.

The lack of effective communication, as highlighted by both Saudi patients and clinicians, could also deter the management of CLBP. Creating a care pathway, therefore, might enhance the quality of communication between healthcare practitioners and their patients. Promoting a multidisciplinary team approach is critical in management of CLBP. Finally, offering psychosocial support, as suggested by both patients and clinicians, could lead to activity normalisation and recovery.

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Appendix 1. PRISMA Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	**43**
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	**NA**
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	**44-47**
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	**48**
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	**48**
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	**48-51**
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	**51**
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	**51**

Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	**51-52**
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	**52**
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	**NA**
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	**53-55**
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	**55**
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	**NA**
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	**NA**
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	**NA**
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	**55-57**
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	**58-60**
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	**60-63**
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	**63-70**
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	**70-73**
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	**NA**
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	**NA**

DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	**73-76**
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	**76-78**
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	**79**
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	**NA**

Appendix 2. Search Outcomes of the Databases

	Databases: PubMed, Medline, CINAHL, PsycINFO, ProQuest and Ebsco
Search 1: Chronic low back pain OR low back pain AND psychosocial factors– limit to full text and peer-reviewed	4444
Search 2: Chronic low back pain OR low back pain AND psychosocial factors AND recovery – limit to full text and peer-reviewed	1307
Search 3: Chronic low back pain OR low back pain AND psychosocial factors AND return to normal activities OR participation– limit to full text and peer-reviewed	2229
Search 4: chronic low back pain OR low back pain AND fear-avoidance AND catastrophising AND worry OR depression. – limit to full text and peer-reviewed	60
TOTAL (from search terms 1-4)	8040
After removal of duplicates	2618
Limiting search to keywords found in abstract or title only	1006

Appendix 3. Search Outcome of Proquest

	Database: Proquest
Search term **Limitation**	January 1, 2005- February 28, 2016 full text; peer-reviewed English language; adults 18+ years
Search 1: Chronic low back pain OR low back pain AND psychosocial factors– limit to full text and peer-reviewed	2571
Search 2: Chronic low back pain OR low back pain AND psychosocial factors AND recovery – limit to full text and peer-reviewed	753
Search 3: Chronic low back pain OR low back pain AND psychosocial factors AND return to normal activities OR participation– limit to full text and peer-reviewed	1396
Search 4: chronic low back pain OR low back pain AND fear-avoidance AND catastrophising AND worry OR depression. – limit to full text and peer-reviewed	51
TOTAL (from search terms 1-4)	4561
After removal of duplicates	2438
Limiting search to keywords found in abstract or title only	826

Appendix 4. Participant Information Sheet

Participant Information Sheet
(Final version 1.0: 25.09.2015)

Title of Study: **Barriers and Facilitators of Activity 'Normalisation' for People with Chronic Low Back Pain.**
Study ID – **Back-to-Normal**.

Name of Researcher(s): **Mr. Mazyad Alotaibi, Prof. Roshan das Nair, Dr. Kate Radford.**

We invite you to participate in a focus group discussion as part of a research study. Before you agree to do so, we would like you to understand why the research is being performed and what your participation would involve. Please take the time to read the following information carefully, and talk to others about the study if you wish. A member of our team will review this information sheet with you and answer any questions you might have. If any details about the study are not clear to you, or if you would like more information, please let us know. We can be contacted using the telephone numbers listed at the end of this sheet.

What is the purpose of the study?

This study aims to identify the factors that enable or prevent people with chronic low back pain (LBP) from 'getting back to normal' and resuming their former activities. Many such factors can influence a person's activity levels. This research specifically aims to explore the experiences of people with chronic LBP living in Saudi Arabia. We wish to identify and explore examine the barriers and facilitators of activity 'normalisation' in people with chronic LBP following physical therapy interventions, from the point of view of the people with chronic LBP following physical therapy interventions.
We hope that physiotherapists, orthopaedic surgeons, and other healthcare professionals will thus benefit from a greater understanding of how to aid the recovery of people with chronic LBP. We hope that the findings from this study can lead to better pathways of care for people with chronic LBP and assist in the development of appropriate guidelines for the management of chronic LBP in Saudi Arabia.

Why have I been invited to participate?

We are inviting you to take part in a focus group discussion because you have previously received physiotherapy for chronic LBP. The aim of the focus group discussion will be to explore the perceptions of people with chronic LBP in terms of barriers and facilitators of activity 'normalisation' following physical therapy interventions. We are inviting approximately 6-8 participants like you to participate in this study.

Do I have to take part?

It is up to you to decide whether you wish to participate in this study or not, and you should take some time to consider your decision. If you do decide to participate, we require that you sign a consent form and return it to Mr. Mazyad Alotaibi at the address provided below. You will also retain a copy of the consent form to keep along with this information sheet. You are free to withdraw from the study at any time, without providing a reason.

What will happen if I agree to participate?

If you wish to take part in this study, you will be contacted by telephone and a time will be arranged for you to take part in a focus group with other people who have chronic LBP. We will do our best to arrange a time that is convenient for you, and will confirm the time by telephone. The focus group will last approximately 90 minutes and will be held in a hospital conference room in Riyadh, Saudi Arabia.

The content of the focus group or interview will be audio recorded and field notes taken in order to document inaudible or contextual information. This content will be transcribed and analysed to identify the barriers and facilitators of activity normalisation in people experiencing chronic LBP.

Expenses

You will be fully reimbursed for any expenses incurred in attendance at a focus group (if necessary). We can also arrange transport if you are likely to experience difficulties in attendance.

What are the possible disadvantages and risks associated with participation?

We do not foresee any disadvantages or risks for participants in this study. We will do our best to arrange the focus group to take place at a time convenient for you.

What are the potential benefits of taking part?

The information obtained from your participation in this study may contribute to the design of rehabilitation services for people with chronic LBP and provide physiotherapists, orthopaedic surgeons and other healthcare professionals with greater insight into the factors that enable or prevent a return to normal activity. Moreover, the findings from this study may facilitate the development of guidelines for the management of chronic LBP in Saudi Arabia.

What happens when the study ends?

When the study ends, you will continue to receive your usual care from the hospital.

What if a problem arises?

If you have a concern about any aspect of this study, you can contact to the researcher (Mr. Mazyad Alotaibi, Principal Investigator, on 0556477525) who will do his best to answer your questions. If you remain unhappy and wish to make a complaint, please contact the hospital's Patient Affairs Department or main supervisor: Dr. Kate Radford, Telephone: 0044 115 823 0226, Email: Kate.Radford@nottingham.ac.uk. Additionally, you can contact the Research Ethics Committee Administrator, c/o The University of Nottingham, School of Medicine Education Centre, B Floor, Medical School, Queen's Medical Centre Campus, Nottingham University Hospitals, Nottingham, NG7 2UH, Telephone: 0044 115 8231063, E-mail: louise.sabir@nottingham.ac.uk.

Will my participation in the study remain confidential?

We will adhere to ethical and legal practices and all information related to you will be handled in confidence.

Any data collected from your participation in the study will be assessed by authorised persons from the University of Nottingham who are involved in the study. Other authorised persons may also review the data in order to verify that the study is being carried out correctly. All such personnel will maintain a duty of confidentiality to you as a research participant, and will do their best to meet this duty.

All information collected about you during the course of this research will be kept **strictly confidential**, stored in a secure and locked office, and in a password protected database. Such information will be anonymised, and a unique identifier will be used so that you cannot be associated with the data.

Your personal data (address, telephone number) will be retained for 6-12 months after the study concludes to allow us to inform you of the findings of the study and possible follow-up studies (unless you advise us that you do not wish to be contacted). All other data (research data) will be kept securely for a period of seven years, during which all necessary precautions will be taken to maintain your confidentiality by all those involved in the study, with only members of the research team having access to your personal data. After this time, your data will be disposed of securely.

Although the information we collect about you is confidential, should you disclose anything to us which we feel puts you or anyone else at risk, we may deem it necessary to report this information to the appropriate body.

What will happen if I don't wish to carry on with the study?

Your participation is voluntary and you are free to withdraw at any time, without giving any reason, and without your legal rights or medical care being affected. If you withdraw from the study, however, the information collected up to that point cannot be erased and may still be used in the project analysis.

What will happen to the results of the research study?

We will use these findings to develop a questionnaire for exploring the perceptions of people with chronic LBP of whether physiotherapy can influence their return to normal activity and/or participation. The findings from this study will be written as a dissertation and submitted to the University of Nottingham for the degree of Doctorate of Philosophy in Rehabilitation and Ageing. Furthermore, the findings will be submitted for publication to allow other healthcare professionals to benefit from the study. Note that you would not be identified in any such report or publication.

Who is organising and funding the research?

The study is organised by the Division of Rehabilitation and Ageing, School of Medicine, University of Nottingham, UK and funded by Prince Sattam Bin Abdulaziz University, Saudi Arabia.

Who has reviewed the study?

All research in the University of Nottingham is reviewed by an independent group of people, called a research ethics committee, in order to protect your interests. This study has been reviewed and given favourable opinion by the ethics committee of The University of Nottingham, Medical School.

Further information and contact details

If you have any questions or concerns about the study or wish to discuss participation, you can contact the principal researcher at the following address:

Mr. Mazyad Alotaibi
Division of Rehabilitation and Ageing
B Floor, School of Medicine
Queens Medical Centre
University of Nottingham
Nottingham
NG7 2UH
Tel: 0044 115 823 0948
Mobile 1: 0556477525
Mobile 2: 0044 7477665545
Email: Msxma23@nottingham.ac.uk

Finally, thank you for reading this information sheet, which you should retain. If you agree to take part, we will ask you to sign a consent form, a copy of which you will receive.

Appendix 5. Consent Form

CONSENT FORM
Final version 1.0: 25.09.2015

Title of Study: Barriers and Facilitators of Activity 'Normalisation' for People with Chronic Low Back Pain.

REC ref: OVSB10112015 SoM RHA

Name of Researcher: Mr. Mazyad Alotaibi, Prof. Roshan das Nair, Dr. Kate Radford.

Name of Participant:

Please initial

1. I confirm that I have read and understand the information sheet version number 1.0 dated 25/09/2015 for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. I understand that should I withdraw then the information collected so far cannot be erased and that this information may still be used in the project analysis. ☐

3. I understand that relevant sections of my data collected in the study may be looked at by the research group and by other responsible individuals for monitoring and audit purposes. I give permission for these individuals to have access to these records and to collect, store, analyse and publish information obtained from my participation in this study. I understand that my personal details will be kept confidential. ☐

4. I understand that the focus group or interview will be audio recorded using an audio digital recorder for data analysis and those anonymous direct quotes from the focus group or interview may be used in the study reports and publication purposes. ☐

5. I understand that all data will be anonymous and confidential with the exception of information being revealed during the focus group or interview which is of concern and may need reporting i.e. potential risks to another person or to myself or criminal behaviour. ☐

6. I give permission for the anonymised data set to be used to inform future projects and for education purposes. ☐

7. I agree to maintain the confidentiality of focus group or interview. ☐

8. I understand that information about me recorded during the study will be kept in a secure database. If the data is transferred is will be made anonymous. Data will be kept for 7 years after the study has ended and then securely destroyed. ☐

9. Optional: I agree for my personal data being kept for 6-12 months after the end of the study so that I can be contacted about possible follow-up studies. ☐

10. I agree to take part in the above study. ☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Name of Person taking consent	Date	Signature

Appendix 6. Participants' Preliminary Data Sheet

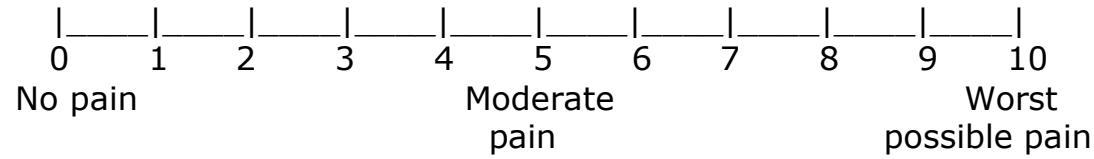
Participants' Preliminary Data Sheet

Sociodemographic

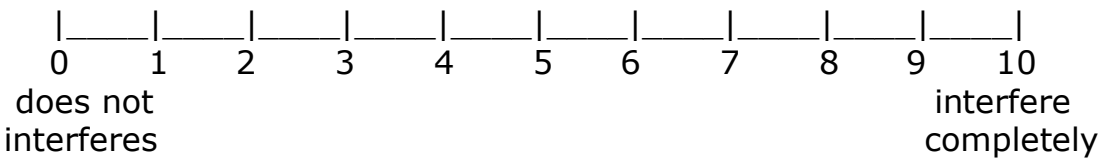
- Name:
- Age:
- Sex: ☐Male ☐Female
- Marital Status: ☐Single ☐Married ☐Divorced ☐Widowed
- Children: ☐None ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 or more
- Education: ☐Primary school ☐Secondary school ☐High school ☐College/Diploma ☐University Degree ☐Postgraduate.
- Occupational status: ☐Student ☐Employed full-time ☐Employed part-time ☐Retired ☐Unemployed ☐Casual worker ☐Not working due to ill health ☐Housewife ☐Other
- What is your job:
- Monthly Income: ☐ less than 3,000 SR ☐ 3,000 – 5,000 SR ☐ 5,000 – 7,000 SR ☐ 7,000 – 9,000 SR ☐ 9,000 – 11,000 SR ☐ more than 11,000 SR.

Medical History

- How long you have a chronic low back pain: …….. Months.
- In the past month, what was your average pain intensity:



- In the past month, how much has your pain interfere with your normal everyday activities:



- In the past three months, how many days you absent from work due low back pain: …… Days.
- In the past three months, how many days sick leave have you taken due low back pain: …… Days.
- Surgical history related to low back pain: ☐Yes, (type of surgery: ……...) ☐No
- Use of prescribed medication related to low back pain: ☐Yes ☐No
- Have you seen a physiotherapist for your low back pain: ☐Yes ☐No
- How many times have you referred to physiotherapy for your low back pain: ……. Times

- How many sessions of physiotherapy have you had per referral related to low back pain: ..... Sessions.
- How frequently you exercise: ☐Never ☐One per week ☐ Two per week ☐Three per week ☐ Four per week or more
- How many hours do you exercise per week:…….. Hours.
- What type of exercise you do? …….

Appendix 7. Information Sheet for Healthcare Professionals

Information Sheet for Healthcare Professionals
(Final version 1.0: 25.09.2015)

Title of Study: **Barriers and Facilitators of Activity 'Normalisation' for People with Chronic Low Back Pain.**
Study ID – **Back-to-Normal**.

Name of Researcher(s): **Mr. Mazyad Alotaibi, Prof. Roshan das Nair, Dr. Kate Radford.**

We invite you to participate in a focus group or interview as part of a research study. Before you agree to do so, we would like you to understand why the research is being performed and what your participation would involve. Please take the time to read the following information carefully, and to talk to others about the study if you wish. A member of our team will review this information sheet with you and answer any questions you might have. If any details about the study are not clear to you, or if you would like more information, please let us know. We can be contacted using the telephone numbers listed at the end of this sheet.

What is the purpose of this study?
This study aims to identify the factors that enable or prevent people with chronic low back pain (LBP) from 'getting back to normal' and resuming their former activities. Many such factors can influence a person's activity levels. This research specifically aims to explore the experiences of people with chronic LBP living in Saudi Arabia. We wish to identify and explore the barriers and facilitators of activity 'normalisation' in people with chronic LBP following physical therapy interventions, from the point of view of the health care professionals that treat these people.
We hope that the findings from this study can lead to better pathways of care for people with chronic LBP and assist in the development of appropriate guidelines for the management of chronic LBP in Saudi Arabia.

Why have I been invited to participate?

We are inviting you to take part in a focus group or interview because you have experience in the management of people with chronic LBP. The aim of the focus group or interview will be to explore the perceptions of physiotherapists and orthopaedic surgeons in terms of barriers and facilitators of activity 'normalisation' following physical therapy interventions in people with chronic LBP. We are

inviting approximately 6-8 participants like you to participate in this study.

Do I have to take part?

It is up to you to decide whether you wish to participate in this study or not, and you should take some time to consider your decision. If you do decide to participate, we require that you sign a consent form and return it to Mr. Mazyad Alotaibi at the address provided below. You will also retain a copy of the consent form to keep along with this information sheet. You are free to withdraw from the study at any time, without providing a reason.

What will happen if I agree to participate?

If you wish to take part in this study, you will be contacted by telephone and a time will be arranged for you to take part in a focus group with other health care professionals or an interview which will be conducted by the main researcher, Mr. Mazyad Alotaibi. For participation in the focus group, we will do our best to arrange a time that is convenient for you. Focus groups lasting approximately 90 minutes will be held in a hospital conference room in Riyadh, Saudi Arabia. For an interview, you will be contacted by telephone and a time will be arranged for the interview to take place at your convenience, either in person at your home, at another mutually agreed location, or by telephone. The interview would last for approximately half an hour.

The content of the focus group or interview will be audio recorded and field notes taken in order to document inaudible or contextual information. This content will be transcribed and analysed to identify the barriers and facilitators of activity normalisation in people experiencing chronic LBP.

Expenses

Participants will not be paid to participate in the study.

What are the possible disadvantages and risks associated with participation?

We do not foresee any disadvantages or risks for participants in this study. We will do our best to arrange the focus group or interview to take place at a time convenient for you.

What are the potential benefits of participation?

The information obtained from your participation in this study may contribute to the design of rehabilitation services for people with chronic LBP and the development of guidelines for the management of chronic LBP in Saudi Arabian.

What if a problem arises?

If you have a concern about any aspect of this study, you can contact to the researcher (Mr. Mazyad Alotaibi, Principal Investigator, on 0556477525) who will do his best to answer your questions. If you remain unhappy and wish to make a complaint, please contact the hospital Research Ethics Committee or main supervisor: Dr. Kate Radford, Telephone: 0044 115 823 0226, Email: Kate.Radford@nottingham.ac.uk. Additionally, you can contact the Research Ethics Committee Administrator, c/o The University of Nottingham, School of Medicine Education Centre, B Floor, Medical School, Queen's Medical Centre Campus, Nottingham University Hospitals, Nottingham, NG7 2UH, Telephone: 0044 115 8231063, E-mail: louise.sabir@nottingham.ac.uk.

Will my participation in the study remain confidential?

We will adhere to ethical and legal practices and all information related to you will be handled in confidence.

Any data collected from your participation in the study will be assessed by authorised persons from the University of Nottingham who are involved in the study. Other authorised persons may also review the data in order to verify that the study is being carried out correctly. All such personnel will maintain a duty of confidentiality to you as a research participant, and will do their best to meet this duty.

All information collected about you during the course of this research will be kept **strictly confidential**, stored in a secure and locked office, and in a password protected database. Such information will be anonymised, and a unique identifier will be used so that you cannot be associated with the data.

Your personal data (address, telephone number) will be retained for 6-12 months after the study concludes to allow us to inform you of the findings of the study and possible follow-up studies (unless you advise us that you do not wish to be contacted). All other data (research data) will be kept securely for a period of seven years, during which all necessary precautions will be taken to maintain your confidentiality by all those involved in the study, with only members

of the research team having access to your personal data. After this time, your data will be disposed of securely.

Although the information we collect about you is confidential, should you disclose anything to us which we feel puts you or anyone else at risk, we may deem it necessary to report this information to the appropriate body.

What will happen if I don't wish to carry on with the study?

Your participation is voluntary and you are free to withdraw at any time, without giving any reason, and without your legal rights being affected. If you withdraw from the study, however, the information collected up to that point cannot be erased and may still be used in the project analysis.

What will happen to the results of the research study?

We will use these findings to develop a questionnaire for exploring the perceptions of people with chronic LBP of whether physiotherapy can influence their return to normal activity and/or participation. The findings from this study will be written as a dissertation and submitted to the University of Nottingham for the degree of Doctorate of Philosophy in Rehabilitation and Ageing. Furthermore, the findings will be submitted for publication to allow other healthcare professionals to benefit from the study. Note that you would not be identified in any such report or publication.

Who is organising and funding the research?

The study is organised by the Division of Rehabilitation and Ageing, School of Medicine, University of Nottingham, UK and funded by Prince Sattam Bin Abdulaziz University, Saudi Arabia.

Who has reviewed the study?

All research in the University of Nottingham is reviewed by an independent group of people, called a research ethics committee, in order to protect your interests. This study has been reviewed and given favourable opinion by the ethics committee of The University of Nottingham, Medical School.

Further information and contact details

If you have any questions or concerns about the study or wish to discuss participation, you can contact the principal researcher at the following address:

Mr. Mazyad Alotaibi
Division of Rehabilitation and Ageing
B Floor, School of Medicine
Queens Medical Centre
University of Nottingham
Nottingham
NG7 2UH
Tel: 0044 115 823 0948
Mobile 1: 0556477525
Mobile 2: 0044 7477665545
Email: Msxma23@nottingham.ac.uk

Finally, thank you for reading this information sheet, which you should retain. If you agree to take part, we will ask you to sign a consent form, a copy of which you will receive.

Appendix 8. Health Care Professionals' Preliminary Data Sheet

Health Care Professionals' Preliminary Data Sheet

Sociodemographic:

- **Name**:
- **Age**:
- **Sex**: ☐Male ☐Female
- **Education**: ☐ University Degree ☐ Postgraduate Diploma ☐Master Degree ☐ Doctorate Degree.
- **Occupational status**: ☐Employed full-time ☐Employed part-time.
- **Type of occupation**: ☐Physiotherapist (II) ☐Physiotherapist (I) ☐ Senior Physiotherapist ☐Resident ☐Specialist ☐Assistant Consultant ☐Associate Consultant ☐ Consultant.
- **Number of years experience managing patients with chronic low back pain**: ……. Years.

Appendix 9. Topic Guide for Focus Group or Interviews with Health Care Professionals and People with Chronic Low Back Pain

Topic Guide for Focus Group or Interviews with Health Care Professionals and People with Chronic Low Back Pain

(Final version 1.0: 25.09.2015)

Introduction

This study addresses the barriers and facilitators of activity normalisation for people with chronic low back pain (CLBP) in order to understand the challenges and enablers of activity normalisation in people who have experienced CLBP and undergone physiotherapy intervention. To date, insufficient knowledge exists on patient and healthcare professional perceptions of facilitators and enablers of activity normalisation, resulting in a need to address this gap through qualitative research. Specifically, this study aims to explore the barriers and facilitators to activity normalisation of activity following physiotherapy intervention for CLBP, as perceived by people with CLBP, physiotherapists, and orthopaedic surgeons.

The purpose of these focus groups or interviews is to identify the factors enabling or preventing people with CLBP from 'getting back to normal' and resuming their former activities. Many such factors can potentially influence people's activity levels. This research specifically aims to explore the experiences of people with CLBP, physiotherapists, and orthopaedic surgeons in Saudi Arabia.

The information obtained from your participation in this study may contribute to the design of rehabilitation services for people with CLBP and provide physiotherapists, orthopaedic surgeons, and other healthcare professionals with greater insight into the factors

enabling or preventing the return to 'normal' activity and increased understanding of how to aid recovery. Moreover, the findings from this study may influence the development of CLBP management guidelines in Saudi Arabia.

In order to achieve these aims, these barriers and facilitators must be identified and explored, based on the question, "What do Saudi Arabian people with CLBP, physiotherapists, and orthopaedic surgeons perceive to the barriers and facilitators of activity 'normalisation' following physiotherapy interventions for CLBP?''

Prompts

Semi-structured questions for people with chronic low back pain:

Certain people with chronic LBP wish to resume their former activities but are unable to do so for various reasons. **If you have received physiotherapy intervention for CLBP to help you 'get back to normal' and resume your former activities, what do you think would enable or prevent you from resuming your former activities? / what factors enables or prevent people with chronic low back pain from getting on to their normal daily activities, such as shopping, socialising or work.**

Personal system/personal coping:

- **Can you tell me what has prevented you from getting on with your usual activities?**

  - Did your LBP affect any of your activities of daily living? How? Please provide me with examples.

  -Have you tried going back or doing again the things you used to do before developing your LBP? (explore)

- **What helped you to get back to your usual activities?**

  - Have you discussed your LBP to anyone else? Somebody you trust?

- What advice have you been given? from whom.

- What do you do to self-manage your LBP (exercises, acupuncture, yoga, medications, et cetera)?

- Did you find your own way or method of coping with your pain?

- Have you had any support and understanding from family, friends, co-workers with regard to your LBP?

Healthcare system:

- **Can you tell me about your experiences of seeking help from healthcare professionals? (explore both good and bad experiences)**
- **What kind of management have you had regarding your LBP?** (explore physical, medical/therapeutic, surgical management)

  -Did this management procedures help you in any way with your pain?

  -Have you been given any strategies to help or prevent pain from recurring/worsening? Please tell me about it.
- **Do you think the healthcare system had helped you in your recovery towards returning to normal activities? Or is it the opposite? Explain.**

Workplace System:

- **Has your LBP affected your performance at work? Tell me how.**
- **Have there been any understanding and/or support from co-workers when it comes to your LBP?**
- **What kind of assistance did you get from your employer/manager regarding work modification?** (probe on policies regarding absence management, return-to-work guidelines, referral to occupational health, et cetera)

Legislative and insurance system:

- **Are you aware of any laws or regulations or any LBP guidelines being implemented in your area?**
- **Have these laws and regulations and/or guidelines helped you in any way in returning to your normal activities?**

<u>Semi-structured questions for physiotherapists:</u>

Certain people with chronic LBP wish to 'get back to normal' and resume their former activities but are unable to do so for various reasons. **In your experience of performed physiotherapy interventions in order to assist people with chronic LBP in 'getting back to normal' and resuming their former activities, what factors do you think enable or prevent them from doing so?**

- **What stops/prevents patients from getting back to your usual activities?**
- **What help patients to getting back to your usual activities?**

  - Do your patients receive any assistance from their employer/managers?

  -What is your opinion on laws and regulations on LBP in your area of expertise?

  -What kind of assistance do your patients get from their employer/manager regarding work modification? (probe on policies regarding absence management, return-to-work guidelines, referral to occupational health, et cetera
- **In your opinion, what are the best ways to manage LBP?**

  -What kinds of pain management do your patients do for their LBP? What is your opinion of this and do you find these effective?

-Can you say that patients can get back to work and return to their normal activities after physiotherapy intervention?

-What are the important things that patients should be told about LBP? (in terms of returning to normal activities)

-Are there things you avoid telling your patients with LBP?

-What do you tell your patients regarding pain and the healing process?

-What advice should they be given?

- **Do you think the healthcare system affect the chronicity of LBP?**
- **What do you think might improve the management of people with chronic low back pain in returning to normal activities?**

  -Is the international clinical guideline of LBP management helpful on your area?

Semi-structured questions for orthopaedic surgeons:

Certain people with chronic LBP wish to 'get back to normal' and resume their former activities but are unable to do so for various reasons. **In your experience of managing people with chronic LBP to allow them to recover and resume their former activities, what factors do you think enable or prevent them from doing so?**

- **What do you think prevented patients from getting back to their usual activities?**
- **What helped patients to getting back to their usual activities?**

  - What are your thoughts about the common patient beliefs and attitudes with LBP like fear, activity avoidance, or catastrophisation?

-Do your patients receive the necessary support and understanding from their employers/managers regarding their LBP? Explore.

- **What do you think are the best ways to manage LBP?**

  -What are the most important or influential things you have do for your patients with LBP?

  -Can you tell me, how you communicate information regarding LBP to patients? Do you think your patients understand all information being relayed?

  -What do you consider to be important things that patients should be told about LBP? (in terms of returning to normal activities)

  -Are there things you avoid telling your patients with LBP?

  -What do you tell your patients regarding pain and the healing process?

  -What advice should they be given?

  -Do you think orthopaedic surgeons can influence the patient's beliefs and attitudes towards activity?

- **Do you think the healthcare system affect the chronicity of LBP?**

- **What do you think might improve the management of people with chronic low back pain in returning to normal activities?**

  -Is the international clinical guideline of LBP management helpful on your area?

  -What is your opinion regarding the laws and regulations in your area regarding LBP? (return-to-work policies, referral to specialists, absenteeism, et cetera)

  -What do you think might enable us as a healthcare to manage patients with chronic low back pain better?

Appendix 10. Ethical Approval of The Medical School, University of Nottingham

The University of Nottingham

Faculty of Medicine and Health Sciences

Research Ethics Committee
School of Medicine Education Centre
B Floor, Medical School
Queen's Medical Centre Campus
Nottingham University Hospitals
Nottingham
NG7 2UH

Direct line/e-mail
+44 (0) 115 8232561
Louise.Sabir@nottingham.ac.uk

20th January 2016

Mr Mazyad Alotaibi
Investigator/Research Student
c/o Dr Kate Radford
Associate Professor Rehabilitation and Ageing
B102, Medical School
Division of Rehabilitation and Ageing
School of Medicine
QMC Campus
Nottingham University Hospitals
NG7 2UH

Dear Mazyad

Ethics Reference No: OVSb10112015 SoM RHA **– please always quote**
Study Title: A study of barriers and facilitators of activity 'normalisation' for people with chronic low back pain.
Chief Researchers/Supervisors: Dr Kate Radford, Associate Professor Rehabilitation & Ageing, Dr Roshan das Nair, Associate Professor/Consultant Clinical Psychologist, Division of Rehabilitation & Ageing, School of Medicine.
Lead Researcher/Student: Mazyad Alotaibi,, PhD Student, Rehabilitation & Ageing, School of Medicine.
Start Date: 01/04/2016
End Date: 31/12/2016
Length of Study: 8 months
No of Subjects: 150

Thank you for submitting the above application which was considered by the Committee at its meeting on 10th November 2015 and the following documents were received:

Short Title: Back-to-Normal.

- FMHS Research Ethics Committee Application Form, version 1.0 Date: 25/09/2015
- Protocol Final Version 1.0 Date 25/09/2015.
- Information Sheet For Health Care Professionals Final Version 1.0: 25.09.2015
- Participant Information Sheet – People with Chronic Low Back Pain Final Version 1.0: 25.09.2015.
- Consent Form Final Version 1.0: 25.09.2015.
- Topic Guide for Focus Group or Interviews with Health Care professionals and people with chronic low back pain version 1.0 Date 25/09/2015.

These have been reviewed and are satisfactory and the study has been given a favourable opinion.

The Committee suggest that on both participant information sheets under "What if a problem arises?" that you revise and refer participants to the local Research Ethics Committee in Saudi Arabia or appropriate as this will be more practical for participants than the UK.

The University of Nottingham

A favourable opinion is given on the understanding that the Conditions of set out below are followed.

1. Please submit copies of the letters of approval from the local ethic committee at the King Fahad Medical City and other hospitals in Saudi Arabia when these are available for our records.

2. A Favourable opinion is given on the understanding that all appropriate ethical and regulatory permissions are respected and followed in accordance with all local laws of the country in which the study is being conducted and those required by the host organisation/s involved.

3. You must follow the protocol agreed and inform the Committee of any changes using a notification of amendment form (please request a form).

4. You must notify the Chair of any serious or unexpected event.

5. This study is approved for the period of active recruitment requested. The Committee also provides a further 5 year approval for any necessary work to be performed on the study which may arise in the process of publication and peer review.

6. An End of Project Progress Report is completed and returned when the study has finished (Please request a form).

Yours sincerely

pp Lamiaa Ali

Professor Ravi Mahajan
Chair, Faculty of Medicine & Health Sciences Research Ethics Committee

Appendix 11. Ethical Approval of King Fahad Medical City

Kingdom of Saudi Arabia
Ministry of Health
King Fahad Medical City
(162)

وزارة الصحة
مدينة الملك فهد الطبية
King Fahad Medical City

المملكة العربية السعودية
وزارة الصحة
مدينة الملك فهد الطبية
(١٦٢)

IRB Registration Number with KACST, KSA: H-01-R-012
IRB Registration Number with OHRP/NIH, USA: IRB00008644
Approval Number Federal Wide Assurance NIH, USA: FWA00018774

February 25, 2016
IRB Log Number: 16-074E
Department: External
Category of Approval: EXEMPT

Dear Mazyad Alotaibi,

I am pleased to inform you that your submission dated February 23, 2016 for the study titled '**A study of barriers and facilitators of activity 'normalisation' for people with chronic low back pain**' was reviewed and was approved. Please note that this approval is from the research ethics perspective only. You will still need to get permission from the head of department or unit in KFMC or an external institution to commence data collection.

We wish you well as you proceed with the study and request you to keep the IRB informed of the progress on a regular basis, using the IRB log number shown above.

Please be advised that regulations require that you submit a progress report on your research every 6 months. You are also required to submit any manuscript resulting from this research for approval by IRB before submission to journals for publication.

As a researcher you are required to have current and valid certification on protection human research subjects that can be obtained by taking a short online course at the US NIH site or the Saudi NCBE site followed by a multiple choice test. Please submit your current and valid certificate for our records. Failure to submit this certificate shall a reason for suspension of your research project.

If you have any further questions feel free to contact me.

Sincerely yours,

F M C Approved 25 FEB 2016 I R B

Prof. Omar H. Kasule
Chairman Institutional Review Board--IRB.
King Fahad Medical City, Riyadh, KSA.
Tel: + 966 1 288 9999 Ext. 26913
E-mail: okasule@kfmc.med.sa

Appendix 12. A full framework matrix with data charts showing the themes, sub-themes, codes descriptive and illustrative quotes

1. Symptom control			
Sub-themes	**Summary of Issues**	**Codes**	**Illustrative Quotes**
Pain coping	Pain control facilitates recovery	Pain control	"I am trying to avoid or minimize movements that require effort, such as standing for a long time, to avoid severe pain." (Pat. 3)
		Pain control	"I have become cautious in some activities and movements that I have performed before to avoid severe pain, because if the pain begins, I will not be able to move and have to stay in bed." (Pat. 6)
	Pain relief and pain control are important first steps to recovery	Controlling pain	"We should relieve pain using medication, rest or 2–3 day of sick leave, and then gradually resume usual activities. We need to make sure that we eliminate the pain to facilitate our patients in returning to their normal activity levels." (Phys. 1)
		Controlling pain	"Controlling the pain, strengthening muscles and practicing physiotherapy exercises will help patients to return to practicing their activities as before." (Phys. 4)
Activities to reduce pain	Activities are recommended to support recovery	Activities advice	"Most of the advice was to continue with physiotherapy or was about weight loss, exercises, swimming, walking, and sports that would help in relieving pain." (Pat. 1)
		Movements Advice	"Some instructions were about certain movements that I have to avoid, as well as about avoiding standing for long periods and performing wrong movements, along with the use of painkillers and the exercises that are useful." (Pat. 4)
Gradual exercise	Patients prefer gradual increase in exercise quantity and intensity	Gradual exercises	"I think that physiotherapists should start exercise treatment gradually, from the easiest exercises to the most difficult, which will be beneficial and suitable in all cases." (Pat. 2)
		Gradual exercises	"Physiotherapists are supposed to start therapy with two exercises; then, the number can be increased gradually." (Pat. 1)
Effect of pain	Pain stopped patients from resuming normal activities	Pain	"When the lower back pain begins, I cannot perform my work duties and daily life activities because the pain affects me. I am trying to resume my activities by using painkillers, but I cannot function as before because of pain." (Pat. 1)
		Pain	"My daily life activities are lower than before, because of the pain that is preventing me from practicing my activities in a natural way." (Pat. 2)
Concern about analgesic use	Concern about analgesic side effects reduced patients' use	Analgesic side effects	"The painkillers that relax the muscles cause drowsiness, and make me sleep for a long time, so I am trying to avoid taking these painkillers." (Pat. 4)
		Analgesic side effects	"I used to take analgesics when attacked by pain, but the long-time use of such drugs has an effect on the kidneys and causes other complications." (Pat. 1)

2. Patient education and awareness			
Sub-themes	**Summary of Issues**	**Codes**	**Illustrative Quotes**
Education is essential	Patient education is needed	Patient education	"Patients require significant education because physicians do not have time to explain their condition in detail or what they need to improve, and to prevent them from making comparisons with other patients." (PT. 4)
		Patient education	"I think the important thing is education, because the level of education given to patients by physicians and physiotherapist is a key factor." (Phys. 2)
	General education is important for public and society	Education	"I think the general public should be educated about the importance of health, exercises and quality of life, what they need to know about lower back pain, and that they may experience lower back pain once or twice in their lifetime, so that they know how to deal with it and not surrender to the pain." (PT. 2)
		Education	"We must educate patients and society about the role of physiotherapy and exercises and their effect on resolving their condition, whether through brochures or by following instructions and advice." (Phys. 5)
Importance of awareness	Awareness amongst patients facilitates recovery	Awareness	"I think awareness is the most important point; we are trying to raise awareness among patients and direct them towards certain advice and instructions." (Phys. 5)
	National awareness programme	National awareness program	"It is very important to initiate a national programme for social awareness about chronic lower back pain and to explain the causes of back pain and prevention methods." (Phys. 6)
Lack of awareness and education amongst patients and community	Poor information available to patients	Poor information	"Patients are unaware about the disease and have insufficient information, as most disease information on the Internet is in English. Arabic language topics are the assumptions of other people and their previous experiences." (Phys. 6)
	Low level of community awareness	Community unawareness	"I think there is a community unawareness about approaches to chronic lower back pain because of a lack of full awareness, and most patients think that lower back is a dangerous condition, uncommon and unknown." (Phys. 5)

3. Adherence to treatment plan			
Sub-themes	**Summary of Issues**	**Codes**	**Illustrative Quotes**
Treatment compliance	Following clinicians' advice is important for recovery	Follow advice	"Patients should follow the advice and instructions that have been given to them by physiotherapists and physicians to resolve their condition, but very few patients follow the advice and instructions." (Phys. 5)
		Follow advice	"If advice and the instructions were provided to the patient during the first month and he or she followed them, the condition would resolve faster." (Phys. 6)

	Adhering to the treatment plan is important	Treatment compliance	"Adherence to treatment plan and advice and following physicians' and physiotherapists' instructions." (Phys. 3)
	Lack of compliance slows recovery	Lack of compliance	"Most patients do not practice their treatment exercises at home and depend on doing physiotherapy at the clinic." (PT. 5)
		Lack of compliance	"A lot of patients are not compliant with the treatment or with the instructions that are given to them." (PT. 4)
	Poor physiotherapy attendance slows return to normal activities	Poor physiotherapy attendance	"The main thing is that some of the patients do not continue the physiotherapy programme even though they stop the home exercises." (Phys. 2)
		Poor physiotherapy compliance	"Most of the patients do not attend a sufficient number of physiotherapy sessions – they attend one or two sessions, and therefore they face difficulty in continuing to practice the exercise." (Phys. 3)
Quantity and complexity of exercises	Tiring exercises	Quantity of exercises	"The physiotherapist instructed me to perform 15 exercises within one session, which is too many exercises and I may forget them." (Pat. 1)

4. Psychological factors			
Sub-themes	**Summary of Issues**	**Codes**	**Illustrative Quotes**
Psycho-social issues	Psychosocial issues support and hinder return to normal activities	Psychosocial issue	"I believe that the majority of patients have a psychosocial issue, which has an effect on recovery; that's why sometimes we should use some specific scales to determine if the risk of a yellow flag is high." (PT. 3)
		Psychosocial	"There is a psychosocial issue, especially in our culture, and many social demands on the patients that sometimes lead to a long time required for recovery." (PT. 4)
		Psychological and social issues	"I think it is psychological reasons sometimes and also social issues that prevent the patients from going back to their activities." (Phys. 2)
		Psychological factor	"I think the psychological factor plays a significant role in returning to practice daily life activities, and this has an impact on influencing daily life in general as most patients have difficulty in understanding their case." (Phys. 5)
Patients' beliefs	Patients' beliefs affect their recovery	Patients' beliefs	"Patients do not believe that physiotherapy is a sufficient intervention, and because they believe that this is not a treatment, they want something more powerful." (PT. 2)
		Incorrect patient beliefs	"Patients have an incorrect belief that physiotherapy or medication will have an instant effect, like 'magic'. As physicians, we always explain to the patients that if the condition has persisted for a long time, the treatment period will be longer than the condition period." (Phys. 3)

	Patients like to compare themselves with others	Comparison with others	"Some patients want to get the same treatment as someone else, like their cousin or friend. This is where education has a role – we have to educate them about their condition and about the treatment they should receive." (PT. 4)
		Comparison with others	"The nature of our community depends in a significant way on the experiences of the patients, with the persisting ignorance that each case is different from the others." (Phys. 5)
Changing beliefs	Changing patients' beliefs is an important factor in recovery	Patients' beliefs	"One of the most important matters, particularly between the physician and patient, is the correction of false beliefs such as that back pain is chronic and physiotherapy and medication do not have an instant benefit." (Phys. 3)
		Changing beliefs	"Patients must change their beliefs about the chronic low back pain and follow the pharmacological treatment and physiotherapy which will help them to practice their activities of the daily life." (Phys. 5)
Reassurance	Reassurance from clinicians supports patient recovery	Reassurance	"Some patients experience fear, but after reassuring them, they resume practicing the activities of their daily life." (Phys. 4)
		Resuming activities	"I reassure patients that back pain is not a significant condition, and encourage them to lose weight and do sport such as swimming or physical activities." (Phys. 6)
Lack of reassurance	Lack of reassurance and encouragement can hinder recovery	Lack of reassurance	"Most physicians have stated that my case is chronic and that if physiotherapy does not achieve any results, I will have to undergo surgery." (Pat. 4)
		Lack of encouragement	"I felt that some physiotherapists wanted to say 'if you did not gain benefits from these exercises, better not to come again.'" (Pat. 3)
Anger	Anger affects the patients' level of pain	Anger	"If I become angry, the pain increases." (Pat. 4)
		Anger	"If I feel fatigued at work or become angry, the pain is aggravated." (Pat. 1)
Fear of pain	Fear of pain leads to reduced activity	Fear of pain	"I am avoiding practicing any activities because I am afraid that I may feel pain if I perform these activities, so I am trying not to tire myself to avoid the pain." (Pat. 5)
		Fear of pain	"My daily life activities have been changed now because I am afraid of feeling severe pain, and because if the pain begins I have to take a rest and stop working for a while." (Pat. 5)
		Fear of pain	"I think some of the patients have a fear of pain, which can lead to a reduced possibility of recovery." (PT. 3)
		Fear of pain	"I think fear of pain plays a great role in returning to practice the daily life activities, due to fear; the patient becomes afraid of certain movements due to the pain." (Phys. 5)
	Fear of recurrence hinder full return to normal activities	Fear of recurrence	"Patients have a fear of the reappearance of the same problem again, and of experiencing the same pain." (PT. 5)

		Fear of recurrence	"Some of the patients are afraid to get back to practicing the daily life activities because of fear and recurrence of pain." (Phys. 7)

5. The role of the clinician			
Sub-themes	**Summary of Issues**	**Codes**	**Illustrative Quotes**
Treatment plans	Need for a clear treatment plan	Unified plan	"I think that, if there is a unified plan or guidelines, this will be beneficial for patients and will help in eliminating confusion and conflict among physicians and physiotherapists." (Pat. 2)
		Clear plan	"I hope guidelines become available, as they will give the indication that there is a clear plan to follow." (Pat. 3)
		Clear treatment plan	"A clear treatment plan and instructions from the physician, because many patients do not get sufficient instructions." (Phys. 4)
Availability of guidelines	Need for clear guidelines	Availability of guidelines	"All healthcare professionals should follow the guidelines to avoid having chronic patients." (PT. 6)
		Evidence-based guidelines	"Evidence-based practice and guidelines will be ideal for both healthcare professionals and patients." (PT. 3)
		Availability of guidelines	"We need to arrange our system more comprehensively with a unified, clear plan. Following the guidelines will help primary care physicians and physiotherapist to resolving patients' conditions more quickly." (Phys. 4)
		Availability of guidelines	"I think if guidelines or a specific plan become available, it would help a large proportion of emergency physicians and primary care providers." (Phys. 5)
	Unavailable guidelines hinder patient recovery	Unavailable guidelines	"There are no clear guidelines to apply, neither from the side of the physician nor from the side of physiotherapy, and patients say the same thing: 'there is no clear plan – I go to the physiotherapist, who gives me exercises that differ from the exercises given by the other physiotherapist.'" (PT. 2)
		Unavailable guidelines	"There are no specific guidelines, which may lead to chronicity and worsening of cases." (PT. 6)
		Unavailable guidelines	"There are no guidelines and no one follows them. Usually we see patients who need surgery and will follow up on them, whilst other cases will be discharged and referred to the pain clinic and physiotherapy." (Phys. 2)
		Unavailable guidelines	"There is no clear treatment plan or guidelines, and so the patient does not trust the physicians." (Phys. 7)
	Treatment Plan	Different treatment plan	"There is no unified plan. Each physician prescribed a plan that differed from other physicians' plans. So, I became confused about whether to follow the plan of this physician or the other physician." (Pat. 5)
		Different treatment plan	"The problem is that every two or three sessions, a new physiotherapist gives me new instructions and exercises until I have been instructed to perform approximately 30 or 40 exercises; I have noted that

			there is a discrepancy between physiotherapists." (Pat. 6)
Problems with diagnosis	Different diagnoses given by different clinicians	Different diagnosis	"The physician's diagnosis may vary from one physician to another, and the same goes for the physiotherapists. Everyone diagnoses your case from his or her own view." (Pat. 4)
		Conflicting diagnosis	"Most physicians make a different diagnosis based on their perspective." (PT. 2)
		Conflicting diagnosis	"Mostly, it is the same diagnosis but the terms may differ because it was not translated to Arabic in a scientific way, and all of the terms with the same meaning are understood differently between one physician and another, which creates a problem for the patient." (Phys. 6)
		Different diagnosis	"I am consulting many physicians, some of them at my own expense, and each one has given me a different diagnosis for my condition." (Pat. 3)
		Conflicting diagnosis	"There is a problem with diagnosing lower back pain and it is complex, not easy, and the diagnosis is often done by a physiotherapist and not a physician, which causes conflict for the patients." (PT. 1)
		Conflicting diagnosis	"The problem for the patients is that they go to more than one physician at the same time, and that some of the physicians may agree on the same diagnosis where others may differ." (Phys. 5)
Conflicting advice	Ambiguous advice confuses patients	Ambiguous advice	"The physiotherapists' advice leads to some confusion and ambiguity, and differs between governmental hospitals and private hospitals. Some advice was positive, but mostly there was confusion in the advice and exercises given by the physiotherapists." (Pat. 2)
		Conflicting advice	"Some physicians tell me one thing while the physiotherapists give you exercises to do that are not related to the physicians' view. Some physiotherapists advised me to stop practicing sport and to keep performing the exercises they prescribed for me, while the others advise me regarding massage." (Pat. 4)
		Conflicting advice	"Everyone, both physicians and physiotherapists, provide their own instructions to the patients and leave them confused as to which instructions they should follow." (Phys. 6)
		Conflicting advice	"It differs from one physician to another; some of them recommended rest to the patients, and then the patients develop a barrier of fear of returning to daily activities instead of being motivated." (Phys. 7)
Importance of good communication	Good patient-physician communication supports recovery	Good communication	"Positive communication with the physiotherapist is what supports me to recover by motivating me to do exercises that have played an important role in my recovery." (Pat. 5)
		Good communication	"A positive relationship and communication with physicians and physiotherapists is very important as it helps the patient to be relaxed and motivated." (Pat. 4)
	Continued communication until the issue is resolved	Good patient-physician communication	"The relationship and communication between the patient and the physician should not end until the condition has resolved, even if the patient is referred to physiotherapy." (PT. 5)

		Full disclosure regarding condition	"I am trying to provide the patient with any information that is beneficial or related to his or her case, and am trying to simplify such information." (Phys. 4)
	Lack of communication between clinicians leads to conflicting advice	Lack of communication	"There is a huge communication gap between the physician and the therapist, and sometimes between the therapist and the patient, which usually leads to conflict in the treatment plan." (PT. 4)
	Poor communication with patients hinders patient understanding	Poor of communication	"Many physicians have a problem in communicating with their patients and how to deal with them, so most patients experience difficulty in understanding their condition and the instructions provided." (Phys. 5)
Importance of multidisciplinary team	lack of having access to a multidisciplinary team	Lack of multidisciplinary team	"A multidisciplinary team is crucial, especially for chronic patients-they require a complete clinical team that includes a psychologist, physician, physiotherapist and health educator." (PT. 2)

6. Social Support			
Sub-themes	**Summary of Issues**	**Codes**	**Illustrative Quotes**
Psycho-logical support	Psychological support improves patient outcomes	Psychological support	"There is no doubt that all forms of support and psychological support have a significant effect on the patients." (Phys. 4)
		Psychological support	"Psychological support, moral support and following the instructions will help patients to return to practicing their daily life activities." (Phys. 7)
Family support	Family support promotes return to normal activities	Family support	"My family's support has played an important role in my recovery and the practicing of my daily life activities." (Pat. 5)
		Family support	"Family support is an important factor. My family has always supported me by advising to not think negatively about my condition, that I will get better, and the pain will go and I will recover to the way I was before." (Pat. 2)
		Family support	"It is very important; primary support should come from the spouse and children as well as from friends and colleagues." (Phys. 1)
		Family support	"Family and friends' support is essential for patients during and after treatment." (Phys. 4)
Lack of employer support	Unsupportive employers hinder full return to work	Unsupportive employers	"I am an employee in a governmental sector that shows no consideration for individuals suffering from lower back pain, as I may be referred first to the medical committee then get retired." (Pat. 3)
		Lack of employers' support	"My work did not understand my case – when pain attacks me in the morning, sometimes they refuse to give me leave and in this case, I am forced to apply for emergency leave until I am out of balance because they think that I am making an excuse." (Pat. 6)

		Unsupportive employers	"Some employers may be unsupportive because they are ignorant of the problems from which the patients suffer and because of the impression they have that employees always try to get leave with a flimsy excuse, so bad employees create trouble for the good ones." (Phys. 3)
		Unsupportive employers	"I notice that some patients complain about their managers and ask for reports that prove their cases and conditions, and this is proof that their employers are not showing an understanding of their cases." (Phys. 4)

7. Issues specific to the Saudi healthcare system			
Sub-themes	**Summary of Issues**	**Codes**	**Illustrative Quotes**
Healthcare system	Lack of specialised clinics	Role of the clinics	"The role of the clinics is limited, as many patients are referred to specialized clinics for which they must wait a long time to be seen." (Phys. 3)
		Lack of clinics	"Appointments for radiology procedures have a very long waiting tine of at least nine months." (Pat. 1)
	Staff shortage and delays	Lack of staff and resources	"The shortage of staff and resources causes delays in the primary health care system, thereby causing patients to wait for a specialised physician appointment for up to as long as one and a half years." (PT. 4)
		Lack of staff and clinics	"Usually, it may take nine months to get an appointment to see a specialist physician; therefore, the pain may progress into chronic pain." (Pat. 4)
	Healthcare system malfunctions in general hindered patient care	Healthcare system	"There is a system malfunction; we have suffered many problems within the health care system, one of which is the referral system. We have no referral system back to the physician because some patients want to discuss their case with their physician after they have been discharged from the physician's clinic." (PT. 1)
		Healthcare system	"The healthcare system can lead to the worsening and aggravation of a patient's condition as it hinders the patient from following the specific steps of his or her treatment plan." (Phys. 5)

Appendix 13. Survey Questionnaire

Survey Questionnaire:
Chronic Low Back Pain Beliefs and Influence of Physiotherapy

Dear Sir/ Madam:

- We are inviting you to take part in the survey because you have previously received physiotherapy for chronic low back pain.
- This study is being conducted to understand your views about how physiotherapy influences a return to normal activity and/or participation.
- It is up to you to decide whether you wish to participate in this study or not, and you should take some time to consider your decision.
- Any data collected from your participation in the study will be assessed by authorised persons from the University of Nottingham who are involved in the study.
- There are no right or wrong answers. Please answer each question based on your own experience.
- There is no time limit for completing this questionnaire. However, assuming you are uninterrupted, it will probably take you about 15 minutes to complete.
- Please be assured that all information about you will be anonymized.
- This research is being organised and conducted by an independent researcher the University of Nottingham, UK and forms part of a dissertation for the degree of Doctorate of Philosophy in Rehabilitation and Ageing. None of the information from this questionnaire will be passed back to the physiotherapists involved in your care.
- We hope that the findings from this study can lead to better pathways of care for people with chronic low back pain and assist in the development of appropriate guidelines for the management of chronic low back pain in Saudi Arabia. The findings will be submitted for publication to allow other healthcare professionals to learn from the study. Note that you would not be identified in any such report or publication.
- By completing this survey, you are consenting to participate in the study.
- Please return your completed questionnaire to one of the clinical team members.

If you have a concern about any aspect of this study or need help in complteting the questionnaire or would prefer to do this by phone, please contact the researcher:

Mr. Mazyad Alotaibi, PhD candidate
Mobile 1: 0556477525
Email: Msxma23@nottingham.ac.uk

PART A: Sociodemographic characteristics

Age: _____

Please tick the box that best describes you.

1. Gender: ☐ Men ☐ Women
2. Highest level of education: ☐Primary school ☐Secondary school ☐High school ☐ Diploma ☐University Degree ☐Postgraduate ☐Doctorate
3. Monthly Income: ☐ less than 3,000 SR ☐ 3,000 – 5,000 SR ☐ 5,000 – 7,000 SR

   ☐ 7,000 – 9,000 SR ☐ 9,000 – 11,000 SR ☐ more than 11,000 SR.
4. Marital status: ☐Single ☐Married ☐ Divorced
5. Children: ☐None ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 or more
6. Occupational status: ☐Student ☐Employed full-time ☐Employed part-time ☐Retired ☐Unemployed ☐Casual worker ☐Not working due to ill health ☐Housewife ☐Other
7. Job title: …….

These questions ask about your treatment and current pain
PART B: Medical History

1. How long have you had low back pain:…….. Months.

2. **In the past month**, how would you rate your average pain intensity:

|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|
0 1 2 3 4 5 6 7 8 9 10

No pain — Moderate pain — Worst possible pain

3. **In the past month**, to what extent has your pain interfered with your normal everyday activities:

|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|
0 1 2 3 4 5 6 7 8 9 10

does not interfere with normal everyday activities — interfered completely with normal everyday activities

4. Have you had surgery because of your low back pain? ☐Yes ☐No

4a. If you answered yes to question 4, please describe your surgery:

……..

5. Since you were diagnosed with low back pain, how many times have you been **referred** to physiotherapy? ……. Times.
6. In the most recent referral to physiotherapy, how many sessions have you received? …… Sessions.
7. How frequently do you physical activities*: ☐Never ☐Once per week ☐ Twice per week ☐Three times per week ☐ Four times per week or more.

*(*By **physical activities** we mean any body movement that includes performing housework, walking, climbing stairs and walking to and from work/ the bus stop to keep your body moving and still count toward the recommended amount of weekly physical activity*).

PART C: Fear-Avoidance Beliefs Questionnaire

Here are some of the things other patients have told us about their pain. For each statement please circle the number from 0 to 6 to indicate how much physical activities such as bending, lifting, walking or driving affect or would affect your back pain.

	Completely Disagree			Unsure			Completely Agree
1. My pain was caused by physical activity.	0	1	2	3	4	5	6
2. Physical activity makes my pain worse.	0	1	2	3	4	5	6
3. Physical activity might harm my back.	0	1	2	3	4	5	6
4. I should not do physical activities which (might) make my pain worse.	0	1	2	3	4	5	6
5. I cannot do physical activities which (might) make my pain worse.	0	1	2	3	4	5	6

The following statements are about how your normal work affects or would affect your neck pain.

	Completely Disagree			Unsure			Completely Agree
6. My pain was caused by my work or by an accident at work.	0	1	2	3	4	5	6
7. My work aggravated my pain.	0	1	2	3	4	5	6
8. I have a claim for compensation for my pain.	0	1	2	3	4	5	6
9. My work is too heavy for me.	0	1	2	3	4	5	6
10. My work makes or would make my pain worse.	0	1	2	3	4	5	6
11. My work might harm by neck.	0	1	2	3	4	5	6
12. I should not do my regular work with my present pain.	0	1	2	3	4	5	6
13. I cannot do my normal work with my present pain.	0	1	2	3	4	5	6
14. I cannot do my normal work until my pain is treated.	0	1	2	3	4	5	6

15. I do not think that I will be back to my normal work within 3 months.	0	1	2	3	4	5	6
16. I do not think that I will ever be able to go back to that work.	0	1	2	3	4	5	6

FABQPA (2,3,4,5): _____/24 FABQW (6,7,9,10,11,12,15): _____/42

PART D: The Roland-Morris Disability Questionnaire

When your back hurts, you may find it difficult to do some of the things you normally do. This list contains sentences that people have used to describe themselves when they have back pain. When you read them, you may find that some stand out because they describe you *today*. As you read the list, think of yourself today. When you read a sentence that describes you today, put a tick against it. If the sentence does not describe you, then leave the space blank and go on to the next one. Remember, only tick the sentence if you are sure it describes you *today*.

1. I stay at home most of the time because of my back.

2. I change position frequently to try and get my back comfortable.

3. I walk more slowly than usual because of my back.

4. Because of my back I am not doing any of the jobs that I usually do around the house.

5. Because of my back, I use a handrail to get upstairs.

6. Because of my back, I lie down to rest more often.

7. Because of my back, I have to hold on to something to get out of an easy chair.

8. Because of my back, I try to get other people to do things for me.

9. I get dressed more slowly then usual because of my back.

10. I only stand for short periods of time because of my back.

11. Because of my back, I try not to bend or kneel down.

12. I find it difficult to get out of a chair because of my back.

13. My back is painful almost all the time.

14. I find it difficult to turn over in bed because of my back.

15. My appetite is not very good because of my back pain.

16. I have trouble putting on my socks (or stockings) because of the pain in my back.

17. I only walk short distances because of my back.

18. I sleep less well because of my back.

19. Because of my back pain, I get dressed with help from someone else.

20. I sit down for most of the day because of my back.

21. I avoid heavy jobs around the house because of my back.

22. Because of my back pain, I am more irritable and bad tempered with people than usual.

23. Because of my back, I go upstairs more slowly than usual.

24. I stay in bed most of the time because of my back.

RMDQ Score:_____

These questions ask about how you cope with your low back pain and your views about how it should be managed and factors that affect low back pain management.

PART E: Beliefs about how Physiotherapy influences a return to normal activity and/or participation in people with low back pain.

Categories	Items	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Pain Coping	1. I try to avoid some movements that require effort to avoid severe pain.					
	2. I have become cautious while doing some activities to avoid severe pain.					
	3. I am trying to resume my activities by using painkillers, but I cannot do everything I did before because of pain.					
Fear of Pain	4. Fear of pain affects my ability to return to my usual daily life activities.					
	5. Fear that pain will delay my recovery.					
	6. I am afraid of the pain coming back.					
Conflicting diagnosis	7. Diagnosing low back pain is difficult and complex.					

	8. The diagnosis made by physicians and physiotherapists are sometimes different.					
Patients beliefs	9. People with low back pain must change their beliefs about low back pain to fully recover.					
	10. Physiotherapy can help me get rid of low back pain.					
	11. Physiotherapy can have an instant effect on low back pain.					
	12. Every person with low back pain is different in diagnosis and experiences from the next.					
Conflicting advice	13. Physiotherapists' advice is confusing.					
	14. Physicians' advice is confusing.					
	15. Physiotherapists and physicians give conflicting advice.					
	16. Physicians and physiotherapists each gave me their own instructions and I am not sure which instructions I should follow.					
	17. Each different physiotherapist gives me different instructions and exercises.					
Treatment compliance	18. I regularly practice the exercises given by my physiotherapist at home.					
	19. I practice my exercises only at the physiotherapy clinic.					
	20. I will continue physiotherapy for low back pain even if I don't get better after a few sessions.					
Quantity and complexity of exercises	21. The Physiotherapist gave me some exercises that I cannot easily perform by myself.					
	22. The Physiotherapist gave me too many exercises and I cannot remember them all.					
Gradual exercises	23. Physiotherapists should start with the easiest exercises first and then progress to the most difficult.					
	24. Physiotherapists should start therapy with one-or two exercises, and then, increase the number of exercises gradually.					
Awareness	25. I am sufficiently aware and well-informed about the causes, complications and treatment of low back pain.					

	26. It is very important that society is made more aware about chronic lower back pain.					
Communication	27. My physician and physiotherapist maintain regular communication with each other regarding my condition and coordinate my treatment plan.					
	28. Having a good relationship with my physician and being able to talk to him/her helps me to follow their advice.					
	29. Having a good relationship with my physiotherapist and being able to talk to him/her helps me to follow their advice.					
	30. My physician has maintained regular follow up with me, even after I was referred to the physiotherapy clinic.					
	31. I experience difficulty in understanding my condition and the instructions given by the physician.					
	32. I experience difficulty in understanding my condition and the instructions provided by physiotherapist.					
	33. Good communication has played an important role in my recovery.					
Guidelines	34. Physicians should follow a clear treatment plan.					
	35. Physiotherapists should follow a clear treatment plan.					
	36. Having some clear clinical guidelines about the way back pain should be managed would help in eliminating confusion and conflict among physicians and physiotherapists.					
Education	37. Physician has educated me about my low back pain.					
	38. Physiotherapist has educated me about my low back pain.					
	39. Education about low back pain is a very important part of my treatment plan.					

	40. People with low back pain should be educated about the role of physiotherapy.					
	41. Society should be educated about the role of physiotherapy.					
	42. I strongly recommend physiotherapy for anyone suffering from low back pain.					

Appendix 14. Ethical Approval of King Khalid University Hospital

Kingdom of Saudi Arabia
King Saud University(034)
P.O.Box 7805 Riyadh 11472
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المملكة العربية السعودية
جامعة الملك سعود (034)
ص.ب ٧٨٠٥ الرياض ١١٤٧٢
هاتف : ٠١١ ٤٦٧٠٠١١ ٩٦٦+
فاكس : ٠١١ ٤٦٧١٩٩٢ ٩٦٦+

جامعة الملك سعود
King Saud University
المدينة الطبية الجامعية

13.02.2017 (16.05.1438)
Ref. No. 17/0072/IRB

To: **Mr. Mazyad Alotaibi**
PhD Candidate
Division and Ageing Department
University of Nottingham, United Kingdom

Lecturer – Prince Sattam bin Abdulaziz University
Department of Physical Therapy and Rehabilitation
College of Applied Medical Sciences
Email: mazyad_pt@yahoo.com
Principal Investigator

Cc: Prof. Rashan das Nair
Dr. Kate Radford
Co-Investigators

Subject: **Approval of Research Project No. E-17-2225**

Study Title: "Barriers and Facilitators of Activity "Normalization" for People with Chronic Low Back Pain"

Type of Review: Expedite
Date of Approval: 01 February 2017
Date of Expiry: 13 February 2018

Dear Mr. Mazyad Alotaibi,

I am pleased to inform you that your above-mentioned research project submitted to the IRB was reviewed and approved on 01 February 2017 (04 Jumaada-I 1438). You are now granted permission to conduct this study given that your study does not disclose participant's identity and poses no risk to the patients.

As principal investigator, you are required to abide by the rules and regulations of the Kingdom of Saudi Arabia and the research policies and procedures of the KSU IRB. If you make any changes to the protocol during the period of this approval, you must submit a revised protocol to the IRB for approval prior to implementing the changes. Please quote the project number shown above in any future correspondence or follow-ups related to this study.

We wish you success in your research and request you to keep the IRB informed about the progress and final outcome of the study in a regular basis. If you have any question, please feel free to contact me.

Thank you!

Sincerely yours,

Dr. Ayman Al-Eyadhy
Chairman, Institutional Review Board
King Saud University College of Medicine
King Saud University Medical City
P.O. Box 7805 Riyadh 11472 K.S.A.
E-mail: aleyadhy@ksu.edu.sa

كلية الطب لجنة أخلاقيات البحوث الطبية
College Medicine Institutional Review Board (IRB)

/rubie

Appendix 15: Tests of Normality

Tests of normality for demographic variables			
	Shapiro-Wilk		
	Statistic	df	Sig.
Age	.955	178	.000
Gender	.632	178	.000
Education	.869	178	.000
Income	.901	178	.000
Marital	.676	178	.000
Children	.846	178	.000
Occupational	.685	178	.000

Tests of normality for medical history			
	Shapiro-Wilk		
	Statistic	df	Sig.
Duration of Low Back Pain	.816	178	.000
Pain intensity	.948	178	.000
Pain interfered with normal daily activities	.963	178	.000
Surgery	.333	178	.000
Number of referral to physiotherapy	.898	178	.000
Number of physiotherapy sessions	.939	178	.000
Frequency of physical activities	.885	178	.000
FABQPA	.947	178	.000
FABQW	.935	178	.000
RMDQ	.968	178	.000

Tests of normality for the 12 domains of physiotherapy belief			
	Shapiro-Wilk		
	Statistic	df	Sig.
Beliefs - Coping with pain	.943	178	.000
Beliefs - Fear of Pain	.954	178	.000
Conflicting Diagnosis	.918	178	.000
Patient Beliefs	.960	178	.000
Conflicting Advice	.969	178	.001
Treatment Compliance	.951	178	.000
Quantity and Complexity of Exercises	.921	178	.000
Gradual Exercises	.909	178	.000
Beliefs - Awareness	.938	178	.000
Communication	.963	178	.000
Guidelines	.900	178	.000
Beliefs - Education	.966	178	.000