BELIEFS ABOUT CHRONIC BACK PAIN AND ITS MANAGEMENT AMONG PATIENTS AND HEALTHCARE PROFESSIONALS IN KUWAIT

BY

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THESIS ABSTRACT

Background: Chronic back pain (CBP) is a multifactorial musculoskeletal problem that affects many people annually. However, due to the lack of back pain-related research in Kuwait, the exact incidence is unknown. It can be caused by physical or psychosocial factors, leading to multidimensional problems, such as psychosocial and economic consequences; therefore, a multidisciplinary approach is required to manage the problem. Cognitive behavioural therapy (CBT) is an effective psychological approach, which aims to change maladaptive beliefs and behaviour in patients with chronic illness. It has been found that CBT is best tailored according to the patient's symptoms, culture and beliefs about their condition. Furthermore, CBT would provide better outcomes when it is interactive and adapts to changes in a patient's day-to-day symptoms, meaning that the content and intensity of the programme could be modified accordingly.

Thesis aim: The aim of the thesis was to investigate the impact of physiotherapists' and patients' beliefs and perceptions about chronic back pain on the illness and its management, as well as the acceptability of cognitive behavioural therapy as a treatment for the CBP. This was approached through four studies: Study One was a systematic review, examining the effect of CBT dose and deliverer of the intervention on the outcomes; study two was a questionnaire study exploring chronic back pain risk factors and predictors in Kuwait; Study Three was a qualitative study exploring the beliefs and perceptions of Kuwaiti chronic back pain patients about their illness; and study four was a qualitative study, exploring physiotherapists' beliefs, knowledge and experience on the management of chronic back pain in Kuwait.

Result: In Kuwait, walking, sedentary life style and current back episode of pain were found to be risk factors for chronic back pain. Moreover, illness perception was found to predict pain intensity, disability and mood (anxiety), whereas the level of insomnia was

found to predict anxiety and disability, which could also be predicted by a coping strategy. Patients' beliefs and cultural norms have a strong impact upon the illness behaviour and coping strategies. Additionally, a therapist's poor communication skills and a patient's unhealthy beliefs were found to reduce the level of adherence. Similarly, a therapist's beliefs and attitudes were found to have a significant impact upon the effectiveness of the management. Physiotherapists in Kuwait acknowledged that a patient's psychosocial factors have a strong impact upon the illness and treatment; however, they were resisting the idea of implementing CBT in physiotherapy treatment.

Conclusion: CBP is a common multifactorial musculoskeletal problem that has psychological, emotional and sociocultural consequences. In Kuwait, CBP is commonly treated with medication and physiotherapy, but studies report only poor to moderate effects for these treatments, with high rates of relapse. CBT is suggested as an option to improve outcomes. It has been shown to be effective for the management of CBP and the co-morbid disability and mood disturbance. Due to the nature of CBP symptoms, CBT programmes must be flexible, adaptive and interactive with patients' symptoms, rather than using a fixed dose and content. Programmes for Kuwaiti patients with CBP must also be sensitive to cultural beliefs and to religion. Kuwaiti patients with CBP have demonstrated awareness of the relationship between their beliefs, emotions and the symptoms; however, they are unaware of CBT or the role of psychological therapies as a treatment option for CBP. Patients also reported poor communication with and negative attitudes from therapists, which discouraged them from adhering to recommendations. Physiotherapists in Kuwait also reported that a patient's beliefs and psychological status might affect the outcomes. However, they are resistant to the idea of implementing CBT for the management of CBP for reasons such as lack of time and high workload. In Kuwait, the lack of activity and poor lifestyle are correlated with the incidence of CBP.

Therefore, a major step towards reducing the prevalence of CBP in Kuwait is to improve the lifestyle by changing health beliefs and associated behaviours. Culturally sensitive CBT programmes are recommended for the management of CBP in Kuwait, with a strong emphasis on the inclusion of religious and spiritual content, especially for the older population. Digital format CBT could be an option for younger patients in Kuwait, many of whom use social media daily.

DEDICATION

MY MOM

MY FATHER

MY FAMILY AND FRIENDS

MY PATIENTS WHO SHARED WITH ME THE EMOTIONS AND EXPEREICNES

TO ANY PERSON WHO TAUGHT ME A LESSON ABOUT THE MEANING OF LIFE

TO MY COUNTRY, KUWAIT

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Chapter 1. Introduction

Pain is defined by the International Association for the Study of Pain (Williams & Craig, 2016) as a stressful and negative emotional experience accompanied by anatomical lesion or injury. The IASP definition requires further elaboration, as the experience of pain is in fact much more multifaceted and the psychosomatic aetiology complex. Pain is a personal experience that cannot be objectively measured and is dependent on the sufferer's own pain threshold and perception of the illness. Instead of considering pain as simple 'nociception', mediated by neuronal transduction of a painful stimulus to the central nervous system (CNS) via the corticospinal pathway, pain should be seen as a complex experience. The complexity of pain sensation involves the interaction of neural messages from different body organs (e.g., back pain and kidney pain), signal modulation in the CNS (e.g., amygdala and anterior cingulate cortex) and the individual's own pain perception.

Pain is a learnt experience that we develop during our early lives (for example, when we fall down or touch a hot cup (Rollman, AbdelShaheed, Gillespie, & Jones, 2004)) and acts as a warning signal from the brain of harm to the body (Moseley & Moseley, 2007). For instance, if someone encounters pain while active (e.g., lifting heavy weights or standing for a long time), it is expected that the person would stop this activity to prevent injury. However, people performing the same pain-inducing activities often report different levels of pain intensity, which are based on their previous individual experiences with pain. People also often report pain in the absence of a detectable anatomical or structural damage, which contradicts the suggestions of researchers that pain can only be brought about by tissue damage (Agüera, Failde, Cervilla, Díaz-Fernández, & Mico, 2010). Both patients and healthcare providers, however, may misinterpret the association between pain and tissue damage (Monie, Fazey, & Singer, 2016); regardless of the cause of pain and the presence of tissue damage, a patient's experience and expression of pain must be taken seriously and clinically addressed.

The physiology of pain

Loeser and Melzack described four components to the experience of pain: nociception, perception of pain, suffering and pain behaviours. The authors also stated that each component is underpinned by anatomical, physiological and psychological components (Loeser & Melzack, 1999). Nociception is the recognition of physical injury by tissue nociceptors connected to A-delta and C fibres (figure 1) – sensory afferent fibres responsible for detecting heat, cold, pressure and pain. These receptors may in turn be activated by local inflammatory processes or neural alterations. Painful stimuli, such as soft tissue lesions, usually lead to the perception of pain. In more severe cases, an injury to the nervous system (e.g., in patients with brain or spinal cord injuries) could also induce pain (Dalyan, Cardenas, & Gerard, 1999; Frisbie & Aguilera, 1990; Leijon & Boivie, 1991).

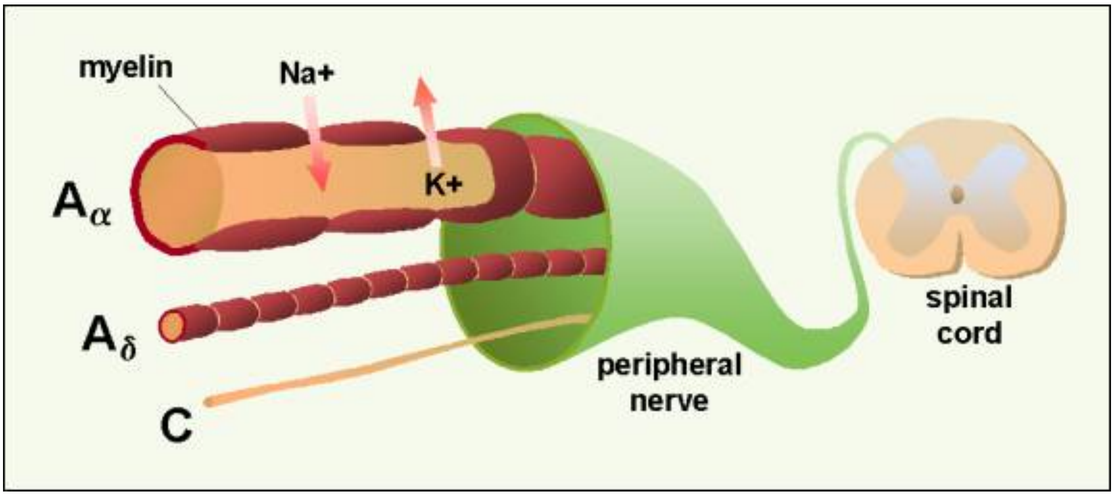

Figure 1: A delta and C nerve fibres

Neurological pain frequently does not respond to non-steroidal anti-inflammatory analgesics, such as ibuprofen, or opioids as effectively as musculoskeletal pain (such as a muscle tear) – demonstrating the complicated association between injury and pain (Kalso, Aldington, & Moore, 2013; Torrance, Smith, Watson, & Bennett, 2007). Research has also showed that the type or extent of injury frequently does not correlate to the intensity of pain in cases of chronic pain (Loeser & Melzack, 1999). For example, a study by Oliveria et al. on chronic shoulder pain found that there is a clear correlation between the damage to the shoulder's anatomy, the pain intensity and the consequent restricted shoulder function (Oliveira, Almeida, Santos, & Nogueira, 2014). Suffering, is a debilitating cognitive reaction to both physical pain and associat4ed psychological or psychosocial factors – such as fear, anxiety, stress and loss of a loved one. Although not all suffering occurs because of pain, in our culture we use the expression of pain to convey suffering. The verbal expression of pain is used to report suffering, regardless of the cause, and may lead to misinterpretation by both the healthcare provider and the patient about the underlying cause of the suffering. For example, people may cry and scream when they suffer from a physical injury (e.g., sudden toe dislocation) or psychological/emotional trauma (e.g., losing a beloved person). This is done to express suffering. Cassell pointed out that '*suffering occurs when the physical or psychological integrity of the person is threatened*' (Cassell, 1982). One recent paper that discussed the concepts of pain and suffering stated that suffering is a natural process for people experiencing pain; however, it becomes harmful when its start to affect the person's quality-of-life and function (Bueno-Gómez, 2017). In context of the latter, pain behaviours are a product of the patient's beliefs about the pain, perception of illness, previous experience of pain and their culture. A patient's belief system has a significant impact on pain chronicity and their daily function (Flor & Turk, 2015; Vlaeyen, Kole-Snijders, Boeren, & Van Eek, 1995). Beliefs that focus on the pain as a threat may have unhealthy consequences, such as refusal to move (to prevent more pain), reduced functionality and low quality-of-life. In turn, this may maintain or increase the duration of the pain (Järemo, Arman, Gerdle, Larsson, & Gottberg, 2017). The perception of illness, is a cognitive reaction that helps the patient cope and understand that the injury or illness is based on multiple factors – such as the patient's emotion, sociocultural beliefs, previous experiences with pain and knowledge of pain obtained from the society (Yasemin, et al., 2017). Past experiences of pain usually shape the individual's response to the present pain and the coping behaviour they chose (Yasemin, et al., 2017). Ossipov et al. reported that a person's interpretation of pain is often affected by the different painful incidents in their life (Ossipov, Dussor, & Porreca, 2010). In a similar manner, sociocultural factors (e.g., the environment, work, family) were reported to also influence the person's beliefs, behaviours, perceptions and emotions – all of which have important implications for their health and pain treatment. Culture influences illness behaviour in a number of ways, including the perception of what is 'normal' and 'abnormal', reflecting on the potential cause of illness and decision-making as to seeking healthcare and the choice of treatment (Peacock & Patel, 2008). A common example of pain behaviour includes saying 'ouch' in the west or 'ayy' in the Middle East, frowning, limping, holding or rubbing the injured site, visiting a doctor or reducing levels of activity. These real-life examples of pain behaviours are likely to be affected by the patient's experience, knowledge and surrounding environment. From the pain behaviours and subjective information provided by the patient, and clinical examination, healthcare practitioners can infer the presence of any pain and suffering (Loeser & Melzack, 1999).

Types of pain

In general, pain can be divided into three types; transient, acute and chronic (Loeser & Melzack, 1999). The activation of pain receptors located in body tissue, such as the skin and muscles, creates transient or temporary pain in the absence of any soft tissue injuries.

Such a pain serves as an alarm system for the body to detect harmful changes or prolonged stress – this could be physical (e.g., prolonged sitting in one position) (Gregory, Dunk, & Callaghan, 2006; Nairn, Azar, & Drake, 2013), or mental (e.g., unsolved family issues) (Munhoz, et al., 2008). Transient pain, therefore, exists to prevent a human from physically and mentally damaging the body (Dray, 1995). This type of pain can occur daily and is rarely a reason to seek medical help. Acute pain, is stimulated by significant tissue damage and the activation of nociceptors in the injured area (Sinatra, 2009). This activates the autonomic nervous system to respond to the pain. Acute injury seldom overwhelms the body's natural healing mechanisms, which does not require medical intervention. Normally, the feeling of pain ceases long before the injured tissue is naturally regenerated or restored. Medical interventions, however, may be useful in some situations, to prevent or reduce pain and accelerate the healing process.

Chronic pain is defined as any pain that lasts for more than 3 months or exceeds the natural recovery time of the injured tissue; this pain commonly negatively impacts the quality-of-life and reduce functionality and level of physical activity (Steglitz, Buscemi, & Ferguson, 2012). In fact, reducing the level of daily activity may result in more physical and psychological damage, as exercise and physical activities promote the release of endorphins that regulate stress hormones (cortisol and adrenalin) (Anderson & Shivakumar, 2015; Balchin, Linde, Blackhurst, Rauch, & Schönbächler, 2016; Classey, Massaud, & Stepp, 2016). When left unmanaged, chronic pain usually leads to mood disturbances (Barbosa, Vieira, & Garcia, 2018), poor cognitive function (Spindler et al., 2018) and negative emotions, such as depression and anxiety (Shuchang et al., 2011). Moreover, research shows that chronic pain has a socioeconomic impact, such as reduced working hours (Wynne-Jones et al., 2014), a negative effect on the sufferer's family (Dueñas, Ojeda, Salazar, Mico, & Failde, 2016) and financial loss to the patient (Phillips, 2009).

Chronic pain is usually provoked by an injury or illness but is maintained other factors (Mercadante, 2015) and can be associated with chronic health disorders, such as osteoarthritis, sciatica or lower back pain. However, there is sometimes no clear injury or underlying disease in cases of chronic pain (Woolf, 2011). Even in the presence of a specific disease, the intensity of the reported pain may not be compatible with the severity of the damaged tissue (Siddall & Cousins, 2004; Turk, Wilson, & Cahana, 2011), the injured tissue could already have healed or the pain may not be linked with tissue damage (Van Wilgen & Keizer, 2012). This is confusing for both patients and clinicians, due to a lack of an association of pain with any anatomical changes (Tyrer, 2006). For patients with chronic pain, this makes it difficult to understand the reasons behind the duration of their symptoms and or determine what interventions to use (Siddall, McCabe, Murray, & Bourne, 2013). Sometimes, the injury may be to significant to be healed by natural body processes – depending on the nature of the damaged tissue, the magnitude of the injury or the involvement of the nervous system (Booth-Kewley, et al., 2014). Moreover, severe injuries may preclude the ability of neuronal and other tissue cells to restore their normal function (Steward, Sridhar, & Meyer, 2012). Chronic pain, however, may also occur in the absence of any injury and, although a frequent cause for seeking medical help, patients sometimes report insufficient treatment and unsatisfactory treatment outcomes (Bekkering, et al., 2011; Breivik, Eisenberg, & O’Brien, 2013; Reid, et al., 2011). Because of the multifactorial nature of chronic illness, other situational contributors, such as daily stress and environmental conditions may exacerbate the pain induced by tissue injury and contribute to the severity and chronicity of the symptoms (Abdallah & Geha, 2017).

As stated by Ramachandran, et al. (1998), pain is an alarm system that tells you there is something wrong with your health; it could be an injury in the soft tissue or a general health problem affecting your body. The perception of pain requires activation of millions of synapses and different neurotransmitter systems in the CNS, all of which occur in milliseconds (Ramachandran, Blakeslee, & Sacks, 1998). It is thought that chronic pain occurs when central and peripheral neurons become hypersensitised and magnify pain transmission in the absence of an active noxious stimulus. Thus, perception of these magnified stimuli by the brain results in the sensation of pain even in the absence of injury (Butler & Moseley, 2013; Hayes, Naylor, & Egger, 2012; Siddall, McCabe, Murray, & Bourne, 2013). Despite the earlier definition of chronic pain as a condition continuing for longer than 3 months and surpassing the body's natural ability to recover (Pedersen, 1981; Von Korff, Ormel, Keefe, & Dworkin, 1992), some studies (Dunn, Jordan, & Croft, 2006; Tamcan, et al., 2010) suggested that the condition is far more complex and its definition requires further elaboration. Dunn et al. (Dunn, et al., 2006) suggested that patients with chronic pain (e.g. in the lower back) may present with four different types of pain expression: persistent mild, severe chronic, recovering or fluctuating. Persistent mild defines stable, low levels of pain; recovering describes initial mild pain that is rapidly alleviated on its own; severe chronic describes permanently high pain; and fluctuating signifies pain that varies between mild and high levels. Patients with all of the above pain presentations also present with psychosocial contributing factors that are similar to those of chronic pain sufferers. In some cases of chronic pain, areas around the healed tissues that were previously injured perpetually signal to the brain to alert of the injury, which results in hyperactivity of the pain areas in the cerebral cortex – a phenomenon called pain neuroplasticity (Butler & Moseley, 2013).

The process of neuroplasticity leads to abnormal neurological responses in the body (pain and neuroplasticity ref the whole article); mainly exacerbation of pain intensity (hyperalgesia) and the sensation of pain even from non-noxious stimuli (allodynia)

(Sandkühler, 2009). In normal situations, both hyperalgesia and allodynia may be evolutionarily useful reactions to enable further protection of injured areas for recovery (SandküHler, 2009). However, if these reactions last beyond the normal recovery period, the CNS may become hypersensitised – a term form which is central sensitisation (Harte, Harris, & Clauw, 2018).

Central sensitisation

In the last few years, the concept of unexplained chronic pain has been investigated intensively. In fact, studies found that the majority of people with chronic musculoskeletal disorders demonstrated some changes in the CNS (Pelletier, Higgins, & Bourbonnais, 2015). In particular, the response of the CNS to different body signals was shown to be exaggerated, leading to sensitisation and generalised hypersensitivity (Latremoliere & Woolf, 2009). This phenomenon is explained by abnormal function of the brain's pain inhibitory mechanisms (Meeus, Nijs, Van De Wauwer, Toeback, & Truijen, 2008) and hyperactivity of the descending and ascending pain facilitatory pathways (Meeus & Nijs, 2007; Staud, Craggs, Robinson, Perlstein, & Price, 2007). Clinically, this manifests in hyperalgesia and allodynia (Jensen & Finnerup, 2014). In addition, central sensitisation involves can lead to abnormal activation of other brain areas (Staud, et al., 2007), such as the insular, anterior cingulate and prefrontal cortices, which are known to be involved in acute pain processing (Seifert & Maihöfner, 2009), and other areas, such as the dorsolateral frontal and parietal associated cortices (Seifert & Maihöfner, 2009); although not responsible for pain processing, these have been shown to be hyperactivated in the brains of patients with central sensitisation. Cognitive emotional sensitisation (Brosschot, 2002) denotes the ability of areas of the frontal brain to regulate nuclei within brainstem, including those of the descending facilitatory pathways (Zusman, 2002). Descending pathway activity, in turn, is inconsistent and can be affected, for example, by the level of attention to the pain and stress (Rygh, Tjølsen, Hole, & Svendsen, 2002).

Chronic pain and medically unexplained pain

Unlike chronic pain, unexplained pain is described as pain that persists either by their character or the negative results of clinical investigation that cannot be attributed to disease (Rosendal, et al., 2017). Chronic back pain and chronic fatigue syndrome are common examples of chronic pain diseases (Creed, et al., 2010; Maher, Underwood, & Buchbinder, 2017), whereas diseases such as irritable bowel syndrome and complex regional pain syndrome fall under the unexplained pain classification (Henningsen, Zipfel, & Herzog, 2007) or are ‘functional symptoms’ (Rosendal, et al., 2017). Nevertheless, researchers have used both terms interchangeably (Nijs, et al., 2011; Williams & Cella, 2012) and this is accepted as both chronic pain and unexplained pain are governed by central sensitisation (Bid, Soni, & Rathod, 2016; Bourke, Langford, & White, 2015; Meeus & Nijs, 2007). Moreover, both diseases lead to a poor quality-of-life and debilitating psychological effects, such as anxiety and depression (Budtz-Lilly, Vestergaard, Fink, Carlsen, & Rosendal, 2015; Burton, Weller, & Sharpe, 2009; Peters, Vlaeyen, & Weber, 2005). according to Rosendal’s classification, unexplained pain is an umbrella concept that includes chronic pain and self-limiting and symptom disorder (Rosendal, et al., 2017). Conversely, Williams and Johnson argued that there is no such thing as unexplained pain as all symptoms must underlie neurophysiological changes or abnormalities, such as central sensitisation (De C Williams & Johnson, 2011). In fact, Creed, et al. proposed that medically unexplained pain in itself is a barrier to improve healthcare outcomes as it offers no insight into the cause, duration, severity or significance of the presenting symptoms (Creed, et al., 2010). This is arguably misleading and unhelpful when applied to patients with chronic pain (Tracey & Bushnell, 2009; Woolf, 2011). Moreover, the term reinforces ‘mind-body dualism’ (Creed, et al., 2010) and may not acknowledge the diverse biological processes often associated with common physical symptoms (Tomenson, et al., 2013) or the interrelationship between psychological, social and physical states (Marks & Hunter, 2015).

Biomedical model

According to Stedman's medical dictionary (Ji, 2006), the biomedical model (figure 2) of pain is a theoretical model that focuses only on the biological elements of the illness and ignores the psychosocial factors. This 'medical illness model' (Wade & Halligan, 2004b) has been one of the predominant models used among healthcare practitioners to evaluate and manage chronic illness. This model assumes that, for each illness, there is anatomical damage that directly induces the pain experience.

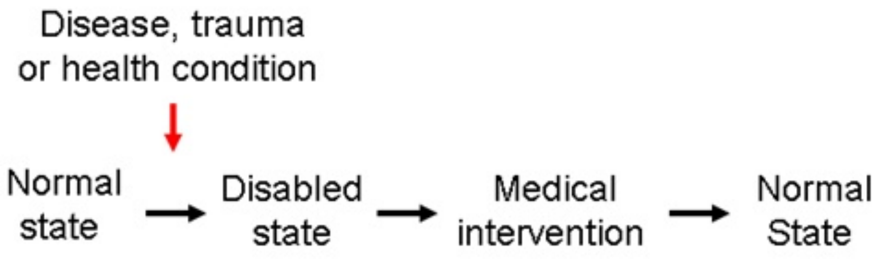

Figure 2: The Biomedical Model of Pain

Wade stated that this model is dominated by three main hypotheses: each pain is caused by a single factor; all painful experience is a direct result of a physical problem; and the ability to treat the single of pain will diminish the pain (Wade & Halligan, 2004a). However, numerous studies have since proved these premises to be wrong (Adams, 2004; Osborn & Smith, 2015; Turk & Okifuji, 2002; Wideman, et al., 2013) and achieving a universally accepted definition of pain via a biomedical model remains a challenge (Shah & Mountain, 2007).

Clearly, the biomedical model of pain is insufficient to explain or predict other common types of pain, such as pain in the absence of injury. Carson, et al. reported that more than 20% of patients visiting hospitals with chronic pain do not present with co-morbid illnesses that could be linked to their symptoms (Carson, et al., 2000) and over 5% of patients admitted to hospital have such issues (Parry, Murray, Hart, & Bass, 2006). This group of disorders is generally termed chronic pain syndrome and includes diseases such as fibromyalgia, complex regional pain syndrome, CBP, irritable bowel syndrome and chronic fatigue syndrome. The biomedical model of illness fails to provide explanations for these illnesses. Evidently, non-medical factors, such as social and culture-related factors, could affect the extent of the symptoms and the subject's ability to cope with the treatment.

Biopsychosocial model

In the early 80s, George Engel (Engel, 1981) introduced the biopsychosocial model (BPS) of illness (figure 3), which proposed that patient symptoms result from an interaction of psychological (beliefs, attitudes, emotions), social (family support, cultural norms) and pathophysiologic (physical disability, neurological conditions) factors (Engel, 1977). Borrell-Carrio and his colleagues later defined Engel's model as a philosophical model that explains how the above different elements could affect illness and pain (Borrell-Carrió, Suchman, & Epstein, 2004).

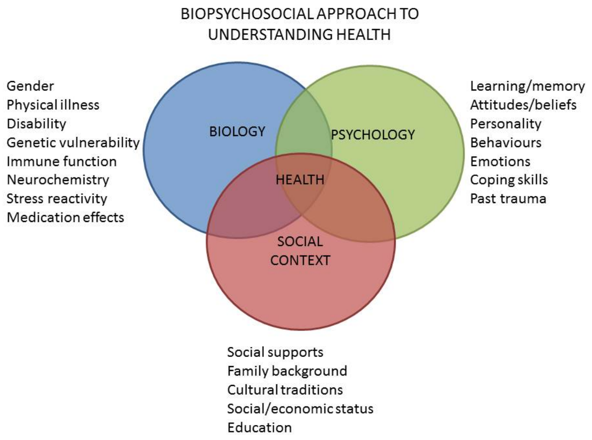

Figure 3: The Biopsychosocial Model of Pain

In many national clinical guidelines for the management of CBP, such as NICE (National Institute for Clinical Excellence, 2009), these elements were reflected in the flags system. The clinical flags system is a medical classification of health barriers to wellbeing: red flags represent pathophysiologic disorders; yellow flags as potential indicators of psychosocial distress; and blue and black flags represents societal organisation and daily life (Main, Sullivan, & Watson, 2008; Shaw, Van Der Windt, Main, Loisel, & Linton, 2009). The healthcare provider indicates the flag to which a patient's symptoms belongs so that other healthcare providers would take the appropriate action when managing the same patient. This model of illness provides a structure to understand how the patient's perception and beliefs could be involved, to provide accurate diagnosis, better outcomes and good quality care (Borrell-Carrió, et al., 2004). In particular, the BPS model acknowledges the complexity of the mind-body-spirit triangle and the central principles of patient-centred care, including compassion, empathy and consideration of the patients' suffering.

An overview on the spine

The spinal column comprises 33 individual bones, placed one on top of the other.

Ligaments and muscles are attached to the bones to keep them together and aligned. The spine provides the main support for the body, allowing the human body to stand upright, bend and twist. The spinal cord, is comprised of fragile neural tracts connecting the brain to the body and limbs and is protected inside the vertebral column. A healthy spine is surrounded by functional muscles, strong bones, flexible tendons and ligaments and active nerves. From the lateral view, an adult spine has a natural S-shaped curve. The neck (cervical) and lower back (lumbar) regions have a small concave curve, while the thoracic and sacral regions are slightly convex (Figure 4).

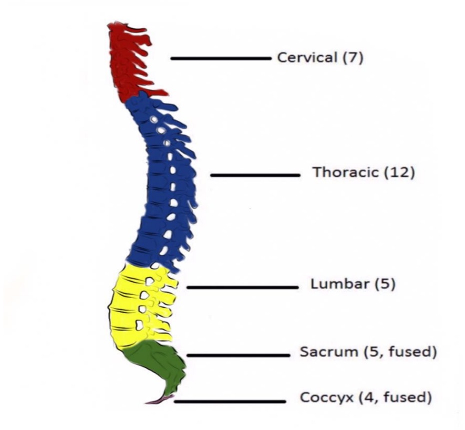

Figure 1: The Spinal Column

The main functions of these curves are to absorb sudden shock to the body, maintain balance and to facilitate natural spinal mobility. Good posture requires regular training (e.g., yoga, weight training and task-oriented activities), correct lifting techniques and healthy posture when standing, sitting or lying (Robbins, Johnson, & Cunliffe, 2009).

In the human body, movements can occur at joint surfaces, between bones and between bones and attached muscles, enabling purposeful

and coordinated limb movements. Movements are usually initiated at the joints following CNS input to the neuromuscular junctions. Logically, therefore, to improve function, individuals must ensure that their joints and muscles are capable of their full range of movement. Physiotherapists are often taught anatomy and biomechanics in a traditional format, whereby, for example, the cervical spine is studied separately from the thoracic spine, which, in turn, is studied separately from the shoulder. Whilst it is important to fully grasp each anatomical region and structure on its own, learning clinical and functional anatomy is crucial in developing an understanding in how these anatomical structures interact functionally – a necessity for positive treatment outcomes.

Chronic back pain

Rozenberg defined CBP as pain in the back that lasts more than 3 months (Rozenberg, 2008), while Patrick, et al. stated that CBP must last more than 6 months to be considered chronic (Patrick, Emanski, & Knaub, 2016). Evidently, there is no clear definition of ‘chronic’ or an clear explanation as to the inconsistency in the proposed pain durations; nevertheless, chronic pain studies tend to describe any pain that lasts more than 3 months. Merskey and Bogduk (Merskey & Bogduk, 1994b) regarded pain as chronic if it lasts for (or recurs during) 3 to 6 months, whereas Fishman argued that any pain persisting past the body’s normal healing time should be regarded as chronic (Fishman, 2012). In the context of back pain, studies have not been clear as to the specific areas of the back the condition constitutes; thus, these pain studies have been mainly divided into lower back pain and neck pain (Licciardone, Minotti, Gatchel, Kearns, & Singh, 2013; Mccaskey, Schuster-Amft, Wirth, Suica, & De Bruin, 2014; O’sullivan, Phyty, Twomey, & Allison, 1997; Tunwattanapong, Kongkasuwan, & Kuptniratsaikul, 2016). However, the treated posterior area remains vague and varies in different studies. For example, Natour, et al. investigated the effect of Pilates training on pain, daily function and quality-of-life in patients reporting lower back pain; the study clearly stated that lower back pain meant any pain felt from the rib cage down, including the lumbar spine (Natour, Cazotti, Ribeiro, Baptista, & Jones, 2015; Tunwattanapong, et al., 2016). In contrast, Licciardone and collegues studied the effect of osteopathic manual therapy on lower back pain, but did not clarify whether they focussed on only lumbar, lumbar and pelvic or general back pain. Natour, et al. study (Licciardone, Minotti, et al., 2013). Similarly, most of the studies on cervical pain do not specify the area if treatnebt. Tunwattanapong, et al. reported a positive effect of neck and shoulder stretching exercises on neck pain; however, the study sample included patients with pain in the neck, and the thoracic back and shoulder (Tunwattanapong, et al., 2016). Maiers, et al., studied the effect of manipulation and exercises on chronic neck pain but did not specify the exact anatomical area they targeted (Maiers, et al., 2014). Therefore, it is evident that in most studies the terms 'neck pain' and 'back pain' do not describe a specific area, instead often including multiple regions of the body.

Chronic back pain (CBP) is a widespread problem with a prevalence of 49-80% (Maniadakis & Gray, 2000), with 2% to 7% of patients transferring to chronic symptoms (Burton, 2005), and one of the most common musculoskeletal disorders that frequently leads to work absenteeism, functional disability and socioeconomic problems (Adams, 2004). CBP has a multidimensional negative impact on sufferers' lives, including an inability to work or perform social activities, problems in relationships and impairment of mental and phys8ical health (Polatin, Kinnedy, Gatchel, Lillo, & Mayer, 1993). Economically, CBP is estimated to cost the UK economy more than £10000 million each year through direct healthcare costs, benefit payments and loss of productivity (Hoy, et al., 2014b; Maniadakis & Gray, 2000). CBP sufferers are a highly heterogenic population, which complicates a universal classification of the condition. That being said, epidemiological studies pointed to both physical and psychological factors as having a crucial impact on the occurrence of CBP. Statistics show that 80% of people globally experience at least one episode of back pain at some point in their lives and approximately

18% of the population has back pain at any given time (Andersson, 1999; Mooney, 1987). According to the US National Centre for Health Statistics reports, more than 10% of patients presenting at hospitals daily in the US complain of back pain, a total of 13 million people. About 3% of discharged patients present with back pain. The cost of CBP management exceeds \$100 billion per annum in the US (Dagenais, Caro, & Haldeman, 2008). Abnormal mechanical loading, such as from using poor lifting techniques, is a known risk factor for acute disc disease (Kelsey, et al., 1984) and for general back pain (Marras, et al., 1993). However, there is growing evidence that back pain is multifactorial and affects the mind and the body (Adams, 2004). A key goal for healthcare providers is to better understand the biomechanical changes in the spine during pain and identify the common unhealthy habits or practices contributing to pain to optimise an effective and patient-specific treatment for pain.

Causes of back pain

It is impossible to attribute CBP to a single cause (Adams, 2004), as the condition appears to involve an interaction of physical (e.g., bending or twisting), pathological (e.g., a herniated disc), biological (e.g., age-related degeneration), psychological (e.g., anxiety) and social (e.g., heavy workload and lack of support) factors. Multiple studies reported that abnormal physical loading (i.e., prolonged bending or lifting whilst twisting the spine) can damage the soft tissues around the spine and vertebral disc, causing pain in the spine (Adams, et al., 2007; Adams, et al., 2000). Pathological problems in spinal structures, such as a herniated discs or spondylolisthesis can also disrupt the normal mechanics of the spine, leading to a pattern of abnormal movements that eventually results in pain (Adams, 2004; Adams, et al., 2007). Damage to the intervertebral disc or vertebral endplate stimulates pain receptors and nerve endings at the site of the injury, leading to severe pain in the back (Bogduk, 2005; Groen, Baljet, & Drukker, 1990). A group of studies reported that the ‘wear and tear’ phenomenon (i.e., natural damage to body structures due to overuse) to the spine is common in the elderly, reduces the mobility and function of spinal structures and aggravates back pain (Adams, McMillan, Green, & Dolan, 1996; Antoniou, et al., 1996; Pollintine, Przybyla, Dolan, & Adams, 2004). Psychosocial factors could also contribute pain through the sufferer’s illness perception, which is defined as the attention, interpretation and behaviour in response to illness-related information (Petersen, Van Den Berg, Janssens, & Van Den Bergh, 2011); thus, understanding coping behaviours in response to pain illness is key in managing chronic illness and pain (Linton, 2005). Furthermore, Montoya, et al. found that lack of social support, and the resulting emotional stress and anxiety, further augments pain signals to the brain (Montoya, Larbig, Braun, Preissl, & Birbaumer, 2004). A recent systematic review by Lee, et al. showed that factors such as psychological distress (e.g., anxiety and depression) and low self-efficacy exacerbate the experience of pain and increase the risk of disability in patients (Lee, et al., 2015).

Conservative/non-chemical management

Different CBP guidelines, including European and NICE guidelines, recommend exercise, manual therapy, acupuncture and cognitive behavioural therapy for management pain (Koes, et al., 2010). In the following sections, each treatment option will be briefly described.

1.1.1 Exercises for back pain

The objective of therapeutic physical exercises is improving the function of muscles and mobilisation of the joints to overall optimise the wellbeing of the individual (Lisier, Perez, & Sakata, 2012). Guidelines state that CBP patients should maintain an active lifestyle and provides them with exercise programmes for the home or gym (Nice, 2009). Therapeutic exercises are found to be moderately effective for reducing disability levels, improving daily function and increasing pain tolerance in CBP, according to multiple studies (Hayden, Van Tulder, Malmivaara, & Koes, 2005b; Van Middelkoop, et al., 2011). Tailoring and individualising the exercise programme to patients with regular therapist-led follow-up appointments has been found to improve treatment outcomes (Hayden, Van Tulder, & Tomlinson, 2005). Importantly, the outcomes of therapeutic exercise are improved if programmes are well-adhered to (World Health Organisation, 2010). Therefore, it is worth exploring factors influencing the rates of adherence to a recommended exercise programme. Higher adherence has been linked to improved treatment outcomes (e.g., muscle power, increased range of motion of the joints) (Di Fabio, Mackey, & Holte, 1995). Nevertheless, it has been reported that between 50% (Friedrich, Gittler, Halberstadt, Cermak, & Heiller, 1998) and 70% (Härkäpää, Järvikoski, Mellin, Hurri, & Luoma, 1991) of patients with CBP do not adhere well to prescribed home exercises. Exercise therapy for CBP encompasses diverse formats; they can be done individually or in a group with patients exhibiting similar symptoms, under the supervision of a physiotherapist or specialised trainer, at home or outdoors (Bronfort, et al., 2011; Carr, et al., 2005). The exercises can use own body weight, training bands, exercise machines, the pool or any other tools helpful for achieving the treatment plan. Patients are encouraged to choose from a wide array of exercise types, including aerobic, anaerobic, stretching, stabilisation, balance and coordination, when designing a programme (Hayden, Van Tulder, & Tomlinson, 2005; Johnson, 2012; Rainville, et al., 2004; Richardson, Hodges, & Hides, 2004; Van Tulder, Malmivaara, Esmail, & Koes, 2000). For muscle strengthening exercises, therapists may focus on spine stabilising muscle groups, such as the multifidus or the transversus abdominis, and may vary the intensity, frequency and duration of exercises (Lisier, et al., 2012). That being said, according to multiple studies, therapeutic exercise for chronic pain has only had a moderate effect (lasting up to 6 months) on pain intensity and functioning (Gladkowski, Medley, Nelson, Price, & Harvey, 2014; Keller, Hayden, Bombardier, & Van Tulder, 2007). However, with consideration of specific functions relevant to the patients (e.g., muscle power, flexibility, endurance), healthcare providers should be able to create an exercise programme that will help CBP patients achieve optimal outcomes (Keller & Richey, 2006). Furthermore, according to a review by Hayden, et al. (2005), therapeutic exercises that are tailored to each patient's clinical requirements and delivered with professional supervision may improve pain and function in CBP and increase adherence rates (Hayden, Van Tulder, Malmivaara, & Koes, 2005a).

1.1.2 Manual therapy and back pain

Spinal manual therapy (SMT), frequently used for both acute and CBP, has been evaluated in multiple randomised controlled trials (RCTs) (Bronfort, Haas, Evans, & Bouter, 2004; Brox, Hagen, Juel, & Storheim, 1999; Cherkin, Sherman, Deyo, & Shekelle, 2003), which are important in informing future clinical guidelines or the efficacy of current clinical practice (Airaksinen, et al., 2006; Chou & Huffman, 2007; Manchikanti, Staats, et al., 2003). Remarkably, these guidelines largely rely on the earlier version of the Cochrane review (Assendelft, Morton, Yu, Suttorp, & Shekelle, 2004). According to that review, SMT showed a moderately improved effect compared to sham manipulation and this effect lasted for only a short period of time. Furthermore, SMT did not show any improvement compared to standard therapies (e.g., general practitioner-led care, analgesics, exercise or back schools) in reducing acute or chronic pain or improving function in the short- and the long-term. SMT is described as any therapy that uses the hands only and includes manipulation or mobilisation (or both) of the vertebral column and the surrounding soft tissues (Maitland, 2013). Mobilisation is a passive and slow technique that uses wide oscillatory movements to improve a patient's joint range of motion and control. Manipulation, in contrast, uses fast but narrower manoeuvres applied to facet joints at the end of passive motion, which often leads to an audible 'crack' (Sandoz, 1969). The cracking sound is called 'cavitation' and occurs when bubbles form within the synovial fluid (Evans, 2002). Healthcare providers, such as chiropractors, manual therapists (physiotherapists trained in hands-on techniques), orthomanual therapists (medical doctors trained in manual therapy) and osteopaths, often practice SMT (French, Brennan, White, & Cusack, 2011; Licciardone, Kearns, & Minotti, 2013; Meeker & Haldeman, 2002). However, the aim of the intervention, the underlying principles, educational approach, assessment tools, treatment objectives and techniques used often vary. For example, the aim of orthomanual therapy is to re-align the spine and establish symmetry in the spine through SMT (Van De Veen, et al., 2005). Manual therapists, focus on correcting functional problems related to the musculoskeletal system through passive mobilisation and manipulation techniques. Chiropractors, in turn, focuses on correcting disorders of the neuromusculoskeletal system, mainly via manipulative and cavitation techniques (Rubinstein, Terwee, Assendelft, De Boer, & Van Tulder, 2013). Based on the school of manual therapy, treatment should focus on the soft tissue, the facet joints or integrating tissues of both.

1.1.3 Acupuncture for back pain

Numerous international lines of evidence support the use of needling and acupuncture as a complementary therapy for people with CBP (Yuan, et al., 2008) and it is one of three main interventions (along with manual therapy and supervised exercise) recommended for CBP by NICE (National, 2016). However, due to a lack of high-quality evidence, the effectiveness of acupuncture remains debatable and many still believe that it works as a placebo (Di Cesare, et al., 2011). A high-quality Cochrane review of 35 trials, conducted by Ezzo et al., evaluated the effectiveness of acupuncture and dry needling for the management of chronic myofascial lower back pain; this was compared to wait-listing, sham therapies and a combination of needling with other conservative therapies. The authors found that patients who received needling (alone or combined with other therapies) reported less pain and better daily function compared to wait-list and sham therapies (Ezzo, et al., 2000). However, acupuncture and dry needling did not achieve significant improvements compared to conservative interventions and alternative medicine. The study recommended that acupuncture and dry needling are mostly effective when combined with other CBP conservative therapies (such as exercise and manual therapy) to relieve pain and improve function. Leung concluded that needling could be beneficial for managing CBP when used as a secondary therapy to other conservative treatments (Leung, 2015).

1.1.4 Cognitive behavioural therapy and back pain

Cognitive behavioural therapy (CBT) is an active psychotherapy (Roth & Fonagy, 2006) that involves cognitive (i.e., exploring and targeting illness-related beliefs) and behavioural (i.e., how the patients respond to the illness) approaches derived from psychological models of normal and abnormal behaviours and socioemotional psychopathy. CBT aims for the therapist and patient to understand the impact of a patient's behaviours, beliefs and thoughts on the illness and the treatment outcomes. A valuable intervention, CBT improves health outcomes by modifying unwanted behaviours and beliefs, helping reduce risk factors and encouraging positive coping strategies (Hansen, Daykin, & Lamb, 2010). This approach was labelled active because it involves regular identification of any cognitive and behavioural changes in a patient that affect their health. Moreover, CBT encourages practical actions to solve issues, such as setting planning and meditation (Lipsey & Landenberger, 2007). Recently, CBT has been introduced as a major intervention for the management of chronic illness, including CBP and cancer. For CBP patients, CBT aims to control pain and the co-morbid mood changes as a means to improve overall patient function; by guiding patients to replace unhealthy behaviours, CBT increases positive health-related attitudes, identifies and correct maladaptive thoughts and beliefs and promotes self-efficacy in pain management (Turner & Romano, 2001). CBT has been shown to be effective for the management of emotional distress, anxiety and insomnia – all of which are associated with chronic pain (Alsaadi, McCauley, Hush, & Maher, 2011; Demyttenaere, et al., 2007; Gore, Sadosky, Stacey, Tai, & Leslie, 2012; Tsang, et al., 2008).

Hoffman et al. published a meta-analysis of RCTs on psychological treatments for CBP and found that psychological interventions had a positive impact on pain, disability, quality-of-life and depression when compared to waiting lists, conventional treatment and medication (Hoffman, Papas, Chatkoff, & Kerns, 2007). That being said, a recent Cochrane review of behavioural treatments (including CBT) for CBP found that behavioural therapy has only a short-term effect on pain and disability compared to control treatments (Henschke, et al., 2010b). Moreover, both the CBT group and the exercise group had similar effects on pain and co-morbid depression in the moderate to long term. Astoundingly, evaluation of the quality of the reviewed studies using the GRADE assessment revealed that most were of poor quality, with no high-quality studies available for comparison. Furthermore, the lack of standardised outcome measures significantly restricted the ability to compare findings across studies. However, a recent study by Hayes, et al. (2014) stated that use of active CBT for the management of CBP has a positive effect on measures related to patient function and ability to work – such as fatigue, avoidance and catastrophising behaviours (Hayes, et al., 2014). CBT could also improve the effectiveness of coping strategies in CBP by accelerating positive neuroplasticity (Shpaner, et al., 2014).

Chronic back pain in Kuwait

Similar to other nations in the world, chronic pain and CBP is common in Kuwait; the Physical Medicine and Rehabilitation Hospital, one of the largest government hospitals in Kuwait, sees over14,000 patients visit the physiotherapy department for treatment of back pain every year.

However, due to lack of research and statistical data, there is no formal analysis of the extent to which CBP is an issue in the country.

In the State of Kuwait, the prevalence of musculoskeletal (MSK) pain ranges from 36% in women to 20% in men (Al-Awadhi, et al., 2004) and also 48% of physiotherapists complain of these symptoms (Al-Rowayeh, et al., 2010). Thus, MSK disorders represent a major health problem amongst Kuwaitis (Al-Awadhi, et al., 2004). According to the global burden of disease, injury and risk factors for young people's health systematic analysis, CBP (low back pain and neck pain) is the leading source of disability in young adults in the Middle East (Stanaway, et al., 2016). Moreover, according to a group of studies, 25% to 50% of Middle Eastern adults complained of chronic MSK pain (Elzahaf, Tashani, & Johnson, 2013; Tsang, et al., 2008), which falls within the global percentage that was previously reported by Maniadakis and Gray (Maniadakis & Gray, 2000). In addition, a study conducted by Hassan, et al. found that 41% of Saudi Arabia's population complains of CBP (Hassan, et al., 2004). As stated by a recent report by WHO, Kuwait's health currently costs more than 1.5 million dollars per capita, with chronic MSK diseases affecting more than 50% of the population annually (World Health Organisation, 2010). However, Kuwait currently lacks research in CBP, with only four relevant studies published to date: two involved adult patients (Al-Obaidi, Al-Zoabi, Al-Shuwaie, Al-Zaabie, & Nelson, 2003; Al-Obaidi, Nelson, Al-Awadhi, & Al-Shuwaie, 2000); one involved school students (Shehab & Al-Jarallah, 2005); and one involved physiotherapist

(Landry, Raman, Sulway, Golightly, & Hamdan, 2008; Shehab, Al-Jarallah, Moussa, & Adham, 2003). In the studies by Al-Obaidi, et al. (2000 and 2003), it was reported that beliefs relating to avoidance (e.g., believing that lifting would hurt the back or that it is necessity to stay in bed if experiencing back pain) and pain anticipation were strong predictors of back pain chronicity and played an important role in restricting patients' physical capacity. Furthermore, because the experience of pain involves emotional and psychological changes and limitations in physical abilities (as mentioned), it was suggested that pain sensation measures are insufficient to accurately assess CBP. There was also a strong emphasis on the importance of including multidimensional measures, such as psycho-emotional measures and disability measures in the assessment of CBP (Baron, Förster, & Binder, 2012; Karayannis, Jull, & Hodges, 2012a). According to Shehab, et al. (2003), physiotherapists in Kuwait hospitals are highly vulnerable to developing back pain due to the strenuous demands of their job (i.e., lifting patients and helping them to walk) and occupational stress. High job demands could create more workload and mental exhaustion (Hartvigsen, Lings, Leboeuf-Yde, & Bakketeig, 2004), which may in turn lead to financial loss and physical injury to staff. Shehab, et al. (2005) reported that the risk factors for back pain in Kuwaiti schoolchildren and adolescents were age, female gender, strenuous physical activity and television. While the above study did not offer an explanation for the above factors, data from previous studies could be used to fill this gap in knowledge. Schneide, et al. reported that females generally lead a sedentary lifestyle that is more stressful and emotional in nature and they often exhibit higher obesity rates; therefore, females are more vulnerable to CBP than males (Schneider, Randoll, & Buchner, 2006). Similarly, Tissot et al. reported that people who are more sedentary are more susceptible to lower back injuries due to the continuous load on the soft tissue around the lumbar spine and pelvic joints (Tissot, Messing, & Stock, 2009). Back pain is also a common problem in ageing patients, due to the wear and tear of the joints; however, most aged patients are shown to remain functional, despite the pain (Rudy, Weiner, Lieber, Slaboda, & Boston, 2007). That being said, the aged participants in the above study were probably much older than the participants in the Shehab, et al. (2005) study; therefore, further investigations are required to understand the suggested risk factors.

Kuwait is a small country (17,820 km^2) where almost 99% of Kuwaitis follow the Islamic religion; however, there is also a minority of Christian Kuwaitis (The Public Authority of Civil Information Kuwait, 2016). People in Kuwait are strongly attached to their cultural beliefs and norms and Islamic rules in particular significantly impact people's behaviour and decisions. As previously discussed, there is a strong sociocultural component to a patient's specific experience of pain (Montes-Sandoval, 1999). Indeed, it is recommended that clinicians and therapists should consider the patient's cultural and religious beliefs when designing the treatment plan and, moreover, to encourage the patients to use cultural and religious-based coping strategies to handle psychological stress (Casas, 1988; Koenig, 2013). A qualitative study by Igwesi-Chidobe and colleagues exploring non-specific CBP in rural Nigeria reported a strong sociocultural component to the problem. The study found that people's cultural beliefs about the causes of their pain and appropriate treatment, their lifestyle, work demands, and even their healthcare providers' stance on CBP, have a strong impact on the patients' method of managing the problem. The investigators recommended that clinicians should provide a treatment based on the biopsychosocial model of health, focusing on changing maladaptive beliefs and behaviours with particular consideration to patient's culture and illness perceptions (Igwesi-Chidobe, Kitchen, Sorinola, & Godfrey, 2016). According to Sjolund and Wittink, 'culture' could involve any behaviour, beliefs, attitudes, values or knowledge learned from society or a group of people in the society (Sjolund & Wittink, 2007).

In Arab and Muslim countries, spirituality and religion shape the beliefs and practices associated with chronic illnesses (M Sweileh, et al., 2012). Religion is central to the Arab self-concept and has been found to promote emotional health in time of crisis or disease. According to Islam, both health and illness are caused by Allah (Al-Krenawi & Graham, 1999) and devout Muslims must, therefore, accept their fate with strong faith, courage and great patience. Anger, for instance, is not an inappropriate response (Ali, 1995). Moreover, it was found that Muslim patients with chronic illnesses not only employed more religious defensive mechanisms than Western patients, but also believed the outcome of treatment (good or bad) to be the will of Allah – thereby minimising anxiety and improving treatment adherence (Amr, Amin, & Hablas, 2010). Overall, few studies have discussed the relationship between religion and health in Kuwait; however, those that have. have concentrated on psychological concepts. Some studies discussed the association between religion and death-related anxiety, obsession and distress (Abdel-Khalek & Lester, 2009; Abdel-Khalek, 2002; Abdel-Khalek & Maltby, 2008). Among Kuwaiti college students, no relationship was found between death anxiety and the religious motivation scale, self-rating of religiosity and strength of religious beliefs (Abdel-Khalek & Lester, 2009). Other studies on adolescents used self-rating and motivation scales to show a significant negative correlation between anxiety and degree of religion (Abdel-Khalek, 2002; Baroun, 2006). A group of studies also discussed the relationship between religion, physical and mental health, concluding that the middle-aged population consider religion an important element to Kuwaiti life (Abdel-Khalek & Maltby, 2008). The same was true for adolescents. There was a correlation between religious motivation and physical health, mental health, happiness and overall life satisfaction (Baroun, 2006). Religion was also found to be related to happiness and health in other studies including two different sample groups; undergraduate students (Abdel-Khalek, 2006) and secondary school students (Abdel-

Khalek & Naceur, 2007). In examining a relationship between religion and hypertension in a selected Kuwaiti sample, Al-Kandari (2003) found that religious commitment and religious activities have an effect on systolic and diastolic blood pressure (Al-Kandari, 2003). Being involved in Islamic organisations and engaging in religious activities were also found to be major contributors to health. Religiosity was shown to provide more security and social support, which are ibn direct relationship with people's health (Al-Kandari, 2011). A study by Maki, et al. reported that patients with backpain in Bahrain go through similar experiences and have comparable expectations of the healthcare system to patients from Western cultures. However, religious coping (e.g. religious expressions, adopting comfortable prayer positions) are not common in the West. Moreover, understanding culture-specific social relationships could inform clinicians on how to advise patients with pacing activities of daily living to communicate their pain experience and delegate home or work responsibilities. Maki suggested that addressing individual culture-specific psychological and social factors in clinical settings should promote the involvement of patients in their own treatment in Bahrain, the Middle East and in the Arab and Muslim communities in the UK (Maki, Critchley, Watson, & Lempp, 2015). Another group of studies conducted in Kuwait and Malaysia found similar results: people who are more religious suffer less from hypertension (Al-Kandari, 2003; Momtaz, Hamid, & Yahaya, 2009). A study conducted in Saudi Arabia on women with CBP (Al-Eisa, 2010) found that cultural and social factors play a crucial role in this condition and that addressing them is key to improving the adherence rate and outcomes. Cross et al. suggested that to satisfy the needs of patients from diverse cultural backgrounds, it is essential that physical therapy education and practice become 'culturally proficient' – i.e. whereby healthcare providers recognise the need to conduct research, disseminate results and develop new approaches to address cultural requirements (Cross, 1989). For example, a study by Ali and May on Egypt participants reported that receiving treatment from a therapist of the opposite gender was uncomfortable for many (Ali & May, 2015). From the participants' viewpoint, this is likely related to the conservative traditions of Middle Eastern societies that frown on casual relationships between opposite genders outside of the family environment (Kulwicki, 2003).

Culture can confer how pain is perceived and responded to; for instance, males are taught to tolerate pain, which can result in them underestimating illness and not going to the hospital when needed. (Sjolund & Wittink, 2007). Religiosity and spirituality are also well known to influence illness perception and associated behaviours (Wachholtz, Pearce, & Koenig, 2007). For example, many Muslims believe that pain is a gift from God to 'purify' their soul of past sins, for which reason many Muslim's patients are willing to accept illness and suffering rather than seek medical help. Kuwaiti culture can often interfere with an individual's health by placing emphasis on the importance of a 'traditional therapist' who uses herbs and primitive tools to treat different illnesses, including back pain. People who still believe in traditional medicine may ignore a health provider's advice and adhere to therapies prescribed by traditional therapists, thereby risking worsening their symptoms.

Valiee, et al. stated that life is sacred for Muslims as they believe that God is the beginning and life is an eternal destiny and an opportunity for spiritual refinement (Valiee, Negarandeh, & Dehghan Nayeri, 2012). Consequently, Muslims perceive illness and pain as a test of a person's loyalty to God and an opportunity to redeem themselves for their sins of the past (Khan & Hilaali, 1999). Most Muslims respond to pain with patience and acceptance as it represents an opportunity to spiritually connect with God (Ebrahim, 2001; Sachedina, 2005). Muslims also believe that no one (not even doctors) can heal illness, except for God (Wehbe-Alamah, 2008), and that death occurs at God's will (Sachedina, 2005). In turn, helping and caring for others is viewed as one of the major obligations in

Islam, and the care-provider is told they will be rewarded by God (Wehbe-Alamah, 2008). In Islam, the body, soul and spirit are mutually vital and a person’s mental health is connected to their overall health (Ubale & Abdullah, 2015). The religious values and beliefs of Muslims, therefore, strongly influence their behaviour and practice, also shaping their perception of health and illness and determining whether they seek healthcare (Rahman, 1989).

In many cases, patients with chronic illnesses use religious and spiritual practices to cope with pain (Keefe & Dolan, 1986), but studies have reported conflicting results on the relationship between religion, spirituality and pain and some report that religion and spirituality are associated with higher pain intensity (Rippentrop, 2005) while others suggested a lowering of pain intensity (Harrison, et al., 2005) or no effect on pain severity, distress and daily life (Abraído-Lanza, Vasquez, & Echeverría, 2004; Rippentrop, 2005). These variations in findings could be explained by use of different methodologies, in particular: 1) differences in the recruited participants with respect to ethnicity, beliefs and illness perception; 2) differences in the outcome measures used to assess religiosity and spirituality; and 3) different religious coping strategies (active or passive). Multiple studies involved a cross-sectional design, which precludes the measurement of pain intensity changes and religious involvement over time. The potential effect of religion and spirituality as coping strategies in the care of chronic illness remains controversial and additional research is required (Rosenberg, et al., 2008). Glover-Graff, et al. (2007) point to prayer being the most common coping behaviour to handle pain after medication, as it was reported by patients visiting pain clinics. Dunn and Horgas (2004) showed that using religion as a coping strategy was common in older adults experiencing chronic pain. In older patients with arthritis, McCauley, et al (2008) stated that 80% of patients with chronic illness in the United States frequently revert to their religion or spirituality for pain relief.

Healthcare providers must provide a high standard of service that is acceptable to patients, is feasible and is cost-efficient. Kamper, et al. (2014b) reported that a treatment programme for CBP should be based on a multidisciplinary approach that contains a combination of different interventions to mitigate CBP symptoms. However, because of the short term effect of most of the available multidisciplinary approaches, the decision to implement a multidisciplinary approach should be balanced against the availability of time and resources. In spite of that, cultural adaptation and understanding the cultural and religious effect remain under-researched areas (Rathod, et al., 2008), especially in the Middle East.

In Kuwait, CBP is commonly treated with electrotherapy and therapeutic exercises that are either performed within the session or at home during the rehabilitation period and as long-term preventive measures. Other conservative managements such as manual therapy are rarely used due to the lack of skills and training within the healthcare workforce. Dry needling was introduced in early 2015 for physiotherapists in Kuwait. However, in spite of the recommendation by National Treatment Guidelines in the US and UK (American Psychiatric Association, 1993; National Institute for Clinical Excellence, 2009), CBT is underused and unknown by most physiotherapists in Kuwait, again due to lack of resources and skills. Williams, et al. (2012b) stated that there is strong evidence for the use of CBT for the management of CBP; however, further research is needed to identify the optimal dose, frequency of sessions and effectiveness of post-treatment refreshing sessions. In spite of CBT having established its efficacy for the alleviation of back pain (Hoffman, et al., 2007; Kerns, Sellinger, & Goodin, 2011), inconsistencies in the reported results exist (Huey Jr & Polo, 2008). One main reason would be that there is no standard CBT protocol; CBT based studies and the CBT used in clinical practice vary greatly in the number of sessions and used strategies within CBT programmes (Ehde, Dillworth, & Turner, 2014). The interconnection between thoughts, feelings, behaviours and outcomes has been identified as the core of CBT (Meichenbaum, Carlson, & Kjos, 2009). CBT based on the biopsychosocial approach has been reported to be an effective treatment for chronic pain (Sveinsdottir, Eriksen, & Reme, 2012a). According to previous studies, CBT was created in Western societies and was thus reinforced by their cultural norms and beliefs, which might not be suitable for Kuwaiti patients; culturally sensitive and religiously adapted CBT is reported to produce better outcomes in Muslim cultures (Naeem, et al., 2015). Although evidence exists for the use of CBT to manage CBP, further research is needed to identify the acceptability of such an approach for use in Kuwait and the risk factors and predictors of CBP in Kuwait, which could inform the development of a CBT programme. To establish a culturally sensitive CBT programme, it is necessary to identify patients' and therapists' beliefs and perceptions about the occurrence of CBP and how it might be treated. The studies within this thesis were undertaken in Kuwait and explored risk factors for and predictors of CBP among Kuwait patients, explored the role of cultural beliefs and patients' beliefs in coping strategies and explored the physiotherapist's beliefs, knowledge and experience of the management of CBP and their acceptance of CBT. The overall aim of this thesis is to investigate the influence of physiotherapists' and patients' beliefs and perceptions about CBP on the illness and its management, and the acceptability of cognitive behavioural therapy as a treatment for the problem. This aim was approached through four separated studies:

Study one: The effects of CBT on CBP: does the intensity and deliverer of CBT matter? A systematic review.

Aim: To explore whether the intensity of CBT (CBT) or/and the deliverer of the CBT has a specific effect on CBP.

Study two: Self-reported pain intensity, disability level and mood predictors in Kuwaiti patients with CBP.

Aim: To explore the association between self-reported pain intensity and the reported physical factors (such as sitting and lifting), and psychosocial factors such as lifestyle and mood. The second aim was to identify predictors for pain, disability and mood in Kuwaiti patients with CBP.

Study three: The effects of CBP patients' beliefs, culture and lifestyle on the illness and their care: interview with Kuwaiti patients.

Aim: To explore the effect of patients' and cultural illness perceptions on the illness behaviour and outcomes in patients with CBP in Kuwait.

Study four: A qualitative exploration of Kuwaiti physiotherapist's beliefs about CBP and its causes.

Aim: To explore physiotherapists' beliefs about CBP and explore their perception of the role of CBT for the management of CBP.

Chapter 2. The effects of cognitive behavioural therapy on chronic back pain: Systematic review to evaluate the dose and deliverer of the cbt programme

Introduction

The International Association for the Study of Pain defines pain as an emotional experience that is associated with unpleasant sensation and coupled with acute or potential tissue injury (Merskey & Bogduk, 1994a). Chronic back pain (CBP) can be defined as pain in the back that lasts for at least three months (Fourney, et al., 2011; Van Hooff, et al., 2014). According to Waterman, et al. (2012), both society and individuals are severely affected by the high incidence rate of CBP at 1.4 per 1000 people yearly (Waterman, Belmont, & Schoenfeld, 2012). CBP may cause progressive physical and psychological effects (Licciardone, Minotti, et al., 2013) and is associated with persistent or recurrent disability (Van Hooff, et al., 2014). Even with the presence of a health-related problem or injury, the symptoms cannot be fully explained. At least one-third of the physical pain symptoms are medically unexplained or inadequately explained (Kroenke, 2003). Chronic pain significantly reduces quality-of-life and work productivity (Gauntlett-Gilbert & Eccleston, 2007; Leeuwen, et al., 2006) and carries significant direct healthcare and associated indirect health costs such as disability payment and loss of productivity (Turk, et al., 2011). In the US, the total cost of chronic pain exceeds $210 billion annually (National Research Council, 2001) and in the UK, the annual costs associated with CBP alone are estimated at £10000 million, due to lost productivity and healthcare expenditure (Hoy et al., 2014; Maniadakis & Gray, 2000). According to the Global Burden of Disease (2010) statistics, lower back pain is classified as the main cause of disability and is sixth in terms of overall burden and its cost has increased from $58.2 million in 1990 to $83 million in 2011(Hoy, et al., 2014a). Management of chronic pain patients in the NHS in the UK requires more than 4.5 million appointments per year, comparable to 793 GP full-time appointments (Belsey, 2002). In the UK, back pain problems are the leading cause of disability and lead to nearly 120 million lost working days annually with an eighth of unemployed people citing back pain as the main reason for their lack of work (Hoy, et al., 2014a). The CBP patients are responsible for more than 50% of the loss in productivity due to their short periods of work absenteeism (less than a week), while a minority (15%) are absent for more than a month. About 80% of the associated costs of CBP are generated by approximately 10% of these cases because of their chronicity and persistency (Murphy & Courtney, 2000).

Studies on the management of CBP have used different combinations of medication, exercises and manual therapies (Onac, et al., 2012; Smeets, et al., 2006; Vibe Fersum, et al., 2013), and the majority report modest or non-significant improvements. The preferred chronic pain treatment option is medication; usually, patients with chronic pain are treated with a variety of drugs (Kouyanou, Pither, & Wessely, 1997), but pharmacological treatment has only a minimal and short-term effect (Dunn, et al., 2010) and has significant adverse effects (McCracken, Hoskins, & Eccleston, 2006). Both patients and clinicians are dissatisfied with the poor results of the currently available treatment options (Rosser, McCracken, Velleman, Boichat, & Eccleston, 2011).

CBP and functional disability frequently occur simultaneously and usually remain co-morbidly in the absence of clear anatomical impairments (Waddell, 1987). The available evidence suggests that CBP and disability are interconnected. For example, some studies demonstrated that the pain level consistently accounts for only insignificant proportions of the variance in disability (Riley, Ahern, & Follick, 1988; Slater, et al., 1991; Waddell, Feder, & Lewis, 1997). The proportions of explained variance in disability are, however, increased markedly when consideration is extended beyond the pain level to include the potential influence of psychological factors and pain behaviour (Main & Waddell, 1991; Reesor & Craig, 1988). A group of studies reported only a small to moderate effect for CBT in the management of CBP and the co-morbid symptoms such as disability, mood and catastrophising beliefs (Henschke, et al., 2010a; Hoffman, et al., 2007; Williams, Eccleston, & Morley, 2012a). Chronic pain is commonly accompanied by depression, sleep disturbance and mood disorders (Park & Moon, 2010) and so there is a great demand to use a broader, multidimensional approach and practice, to help in addressing the physical and psychosocial aspects of the problem; an example would be CBT.

CBT is a psychological intervention consisting of a combination of different cognitive therapies (e.g. cognitive rehearsal, emotional journaling), and physical strategies (e.g., physical activities, exercise) that go beyond the traditional pain relief methods, by addressing dysfunctional behaviours and unwanted beliefs (e.g., staying in bed when having pain, or believing that lifting heavy objects would cause spinal injury) so as to change behavioural and thinking patterns (Dobson, 2009). The concept of CBT suggests that symptoms and dysfunctional behaviours are frequently facilitated in the higher brain cognitive areas, and therefore improvement could be secured by modifying dysfunctional thinking and beliefs (Dobson, 2009). For example, when a patient with CBP believes that bending or twisting the spine will cause damage to their vertebral column, many daily activities such as working and showering might be affected. Cognitive behavioural therapy would help such patients to overcome fear of movement and improve quality-of-life by correcting these unhealthy beliefs and behaviours. Previous studies have found that a large group of patients' with CBP might hold biomedical beliefs connecting their pain and dysfunction to anatomical or structural abnormalities (Baird & Haslam, 2013; Bunzli, et al., 2015) that are usually found in radiological investigations or in ideas and advice provided by the healthcare providers (Baird & Haslam, 2013; Lin, et al., 2013). A narrative review (Sveinsdottir, Eriksen, & Reme, 2012b) showed that CBT affects the management of CBP, specifically the co-morbid symptoms such as depression (Hollon, et al., 2005). The main focus of CBT is not the pain itself, but the perception and meaning of the pain, which leads to better pain behaviours and coping strategies (McCracken & Turk, 2002; Vlaeyen & Morley, 2005).

The mechanism of CBT is to identify unhelpful and unhealthy thoughts (e.g., avoiding physical activity each time the patient feels pain), behaviours and strategies, challenging dysfunctional assumptions, core beliefs and negative automatic thoughts (e.g., staying active within the pain free abilities) to provide functional and helpful solutions. According to McCracken and Turk (2002), there are common components for CBT, such as encouraging the patient to learn self-management strategies, training in relaxation skills, cognitive training (understanding one's own feelings and emotions and learning how to express them), behavioural activities (identification of maladaptive behaviour and goal setting), problem-solving skills training, communication skills and maintenance and relapse prevention. These interventions have been successful in helping treat chronic pain, including CBP (Nijs, et al., 2013). CBT produced clinical improvements similar to those achieved with lumbar fusion (Domenech, et al., 2011; Nijs, Van Houdenhove, & Oostendorp, 2010) and increased the effectiveness of other interventions, including exercise (Beissner, et al., 2012) and manual therapy (Oostendorp, et al., 2015). The European guidelines for the management of CBP, recommend CBT for patients with CBP, especially when surgical interventions are recommended (Airaksinen, et al., 2006). Generally, CBT may be more cost effective than pharmacological treatments (Norton, et al., 2015), and has comparable outcomes to multidisciplinary management, including medication (Lera, et al., 2009). A critical review reported moderate effects when comparing behavioural interventions for chronic pain management to pharmacological treatments or no intervention (Morley, Eccleston, & Williams, 1999), and a meta-analysis by Hoffman et al. (2007) found that CBT has a superior effect on the long-term and lower risks of adverse effects, when compared to pharmacological interventions for CBP. A more recent review reported that CBT improved the general pain related outcomes compared to opioids in cases of chronic pain (Majeed & Sudak, 2017).

The international guidelines and a Cochrane review (Kamper, et al., 2014a) recommended a multidimensional behavioural approach using CBT to improve the associated psychological and physical dysfunction in chronic pain patients. However, a meta-analysis by Hofmann et al. (2012) showed only moderate, short-term effects of CBT for chronic pain and the results were highly variable, with some doubt as to whether the observed changes in pain intensity could be considered clinically significant and whether pain relief should be the primary goal of intervention. Moreover, Tseng et al. (2014) concluded that it is important to include quality-of-life and daily functioning as treatment goals, which are just if not more important as the relieving of pain itself.

Although CBT has shown promising benefit for the management of CBP, it remains unsettled as to who should deliver CBT and to whether a certain type of professional degree, level of training or expertise is required to deliver efficacious CBT to patients with chronic pain. Consideration must be given to what CBT techniques can be applied naturally as part of that provider’s usual care (e.g., a physiotherapist using graded activity techniques for back pain, or nurses offering instruction in relaxation techniques) and what CBT techniques such as cognitive restructuring may require the education and experience of a psychologist and may be less appropriate for delivery by others. Several prior have investigated the effectiveness of combined interventions delivered by physiotherapists for non-cancer pain, such as low back pain (Lamb, et al., 2010; Macedo, et al., 2012; Pengel, et al., 2007), neck pain (Pool, et al., 2010; Sullivan, et al., 2006;

Williamson, et al., 2009), knee pain (Hunt, et al., 2013; Hurley, et al., 2007), general musculoskeletal pain (Åsenlöf, Denison, & Lindberg, 2009) and cancer pain (Korstjens, et al., 2011). Most reported overall benefits and improvements in patient's symptoms and outcome measures involved in the studies including the cognitive and behavioural related measures. However, there has been considerable variability in the training provided to physiotherapists at between 1 and 4 days of training with or without on-going mentoring, (Hunt, et al., 2013; Lamb, et al., 2010; Williamson, et al., 2009) or details of training have not been reported (Hurley, et al., 2007; Johnstone, Donaghy, & Martin, 2002; Pengel, et al., 2007). The deliverer of the intervention (psychologist or physiotherapist) also varied between studies (George, et al., 2008; Johnson, et al., 2007; Pengel, et al., 2007) and procedures to determine treatment fidelity also differed (Johnson, et al., 2007; Lamb, et al., 2010; Pengel, et al., 2007). Challenges in using psychosocial interventions in physiotherapy practice have also been identified, including dominance of the biomedical perspective in physical therapy education and practice (Foster & Delitto, 2011; Hunt, et al., 2008; Main & George, 2011), a possible lack of understanding of psychosocial factors (Beissner, et al., 2009) and how to assess and manage these factors (Foster & Delitto, 2011) and concerns with time constraints (Beissner, et al., 2009; Foster & Delitto, 2011). In a qualitative study by Nielsen et al. (2014) to explore physiotherapists' perceptions and experiences of CBT, it was concluded that physiotherapists could deliver CBT and a pain coping skills training programme confidently, provided that they receive comprehensive training and mentoring by psychologists to ensure treatment fidelity (Nielsen, et al., 2014). Bryant et al. (2014) also reported that a systematic approach to training and accrediting physiotherapists to deliver a standardised CBT programme such as a pain coping skills programme could lead to high and prolonged adherence rates among patients. Brunner at al. (2013) found that, with additional training, physiotherapists could deliver cognitive behavioural interventions that are effective for patients with CBP. Without training or resources, however, successful translation and implementation remained unlikely. In a review of secondary prevention interventions for patients with acute onset of low back pain, Nicholas et al (2011) found that the expertise of the interventionist might be relevant because among the studies in which the psychological treatments were not superior to usual care, none used a psychologist to deliver the treatment. In contrast, most studies in which a psychologist delivered the psychological treatment demonstrated a benefit above usual care.

Sveinsdottir et al. (2012) pointed that CBT has positive effect on the cognitive, behavioural and physical components in patients with CBP, especially when compared to waiting list and treatment as usual groups. When compared to other interventions such as exercise and manual therapy, however, CBT showed inconclusive and mixed findings. Sveinsdottir et al. suggested that multidisciplinary interventions that integrate CBT with other approaches (e.g., functional training, manual therapy) might represent the future direction of management of CBP, with treatments tailored and customised for the patient's needs and requirements. Williams et al. (2012b) opined that the value of CBT for chronic pain is well investigated and there is no need for further trials comparing the effects of CBT versus other treatments on pain-related problems; they suggested that it would be more productive to focus on clarifying the action and mechanism of CBT effects. Therefore, factors affecting the success of CBT might need further exploration, such as the dose-response of CBT, the deliverer and therapeutic alliance (Nice, 2012; Spencer et al., 2018; Strauss, Huppert, Simpson, & Foa, 2018).

Although the intensity of the CBT programme has been discussed in many studies that focused on psychological disorders (e.g., depression and anxiety), it has rarely been discussed in relation to chronic musculoskeletal disorders such as CBP. Studies that explored CBT effectiveness for the management of CBP have often used different components of psychological and physical strategies with different intensity (number of sessions or hours) and reported different conclusions. Therefore, it is important to identify the optimum components and intensity of CBT for the management of CBP. Ehde et al. (2014) reported that CBT related strategies in RCTs differ widely in their content, format (e.g., group vs. individual, in-person vs. online) and dose (e.g., daily sessions vs. monthly session). Cognitive behavioural therapy for pain management is usually a multifactorial intervention that has no specific standard design for either group or individual therapy. Some of the treatment manuals used in CBT studies were established by the researchers for experimental purposes and were not published, making comparisons of specific CBT interventions across studies difficult. Studies evaluating different treatment doses, formats and content are also insufficient (Williams, et al., 2012b). The optimal content and components, delivery method, specific groups and subgroups, therapeutic dose and session intensity have not yet been identified, but doing so might help to improve the outcomes and effectiveness. Investigators are also required to explore the importance of refresher sessions after initial treatment, and the ideal frequency, duration and mode (e.g., SMS, emails) of such sessions to foster and maintain the treatment products (Ehde, et al., 2014).

The aim of this systematic review was to explore the effect of CBT intensity and delivery on self-reported pain severity, disability, emotion and quality-of-life in CBP patients. To our knowledge, this is the first review of its type to have done this.

Materials and method

The primary objective of this study was to explore the effect of the intensity of the CBT programme (i.e., number of sessions or hours) and the deliverer of the CBT (i.e., physiotherapist, psychologist) on the pain, functional disability (i.e., inability to perform daily activities), negative mood (depression and anxiety) and quality-of-life in patients with CBP. The PRISMA Statement was used to guide the conduct and reporting of the study (see Appendix 1) (Moher, et al., 2009).

2.1.1 Data sources and searches

References were selected through searching electronic databases and manual searching. The following electronic databases were searched for between 1900 and May 2017, for both cognitive and behavioural interventions: Cinhal, PsychINFO, PEDro, PubMed Cochrane and MEDLINE. Manual searches were executed, and relevant references retrieved from those listed in the selected articles and relevant systematic reviews. Different combinations of the key words have been performed using Boolean logic for the searching process, using the following terms: “Back pain”, “chronic back pain”, “cognitive therapy”, “cognitive treatment”, “behavioural therapy”, “behavioural treatment”, “psychotherapy”, “psychological intervention”, “psychological treatment”, and “cognitive behavioural therapy”. During the first screening, the main reviewer evaluated the titles and abstracts of each citation and excluded clearly irrelevant studies. For each potentially eligible study, the same reviewer examined the full-text article and assessed whether the study fulfilled the inclusion criteria.

2.1.2 Study Selection

Studies were included if they were randomised controlled trials of cognitive or behavioural therapy or both, recruited patients with CBP (described as pain between shoulder girdle and the pelvic area for more than three months), were published in English, recruited adult subjects (18 years and above) and included one of the following outcomes: pain, disability, quality-of-life or work disability. Studies were excluded if they did not report on behavioural or cognitive interventions, reported on acute or experimental pain, were a conference paper or dissertation or recruited subjects under the age of eighteen. The inclusion and exclusion criteria were obtained from Richmond et al.'s (2015) study then modified to facilitate the aim of the study. Full descriptions are reported in Table 1.

Table 1. Inclusion / Exclusion Criteria and working definitions. Variable Description

Studies Design	Randomised controlled trial only
Population	RCTs were included if they assessed adult participants (males and females over the age of 18) with a clinical diagnosis of CBP +/- radiating leg pain (Nice, 2009) for 3 months and more. Studies were excluded if the duration of participants' symptoms was less than 3 months. Trials were excluded if they included participants with a pathological cause of back pain, such as: infection, neoplasm, metastasis, osteoporosis, rheumatoid arthritis, fractures, spinal canal stenosis, or nerve root compromise. Participants with neurodegenerative conditions (such as, multiple sclerosis), or women experiencing back pain during pregnancy, were also excluded.
Intervention	RCTs were included if they investigated a cognitive behavioural intervention for CBP. As there is no consensus for a specific definition of cognitive behavioural interventions (Burton, et al, 2005; Hansen, et al, 2010), the reviewer obtained the definition to allow for transparency in selection of studies: cognitive behavioural interventions were included if they met the following working definition 'The intervention is explicitly or implicitly based on the cognitive behavioural therapy model (where the use of cognitive behavioural in relation to the intervention is explicitly stated OR where the connection between thoughts, feelings and behaviours in relation to the intervention is implicitly described) AND it uses specific techniques to both change cognitions and change behaviours.'
Comparators	Psychological interventions that were not explicitly or implicitly based on the cognitive behavioural therapy model were excluded. Interventions using techniques to change either cognitions (such as cognitive restructuring) or behaviours (such as operant conditioning), but not both, were also excluded. Cognitive behavioural interventions delivered by any health care professional were included, however, interventions delivered by lay personnel were excluded. The delivery method was not restricted (e.g. delivery using face-to-face, booklet or website were included). In cases where treatments were multimodal, for example, including cognitive behavioural as a component of a comprehensive back school, the

	intervention was deemed eligible only when the main focus of the intervention was based on cognitive behavioural model. For example, if an intervention consisted of six treatment sessions covering a wide range of components, and cognitive behavioural constituted only one of those sessions, it was not deemed eligible for inclusion as cognitive behavioural was not the main focus of the treatment. Two comparison arms were included: **CBT intensity or dose:** the effectiveness of the CBT in management of CBP in either brief intensity (4-8 sessions or 10 hours of CBT or less) compared with high intensity of CBT (12-20 sessions or more than 12 hours). If the study included sessions between 8 and 12 or 10 and 12 hours, we referred back to the description of the main author of the study. **The deliverer:** a psychologists or physiotherapists or other health care providers. Studies that delivered CBT online or by a manual booklet were excluded.
Outcomes	At least one measure of either; Pain, Disability, Quality-of-life, mood. If more than one measure was used to assess these variables, priority was assessed according to the following rules: Pain: For pain, if more than one outcome measure is reported, the hierarchy will be VAS then NRS then single item measure, then multi-item measure. Condition-specific disability: For disability, if more than one outcome measure is reported, the Roland-Morris Questionnaire (RMQ) will be used in the analysis if available. Otherwise, the ODI, the QBPDS, and the PDI will be prioritised as ordered. Quality-of-life: Both the EQ-5D and the SF-36 or SF-12 are commonly used to assess general quality-of-life. If an included study reports more than one of these scales, they will be prioritised in the above order. For the SF-12 and SF-36 quality-of-life measures, the summary scale (mental & physical health) will be prioritised. If the two components are only reported separately, the physical health component will be prioritised over the mental health component. If only the eight subscales are reported, the general health domain will be used in the analysis. Mood: depression and anxiety measures were our main focus in this category. Outcome measures that evaluate emotion and psychological aspects other than depression and anxiety such as fear or catastrophising behavior were ignored in this review. If more than one measure is reported, priority of the specific measure such as hospital anxiety and depression scale or Beck depression inventory.
Language	Only trials written in English were recruited for this review.

2.1.3 Screening and data extraction

The reviewer extracted the characteristics and intervention outcomes of each trial using a standardised data extraction form. Our definition of a pain-relevant outcome was based on recommendations from the Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials (IMMPACT) (Dworkin, et al., 2005; Turk, et al., 2003). IMMPACT recommends the following domains: pain intensity, emotional functioning, physical functioning (pain interference or pain-specific disability, health-related quality-of-life), and participant ratings of global improvement or treatment satisfaction. The deliverer (physiotherapists, psychologist or lay-person) was assessed as was the intensity of the CBT (brief = 4-8 sessions or less than 10 hours; intensive = 12-20 sessions or more or 12 hours or more; (Cully & Teten, 2008; Murphy, et al., 2014).

2.1.4 Assessment of risk of bias in the included studies

The reviewer conducted the risk of bias assessment independently. The risk of bias of the individual studies was assessed using the criteria list recommended by the Cochrane Back Review Groups (CBRG), which consisted of 11 items (see Appendix 2). Items were scored as positive if they fulfilled the criteria, negative when there was a clear risk of bias, and inconclusive if there was inadequate information (Bouter, et al., 2003). A total score was calculated, and scores were divided into low quality or high risk of bias (0-5), moderate quality or moderate risk of bias (6-8) and high quality or low risk of bias (9-11) of the internal validity criteria (total range 0–11).

2.1.5 Overall assessment

The overall assessment was obtained from Crist and Grunfeld (2013). Findings from the selected studies were classified in one of four levels of evidence: (i) strong evidence, which was described as at least three studies providing consistent findings of an association in the same direction; (ii) moderate evidence, with a significant association in the same direction reported by at least two studies with one or none in the opposing direction; iii) inconsistent evidence, when the findings was inconsistent and the direction of the findings was vague; and (iv) weak evidence when only one study provided supportive evidence or studies consistently identified no association (Crist & Grunfeld, 2013).

2.1.6 Data synthesis

A systematic synthesis has been undertook following guidance by Popay et al. (Popay et al., 2006). The narrative synthesis involved describing, organising, exploring and interpreting the study findings, taking into account the methodological adequacy. The similarities and differences between study findings have been investigated, including study quality; intervention characteristics, treatment dose; delivery and outcome measures. Where particular patterns of findings have emerged, we have presented possible explanations for these findings.

Results

The electronic and manual search strategy (figure 1) resulted in 1919 bibliographic records, which was reduced to 293 after screening; 215 were excluded as they did not meet the inclusion criteria, leaving a total of 78 studies. After that, 43 studies that met the exclusion criteria were excluded after assessing the full text, leaving 35 studies to be included. Backward reference searching was performed and a further 28 eligible studies were identified, which was later reduced to two, after being read fully, and excluded 26 articles that did not meet the inclusion criteria. Therefore, a total of 37 eligible articles were retained in this review (Table 2).

Studies were conducted in eleven countries; six in the Netherlands (Lambeek, et al., 2010; Smeets, et al., 2008; Smeets, et al., 2006; Van Den Hout, et al., 2003; Van Der

Roer, et al., 2008; Von Korff, et al., 2005), six in Norway (Brox, et al., 2006; Brox, et al., 2003; Froholdt, et al., 2012; Haldorsen, et al., 1998; Harris, et al., 2017; Vibe Fersum, et al., 2013), six in Germany (Basler, Jäkle, & Kröner-Herwig, 1997; Christiansen, et al., 2010; Glombiewski, Hartwich-Tersek, & Rief, 2010b; Göhner & Schlicht, 2006; Luedtke, et al., 2015; Schweikert, et al., 2006), five in the United States (Cherkin, et al., 2016; Kerns, et al., 2014; Menzel & Robinson, 2006; Moore, et al., 2000; Zgierska, et al., 2016), five in the UK (Fairbank, et al., 2005; Hay, et al., 2005; Johnson, et al., 2007; Lamb, et al., 2010; Newton-John, Spence, & Schotte, 1995), four in Sweden (Abbott, Tyni-Lenné, & Hedlund, 2010; Andersson, et al., 2012; Bergström, et al., 2012; Buhrman, et al., 2011; Linton & Ryberg, 2001), one in Italy (Monticone, et al., 2013), one in France (Roche-Leboucher, et al., 2011), one in Pakistan (Khan, et al., 2014), one in Australia (Nicholas, Wilson, & Goyen, 1992) and one in Brazil (Machado, et al., 2007) (see Table 2). There were differences in the follow-up period, with the shortest follow-up was one week post treatment (Andersson, et al., 2012) and the longest up being nine and 10 years (Bergström, et al., 2012; Froholdt, et al., 2012). The total number of participants across studies was 6,458, ranging from 20 participants (Nicholas, et al., 1992) to 701 participants (Lamb, et al., 2010).

According to the criteria of the Cochrane Back Review Group (CBRG) (Bouter, et al., 2003), the quality of most of the studies' methodology ranged from 4 to 9 (see Table 4) and was generally moderate. However, most of the studies' internal validity related to methodological criteria was not accomplished, such as inadequate randomisation, poor allocation processes, lack of patient or care-provider blinding and insufficient dropout reports. None of the selected studies achieved all eleven items and ten studies showed serious limitations and bias (Bergström, et al., 2012; Göhner & Schlicht, 2006; Harris, et al., 2017; Khan, et al., 2014; Machado, et al., 2007; Newton-John, et al., 1995; Nicholas, et al., 1992; Roche-Leboucher, et al., 2011; Schweikert, et al., 2006; Zgierska, et al., 2016). Only two studies (Luedtke, et al., 2015; Monticone, et al., 2013) showed an overall high quality of evidence. Many studies had issues with blinding criteria, as most failed to conduct blinding for both the patients and the intervention providers. However, the blinding of patients in various RCTs investigating the effect of CBT on CBP was a problematic issue (Karanicolas, 2010). To limit biased conclusions in reviews of research, the quality of backpain-related RCTs should be improved.

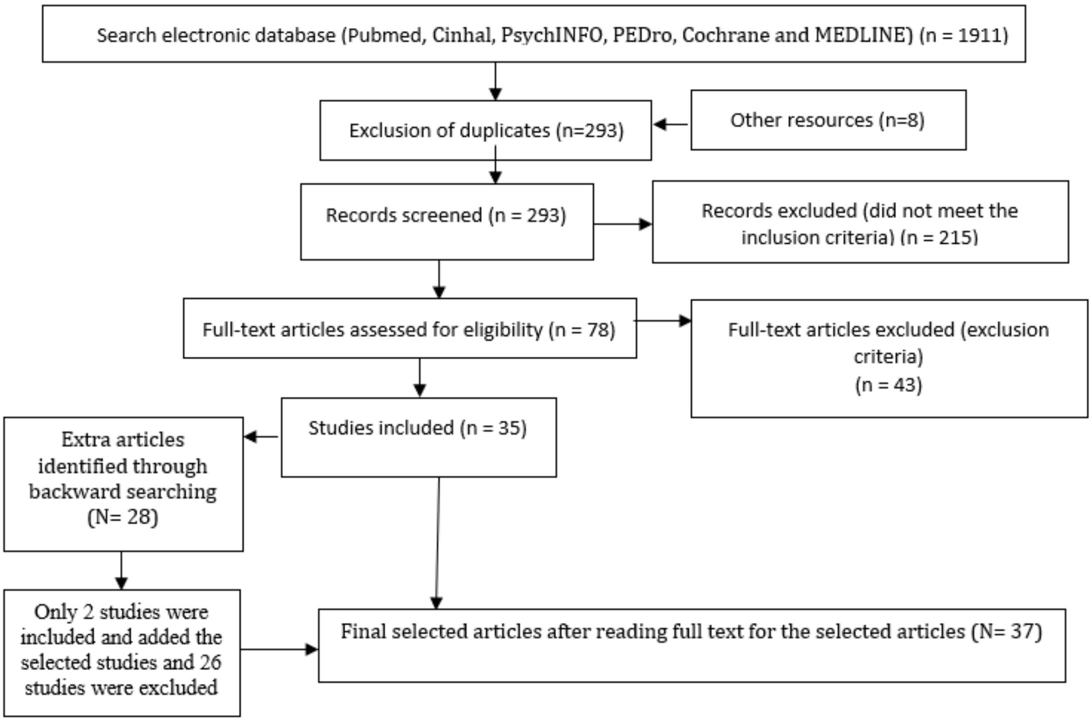

Figure 2. Flow chart of the search strategy

Fourteen studies provided brief CBT sessions (Abbott, et al., 2010; Vibe Fersum, et al., 2013; Lamb, et al., 2010; Moore, et al., 2000; Newton-John, et al., 1995; Smeets, et al., 2006; Smeets, et al., 2008; Von Korff, et al., 2005; Hay, et al., 2005; Harris, et al., 2017; Christiansen, et al., 2010; Göhner & Schlicht, 2006; Menzel & Robinson, 2006; Roche-Leboucher, et al., 2011), while twenty-three studies provided CBT intensively (Basler, et al., 1997).

A psychologist or clinical psychologist delivered the CBT programme in 26 studies (Andersson, et al., 2012; Basler, Jäkle, & Kröner-Herwig, 1997; Bergström, et al., 2012; Christiansen, et al., 2010; Cherkin, et al., 2016; Fairbank, et al., 2005; Froholdt, et al., 2012; Glombiewski, et al., 2010; Göhner & Schlicht, 2006; Harris, et al., 2017; Linton & Ryberg, 2001; Luedtke, et al., 2015; Kerns, et al., 2014; Machado, et al., 2007; Menzel & Robinson, 2006; Monticone, et al., 2013; Moore, et al., 2000; Newton-John, et al., 1995; Nicholas, Wilson, & Goyen, 1992; Roche-Leboucher, et al., 2011; Schweikert, et al., 2006; Smeets, et al., 2008; Smeets, et al., 2006; Van den Hout, et al., 2003; Zgierska, et al., 2016; Von Korff, et al., 2005), whereas eight studies used a trained physiotherapist to deliver the CBT intervention (Abbott et al., 2010; Brox, et al., 2003; Brox, et al., 2006; Johnson, et al., 2007; Khan, et al., 2014; Lambeek, et al., 2010; Linton & Ryberg, 2001; van der Roer, et al., 2008; Vibe Fersum, et al., 2013). Lambeek et al. (2010) used an occupational therapist to deliver the programme, while both Haldorsen et al. (1998) and Lamb et al. (2010) used a mixed group of psychologists, physiotherapists and other healthcare professionals. All the primary and secondary outcome measures involved are reported in Tables 2 and 3.

Table 2. Studies' demographic information

Author Country (N)	CBT group (N)	Control Group(s) (N)	Main measure	Secondary measure	CBT content and delivery method	Intensity of CBT	Content of comparison Groups	Follow up	Main findings
Abbott, et al., 2010 Sweden (107)	CBT (N = 53)	Exercise (N = 54)	ODI	VAS E-QoLQ	First they received exercise programme similar to the exercise group in addition to lumbo-pelvic exercises. Moreover they received CBT programme consisted of: patient education on healing processes, physiological and psychological pain processes, relaxation techniques, and cognitive coping strategies for pain management. Implement work and recreational time contingent functional goals with use of a Patient Goal Priority Questionnaire. Motivational discussion and positive reinforcement of goal progress. Resource and hinder analysis for goal attainment and Motivational discussion and positive reinforcement of goal progress and action plans for management of hinders, setbacks, and relapses. Trained physiotherapists used to deliver the programme	Three sessions	Physiotherapists instructed respiratory and circulatory exercises, training of transfers, walking, and other activities of daily living relevant for the patient. Before discharge from hospital, patients received a one time 20- minute instruction of a home training programme containing dynamic exercises intended to gradually enhance the endurance capabilities of the back, abdominal and leg muscles, stretches and cardiovascular exercise.	3,6 and 12 months, then 2 and 3 years	Both CBT group and exercise therapy group significantly improved in all outcome measures from baseline up to 2-3 years follow-up after intervention. These results are showed a very large effect sizes for CBT group and medium-large effect sizes for exercise therapy. Moreover, CBT group scores for ODI, SES, BBQ, and TSK improved significantly more than the exercise therapy group scores at 3, 6, 12 months, and 2 to 3 years after the operation. Furthermore, the CBT group's back pain VAS at 3 and 6 months, EQ-5D at 12 months, CSQ-CAT at 6 months and 2 to 3 years, significantly improved more than the exercise therapy group.
Andersson, et al., 2012 Sweden (21)	CBT (N = 11)	Waiting list (N = 10)	CSQ	MPI PIRS HADS QoLI	Treatment was delivered in six weekly group sessions, each lasting 2 hours with a 15 minute break. Each session included homework assignments, feedback, rationale, and written text materials as hand outs. Exercises were completed during the sessions. The following treatment components were included: 1) rationale and a CBT model; 2) applied relaxation in five steps; 3) goal formulation; 4) information on exercise, pacing, and planning of activities; 5) sleep management; 6) problem solving; 7) communication strategies; 8) assertiveness; and 9) relapse prevention. Two M.Sc. psychologists, who received supervision by the first author, delivered the treatment.	Six sessions, a session every week. Each session last 2 hours.	Control: waiting list who received exercises at the end of the experiment	N/A	There was a general small but significant improvements in all measures including pain level, quality-of-life, depression and anxiety scales and disability level in the CBT group. However, it was reported that this study provided a preliminary support for the use of a tailored brief group-based CBT intervention for older adults with chronic pain.

Basler, et al., 1997 Germany (76)	Medical care + CBT (36)	Medical care only (40)	Pain diary	HCS DDS	CBT consisted of pain educational programme, relaxation techniques, breathing exercises, cognitive reconstructions, beliefs and behavioral modification, strengthening and stretching exercises, postural correction exercises and pleasant activity planning. A psychologist delivered the psychological interventions.	12 sessions, one session every week for 12 weeks. Each session lasted 150 minutes. Total hour of CBT equal 30 hours.	Medical care only including nerve block, medication, physiotherapy and electrotherapy	6 months	Experimental subjects reported less pain, better control over pain, more pleasurable activities and feelings, less avoidance and less catastrophising. In addition, disability was reduced in terms of social roles, physical functions and mental performance. The results were maintained at follow-up. Patients who only received medical treatment showed little improvement. Data indicate that the programme meets the needs of the patients and should be continued.
Bergström, et al., 2012 Sweden (214)	First group involved behavioural-oriented physiotherapy (N = 54). The second group was CBT alone (N = 44) and third group combined CBT with physiotherapy (N = 50)	Treatment as usual (N = 46)	Registered sickness absence	MPI	Basic elements of the CBT; included activity planning, goal setting, problem solving, applied relaxation, cognitive coping techniques, activity pacing, training in how to break vicious circles, assertion training and the role of significant others. Individually tailored homework assignments were given at the end of each session. The programme was delivered by a psychologist	Four weeks, each week 13-14 hours, in addition to 6 booster sessions.	G1 = Each participant was assigned to an individually tailored training programme, which was carried out on a part-time basis (approximately 20 scheduled hours per week/4weeks). The programme included individual goal setting, gradually increased exercises to improve muscular endurance, aerobic raining, pool training, relaxation techniques and body awareness therapy. Homework assignments for physical activities were given according to the individual's interests and problem areas. G3 = combination of G1+ G2 (40 scheduled hours per week/4 weeks) G4 = control group received 'treatment as usual' care	10 years	After 10 years follow-up, all groups, including the control group, showed overall improvement in the MPI with superiority to combined CBT with physiotherapy group. However, this improvement was insignificant. Therefore, long-term follow-up of intensive CBT showed non-significant improvement in MPI score. Therefore, In terms of long-term follow-up of sickness absence, the multidisciplinary programme appears to be most beneficial for patients with dysfunctional problems and active adaptor patients. In contrast, the CBT and PT interventions failed to benefit any patient group.
Brox, et al., 2003 Norway (64)	CBT+ exercise (N = 27)	Lumbar fusion+ exercise (N = 37)	ODI	VAS GFS HSC-25 FABQ	The content of the CBT was educational lectures about physical activities to overcome the fear of movement and activities. CBT was delivered by the physiotherapist and the physician	CBT was given for one week intensively, and then CBT was re-enforced with each PT session for three weeks	Spinal fusion group: the instrumental lumbar fusions. The aim of the procedure is to stabilise the involved segments and to reduce pain. The standard treatment consisted of posterolateral fusion with transpedicular screws of the L4 –L5 segment and/or the L5–S1 segment. Autologous bone was used in all cases. Postoperative rehabilitation was at the choice of the surgeon, not according to any study protocol Physiotherapy: general spinal exercises	1 year	The Oswestry Disability Index score was reduced significantly from 41 to 26, in the surgery group, compared with 42 to 30 in the CBT and exercise group. The mean difference between groups was 2.3 (-6.7 to 11.4), p value equal 0.33. There was no different between groups in the improvements in back pain intensity, use of painkillers, psychological distress and return to work. In the CBT and exercise group, fear-avoidance beliefs and fingertip-floor distance were reduced further, while lower limb symptoms were reduced more in the surgical group. According to an independent investigator, there was 70% of success rate in the surgical group and 76% in the CBT and exercise group. Therefore, there was

									significant improvement in all measures (pain, disability, emotion, quality-of-life) after one-year follow-up in both groups at one-year follow-up.
Brox, et al., 2006 Norway (57)	CBT+ exercise (N = 27)	Lumbar fusion+ exercise (N = 28)	ODI	VAS GFS HSC-25 FABQ	The content of the CBT was educational lectures about physical activities to overcome the fear of movement and activities. CBT was delivered by the physiotherapist and the physician	CBT was given for one week intensively, and then CBT was re-enforced with each PT session for three weeks.	Spinal fusion group: the instrumental lumbar fusions. The aim of the procedure is to stabilise the involved segments and to reduce pain. The standard treatment consisted of posterolateral fusion with transpedicular screws of the L4 –L5 segment and/or the L5–S1 segment. Autologous bone was used in all cases. Postoperative rehabilitation was at the choice of the surgeon, not according to any study protocol Physiotherapy: general spinal exercises	1 year	In the surgical group, The Oswestry Disability Index (ODI) was significantly improved from 47 to 38, while it was improved from 45 to 32 in the CBT and exercise group. After the adjustment of gender, the mean difference between treatments was -7.3 (95% CI -17.3 to 2.7, p = 0.15). In the surgical group, the success rate was 50%, whereas it was 48% in the CBT/ exercise group. Lumbar fusion failed to show any benefits over CBT and exercise intervention in patients with CBP who previously had disc herniation surgery. In CBT group, pain and emotion didn't improve significantly, whereas, in the fusion group did improve only in pain. Therefore, there was a significant improvement in ODI in both groups after one-year follow-up.
Cherkin, et al., 2016 USA (342)	CBT = 113	Mindful = 116 Usual care = 113	RMDQ	VAS PHQ-8 GADS SF-12	Chronic pain education, understanding the relationship between thoughts and beliefs, sleep hygiene, relapse prevention, changing behavioral changes, goal setting, relation skills and pain coping strategies. CBT was provided by clinical psychologists	2 hours peer week for 8 weeks. Total hour of CBT equal 16 hours.	Treatment as usual = any medical care they normally received Mindfulness group = meditation, yoga, body awareness, understanding ones emotion and breathing exercises.	6 months and 12 months	Both CBT group and mindfulness group showed significant improvement in pain and disability measures at 6 months follow-up. CBT group showed significant improvement at depression and anxiety measures at 6 months follow-up. At one year follow-up both CBT and mindfulness groups showed significant improvement comparing to usual care group.
Christiansen, et al., 2010 Germany (75)	Exercise + CBT (N = 41)	Usual care = Exercise only (N = 34)	Hannover ADL	NRS FCE	The first 30-min intervention period started with the mental contrasting strategy. The second 30-min intervention session was twofold. Firstly, to assist the participants in identifying beneficial behaviour, i.e., behaviour that counteracts the obstacles generated in the first session and secondly to form implementation intentions. CBT was provided by a psychologist	Two 30 min sessions on day 3 and day 9.	Treatment as usual: 3 weeks of supervised intensive back pain physiotherapy exercise	3 weeks, 4 months	At two years follow-ups, group that received motivational CBT improved their functional capacity more than the control group using behavioural measures (ergometer, lifting) and subjective ratings. Therefore, it was concluded that at 3 months FU, CBT group showed significant improvement in physical capacity (ADL level). Both groups showed non-significant improvement in pain level. However, CBT combined with

									motivational strategies were recommended for CBP patients to improve their engagement in physical activities.
Fairbank, et al., 2005 UK (349)	CBT + exe = 151	Surgery = 139	ODI The shuttle walking test	SF-36 TDRAM	Cognitive behavior therapy principles were used to identify and overcome fears and unhelpful beliefs that many patients develop when in pain. CBT was delivered by clinical psychologists	Average of 75 hours of CBT with 4 refreshing sessions.	Spinal fusion sutgery	1,3,6,12 and 24 months post-treatment	Both groups reported reductions in disability during two years of follow-up, possibly unrelated to the interventions. The statistical difference between treatment groups in one of the two primary outcome measures was marginal and only just reached the predefined minimal clinical difference, and the potential risk and additional cost of surgery also need to be considered. No clear evidence emerged that primary spinal fusion surgery was any more beneficial than intensive rehabilitation.
Fersum, et al., 2013 Norway (121)	CBT (N = 62)	Manual therapy + exercise (N = 59)	ODI	NRS HSC-25 FABQ	Each patient received a specific targeted intervention directed at changing their individual cognitive, movement and lifestyle behaviors considered by the therapist to be maladaptive (provocative) of their disorder. CBT was delivered by experienced and well trained in CBT physiotherapist	CBT = initial 1 hour session, followed by 2-3 sessions for 30-45 min (a session every week). Finally, every 2-3 weeks CBT session was provided. (Total period is 12 weeks, which makes almost 6-7 sessions).	Control group: where treated with joint mobilisation/manipulation in addition to back exercises at the clinic or as home programme.	3 and 12 months	The results of this study support that a CBT approach to manage non-specific CBP was more effective at improving pain intensity, disability, fear related beliefs, mood and sick leave at long-term follow-up than manual therapy combined with exercise group. That being said, both groups showed significant improvement in all measures with superiority for the CBT group
Froholdt, et al., 2012 Norway (124)	CBT+ exercise (N = 58)	Lumbar fusion+ exercise (N = 66)	ODI	VAS GBDQ FABQ	Cognitive activates to encourage them to perform physical activities they were informed not to do them. CBT was delivered by a psychologist	One week in out Pt. clinic, 2 weeks at home, then 1 week in out Pt. clinic. A total of 25 hours per week (Total of 100 hours consist of CBT and EXE). .	G1 = Lumbar fusion consisted of posterolateral autologous bone transplantation and transpedicular screw fixation of the L4– L5 and/or L5–S1 segments, followed by 3-6 months of physiotherapy.	9 years	Participants in the surgical group (lumbar fusion) and participants in CBT combined with exercise group both reported positive long-term outcomes. Additionally, both groups reported reduction in pain intensity and improvement in functional abilities at 9 years follow-up camper to 1-year follow-up, however, patients in the surgical group reported frequent consumption of medications and more sick leaves. Patients in the surgical group also, reported that they were more satisfied with their quality-of-life after surgery comparing with CBT and exercise group. Therefore it can be concluded that both groups showed significant improvement in

									all measures with non-significant differences between them.
Glombiewski, et al., 2010 Germany (116)	Two groups involved CBT, first group combined CBT with EMG biofeedback (N = 35) and the second group used CBT alone (N = 30).	Waiting list (N = 50)	NRS	PDI BDI	The initial phase of the programme included information about biopsychosocial aspects of pain (sessions 1 and 2), goal setting (session 3), progressive muscle relaxation (sessions 4, 5 and the first 15 min of most of the following sessions), activity scheduling (sessions 6–8 and 13), cognitive therapy for restructuring pain cognitions (sessions 9 and 10), restructuring of fear avoidance beliefs (session 12), breathing exercises and further progressive muscle relaxation training (sessions 11 and 15), attention diversion (session 14), relapse prevention strategies (session 17 and the last session) and stress-coping skills. CBT was delivered by one female licensed cognitive- behavioral therapist and two female and one male Ph.D. students and advanced trainees in CBT	Twenty five sessions, each session is 1 hour's sessions	EMG: Patients were practicing relaxation activities and physical activities while receiving feedback from the biofeedback machine.	6 months	Both CBT and CBT+ biofeedback groups showed significant improvement in the reported pain intensity, level of functional disability and showed less depressive symptoms over the period of 6 months. Additionally, there was no clinically significant difference between the groups. Therefore, the high treatment acceptability associated with biofeedback addition can also be achieved with CBT alone.
Göhner & Schlicht, 2006 Germany (47)	CBT + physiotherapy (N = 25)	Physiotherapy alone (N = 22)	SF-12	NRS	To enhance self-efficacy perceptions, reduce barrier perceptions and maximise severity perceptions of participants by applying cognitive-behavioural strategies. A psychologist delivered CBT.	Three sessions, each session 50 min, conducted within 6-8 weeks.	Control: a standard physiotherapy treatment that concerned the selection of exercises. Ten compulsory exercises (four strengthening exercises, five stretching exercises, one relaxation exercise) and 12 optional exercises were chosen according to common treatment methods	3 and 6 months	Both groups have improved, but CBT and exercise group showed significant improvement compared to exercise-alone group. However, there were no group differences in regard to pain intensity. Therefore, the results indicated that short and inexpensive cognitive behavioral therapy programme was able to enhance patients' self-efficacy and severity perceptions and to reduce their perceived barriers compared to a standard physiotherapy treatment control group. This enabled participants to adhere to treatment recommendations on a regular basis up to 6 months later.

Haldorsen, et al., 1998 Norway (142)	CBT (N = 142)	Treatment as usual (N = 80)	VAS	ADS GRWAS STAI HSC-25	Training in behavioral goal setting, problem solving and self-rewards as techniques for maintaining or developing healthy habits. Cognitive coping strategies were discussed and advice was given. The patients also learned about physical and psychological symptoms of stress and how they could reduce these symptoms. Patients also were provided with physical activities that involved morning exercise, body awareness training, relaxation training, stretching, cardio active training, exercises in a heated pool, work training, individually based medical training therapy (MTT) and exercises. Finally, the educational session involved different subjects, such as anatomy, pain, physical and mental coping strategies, work, and lifestyle. This multi model CBT was delivered by neurologist, a general practitioner, a psychologist, nurses, and physiotherapists	Four weeks, 5 days/week and each day 6 hours session	Standard physiotherapy	4 weeks, 2,6,10 and 12 months	There were insignificant differences between the number of patients who had returned to work in the MMCBT and the control group. Non-returners in the control group were lacking the energy, exercise irregularly, work in jobs the demands high workload on the spine, and did not expect to be back to work in the course of a couple of weeks. Diagnostic tools that identify patients who benefit from extensive or specific treatments are required. In another words, the MMCBT group did not differ from the control group on medical variables, demographic variables, pain, function in daily activities, subjective health complaints, quality-of-life, work ability, physical activity and psychological variables.
Harris, et al., 2017 Norway (214)	Brief CBT = 99	Brief CBT+ group CBT = 55 Brief CBT+ exe = 60	Sick leave rate	ODI HADS SHCI FABQ	Brief CBT included cognitive reassurance, education and fear management. Delivered by a physician and physiotherapist. Group CBT included coping strategies, graded exposure to physical activity, correction of dysfunctional thoughts and beliefs. Delivered by a trained psychiatry in CBT	Brief CBT = 2-4 hours Group CBT = 10.5 hours	54 hours of group training included strength and stability exercises delivered over a period of 3 months and a brief CBT session for 2-4 hours at the beginning of the programme.	12 months	Both CBT and exercise group reported insignificant improvement in disability, anxiety and depression and reduction in sick leave. There was no difference between the groups at 12 months follow-up.
Hay, et al., 2005 UK (402)	CBT = 201	Physiotherapy = 201	RMDQ	VAS MPQ ZDI Tampa scale	Identifying and addressing psychosocial risk factors for persistent or recurrent disability related to back pain. The emphasis was on return to normal activity through functional goal setting, with educational strategies to overcome psychosocial barriers to recovery. CBT was delivered by trained physiotherapists.	One 40 minutes session followed by 6 20 minutes session, which equal to less than 3 hours of CBT.	Physiotherapy sessions consisting of exercises and manual therapy.	3 and 12 months follow-up	Both groups reported significant improvement in all measures at 3 and 12 months follow-up.
Johnson, et al., 2007 UK (234)	CBT (N = 116)	Booklet (N = 118)	VAS severity	RMDQ	Educational pack containing a booklet and audiocassette. Both contained advice on self-management suitable for patients with persistent LBP. There were nine 'leaflets' in the booklet: pain and activity; pacing; goal setting; stress;	Two hours session for 8 sessions within 6 weeks	Control group received educational pack containing a booklet and audio-cassette. Both contained advice on self-management suitable for patients with persistent LBP. There were nine 'leaflets' in the booklet: pain and activity; pacing; goal setting; stress; posture and	3,6,9,12 and 15 months	This intervention programme produces only modest effects in reducing LBP and disability over a 1-year period. The observation that patient's preference for treatment

					posture and body mechanics; guide- lines for sleep hygiene; beds and sleeping; flare-up plans; when to see your GP. CBT = problem solving, pacing and regulation of activity, challenging distorted cognitions about activity and harm, and helping patients to identify helpful and unhelpful thoughts about pain and activity. Moreover, each session they were practicing specific back exercises CBT was delivered by physiotherapist		body mechanics; guide- lines for sleep hygiene; beds and sleeping; flare-up plans; when to see your GP, in addition to the usual care		influences outcome required further study. A treatment programme involving education and active exercises, delivered based on CBT approach, produced insignificant changed over 15 months period of follow-up in pain and disability measures.
Khan, et al., 2014 Pakistan (54)	CBT + exercise (N = 27)	Exercise alone (N = 27)	VAS	RMDQ	CBT consisted of operant behavioural graded activity and problem solving training. In graded activity the physical therapist focused on gradual increase or pacing of activities which were important and relevant for individual patients with instruction to modify dysfunctional beliefs and general exercises consisting of rolling, bridging, knee to chest, hamstring stretching (each exercise 20 repetitions) and cycling plus treadmill each exercise for 10 minutes with resistance and speed adjusted to patient individual needs. Trained physiotherapists delivered the programme	The duration of the intervention was for 12 weeks, 3 sessions a week for each group. Additionally, home programme consisted of the same content were given for the patient to do twice a day, 5 days a week for 12 weeks	Exercise group Similar to the combined CBT with exercise group but without the CBT programme	3 months	Both study groups reported statistically significant improvements in both outcomes measures, p = 0.000. However, mean improvements in pain intensity measure (VAS) and Ronald Morris score after the treatment was superior in CBT and exercises group comparing to General exercise group. In conclusion, both interventions are effective in treating chronic low back pain however; CBT & General exercises are clinically more effective than General exercises alone. The results of the trial showed that participants in both CBT with general exercises and general exercises both groups made significant improvements in pain scale and RDQ (P-value = 0.000). However CBT group showed better results in mean pre and post intervention score on both measures VAS and Ronald Morris Disability Questionnaire as compared to general exercises group
Kerns, et al., 2014 USA (161)	Both groups involved CBT, but the first group was standard CBT (N = 68) and the second group was tailored CBT (N = 60)		NRS	MPI RMDQ BDI	Involved: Exercise module, Relaxation module, Cognitive control module, Body mechanics module, Pacing module, Task, persistence module, Assertiveness module, Time contingent pacing module and Avoiding asking for help module. The content of the programme was tailored to patient preference. CBT was delivered by expert psychologist	Ten sessions each session 1 hour During 14 week	Similar CBT content but without focusing on patient preference.	15 weeks	There were insignificant differences observed between treatment groups on measures of treatment engagement or adherence. However, these factors were significantly related to some pre- to post-treatment improvements in outcomes, regardless of treatment condition. Participants in this study provided an evidence of a high degree of participation and adherence. However, patient’s preference tailored treatment and employed motivational enhancement strategies, failed to

									improve treatment participation over and above SCBT for CBP. Evidence that participation and adherence were associated with positive outcomes supports continued clinical and research efforts focusing on these therapeutic processes. Therefore, the results did not support the hypothesis that a tailored approach to CBT would enhance engagement and participation in treatment in the patients treated in this study.
Lamb, et al., 2010 UK (701)	CBT (N = 468)	General education (N = 233)	RMDQ	VAS SF-12	Training consisted of guided discovery, identifying and countering negative automatic thoughts, pacing, graded activity, relaxation, and other skills. Additionally, they received 15 min of active management advice, which included the benefit of and how to remain active, avoidance of bed rest, appropriate use of pain medication, and symptom management. Physiotherapists, nurses, psychologists, and occupational therapists delivered the programme.	Six sessions each session 1.5 h	Control group received 15 min of active management advice, which included the benefit of and how to remain active, avoidance of bed rest, appropriate use of pain medication, and symptom management with no further interventions.	3,6 and12 months	Over 1 year, CBT group had long-term effect on sub-acute and chronic low-back pain at a low cost to the health-care provider. This trial shows that a bespoke cognitive behavioral intervention package, BeST, is effective in managing subacute and chronic low-back pain in primary care. Compared with advice alone, advice plus cognitive behavioural intervention was associated with significant benefits in nearly all outcomes at 3, 6, and 12 month
Lambeek, et al., 2010 Netherland (134)	CBT (N = 66)	Treatment as usual (manual therapy +exe) (N = 68)	Return to work	VAS RMDQ	Workplace intervention based on participatory ergonomics and a graded activity programme, which is a time contingent programme based on cognitive behavioral principles. CBT was delivered by occupational therapist	Twelve weeks	Control group received treatment usual care (physiotherapy, manual therapy and occupational therapy)	3,6,9 and 12 months	Multidisciplinary group was more beneficial on return to work (hazard ratio 1.9, 95% confidence interval 1.2 to 2.8, P = 0.004). After 12 months, patients in the Multidisciplinary group improved significantly on functional status compared with patients in the usual care group (P = 0.01). Improvement of pain between the groups was insignificantly. The Multidisciplinary programme significantly reduced disability due to chronic low back pain in private and working life. Functional status and pain improved over time in both groups. Pain intensity improvements between the groups were observed to be insignificant. The differences in functional status between the groups at 12 months were significant (P = 0.01) and in favor of the integrated care group.

Linton and Ryberg, 2001 Sweden (253)	CBT (N = 84)	Treatment as usual (N = 91)	HADS	NRS FABQ	CBT consisted of: Problems solving, Applied relaxation, Learning about pain Activities, maintain daily routines, Scheduling activities, Relaxation training, Warning signals, Cognitive appraisal, Beliefs, Communication skills, Assertiveness, Risk situations, Applying relaxation, Plan for coping with flare, Coping skills review, Applied relaxation, Risk analysis and Plan for adherence. CBT was delivered by certified therapist in CBT	Six weeks, each week one session and each session 2 hours	Control group received treatment as usual. Each patient was free to select the type of the treatment they would like to receive	1 year	There was insignificant improvement in pain and mood scores between the two groups; with CBT group showing slight beneficial over the control group. At one year follow-up; CBT group reported significant improvements on 26 out of 33 outcomes measures. Between groups analysis showed that CBT group has significantly positive result regarding fear of movement's related beliefs, more pain-free days, and less sick leave days, comparing to the control group. CBT group also demonstrated threefold improvement in the reported long-term sick leave during the follow-up. Therefore, CBT group showed significant effect on disability; in spite that back pain is self limiting problem with natural recovery process.
Luedtke, et al., 2015 Germany (135)	Anodal transcranial direct current stimulation followed by CBT (N = 67) Sham transcranial direct current stimulation followed by CBT (N = 68)		VAS	ODI	A maximum of eight patients per group received physically challenging sessions, including cardiovascular exercises, machine assisted muscle strength training, specific muscle stabilisation exercises for the trunk muscles, and work hardening sessions, and educational sessions on the neurophysiology of pain, pain coping strategies, and relaxation classes. Expert psychologist and other medical experts delivered CBT.	Five weeks for 5 hours daily	Participants received 20 minutes of anodal or sham stimulation over the left motor cortex with an intensity of 2 mA on five consecutive days	1, 3 and 6 months	There were insignificant differences between groups for pain and Oswestry disability index at the two primary endpoints after stimulation and after cognitive behavioral management. Therefore the use of transcranial direct current stimulation for the management of comorbid pain and disability is insignificant.
Machado, et al., 2007 Brazil (33)	CBT (N = 16)	Exercise alone (N = 17)	RMDQ	VAS BDI	The role of the therapists was to provide unconditional support as the patients discussed their life stressors, including chronic pain. No particular subject was restricted in the discussion group CBT was delivered by clinical psychologists	Groups of up to 10 patients attended 80- minute treatment sessions twice a week for 9 weeks	Control: Patients in this group received a general exercise programme consisting of 20-minute walking, general stretching, and strengthening in the bridge position (lying supine with knees flexed, patients had to raise their hips and hold for 5 second, repeating this procedure 15 times). Groups of up to 10 patients performed 40- minute sessions twice a week for 9 weeks	6 months	The results of this pilot study demonstrated that short-term of therapeutic exercises was more beneficial for the management of functional disability in patients with CBP, compared to client-centred therapy. In spite that both groups reported disability improvement at long-term follow, and pain and depression outcome measures at each time follow-up, the results required cautioned interpretation. At 9 weeks FU, the exe group showed better improvement (significant) in

									the disability level. At 6 months FU, exe group had better improvement but non-significant. At 9 weeks, there was non-significant improvement in pain level in the exe group. At 6 month FU, exe group had non-significant improvement in pain score than the CBT. At 9 weeks there was non-significant improvement in the depressive symptoms
Menzel & Robinson, 2006 USA (32)	CBT (N = 8)	Waiting list (N = 10)	CSQ	VAS PSS ODI PDI BDI	CBT sessions targeting stress management, pain coping, job stress and satisfaction, depression and anxiety. CBT was delivered by a psychologist	Six sessions, over 6 weeks, each session 1.5 hours.	Control: waiting list who received the same CBT programme at the end of the research.	6 and 12 weeks	Pain intensity scores improved in the intervention group, demonstrating a large effect, however, stress scores increased. Depression scores, responsible of one-third of the variance in hours work absenteeism because of back pain. CBT showed promising result as secondary preventive measures, in spite of the high drop out rate. Therefore, it can be concluded that there was non-significant improvement for CBT in pain intensity. there was significant improvement in control group in stress. There was also a non-significant difference between the groups at the FU. The sample size was small, so the result of this study could be non-significant.
Monticone, et al., 2013 Italy (90)	CBT+ exercise (N = 45)	Exercise only (N = 45)	RMDQ	Tampa Scale SF-36	To modify fear of movement beliefs, catastrophising thinking, and negative feelings, and ensuring gradual reactions to illness behaviours. The main situations avoided by the patients were pointed out on the basis of the fear-avoidance beliefs emerging from their usual activities and the results arising from the presentation of images of back-stressing activities. The CBT was delivered by a clinical psychologist	One-hour session, weekly for 5 weeks. Followed by 1 session monthly for one year.	Exercise in both groups: The patients underwent a multimodal motor programme consisting of active and passive mobilisations of the spine, and exercises aimed at stretching and strengthening muscles, and improving postural control.	5 weeks, 12 and 24 months	The long-lasting multidisciplinary programme was more beneficial in improving disability, fear of avoidance beliefs, pain intensity and enhancing the quality-of-life in chronic back pin patients, comparing to the exercise group. The effects were clinically significant and demonstrated 1-year effect size. CBT group showed significant improvement in the pain level & quality-of-life. CBT group also reported progressive non-significant improvement in RMDQ There was general non-significant in all other measures in the CBT
Moore, et al., 2000 USA	CBT (N = 113)	Treatment as usual (N = 113)	Self care orientation	Worry rating (0-10)	Brief CBT sessions and self reading booklet focusing on education, cognitive skill acquisition, behavioural rehearsal, generalisation	For 6 weeks, every week one session.	Self-care materials, developed specifically for this study, were provided to study participants at the end of the last group session as part of the intervention.	3,6,12 months	Participants in the Self Care intervention (intervention group) demonstrated significant

(226)				VAS FABQ RMDQ SF-36	and maintenance. Two experienced psychologists delivered the CBT.		These materials included a book developed for this study (Moore, et al., 1996), a 40-min videotape on back pain self care, and a 25-min videotape demonstrating exercises (Patient Education Media, 1996).		improvements in back-related worry and fear-avoidance beliefs than the control group. In addition, there were moderate significant effects on pain intensity and interference with activities. Therefore, pain was reduced significantly at 6 moths follow-up. the disability was improved at 3 months follow-up only.
Newton-John, et al., 1995 UK (44)	CBT (N = 16)	EMG group (N = 16) and waiting list group (N = 16)	BDI	STAI CSQ PDI PBQ NRS	Education and understanding of back pain, teach the patient how to overcome fear of movement, and help him to set suitable plan to cope with problem and improve function. CBT was delivered by clinical psychologist (the first author)	Two, 2 hours group CBT, followed by one session of 45 min individual CBT, and finally, 3 min, CBT follow-up by phone.	Biofeedback group: The treatment programme consisted firstly of a psychoeducational session, in which the interaction between stress and the effect on muscle tension was presented. Subjects were then introduced to the pain-tension-pain cycle (Flor, et al., 1985), which proposes that chronic pain conditions may be exacerbated by a reciprocal interaction between pain and muscular contraction	3 and 6 months	Post intervention follow-up showed significant improvement in pain intensity, disability, depression pain related beliefs in both CBT group and EMGBF group. In contrast, there was insignificant change in the waiting list control group. The improvements in pain intensity, pain related beliefs, anxiety, use of active coping and depression were maintained at 6 months follow-up, in both groups. At 6 months follow-up, insignificant differences between CBT and EMGBF were reported on any measures. Further research is required to determine the degree to which these results reflect the mild level of psychological impairment and disability status of patients in the present study. Both groups, CBT & CBT-B have shown significant improvement in the pain and disability level. Additionally, the emotional distress (anxiety and depression) was improved too, but not a significant. Adding biofeedback to CBT did not show any difference
Nicholas, et al., 1992 Australia (20)	CBT +exercises = 10	Exercise+ attention control = 10	Pain rating chart (0-5)	PBQ CSQ BDI	CBT consisted of pain and back pain education, importance of activity, fear and depression management, stress management, goal setting and identification and modification of unwanted behaviors and beliefs. CBT was delivered by psychologist	12.5 hours over a period of 5 weeks	Understanding and discussing problems that face patients with CBP and learn how to manage these problems.	6 months	There was a significant improvement in all outcome measures at 6 months follow-up, except the pain measure in CBT group over the control.

Nicole van der Roer, et al., 2008 Netherlands (114)	CBT+ exercise (N = 60)	Exercise only (N = 54)	RMDQ	NRS	Goal setting, discussing patient history, signing treatment contract, providing education about the treatment and its benefits. Combined with therapeutic exercise CBT was delivered by trained physiotherapists	Ten individual sessions	Physiotherapy treatment according to the guidelines, which included therapeutic exercises	6,13,26 and 52 weeks	Generally, treatment group and control group demonstrated insignificant differences between them in all outcome measure during the follow-up. Treatment group, however, reported improvement in pain intensity at 6 months follow-up more than control group, which became insignificant at 12 months follow-up. Furthermore, No statistically significant differences were found for functional status. CBT group showed significant improvement in pain intensity at 6 months FU. This affect was absent at 1 year FU. At 1 year FU, both groups showed non-significant improvement in pain score. Therefore, intensive exercise combined with CBT was not more beneficial than usual physiotherapy management for back pain.
Roche-Lebouchér, et al., 2011 France (132)	CBT (N = 62)	Active physiotherapy (N = 64)	Number of sick leave	Fingertip to floor DPQ	CBT programme based on the biopsychosocial model of pain provided by a psychiatric. CBT was delivered by a psychologist	One session every week for 5 weeks.	Control: was composed exclusively of ambulatory physiotherapy, 1 hour 3 times a week, during 5 weeks, and was provided by a private-practice physiotherapist, who had pre- viously received information and training on this programme. The programme was in accordance with the international guide- lines on rehabilitation for LBP patients and included only ac- tive and isotonic exercises. The first 2 weeks were focused on flexibility training and pain management. Strengthening ex- ercises and functional training were then introduced. Patients were advised to perform home exercises for at least 50 minutes twice a week (these exercises could include stretching, jogging, and swimming)	1 year	Both CBT group and active physiotherapy group showed significant changes in all measures in short-term with superiority for the CBT group. However, after one-year follow-up, the superiority of the intensive CBT on physical outcome that gained at the end of the treatment was insignificant. All physical and functional measures were improved except the anxiety and depression after one year follow-up. Therefore, Both programmes are efficient in reducing disability and sick-leave days, however, CBT is significantly more effective in reducing sick-leave days especially at long-term follow-up.
Schweikertet al., 2014 Germany (409)	CBT+ usual care = 200	Usual care only = 209	E-QoLQ	VAS	Pain distraction techniques, relaxation techniques, cognitive appraisal, stress management, social stress management and dysfunctional behaviors modification. CBT was delivered by psychologist	10 hours over a period of 3 weeks	Physiotherapy, massage, electrotherapy, pain education and lifestyle lectures.	3 weeks	Although it was applied by experienced pain psychologists, there was no detectable effect of CBT added to standard therapy for LBP. Neither pain nor emotional discomfort could be reduced by the programmeme.

Smeets, et al., 2006 Netherlands (211)	Two groups involved CBT, first one involved CBT only (N = 55) and the second one involved CBT combined with exercise (N = 55)	Active physiotherapy group (N = 52) and waiting list group (N = 49)	RMDQ	VAS BDI	The programmeme consisted mainly of graded activity training (GA) and problem solving training (Borrell-Carrió, et al.). CBT contained Education about pain types, goal setting and activity planning, relaxation and breathing exercises, cognitive pain controlling technique, training to change maladaptive behaviours, and strategies to prevent symptoms relapsing. CBT. CBT was delivered by clinical psychologist or trained social worker.	Eight sessions, two sessions every week, each session 1 hour. Total 4 weeks.	Active physiotherapy group (Van Wilgen, Van Ittersum, & Kaptein): In a group of 4 maximum, patients were invited to perform 30 minutes of aerobic training on a bicycle (65% to 80% heart rate maximum) and 75 minutes of strength and endurance training of their lower back and upper leg muscles (3 series of 15 to 18 repetitions in a dynamic- static manner) 3 times a week during 10 weeks. The exercises consisted of leg extension while sitting on knees and hands, trunk lifting and lifting both legs while lying prone on a couch. Combined group: CT consisted of APT in combination with the PST, both offered in the same frequency and duration as described before. The patient was told that he/she first had to gain enough aerobic fitness and strength before increasing his/her activities. The GA was not started until the third week, and it started with the selection of the 3 patient-relevant activities. By the end of the fourth week the final goals and daily quota were set. In total, 19 sessions with a total duration of 11 hours were given.	10 weeks	All the active groups (CBT, active physiotherapy and CBT combined with active physiotherapy) reported improvement in pain catastrophising, while the wait-list group did not report improvement. All groups reported no difference in the change in internal control. Participants in all active groups reported improvement in disability, pain intensity and main complaints, while no changes were observed in the wait-list group. Active physiotherapy (APT) group was the only group that reported improvement in depression. The improvements in disability and pain intensity were mediated by improvement in pain catastrophising. Similarly, the positive change in depression observed in the APT group was mediated by the positive changes in pain catastrophising. Both CBT and physical activities improved pain catastrophising, which had a key role in mediating the outcome of the treatment significantly. All the three active groups (APT, CBT and CBT+APT) have shown significant reduction in pain intensity and disability. ATP group was the only group to reduce depression significantly.
Smeets, et al., 2008 Netherland (223)	Two groups involved CBT, first one involved CBT only (N = 58) and the second one involved CBT combined with exercise (N = 61)	Active physiotherapy group (N = 53) and waiting list group (N = 51)	RMDQ	VAS MPI BDI	Consisted of operant-behavioral graded activity training (GA) and problem solving training (PST) Psychologist or social worker delivered the programme	Twenty sessions each session 30 min	G1 = In a group of maximum four, patients were invited to perform 30 min of aerobic training on a bicycle (65–80% heart rate maximum) and 75 min of strength and endurance training of their lower back and upper leg muscles (three series of 15–18 repetitions in a dynamic–sta- tic manner with a training intensity of 70% of the 1-Repetition Maximum, which was reassessed every fifth session), three times a week during 10 weeks. Two physiotherapists super- vised the training. Combination of CBT with active physiotherapy Waiting list for 10 weeks	6 and 12 months	At the follow-up, all treatment groups reported insignificant improvements in depression and other performance tasks except lifting. In spite that all groups reported moderate pain reduction at post-treatment testing, this improvement was diminished at 1-year follow-up, and even was aggravated in the combined group. Additionally, at 1-year follow-up, did not change and even increased in both APT and GAP groups, while it was slightly diminished in CT group.
Van den Hout, et al., 2003	CBT	Education	RMDQ	MPI	Problem-solving therapy is a cognitive–behavioral therapy in which problem-solving	Ten sessions each session 90 min	Graded activity = Positive reinforcement for activity increments, and a workplace visit. The training	6 and 12 months	Data analyses showed that employees in the GAPS group had

Netherland (84)	(N = 45)	(N = 39)			skills are taught. The PST-model describes 5 steps in which problems are typically solved: problem orientation, problem definition and formulation, generation of alternatives, decision-making, and implementation and evaluation. CBT was delivered by behavioral therapists		consisted of 15 one-hour sessions and 3 additional sessions dedicated to back education and lifting instructions. The occupational therapist treated patients individually for 30 minutes per week, during which graded activity was applied to personally relevant activities like work, housekeeping, and leisure time activities. Furthermore, the occupational therapist contacted the occupational physician and the patient's supervisor at the workplace to discuss a plan of return- to work. When considered necessary by the occupational therapist, a workplace visit was planned. Group education = Group education consisted of 10 90-minute lessons in which issues related to the back and to back pain were dis- cussed. A physiotherapist, an occupational therapist, and a psychologist, using a protocolised manual, served as lecturers. No skills were taught, and each theme was discussed during no more than one protocolised session.		significantly less work absenteeism days, in the second half-year post treatment. Moreover, work status was more positive for employees in this condition, represented in a more employees had a 100% return-to-work and fewer patients ended up receiving disability pensions one year post treatment. Moreover, the addition of problem-solving therapy to behavioral graded activity had supplemental value in employees with nonspecific low back pain. Specifically, at 6 months only, problem solving had significant improvement over the control group.
Von Korff, et al., 2005 Netherlands (240)	CBT+ exercise (N = 119)	Treatment as usual (N = 121)	RMDQ	Back pain worry FABQ SF-36	Identifying and addressing patient fears about back pain, discussion about activities and QoL, goal setting, planning for exercises and activities, action plan to achieve those goals. CBT was provided by a psychologist	A total of 3.5-hours divided into 4 sessions has been conducted within 30 days.	Control group: The Control Group received care as usual, whose content is highly variable across patients. Usual care often included use of prescription and non-prescription pain medications, infrequent primary care visits for back pain, and use of ancillary services such as physical therapy by a minority of patients	2,6,12 and 24 months	Over a 2 years follow-up period, patients The intervention group reported better improvement in pain related fear (P = 0.01), pain intensity (P = 0.01) and functional abilities (P = 0.01) comparing to control group. About 42% of the participants in the intervention group reported 1/3 improvement in the Roland and Morris Disability Questionnaire (RMDQ) scores at 6 months follow-up, while only 24% in the control group (P = 0.01). At 2 years follow-up, some participants in the intervention group demonstrated inability to perform daily activities for 30 or more days in the last 3 months (P = 0.01). The adjusted mean difference in activity limitation days was 4.5 days at 6 months, 2.8 days at 12 months, and 6.9 days at 24 months. Generally, both groups showed improvement, however, the improvement didn't start until 6 months. The CBT group had significant pain and functional improvement at the 6 months FU. Pain measure continues to have significant improvement at 1 year FU, whereas the functional status improvement became non-significant at 1 year FU. At 24 months FU, all the improvement was non-significant. Both groups didn't show significant

									improvement in other measures.
Zgierska, et al., 2016 USA (35)	Usual care+ meditation + CBT = 21	Usual care +wait list = 14	NRS BPI	ODI CPAQ MAAS	Included understanding meditation, how to use meditation to control pain and stress, pain and stress triggers, coping strategies, thoughts and beliefs management and planning for healthy lifestyle. CBT was delivered by two-trained psychologist.	2 hours per week for 8 weeks equal to 16 hours of CBT.	Usual care included medication and physiotherapy	8 weeks and 26 weeks post treatment	Meditation-CBT intervention reduced significantly pain severity and sensitivity to experimental thermal pain stimuli in patients with opioid-treated CLBP at 8 and 26 weeks of follow-up. Both groups reported insignificant improvement in other measures including the disability score.

ODI= Oswestry disability index, VAS= Visual analogue scale, E-QoLQ= European Quality-of-life Questionnaire, CSQ= Coping strategies questionnaire, MPI= Multidimensional pain inventory, PIRS= Pain and Impairment Relationship Scale, HADS= Hospital anxiety and depression scale, QoLI= Quality-of-life inventory, HCS= Heidelberg Coping Scale, DDS= Dusseldorf Disability Scale, GFS=General Function Score, HSC-25= Hopkins Symptom Checklist-25, FABQ= Fear-Avoidance Belief Questionnaire, RMDQ= Roland and Morris disability questionnaire, PHQ-8= Patient health questionnaire-8, GADS= Generalised anxiety disorder scale, NRS= Numerical rating scale, FCE= Functional capacity evaluation, TDRAM=The distress and risk assessment method, GBDQ=Global back disability questionnaire, PDI= Pain disability index, BDI= Beck depression index, ADS= Active discomfort scale, GRWAS= Graded Reduced Work Ability scale, STAI=State Trait Anxiety Index, SHC= Subjective Health Complaints Inventory, MPQ= Short-form McGill pain questionnaire, ZDI= Modified Zung depression inventory, PSS= Preserved stress scale, PBQ= Pain beliefs questionnaire, DPQ= Dallas pain questionnaire, BPI=Brief pain inventory, CPAQ= Chronic Pain Acceptance Questionnaire, MAAS=Mindful Attention Awareness Scale

Table 3: scores in the main outcomes measures

Author	Score of Pain measure			Score of Disability measure			Score of Emotion measure			Score of Quality of life measure		
	Baseline Mean (SD)	Post-treatment Mean (SD)	Follow up Mean (SD)	Baseline Mean (SD)	Post-treatment Mean (SD)	Follow up Mean (SD)	Baseline Mean (SD)	Post-treatment Mean (SD)	Follow up Mean (SD)	Baseline Mean (SD)	Post-treatment Mean (SD)	Follow up Mean (SD)
Abbott et al., 2010	NA			NA			NA			NA		
Andersson et al., 2011	CBT= 38 (10) Control= 33 (23)	CBT= 37 (18) Control= 35 (22)	CBT= NA Control= NA	CBT= 58 (12) Control= 58 (13)	CBT= 53 (9) Control= 62 (10)	CBT= NA Control= NA	CBT= 15 (7) Control= 16 (10)	CBT= 9 (5) Control= 16 (11)	CBT= NA Control= NA	CBT= 3 Control= 2	CBT= 3 Control= 2	CBT= NA Control= NA
Basler et al., 1997	CBT= 5 Control= 4	CBT= 4 Control= 4	CBT= 4 Control= NA	CBT= 2 Control= 2	CBT= 2 Control= 2	CBT= 1 Control= NA	NA			NA		
Bergström, 2012	NA											
Brox et al., 2003	CBT= 64 Surgery= 62 (15)	NA	CBT= 49 (24) Surgery= 39 (26)	CBT= 43 (13) Surgery= 42 (11)	NA	CBT= 30 (20) Surgery= 26 (16)	CBT= 2 (0.6) Surgery= 2 (0.5)	NA	CBT= 1.5 (0.5) Surgery=1.5 (0.4)	CBT= 45 Surgery=36 (19)	NA	CBT= 23 (19) Surgery= 18 (17)
Brox et al., 2006	CBT= 65 (11) Surgery= 65 (15)	NA	CBT= 50 (20) Surgery= 51 (27)	CBT= 45 (9) Surgery= 47 (9)	NA	CBT= 32 (19) Surgery= 38 (20)	CBT= 2 (0.5) Surgery= 2 (0.6)	NA	CBT= 2 (0.5) Surgery= 2 (0.6)	CBT= 39 (17) Surgery= 40 (20)	NA	CBT= 24 (21) Surgery= 31 (22)
Cherkin et al., 2016	CBT= 6 Mindful=6 Usual care= 6	NA		CBT=12 (5) Mindful= 12 (5) Usual care= 10(5)	NA		**Anxiety:** CBT= 1 (0-2) Mindful= 1 (0-2) Usual care= 1 (0-2) **Depression:**	**NA**		CBT= 39 (9) Mindful= 38 (8) Usual care= 40 (8)	NA	

							CBT= 6 Mindful= 6 Usual care= 5					
Christiansen et al., 2010	CBT= 6 Control= 6	CBT= 5 Control= 5	CBT= 4 (3) Control= 4	CBT= 62 Control= 69 (18)	CBT= 70 (13) Control= 71 (17)	CBT= 75 (17) Control= 68 (24)	NA			NA		
Fairbank et al., 2005	NA			CBT= 45 (15) Surgery= 47 (15)	NA=	CBT= 36 (21) Surgery= 34 (21)	CBT= 31 (12) Surgery= 32 (10)	NA	CBT= NA Surgery= NA	CBT= 20 (10) Surgery= 19 (9)	NA	CBT= 28 (15) Surgery= 29 (15)
Fersum et al., 2013	CBT= 5 MT-EXE= 5	CBT= 2 MT-EXE= 4	CBT= 2 MT-EXE= 4	CBT= 21 (8) MT-EXE= 24 (8)	CBT= 8 (7) MT-EXE= 19 (8)	CBT= 10 (10) MT-EXE=20 (12)	CBT= 1 (0.3) MT-EXE= 2 (0.4)	CBT= 1 (0.3) MT-EXE= 1 (0.4)	CBT= 1 (0.3) MT-EXE= 2 (0.5)	NA		
Froholdt et al., 2012	CBT= 63 (13) Surgery= 62	CBT= NA Surgery= NA	CBT= 40 (26) Surgery= 37 (25)	CBT= 44 (11) Surgery= 45 (11)	CBT= NA Surgery= NA	CBT= 25 (18) Surgery= 24 (20)	CBT= 2 Surgery= 2 (0.5)	CBT= NA Surgery= NA	CBT= 1 (0.4) Surgery= 1 (0.4)	CBT= 5 Surgery= 5	CBT= NA Surgery= NA	CBT= 5 Surgery= 7
Glombiewski et al., 2010	CBT-B= 5 CBT= 5 WL= 5	CBT-B= 4 CBT= 4 WL= 5	CBT-B= 4 CBT= 4 WL= NA	CBT-B= 4 CBT= 5 WL= 5	CBT-B= 3 CBT= 4 WL= 4	CBT-B= 4 CBT=4 WL= NA	CBT-B= 15 (8) CBT= 17 (9) WL= 16 (8)	CBT-B= 12 (9) CBT= 15 (10) WL= 15 (8)	CBT-B=13 (9) CBT= 15 (9) WL= NA	NA		
Göhner & Schlicht, 2006	CBT= 5 Control= 4	CBT= 3 Control= 3	CBT= 2 Control= 2	NA			NA			NA		
Haldorsen 1998	NA											
Harris et al., 2017	NA			BI= 28 (13) BI+CBT= 29 (13)	BI= 22 (1) BI+CBT= 23 (15)	NA	BI= 9 (8) BI+CBT= 11 (8)	BI= 7 (7) BI+CBT= 7 (7)	NA	NA		

				BI+ exe= 30 (13)	BI+ exe= 28		BI+ exe+ 9 (7)	BI+ exe= 7 (7)				
Hay et al., 2005	CBT= 61 (20) Control= 61 (19)	NA	CBT= 17 (22) Control= 17 (23)	CBT= 14 (5) Control= 13 (5)	CBT= 6 (6) Control= 5 (6)	CBT= 5 (6) Control= 4 (6)	CBT= 25 (8) Control= 24 (8)	CBT= 25 (7) Control= 24 (8)	CBT= 25 (7) Control= 25 (7)	NA		
Johnson et al., 2007	CBT= 45 (18) Control+52 (32)	CBT= 29 (25) Control+ 35 (27)	CBT= 28 (26) Control+ 36 (27)	NA			CBT= 11 Control+ 11	CBT= 7 (5) Control+ 8 (5)	CBT= 7 (6) Control+ 8 (6)	CBT= 1 (.02) Control+1 (0.2)	CBT= 1 (0.2) Control+ 1 (3)	CBT= 1 (0.2) Control+ 1 (.02)
Khan et al., 2014	CBT= 7 Control= 7	CBT= 3 Control= 5	NA	CBT= 14 (3) Control= 13	CBT= 5 (3) Control= 9	NA	NA			NA		
Kerns et al. 2014	INT= 4 Control= 7	INT= 4 Control= 6	INT= NA Control= NA	INT= 13 (5) Control= 16 (5)	INT= NA Control= 14 (5)	INT= NA Control= NA	INT= 3 Control= 20 (11)	INT= 3 Control= 17 (11)	INT= NA Control= NA	NA		
Lamb et al., 2010	CBT= 59 (19) Control= 59 (20)	CBT= NA Control= NA	CBT= NA Control= NA	CBT= 9 (5) Control= 9 (5)	CBT= NA Control= NA	CBT= NA Control= NA	NA			CBT= 37 (9) Control= 38 (10)	CBT= NA Control= NA	CBT= NA Control= NA
Lambeek et al.,2010	CBT= 6 Control= 6	CBT= 1 Control= 2	CBT= 2 Control= 2	CBT= 15 (5) Control= 15	CBT= 4 Control= 4	CBT= 7 Control= 4	NA			NA		
Linton and Ryberg, 2001	CBT= 5 Control= 6	NA	CBT= 5 Control= 5	NA			CBT= 11 (8) Control= 11 (7)	NA	CBT= 10 (8) Control= 11 (8)	NA		
Luedtke et al., 2015	INT= 48 (21) Sham= 48 (18)	INT= 26 (26) Sham= 23 (23)	INT= 29 (26) Sham= 22 (21)	INT= 17 (6) Sham= 15 (5)	INT= 8 (7) Sham= 7 (6)	INT= 9 (7) Sham= 7 (6)	INT= 13 (8) Sham= 12 (8)	INT= 9 (8) Sham= 8 (6)	INT= NA Sham= NA	NA		
Machado et al., 2007	CBT= 6 (NA) EXE= 7 (NA)	CBT= 6 (NA) EXE= 6 (NA)	CBT= 6 (NA) EXE= 6 (NA)	CBT= 15 (NA) EXE= 15 (NA)	CBT= 15 (NA) EXE= 12 (NA)	CBT= 13 (NA) EXE= 10 (NA)	CBT= 20 (NA) EXE= 25 (NA)	CBT= 22 (NA) EXE= 22 (NA)	CBT= NA EXE= AN	NA		

Menzel & Robinson, 2006	CBT= 49 (31) Control= 36 (26)	CBT= 37 (24) Control= 45 (27)	NA	NA			NA			NA		
Monticone et al., 2013	CBT= 7 Control= 7	CBT= 3 Control= 5	CBT= 2 Control= 6	CBT= 15 (3) Control= 15 (3)	CBT= 5 Control= 11	CBT= 1 Control= 11	NA			CBT= 42 (5) Control= 42 (5)	CBT= 25 Control= 40 (5)	CBT= 18 Control= 41 (5)
Moore et al. 2000	CBT= 5 Control= 5	NA	CBT= 3 Control= 3	CBT= 9 (7) Control=8 (6)	NA	CBT= 5 (6) Control=6 (6)	NA			NA		
Nakao et al., 2012	NA			NA			CBT= 3 (0.5) Control= 3 (0.5)	NA	CBT= 2 Control= 2	NA		
Newton-John et al., 1995	CBT=16 CBT+B=17 (12) WL=16 (12)	CBT=10 (11) CBT+B= 8 (6) WL= 18 (9)	CBT= 9 (11) CBT+B= 8 (7) WL= NA	CBT= 27 (20) CBT+B=23 (10) WL=25	CBT= 18 (15) CBT+B= 15 (8) WL= 26 (17)	CBT= 16 CBT+B= 23 (23) WL= NA	CBT= 15 (9) CBT+B= 10 (6) WL= 11 (7)	CBT= 9 (8) CBT+B= 6 (5) WL= 11 (5)	CBT= 7 (5) CBT+B= 7 (6) WL= NA	NA		
Nicholas et al., 1992	CBT= 3 Control= 3	CBT= 3 Control= 3	CBT= 3 Control= 3	NA			CBT= 17 (7) Control= 20 (11)	CBT= 15 (6) Control= 16 (10)	CBT= 14 (6) Control= 19 (10)			
Nicole van der Roer et al., 2008	CBT= 6 Control= 6	CBT= 5 Control= 5	CBT= 7 Control= 7	CBT= 12 Control= 12	CBT= 10 Control= 10	CBT= 7 Control= 7	NA			NA		
Roche-Leboucher et al., 2011	CBT= 5 AT= 5	CBT= NA AT= NA	CBT= 3 AT= 4 \	CBT= 52 \ AT= 51 (23)	CBT= NA AT= NA	CBT= 31 (23) AT= 39 (22)	CBT= 37 \ AT= 31 (24)	CBT= NA AT= NA	CBT= 22 (24) AT= 26 (24)	NA		
SCHWEIKERT et al., 2014	NA			NA			NA			NA		
Smeets et al. 2006	NA											

Smeets et al., 2008	NA			NA			NA	NA
Van den Hout et al., 2003	CBT= NA Control= NA	CBT= NA Control= NA	CBT= NA Control= NA	CBT= NA Control= NA	CBT= NA Control= NA	CBT= NA Control= NA	NA	NA
Von Korff et al., 2005	CBT= 6 Control= 6	NA	CBT= 4 Control= 5 (3)	CBT= 12 (6) Control= 11 (6)	NA	CBT= 8 (7) Control= 9 (7)	NA	NA
Zgierska et al., 2016	CBT= 6 Control= 5	NA		CBT= 68 (9) Control= 64	NA		NA	NA

CBT= cognitive behavioural therapy, CBT+B= cognitive behavioural therapy combined with biofeedback, MT+exe= manual therapy +exercise, NA= not applicable

According to the Cochrane Back Review Group's (CBRG) (Bouter, et al., 2003) assessment tool that was used to assess the quality of the studies in this review (see Table 4), only two studies were identified as high quality – Monticone, et al. (2013) and Luedtke, et al. (2015) – while 25 were evaluated as moderate quality (Abbott, Tyni-Lenné, & Hedlund, 2010; Andersson, et al., 2012; Basler, Jäkle, & Kröner-Herwig, 1997; Cherkin, et al., 2016; Brox, et al., 2003; Brox, et al., 2006; Christiansen, et al., 2010; Fairbank, et al., 2005; Froholdt, et al., 2012; Glombiewski, et al., 2010; Haldorsen, et al., 1998; Johnson, et al., 2007; Linton & Ryberg, 2001; Lamb, et al., 2010; Menzel & Robinson, 2006; Moore, et al., 2000; Smeets, et al., 2008; Van den Hout, et al., 2003; Von Korff, et al., 2005; van der Roer, et al., 2008; Vibe Fersum, et al., 2013; Haldorsen, et al., 1998; Johnson, et al., 2007; Hay, et al., 2005) and 10 as low quality (Altmaier, et al., 1992; Bergström, et al., 2012; Göhner & Schlicht, 2006; Harris, et al., 2017; Khan, et al., 2014; Machado, et al., 2007; Nakao, et al., 2012; Newton-John, et al., 1995; Nicholas, et al., 1992; Roche-Leboucher, et al., 2011; Schweikert, et al., 2006; Zgierska, et al., 2016) (see Table 4).

Table 4 shows risk of bias assessment for the selected studies

Reference	Randomisation adequate?	Allocation concealed?	Groups similar at baseline?	Patient blinded	Care provider blinded	Outcomes assessor blinded	Co-intervention avoided or	Compliance accepted	Dropout rate described and acceptable?	Timing outcome assessment	Intention- to-treat analysis?	Total score	Quality rating
Abbott, et al., 2010	+	+	_	_	_	+	?	+	+	+	+	7	Moderate
Andersson, et al., 2012	+	+	+	-	-	-	?	?	+	+	+	6	Moderate
Basler, et al., 1997	+	+	+	_	_	_	?	+	+	+	_	6	Moderate
Bergström, et al., 2012	+	_	-	-	-	+	?	_	+	+	-	4	Low
Brox, et al., 2003	+	+	+	-	+	+	?	-	+	+	+	8	Moderate
Brox, et al., 2006	+	+	+	-	?	-	?	-	+	+	+	6	Moderate
Cherkin, et al., 2016	+	+	+	_	_	_	_?	+	+	+	+	7	Moderate
Christiansen, et al., 2010	+	-	+	+	-	-	?	+	+	+	+	7	Moderate
Fairbank, et al., 2005	+	+	_	_	_	+	?	+	_	+	+	6	Moderate
Fersum, et al., 2013	+	+	+	-	+	+	?	+	-	+	+	8	Moderate
Froholdt, et al., 2012	+	-	+	-	-	-	?	+	+	+	+	6	Moderate
Glombiewski, et al., 2010	+	?	+	-	-	-	?	+	+	+	+	6	Moderate
Göhner & Schlicht, 2006	+	-	+	-	-	-	?	?	+	+	?	4	Low
Haldorsen, et al., 1998	+	_	+	_	+	_	?	+	_	+	_	5	Moderate
Harris, et al., 2017	+	+	_	_	_	_	_	_	+	+	+	5	Low
Hay, et al., 2005	+	+	_	_	_	_	?	+	_	+	+	6	Moderate
Johnson, et al., 2007	+	+	+	_	_	_	?	+	+	+	+	7	Moderate
Khan, et al., 2014	+	_	+	+	_	_	?	_	+	+	_	4	Low
Kerns, et al. 2014	+	+	+	+	+	_	?	_	+	+	+	8	Moderate
Lamb, et al., 2010	+	+	+	-	-	+	?	+	_	+	+	7	Moderate

Lambeek 2010	+	+	+	_	_	+	?	+	+	+	+	8	Moderate
Linton and Ryberg, 2001	+	+	+	_	_	_	?	+	+	+	+	7	Moderate
Luedtek, et al., 2015	+	+	+	+	+	+	?	+	+	+	+	10	High
Machado, et al., 2007	+	?	+	-	-	+	?	-	-	+	+	5	Low
Menzel & Robinson, 2006	+	?	+	-	-	-	?	+	+	+	+	6	Moderate
Monticone, et al., 2013	+	+	+	+	+	+	?	+	+	+	?	9	High
Moore, et al., 2000	+	?	+	-	+	-	?	+	+	+	+	7	Moderate
Newton-John, et al., 1995	-	-	+	-	-	-	?	+	-	+	-	3	Low
Nicholas, et al., 1992	+	_	+	_	+	_	?	_	+	+	_	5	Low
Nicole van der Roer, et al., 2008	+	+	+	-	-	-	?	?	+	+	+	6	Moderate
Roche-Leboucher et al., 2011	+	?	+	?	-	?	?	?	+	+	?	4	Low
Schweikert, et al., 2007	+	_	+	_	_	_	?	+	+	+	_	5	Low
Smeets, et al., 2006	+	+	+	-	-	+	?	+	+	+	+	8	Moderate
Smeets, et al., 2008	+	+	+	_	_	+	?	_	+	+	+	7	Moderate
Van den Hout, et al., 2003	+	?	+	_	_	+	?	_	+	+	_	5	Moderate
Von Korff, et al., 2005	+	-	+	-	-	+	?	+	+	+	+	7	Moderate
Zgierska, et al., 2007	+	_	+	_	_	_	?	_	+	+	+	5	Low

All the identified RCTs involved patients with CBP and compared CBT effectiveness with other interventions and treatment options including not providing any treatment. Four studies (Brox, et al., 2003; Brox, et al., 2006; Fairbank, et al., 2005; Froholdt, et al., 2012) compared CBT to lumbar fusion surgery, and three compared CBT to no treatment groups or wait-list (Glombiewski, et al., 2010; Menzel & Robinson, 2006; Andersson, et al., 2012). The use of an educational programme was compared to CBT in seven studies (Harris, et al., 2017; Bergström, et al., 2012; Johnson, et al., 2007; Lamb, et al., 2010; Moore, et al., 2000; Van Den Hout, et al., 2003; Von Korff, et al., 2005), which compared CBT outcomes to an educational booklet combined with activity or education intervention alone. Standard physiotherapy (e.g., electrical modalities and basic exercises) or active physiotherapy (e.g., functional exercises) were compared to CBT in thirteen studies (Hay, et al., 2005; Zgierska, et al., 2016; Haldorsen, et al., 1998; Abbott, et al., 2010; Christiansen, et al., 2010; Göhner & Schlicht, 2006; Khan, et al., 2014; Machado, et al., 2007; Monticone, et al., 2013; Roche-Leboucher, et al., 2011; Smeets, et al., 2008; Smeets, et al., 2006; Van Der Roer, et al., 2008;). CBT and treatment as usual were compared to each other in four studies (Linton & Ryberg, 2001; Basler, Jäkle, & Kröner-Herwig, 1997; Cherkin, et al., 2016; Bergström, et al., 2012). Kerns et al. (2014) involved a similar CBT programme for the control group with only a minor modification in which patient preference was not targeted, whereas, in Luedtke, et al. (2015), both groups used the CBT programme, but one group received another placebo intervention. Harris, et al. (2017) provided pain education to all groups and then provided CBT to one group and exercise (strength and endurance training) to the other. The follow-up period ranged from a few weeks post-treatment (Smeets, et al., 2006) to 10 years (Bergström, et al., 2012). CBT was compared to a combination of manual therapy with exercises in two studies (Vibe Fersum, et al., 2013; Lambeek, et al., 2010).

2.1.7 Brief CBT

Sixteen studies provided brief CBT during their experiments. Fifteen measured pain, 11 measured disability level, 8 measured mood and 6 measured quality-of-life (see Table 1).

2.1.7.1 Pain measures

Nine studies (Abbott, et al., 2010; Vibe Fersum, et al., 2013; Lamb, et al., 2010; Moore, et al., 2000; Newton-John, et al., 1995; Smeets, et al., 2006; Von Korff, et al., 2005; Hay, et al., 2005; Kerns, et al., 2014), reported significant improvement in pain measures, whereas seven reported non-significant change (Christiansen, et al., 2010; Göhner & Schlicht, 2006; Menzel & Robinson, 2006; Roche-Leboucher, et al., 2011; Van der Roer, et al., 2008; Schweikert, et al., 2006; Smeets, et al., 2008). Both Moore, et al. (2000) and Lamb, et al. (2010) reported that pain intensity was significantly improved at 3-, 6- and 12-months post-treatment assessment. Similar results were obtained by other studies (Machado, et al., 2007; Moore, et al., 2000; Van Den Hout, et al., 2003; Vibe Fersum, et al., 2013; Von Korff, et al., 2005) which stated that the significant improvement of pain measured was maintained at six months (Machado, et al., 2007; Newton-John, et al., 1995) and one-year follow-up (Van Den Hout, et al., 2003; Vibe Fersum, et al., 2013; Von Korff, et al., 2005) respectively. However, Von Korff, et al. (2005) pointed out that the pain improvement had lost its significance at the two year follow-up. One study demonstrated that there were no group differences between the control and treatment group (Göhner & Schlicht, 2006). Therefore, there is a moderate level of evidence that brief CBT would produce significant pain improvement and could be maintained for 6 months follow-up for CBP patients in this review.

2.1.7.2 Disability measures

A significant improvement in disability was reported in ten studies (Abbott, et al., 2010;

Christiansen, et al., 2010; Vibe Fersum, et al., 2013; Hay, et al., 2005; Lamb, et al., 2010; Moore, et al., 2000; Newton-John, et al., 1995; Smeets, et al., 2006; Von Korff, et al., 2005), while one reported non-statistically significant improvement in disability (Smeets, et al., 2008). At one and two years' follow-up, Von Korff, et al. (2005) reported that the disability measure showed a non-significant improvement (Van Den Hout, et al., 2003), while five studies (Abbott, et al., 2010; Lamb, et al., 2010; Moore, et al., 2000; Nakao, et al., 2012; Vibe Fersum, et al., 2013) reported that the significant improvement in the disability measures was maintained at the twelve month follow-up. Therefore, there is strong evidence that brief CBT would produce significant disability improvement for up to one year.

2.1.7.3 Mood measures

Two studies used a measure that evaluated both depression and anxiety (Vibe Fersum, et al., 2013; Harris, et al., 2017). One study reported significant improvement in depression and anxiety (Vibe Fersum, et al., 2013), and reported that mood scores maintained a significant improvement at three and twelve month follow-ups (ibid). Harris (2017) reported a non-significant improvement and both used the hospital anxiety and depression scale (HADS). Depression alone was measured in four studies and all used the Beck depression index (Menzel & Robinson, 2006; Smeets, et al., 2006; Smeets, et al., 2008; Kerns, et al., 2014). All the studies that measured depression only reported non-significant improvement except Kerns, et al. (2014), which reported significant improvement. Two studies measured anxiety alone; one reported a significant improvement (Moore, et al., 2000), while the other reported a non-significant change (Von Korff, et al., 2005). Two measured anxiety and depression using separated measures and both reported a significant improvement in all measures; Hay, et al. (2005) and Newton-John, et al. (1995), however the latter paper reported that the result was non-significant at the one year review. Therefore, the strength of evidence related to brief CBT and mood measures is inconsistent, and further research is required to draw a firm conclusion.

2.1.7.4 Quality-of-life

Seven studies (Abbott et al., 2010; Christiansen et al., 2010; Hay et al., 2005; Harris et al., 2017; Lamb et al., 2010; Newton-John et al., 1995; Von Korff et al., 2005) reported improvements in the quality-of-life; four of them (Abbott, Tyni-Lenné, & Hedlund, 2010; Christiansen, Oettingen, Dahme, & Klinger, 2010; Froholdt, Reikeraas, Holm, Keller, & Brox, 2012; Lamb et al., 2010) showed significant changes, whilst three (Andersson, Johansson, Nordlander, & Asmundson, 2012; Johnson et al., 2007; Moore, Von Korff, Cherkin, Saunders, & Lorig, 2000; Von Korff et al., 2005) showed non-significant change on measures of quality-of-life. Christiansen, et al. (2010) reported improvements in the overall daily activity measure (Hannover ADL and functional capacity evaluation) at the three month follow-up, but no further follow-up assessment was performed (Christiansen, et al., 2010). Each study in the brief intensity group used different outcome measures to assess the change in the quality-of-life. Therefore, there is a moderate weight of evidence that brief CBT would produce significant improvement in quality-of-life related measures for CBP patients in this review.

2.1.8 High dose CBT

2.1.8.1 Pain measure

Ten studies (Basler, 1997; Brox, et al., 2003; Cherkin, et al., 2016; Froholdt, et al., 2012; Glombiewski, Hartwich-Tersek, & Rief, 2010b; Khan, et al., 2014; Machado, et al., 2007; Monticone, et al., 2013; Van Den Hout, et al., 2003; Zgierska, et al., 2016) reported significant improvement in the pain measures. Nine studies reported non-significant change in the pain measures (Andersson, et al., 2012; Bergström, et al., 2012; Brox, et al., 2006; Haldorsen, et al., 1998; Johnson, et al., 2007; Lambeek, et al, 2010; Linton & Ryberg, 2001; Luedtke, et al., 2015; Nicholas, et al., 1992). Although Van Der Roer, et al., reported a significant improvement in the pain measures in the post treatment assessment, they reported later that the pain score was non-significant at the one-year follow-up. In other studies, the significant improvement in pain was maintained after six months (Basler, et al., 1997) and 12 months (Brox, et al., 2003; Cherkin, et al., 2016; Van Den Hout, et al., 2003). Froholdt et al. (2012) stated that the post treatment improvement in the pain score was maintained at the two year follow-up. Therefore, there is weak evidence that intensive CBT would produce significant improvement and could be maintained for 6 months for CBP patients in this review.

2.1.8.2 Disability measure

Eight studies reported significant improvement in the disability measures (Basler, et al., 1997; Brox, et al., 2003; Brox, et al., 2006; Cherkin, et al., 2016; Fairbank, et al., 2005; Khan, et al., 2014; Machado, et al., 2007; Van Den Hout, et al., 2003), while seven studies reported non-significant change in the disability score (Bergströmet, et al., 2012; Haldorsenet al., 1998; Johnson, et al., 2007; Lambeek, et al., 2010; Luedtke, et al., 2015; Monticone, et al., 2013; Zgierska, et al., 2016). It was reported that the significant improvement on the disability measure was maintained at six months (Basler, et al., 1997), one year (Cherkin, et al., 2016) and two years (Fairbank, et al., 2005). At the one- and two-year follow-up, Van Den Hout, et al. reported that the measure of disability still indicated an improvement, but not at the same level of significance as the earlier follow-ups. Therefore, there is weak evidence that intensive CBT would produce significant disability improvement and could be maintained for 6 months follow-up for CBP patients in this review.

2.1.8.3 Mood measure

Six studies used one measure that evaluated both depression and anxiety (Brox, et al., 2003; Brox, et al., 2006; Fairbank, et al., 2005; Andersson, et al., 2012; Haldorsen, et al., 1998; Linton and Ryberg, 2001). Two reported significant improvement in the mood measures (Brox, et al., 2003; Fairbank, et al., 2005), while the remaining four reported non-significant change. Depression alone was measured in three studies using the Beck depression index (Glombiewski, et al., 2010; Machado, et al., 2007; Nicholas, et al., 1992). Both Glombiewski, et al. (2010) and Nicholas, et al. (1992) reported a significant change in depression, while the remaining study reported non-significant change. Nicholas et al. (1992) reported that the significant improvement was maintained at the six months and one-year follow-ups. Cherkin et al. (2016) measured anxiety and depression using separated measures and reported a significant improvement in both measures and reported that at the twelve months follow-up, the improvement in the mood was non-significant. Therefore, the weight of evidence to support the effect of intensive CBT on the mood measures for CBP patients in this review is weak.

2.1.8.4 Quality-of-life

Four studies reported significant improvement in quality-of-life (Brox, et al., 2003; Cherkin, et al., 2016; Froholdtet, et al., 2012; Monticone, et al., 2013), while the other five studies reported non-significant change in quality-of-life (Andersson, et al., 2012; Brox, et al., 2006; Fairbank, et al., 2005; Johnson, et al., 2007; Zgierska, et al., 2016). The observed improvement was maintained at the one- year follow-up (Brox, et al., 2003), the two-year follow-up (Fairbank, et al., 2005), and the nine-year follow-up (Froholdt, et al., 2012). Cherkin et al. reported that at 12 months follow-up, the improvement in the quality-of-life was non-significant. Both Brox et al. (2003) and Brox et al. (2006) used the general function score outcome measure to evaluate quality-of-life, but reported different results. Similarly, SF-36 was used in two studies and each reported different results (Fairbank, et al., 2005; Monticone, et al., 2013). Therefore, the level of evidence related to intensive CBT and quality-of-life measures is inconsistent, and further research is required to draw a firm conclusion.

2.1.9 The deliverer

2.1.9.1 Pain measure

Five studies that used a physiotherapist to deliver CBT reported significant pain improvement (Abbott et al., 2010; Brox, et al., 2003; Vibe Fersum, et al., 2013; Hay, et al., 2005; Khan, et al., 2014), while three reported non-significant change in pain measures (Brox, et al., 2006; Johnson, et al., 2007; Van Der Roer, et al., 2008). The significant pain improvement was maintained at the one-year follow-up (Brox, et al., 2003; Vibe Fersum, et al., 2013; Hay, et al., 2005). Among the studies that involved a psychologist or psychotherapist to deliver the CBT, thirteen studies reported significant change in the pain (Basler, et al., 1997; Cherkin, et al., 2016; Froholdt, et al., 2012; Glombiewski, et al., 2010; Kerns, et al., 2014; Machado, et al., 2007; Monticone, et al., 2013; Moore, et al., 2000; Newton-John, et al., 1995; Smeets, et al., 2006; Van den Hout, et al., 2003; Von Korff, et al., 2005 ; Zgierska, et al., 2016), while elven studies reported insignificant change in the pain (Andersson et al., 2012; Bergström, et al., 2012; Christiansen, et al., 2010; Nicholas, et al., 1992; Linton & Ryberg, 2001; Luedtke, et al., 2015; Menzel & Robinson, 2006; Roche-Leboucher, et al., 2011; Schweikert, et al., 2006; Smeets, et al., 2008; Göhner & Schlicht, 2006). The significant improvement in the pain was maintained at six months (Basler, et al., 1997; Newton-Johnet al., 1995) and the one-year follow-up (Cherkin, et al., 2016; Van Den Hout, et al., 2003; Vibe Fersum, et al., 2013). However, Von Korff et al. (2005) pointed out that the pain improvement had lost its significance at the two-year follow-up (Von Korff, et al., 2005).

Two studies – Lamb et al. (2010) and Haldorsen et al. (1998) – that involved a multidisciplinary team (physiotherapists, nurses, psychologists and occupational therapists) to deliver CBT reported contradictory results. While the former reported a significant improvement in pain which was maintained at the one-year follow-up, the latter reported non-significant change in the pain post-treatment assessment and at the follow-up. Finally, Lambeek et al. (2010) was the only study to involve an occupational therapist to deliver the CBT and reported that there was non-significant change in the pain measure. Therefore, there is a moderate level of evidence that CBT programmes delivered by physiotherapists would produce significant pain improvement and could be maintained up to the one-year follow-up for CBP patients in this review. However, the level of evidence related to psychologists delivering CBT and pain measures is inconsistent, and further research is required to draw a firm conclusion.

2.1.9.2 Disability measure

Six studies that involved physiotherapists in delivering CBT reported significant improvement in the disability measures (Abbott, et al., 2010; Brox, et al., 2003; Brox, et al., 2006; Vibe Fersum, et al., 2013; Hay, et al., 2005; Khan, et al., 2014), while only one study (Johnson, et al., 2007) reported non-significant change in the disability measures. The significant improvement in disability was maintained at the six-month (Vibe Fersum, et al., 2013) and 12-month follow-ups in a group of studies (Abbott, et al., 2010; Hay, et al., 2005). Van Der Roer et al. (2008) reported that the disability level changed significantly at the post-treatment assessment, however at the six- and 12-months follow-ups, the improvement became insignificant.

Among the studies that recruited a psychologist to provide CBT, ten reported significant improvement in the disability measure (Basler, et al., 1997; Cherkin, et al., 2016; Christiansen et al., 2010; Fairbank, et al., 2005; Kerns, et al., 2014; Machado, et al., 2007; Newton-John, et al., 1995; Smeets, et al., 2006; Van Den Hout, et al., 2003; Von Korff, et al., 2005), while five reported non-significant change in the disability (Bergströmet al., 2012; Harris, et al., 2017; Monticone, et al., 2013; Smeets, et al., 2008; Zgierska, et al., 2016). The significant improvement in disability was maintained at the 6-month follow-up (Basler, Jäkle, & Kröner-Herwig, 1997), one year (Cherkin, et al., 2016, Moore, Von Korff, Cherkin, Saunders, & Lorig, 2000) and 2 years (Fairbank, et al., 2005). At the one- and two-years follow-ups, Von Korff et al. (2005) and Van Den Hout et al. (2003) reported that the disability measure was still improved but not as significant.

Two studies that involved multidisciplinary teams delivering CBT reported contradictory results (Lamb, et al., 2010; Haldorsen, et al., 1998). Lamb, et al., reported significant improvement in the disability measurement that was maintained at 12 months follows up, while Haldorsen, et al., reported insignificant change. Lambeek et al. (2010) involved occupational therapists delivering the CBT and reported that there was insignificant change in the disability measure at post treatment scores. At the 12-month follow-up, however, they reported that the disability measure was significantly improved. Therefore, there is a strong level of evidence that CBT programmes delivered by physiotherapists would produce significant disability improvement and could be maintained up to the one-year follow-up for CBP patients. The level of evidence related to psychologists delivering CBT and disability measures is moderate, and this improvement could be maintained for up to one year.

2.1.9.3 Mood measure

Four studies that recruited physiotherapists to deliver the CBT included a measure of mood, and three reported a significant improvement (Brox, et al., 2003; Vibe Fersum, et al., 2013; Hay, et al., 2005) that was maintained at the one-year follow-up. One study reported non-significant change in the mood measures (Brox, et al., 2006). Nine studies that involved psychologists delivering the CBT reported non-significant change in the mood measure (Andersson, et al., 2012; Harris, et al., 2017; Kerns, et al., 2014; Linton & Ryberg, 2001; Machado, et al., 2007 ; Von Korff, et al., 2005; Schweikert, et al., 2006; Smeets, et al., 2006; Smeets, et al., 2008), while six reported significant change in the mood measure (Cherkin, et al., 2016 ; Fairbank, et al., 2005 ; Glombiewski, et al., 2010b; Moore, et al., 2000 ; Nicholas, et al., 1992; Newton-John, et al., 1995). Nicholas et al. (1992) reported that the significant change in mood was maintained at the six-month follow-up. Therefore, three is a moderate level of evidence that CBT programmes delivered by either physiotherapists or psychologists would produce significant mood improvement for CBP patients in this review.

2.1.9.4 Quality-of-life

Three studies that recruited physiotherapists to deliver the CBT reported significant change in quality-of-life measure (Hay, et al., 2005; Brox, et al., 2003; Abbott, et al., 2010), while Johnson et al. (2007) and Brox et al. (2006) reported non-significant change in the quality-of-life assessment. This significant improvement was maintained at the one-year follow-up in Brox et al. (2003) but not in the other studies.

Among the studies that involved a psychologist delivering the CBT, five reported significant change in quality-of-life (Cherkin, et al., 2016 ; Christiansen, et al., 2010; Newton-John, et al., 1995; Froholdt, Reikeraas, Holm, Keller, & Brox, 2012; Monticone, et al., 2013), while six reported non-significant change (Andersson, et al., 2012; Fairbank, et al., 2005; Harris, et al., 2017; Von Korff, et al., 2005; Schweikert, et al., 2006; Zgierska, et al., 2016). The significant change in quality-of-life was maintained at the two-year (Fairbank, et al., 2005) and nine-year follow-ups (Froholdt et al., 2012). One study that involved a multidisciplinary team to deliver CBT reported contradictory results and a significant improvement in quality-of-life that was maintained at the 12-month follow-up (Lamb, et al., 2010). Therefore, the level of evidence related to CBT programmes delivered by physiotherapist or psychologists and quality-of-life measures are inconsistent, and further research is required to draw a firm conclusion.

Discussion

The aim of this systematic review was to explore the effect of CBT in terms of intensity and deliverer on self-reported pain severity, disability, mood and quality-of-life in CBP patients. To the best of our knowledge, this is the first review of its type to have done this. The results of the review indicate that brief CBT (between 4-8 session or less than 10 hours) had better outcomes on the disability and quality-of-life measures than high intensity CBT (more than 12 sessions or more than 12 hours). Both intensities had a moderate but significant effect on changing the level of pain over a period of six months, however did not lead to significant change on the mood measures (anxiety and depression) in the reviewed studies. Additionally, the results indicated that CBT programmes provided by trained physiotherapists would successfully produce positive change on pain, disability, mood and quality-of-life measures in patients with CBP, similar to the results that were obtained when the CBT was delivered by psychologists or by a multidisciplinary team.

Main findings

2.1.10 Treatment dose/intensity

The findings of this review show that a brief CBT for CBP patients would produce significant change in pain, disability and quality-of-life, and the effect would be maintained for period of six to twelve months after treatment. Similar results have previously been reported (Andrews, et al., 2010; Bennett-Levy, et al., 2010; Clark, 2011; Clark, et al., 2009; Farrand & Woodford, 2013; Grist & Cavanagh, 2013; Iapt, 2012). Previously, it was suggested that brief CBT might be effective to reduce anxiety and depression in the general population (Andrews, et al., 2010; Farrand & Woodford, 2013; Grist & Cavanagh, 2013), especially in the short-term (Bennett-Levy, et al., 2010). In addition, in the UK, brief CBT interventions are recommended by NICE (2011) for those with mild to moderate anxiety and depression. Since 2008, low intensity CBT has been introduced to people with sub-clinical symptoms of anxiety and depression as part of the UK's Improving Access to Psychological Therapies (Iapt) initiative, with some success (Clark, 2011; Clark, et al., 2009; Iapt, 2012). In the chronic pain population, reviews have suggested general effectiveness for CBT in the management of chronic musculoskeletal pain and CBP (Melisza & Mabruroh, 2017; Sturgeon, 2014), without describing the intensity of the provided interventions. However, in a recent longitudinal cohort study on patients with depression, it was found at one year follow-up that half of the participants who received brief and low intensity CBT had relapsed, especially those with residual depression at the end of the treatment (Ali, et al., 2017).

Other studies have tried to provide predictors for the CBT's effectiveness. For example, early positive changes in the symptoms and the length of the CBT have been correlated with short-term effectiveness in patients with general anxiety and depression (Delgadillo, 2014). Glenn et al. (2013) suggested that higher treatment dose and patient engagement in CBT for anxiety disorders were stable and robust predictors of greater reductions in anxiety, depression and functional disability (Glenn et al., 2013). They suggested that long-term learning could be reinforced and maintained by practicing the CBT techniques continuously, and therefore that more time spent practicing CBT skills (high treatment dose) and greater effort committed to practice (high patient engagement) can lead to better functional long-term learning, resulting in an improvement in symptoms and functional abilities. Conversely, a low treatment dose and a lack of patient engagement are viewed as reasons for a poor response to treatment. However, guidelines produced by Durham et al. (2005) on CBT for anxiety and depression in patients with anxiety disorder found that providing CBT beyond the standard protocol of about 10 sessions over a period of 6 months would not lead to better outcomes (Durham, et al., 2005). In a similar manner, chronic pain is significantly associated with depression and anxiety (Holmes, Christelis, & Arnold, 2013; Sheng, et al., 2017), which led to poor treatment response (Cherkin, et al., 1996; Karp, et al., 2005). Other studies have reported that chronic pain patients with high level of depression and catastrophising behaviours are expected to have poor response to medical interventions, including the psychological interventions (Keefe, et al., 1989; Mankovsky, et al., 2012).

Multiple factors might play an important role in the reported poor improvements in our review, such as the greater complexity and severity of presenting problems at the time of referral, failure to complete treatment irrespective of modality, the amount of interim treatment during the follow-up period and possibly other treatment being received alongside CBT such as analgesia or physiotherapy. Psychological interventions in chronic pain cases should recognise that anxiety disorders and chronic health conditions tend to follow a chronic course and that good outcomes with CBT over the short-term are no guarantee of good outcomes over the longer term. This might explain the inability of CBT interventions in the reviewed studies to maintain long-term positive effects because the corrected maladaptive beliefs could be affected by daily habits and residual symptoms (Taylor, et al., 2010). For example, people with high workload or a stressful job are expected to suffer from depression and anxiety (Desouky & Allam, 2017; Song, et al., 2017), which might lead symptoms replaces (Thomas 2016) and failure of treatment (Gorwood, et al., 2010). Verhoeven and De Wit (2018) stated that personal habits that have undesirable consequences or have harmful effect might prevent flexible behavioural adjustments and have health-related consequences. Some studies have reported that, unless booster sessions and continuous monitoring are performed, relapses occur due to the multifactorial nature of CBP (Gearing, et al., 2013; Spence, et al., 2011). The multifactorial nature of chronic pain makes it difficult to control as it could be aggravated by different factors, such as daily activities, sociocultural stress, beliefs and uncontrolled situations such as illness or accident (Rodrigues-De-Souza, et al., 2016). Sometimes, these factors might have an even stronger effect than the CBT programme (Bham & Ross, 2005; Hernandez & Blazer, 2006). Most of CBT interventions for psychological disorders have relapse prevention strategies within the protocol. However, the number of sessions focused on detection and prevention of relapse is usually limited to the final 2 or 3 sessions. CBT interventions in the future might benefit from a more elaborate intervention protocol focused on staying well after the recovery from pain and maintenance of treatment gains (Durham, et al., 2005).

In a time when healthcare funding is limited in the UK and Europe (Karanikolos, et al., 2013; Roberts, 2015) and the Middle East (Alkhamis, Hassan, & Cosgrove, 2014), and is unlikely to improve in the near future, healthcare providers might weigh up the balance between maximising therapy effectiveness and widening access to all who might benefit. With limited therapist resources, our findings suggest that low intensity CBT could be an effective way to widen access while maintaining treatment effectiveness (Betancourt, et al., 2016). Previously in a five-year follow-up study of 40 participants who were randomised to either CBT or a control group (recreational activities with informal support), Drury, Birchwood and Cochrane (2000) found no differences between CBT and the control with regard to the number of relapses or admissions, positive or negative symptoms or time spent in acute inpatient facilities. However, for those individuals who received CBT and did not have more than one relapse, the effects of CBT endured. These participants continued to show reduced self-rated delusional conviction, observer-rated delusional ideation, thought disorder, hallucinations and increased perception of control over psychosis. Therefore, one might hypothesise that psychological interventions which emphasise staying well after psychosis or additional interventions aimed at early detection of relapse and intensive preventative interventions may help sustain the effects of CBT and other treatments (ibid). Similar results have been obtained in chronic pain studies that found that patients who received CBT continued to show improvement in pain catastrophising measures (Schütze, et al., 2018) and patient global assessment (McBeth, et al., 2012). However, a recent systematic review on predictors that affect CBT outcomes in patients with chronic pain concluded that, although many patients with chronic pain might benefit from CBT, the evidence is inconsistent and it is not clear which patient group would benefit from CBT and which would not (Gilpin, et al., 2017). This suggests that the emotional level and psychological distress at the baseline might have a strong impact on CBT outcomes.

Long-term outcome of the anxiety disorders was found to be most significantly predicted by the complexity and severity of presenting complaints at the time of referral, completion of treatment, whether CBT or non-CBT, and the receipt of further treatment during the follow-up period (Durham, et al., 2005). The severity of anxious and depressive symptoms prior to treatment has been found to predict the response to psychotherapy (Rosenkranz & Muller, 2011). This might explain why our results failed to find positive effect of both brief and high intensity CBT on the mood measures as most of the recruited studies in this review involved participants with sub-clinical levels of anxiety and depression. Clinical experiences suggested that intensive psychological therapy might be helpful for patients with more complex pain symptoms and there is some evidence that supports this. For example, in a study on pain self-management training in patients with chronic pain, it was concluded that the more sessions the patients attended, the more the significant were the outcomes (Damush, et al., 2016). In a review by Linda et al. (2015), it was suggested that less intensive CBT might have similar effects to intensive CBT in patients with depression seen in primary care. However, previous work has suggested that back pain patients' characteristics at the baseline do not predict treatment response to standard physiotherapy (Underwood, et al., 2007) or CBT (Turner, Holtzman, & Mancl, 2007). Instead of that, research suggested that, patients' treatment expectations in regard to the treatment outcomes have strong impact on CBT outcomes in patients with CBP (Beasley, Ferguson-Jones, & Macfarlane, 2017) and in patients with chronic pain in general (Cormier, Lavigne, Choinière, & Rainville, 2016).

In considering the implications of the present study it should be remembered that the clinical effectiveness of CBT in daily practice might be less than that found in RCTs. Therefore, the implementation of CBT might need to follow some of the methodological steps used in clinical research such as clinical supervision and assessment of therapist competence in delivering treatment protocols to achieve the same results (C. Durham, 2000). This might be more important with some of the complicated psychological interventions (Wells, 1999), which appear to be more demanding of therapist skill than standard treatments.

2.1.11 The deliverer

The results of this review showed that CBT provided by a trained physiotherapist would produce a significant change in pain, disability, mood and quality-of-life measures in patients with CBP. In 2016, a review by Hall et al. reported that with additional training, physiotherapists could deliver effective CBT interventions. Several studies have investigated the ability of a physiotherapist to provide CBT for patients with chronic musculoskeletal pain such as neck pain (Pool, et al., 2010; Sullivan, et al., 2006), back pain (Johnson, Jones, & Wiles, 2007; Pengel, et al., 2007), knee pain (Hunt, et al., 2013; Hurley, et al., 2007) and general chronic musculoskeletal pain (Åsenlöf, et al., 2009) and all have reported positive results. A randomised controlled trial investigating the ability of physiotherapists to deliver a combined treatment of therapeutic exercises and a CBT programme based on pain coping strategies for patients with chronic knee osteoarthritis (Bennell, et al., 2012) found that, with appropriate training, physiotherapists were capable of delivering the programme successfully and produced a clinically significant change in the outcomes. A qualitative study (Nielsen, et al., 2014) investigated physiotherapists' perspectives on delivering CBT, and concluded that physiotherapists can be trained to confidently deliver a CBT programme to enhance their clinical practice, providing that an expert psychologist trained in CBT can monitor their performance in the initial phases.

CBT programmes delivered by a non-psychologist have been reported to have many benefits. Bennell et al. (2012) reported potential advantages of using a single therapist, such as better integration of the intervention components, increased availability of CBT treatment to those who may not have access to a psychologist, reduced time and cost for patients and reduced overall costs to the health care system with the ability to integrate exercises and psychological treatment into a single session (Hunt, et al., 2013). Although physiotherapists might not have specialist training in psychological interventions, they are a logical choice to be trained in the delivery of CBT given their expertise in administering physical treatments to treat pain and their understanding of the biopsychosocial approach (Bennell, et al., 2012). Despite previous trials having established that traditional biomedical-based treatments (e.g., acupuncture, manual therapy, massage, and specific exercise programmes) that focus only on physical symptoms do provide short-term benefits, their sustained effect is questionable. A CBT approach includes techniques to target both physical and psychosocial symptoms related to pain and to provide patients with long-lasting skills to manage these symptoms on their own. This combined method has been used in a variety of settings delivered by different health care professionals and has been shown to produce long-term effects on patient outcomes. What has been unclear is whether these programmes are effective when delivered by physiotherapists in routine day-to-day physiotherapy practice (Hall, et al., 2016). There is a lack of research to draw a conclusion related to the effectiveness of multidisciplinary team in the management of CBP with programmes that included CBT in our review. For over a decade, there has been a call for further research to improve this area, as many reviews have failed to provide a clear conclusion due to the lack of research and unclear results (Scascighini, et al., 2008; Schütze, et al., 2018; Von Der Hoeh, et al., 2014).

Barriers to implementing CBT in physiotherapy daily practice have been discussed in many studies (Barlow & Stevens, 2014; Critchley, et al., 2016; Gardner, et al., 2017; Ringle, et al., 2015; Synnott, et al., 2015). A major barrier, according to Barlow and Stevens (2014), is that physiotherapists might lack knowledge of the theoretical foundations of chronic pain management. The lack of knowledge of and use of a biopsychosocial assessment and identification process means people with chronic pain are managed as if they have acute pain (Whitten, 2005). This suggests that physiotherapists need opportunities to see chronic pain management in action before they adopt the new forms of thinking and practice. In qualitative work by Critchley et al. (2016), it was reported that for physiotherapists to implement CBT in the everyday practice, physiotherapy systems and practice should be prepared to fit with CBT requirements, either by providing appropriate training or by integrating CBT in physiotherapy academic curriculum (Brunner, et al., 2013).

Another barrier was that physiotherapists are lacking the fundamental knowledge and skills to identify patients with psychological issues and deliver psychological intervention efficiently (Synnott, et al., 2015). Overall, a major barrier to implementing evidence-based practice in the clinical practice is the personal beliefs and attitudes of the physiotherapists (Gardner, et al., 2017). Research reported a strong correlation between healthcare providers' beliefs and patients' health beliefs and treatment outcomes such as satisfaction, adherence and positive response to treatment (Jackson, 2005; Street et al., 2009). To achieve high quality of treatment outcomes, effective communication and communication skills are required (Hall, et al., 2002; Street et al., 2007). Research has shown that healthcare providers often have a modest understanding of their patients' beliefs with respect to patient preferences for involvement in decision-making about their health (Strull, Lo, & Charles, 1984), desire for information (Willems, et al., 2005), perceptions of health condition (Suarez-Almazor, et al., 2001), interest in life-sustaining treatments (Teno, et al., 1995), beliefs about treatment effectiveness and diagnosis (Quirt, et al., 1997), level of health literacy (Kelly & Haidet, 2007) and emotional conditions (Butow, et al., 2002; Hall, et al., 1999). In practice, therapists' beliefs and attitudes cannot be controlled in opposite to the research sitting where the environment is staged and controlled.

The majority of the CBT protocols and psychological interventions were delivered by physiotherapists in the studies reviewed here, and showed some positive benefit in terms of patient outcomes. However, there is considerable heterogeneity in regard to the behavioural and cognitive components incorporated in the interventions (Nielsen, et al., 2014). Likewise, there has been considerable variability in the training provided to physiotherapists (equivalent to 1 to 4 days training, with or without ongoing mentoring) (Hunt, et al., 2013; Johnson, Jones, & Wiles, 2007; Lamb, et al., 2010; Williamson, et al., 2009), or details of training have not been reported (Hurley, et al., 2007; Johnstone, et al., 2002; Pengel, et al., 2007; Woby, et al., 2004). There has been variability in who delivered the training (psychologists or physiotherapists) (George, et al., 2008; Johnson, Jones, & Wiles, 2007; Pengel, et al., 2007) and procedures to determine treatment fidelity (Åsenlöf, et al., 2009; Johnson, Jones, & Wiles, 2007; Lamb, et al., 2010; Pengel, et al., 2007; Williamson, et al., 2009). Challenges in incorporating psychosocial factors in physiotherapy practice also have been identified, including the dominance of the biomedical perspective in physiotherapy education and practice (Foster & Delitto, 2011; Hunt, et al., 2008; Main & George, 2011), possible lack of understanding of psychosocial factors and how to evaluate and manage these factors (Foster & Delitto, 2011), and concerns with time constraints (Beissner, Henderson Jr, et al., 2009; Foster & Delitto, 2011). Therefore, standardising these issues and targeting the implementation barriers would facilitate the implementation of CBT in physiotherapy day-to-day practice (Hall, et al., 2016).

Our findings reveal some gaps in the literature that prevent firm conclusions being drawn. First, there were insufficient long-term follow-up studies that monitored the participants after treatment. Hlatky (2014) stated that long-term follow-up is crucial for clinical trials and that the length of the follow-up period depends on the nature and history of the problem. In a large study involving more than 1,300 patients with a history of back pain, Stanton et al. (2008) reported that the majority of participants reported a relapse after one year, but this was not as common as previously reported. Therefore, patients with an episode of back pain would experience another episode after one year or more, and that is why a follow-up of longer than one year is required. Much research exists providing evidence that CBT might be an effective treatment for chronic pain and CBP with up to a one-year follow-up (Hajihasani, et al., 2018; Richmond, et al., 2015), but there is little evidence on the endurance of treatment gains over a longer period. Those follow-up studies which have been conducted tend to be either naturalistic follow-ups of cohorts of patients, which could provide minimal amount of information about the efficacy of specific treatments, or they report on the follow-up of a specific treatment over relatively short durations post-treatment such as six months to one year. There is a need, therefore, for longer term follow-up studies of CBT treatment trials (Durham, et al., 2005; Knecht, Humphreys, & Wirth, 2017; Marras, et al., & Maronitis, 2007; Stanton, et al., 2008). There are also many conservative interventions such as manual therapy and exercise that have been shown to provide up to one-year's effectiveness for the management of CBP (Aure, Nilsen, & Vasseljen, 2003; Balthazard, et al., 2012; Cuesta-Vargas, et al., 2011; Licciardone & Aryal, 2014; Slater, et al., 2012). These trials reported that the incidence of relapse after the first year was due to maladaptive behaviours and beliefs, recommending that CBT should be considered to overcome these obstacles. CBT is thus expected to improve the effectiveness of the conservative intervention by changing maladaptive behaviours and beliefs and reducing the chances of re-learning and re-practicing behaviours that would provoke the problem again (Aggarwal, et al., 2010; Brunner, et al., 2013; Niemistö, et al., 2003; Sveinsdottir, et al., 2012a). Future research about CBT for CBP might consider long-term follow-up of at least 3-5 years, to provide a strong platform for drawing firm conclusions.

Another gap was the lack of standardisation in the CBT programmes, which complicated the comparison process. Previous work by Dworkin et al. (2005) found that CBT trials lack standardisation due to the differences in the recorded baseline of the participants, the content of the CBT, the dose and the method of delivery. Therefore, it is difficult to specify an ideal number of CBT hours or sessions due to the variety of the symptoms and patients' interpersonal differences (Dworkin, et al., 2005; Dworkin, et al., 2008).

2.1.12 Methodological considerations

Generally, this systematic review provided moderate quality evidence. Most of the studies exhibited significant limitations in the methodological quality, and in some there was imprecision of data (missing or incomplete data) and inconsistency due to heterogeneity. According to Hill and Fritz (2011), CBP is a heterogeneous disorder incorporating various subgroups of patients. Ignoring such heterogeneity during the analysis and interpretation of the findings would affect the reliability and validity results and reduce the generalisability of the findings (Hill & Fritz, 2011). Further research may have an important impact on our confidence in the estimated effect and may possibly change the estimate.

2.1.13 Limitations, strengths and future work

Numerous biases could occur as a result of a study's search and selection method. Unpublished studies related to the topic might be missed due to difficulties in accessing these studies, which are liable to be pilot studies with insignificant findings, leading to publication bias. According to Borenstein et al. (2000), the investigator should perform an intensive search of the literature, trying to minimise such bias. The manual screening of references from the selected literature may consequently produce an over-representation of related studies because trials with a positive result are expected to be referred to in other publications, leading to reference bias (Jannot, et al., 2013). Reference or citation bias is a common phenomenon in scientific literature in which trials that report significant or positive results are liable to be cited more than those with negative or insignificant findings on the same topic (Nieminen, et al., 2007). Studies published in languages other than English were not included in this review; however, it is not clear whether a language restriction is associated with bias (Egger & Smith, 1998). Most of the studies provided low to moderate evidence and only a minority were evaluated as high quality, leading to an underestimation of effect. Further high-quality evidence might help to evaluate the effect of CBT on chronic pain co-morbid symptoms, especially the impact on depression and anxiety and the overall quality-of-life. Currently, the available evidence and information to evaluate the quality and clinical importance of the studies' findings is inadequate, which might reduce the effectiveness of CBT for the management of CBP. Furthermore, the majority of studies used only two outcome measures – pain intensity and disability level – restraining the ability to report on other important outcomes. It was difficult to conduct a sensitivity analysis due to the relatively small number of studies pooled within the different subgroups; however, the CBRG (Bouter, et al., 2003) method applied tried to account for the risk of bias found in the different studies. A major strength of this review was that it was the first to evaluate the effect of CBT intensity on the CBP patients.

2.1.14 Implications for practice

Brief CBT sessions (ranging from 4-8 sessions) for the management of CBP might be efficient to produce significant change on pain, disability and quality-of-life measures in patients with CBP. Additionally, physiotherapists with sufficient training and expert supervision might be able to deliver CBT for CBP patients. This is important to overcome the lack of access to psychotherapy in some areas, saving time and cost and providing up-to-date health services. However, patients with depression and anxiety which might interfere with of the outcomes should visit psychotherapists as CBT failed to provided significant change in depression and anxiety in our review. Consequently, working in multidisciplinary team might help in the management.

2.1.15 Implications for research

There is a need for high quality RCTs that explore the effect of CBT on mood and the quality-of-life in CBP patients. High quality research should fulfil all aspects of study design, such as reporting study questions, methods, sampling and outcomes measure, and avoid or report any expected bias (Boaz & Ashby, 2003; Lohr, 2004), and intent-to-treat analysis and assessing the reliability of the findings (Stanley, 2007).

Studies could use groups with high and low intensity CBT to explore the effect of CBT intensity on CBP. Additionally, researchers might keep following the participants for more than two years, so that the long-term effect of CBT could be understood, as relapses are not uncommon among CBP sufferers.

Conclusion

CBT is a psychological intervention that is widely used for the management of CBP. Despite recommendation to provide a higher dose of CBT, our review has revealed that a brief course of CBT with a booster session might be enough to produce significant changes in CBP patients with sub-clinical psychological symptoms. Additionally, most physiotherapists can provide CBT for patients with CBP if they received the appropriate training. The few barriers could be targeted to encourage physiotherapists to implement CBT in their daily practice. Further research is required to provide standard system for better understanding of the effect different dose of CBT on CBP.

Chapter 3. Predictors of self-reported pain intensity, disability level and mood in Kuwaiti patients with chronic back pain

Introduction

CBP is a widespread and costly musculoskeletal problem (Koes, Van Tulder, & Thomas, 2006) that is associated with a high recurrence rate (24% to 87%) (Stanton, et al., 2008) and chronicity rate (72%) (Slater, et al., 2009; Wahlgren, et al., 1997) within one year of the first episode (Stanton, et al., 2008). More than 75% of CBP cases are described as nonspecific, with no strong evidence of patho-anatomical or radiological deformity (i.e., slipped disc) (Waddell, 2004). CBP is a critical and growing health problem in many countries (Ferrari, et al., 2015). In addition to the pain and disability produced, it has a major effect on work productivity and financial status due to a high level of sick-leave and work absenteeism (Waddell, 2004). About 13% of workers experience productivity loss due to work absenteeism (i.e., 3 working days per episode) because of common chronic pain conditions, including upper and lower back pain (Escorpizo, et al., 2007; Kotlarz, Gunnarsson, Fang, & Riszo, 2010). CBP generates very high cost (Raftery, et al., 2012); for example, in the UK alone, in 2000, the estimate of the resultant health-care costs was £12.3 billion (Maniadakis & Gray, 2000) and more than $200 billion in the US (Ma, Chan, & Carruthers, 2014; Mafi, et al., 2013; Martin, et al., 2008). Both society and individuals are severely affected by its high incidence (1.4 per 1,000 people, yearly) (Waterman, et al., 2012; Thelin, Holmberg, & Thelin, 2008). Approximately one fifth of the population is affected by CBP at some point in their lives (Long, 1999) and half of the world’s population is expected to experience at least one episode of back pain by the age of 30 (Papageorgiou, et al., 1995). In a report by the United States’ National Centre for Health Statistics (2012), it was estimated that, in every three months, more than 28% of adults would experience at least one episode of back pain. Additionally, according to

Lawrence et al. (2008), in 2008 more than 60 million American adults reported daily activity restrictions due to CBP.

Risk factors for CBP could be classified into three groups: **personal factors** such as age, smoking habits, physical abilities and body weight (Hamberg-Van Reenen, et al., 2007; Wai, et al., 2008); **psychosocial factors** such as stress, socioemotional support and job satisfaction (Hoogendoorn, et al., 2000; Ramond, et al., 2011); and **physical factors** such as twisting, bending, lifting and posture (Tiemessen, Hulshof, & Frings-Dresen, 2008). The association between the physical risk factors and CBP is, however, unclear, according to Bakker et al. (2009) and Wai et al. (2008), and the evidence on the dose-response relationships in back pain patients is mixed and inconsistent (Burström, Nilsson, & Wahlström, 2015; Lings & Leboeuf-Yde, 2000; Ribeiro, et al., 2012; Solecki, 2010). The association between the type of physical exposures and CBP might be insignificant by comparison to the association with the amount and intensity of the load on the lower back (i.e., the way that physical activities affect the musculoskeletal system), since a higher load might overload the spinal structures, causing injuries (Burdorf, 2010). It has been suggested that cumulative loads on the spine may be linked to CBP (Seidler, et al., 2009), and clinical observations indicate that impairment in motor control during sitting and standing could produce CBP because it could lead to defects in the body’s mechanics during such activities, leading to abnormal spinal function (Burnett, et al., 2004). Yet the evidence is conflicting, as some studies reported that sitting and standing increased the risk for CBP (Lis, Black, Korn, & Nordin, 2007), whereas other studies showed no association (Bakker, et al., 2009; Fransen, et al., 2002). Moreover, a systematic review by Christensen and Hartvigsen suggested that the evidence to support the relationship between body posture and back pain is weak and inconsistent (Christensen & Hartvigsen, 2008).

It is well documented that patients with CBP suffer from mood changes and emotional disorders such as anxiety, depression and anger (Alba-Delgado, et al., 2013; Feldman, Downey, & Schaffer-Neitz, 1999; McWilliams, Cox, & Enns, 2003; Song, et al., 2015). Kendall et al. (1997) presented several psychosocial and environmental risk factors for disability and loss of productivity. These included fear of pain or injury, incorrect illness beliefs and mood distress (e.g., depression and anxiety). However, a study by Grimmer-Somers, Prior and Robertson (2008) examined these factors and suggested that, in spite of the validity of these factors in moderate or high 'yellow flag' symptoms,[1] people with mild symptoms might not have lengthy and chronic pain and recommended further testing. A recent study by Hashmi et al. (2013) claimed that brain activity that was detected in the functional MRI in the participated patients with CBP was shifted from pain-related areas (the prefrontal, anterior and parietal cingulum) to more cognitive and emotional areas (the limbic system and the autonomic nervous system). Nicholas et al. (2011) concluded that targeting yellow flags such as work overload and catastrophising beliefs, especially during a high symptoms phase, leads to more reliably positive outcomes than neglecting them or providing psychotherapy to sufferers, irrespective of the psychological risk factors. However, a review by Ramond et al. (2011) concluded that, in spite of the large number of studies investigating this topic, only a small number reported a modest ability to predict CBP related outcomes and failed to provide prognostic tools for CBP patients such as the STarT Back Screening Tool. This is a simple prognostic questionnaire that helps clinicians identify changeable risk factors (biomedical, psychological and social) for backpain-related functional disability (Traeger

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[1] Yellow flags are psychosocial indicators suggesting an increased risk of progression to long-term distress.

& McCauley, 2013). The interaction of pain, negative mood and emotional imbalance will result in disability and a low quality-of-life (Waddell, 2004; Woolf, 2010). Patients with CBP commonly complain of physical impairments and functional limitations that impact on their daily activities and quality-of-life (Horng, et al., 2005). For example, it may affect the performance of basic daily activities such as walking and dressing, or work-related tasks such as standing or sitting in the office. It seems that the intensity of pain in patients with mild or severe pain may affect functional abilities in patients with CBP; however, Brunner et al. (2013) and Pincus et al. (2002) have reported that the intensity of the pain and the disability levels are not highly correlated, and both are linked to different risk factors (Kovacs, et al., 2005). The pain and disability in chronic musculoskeletal disorders such as CBP are complex issues that even advanced diagnostic technology such as MRI scans are not able to predict precisely (Bajpai, Saini, & Singh, 2013; Lateef & Patel, 2009; Wani & Deshpande, 2014).

Although back pain is a common reason for seeking medical help (Deyo, Von Korff, & Duhrkoop, 2015; Hart, Deyo, & Cherkin, 1995), health professionals are usually disappointed, partially because of the belief that the treatment fails to produce the expected outcomes (Chew-Graham & May, 1999), and the low level of evidence to support treatment effectiveness for CBP (Van Middelkoop, et al., 2011). Balague and Dudler (2011) found that treatment outcomes for people with CBP are poor to moderate. Indeed, the prognosis for CBP is disappointing (Artus, et al., 2010; Croft, et al., 1998), because spinal problems are usually associated with frequent relapses or transition to CBP. Chronic pain patients are not a homogenous group even when they share the same diagnosis, as a patient’s culture, beliefs and interpersonal characteristics interact with the symptoms and produce a unique health problem (Benzon, et al., 2008). This false assumption of sample homogeneity, ignoring the importance of complexity and the multifactorial nature of the illness, and the lack of treatment specificity reduced the quality of the outcomes (Hush & Marcuzzi, 2012; Rusu, Boersma, & Turk, 2012). Also, many back pain specialists report that psychosocial factors frequently affect CBP symptoms (Moore, 2010). The biomedical model (Engel, 1989) of CBP was re-evaluated three decades ago for CBP only, and then more recently for acute and sub-acute stages to implement a wider biopsychosocial framework that would match the complexity of this disease (Miller, Pinnington, & Stanley, 1999). Evaluating patients with CBP using a multidimensional system may improve outcomes (Brennan, et al., 2006). Therefore, it is important to identify back pain risk factors in all dimensions (e.g., physical, psychological and sociocultural factors), to understand how a patient's psychological distress and culture might affect their symptoms.

In Kuwait, the academic field is small. The first and only government university, Kuwait University, was founded in 1961 and although many private universities and colleges have been established in the last 10 years, none of them teach medicine and health science. There is only one school of medicine and allied health science, and it belongs to Kuwait University and there are only four published studies related to back pain that have been conducted in Kuwait: two involved adult patients (Al-Obaidi, et al., 2003; Al-Obaidi, et al., 2000); one involved school students (Shehab & Al-Jarallah, 2005) and one involved healthcare providers (Landry, et al., 2008; Shehab, et al., 2003). These studies provided a moderate level of evidence and lack the long-term follow-up. They were the first of their kind in Kuwait, and therefore they provide a database for future research.

In Al-Obaidi, et al. (2000), the difference in spinal isometric strength that can be accounted for by anticipation of pain, pain sensory perception, beliefs about functional limitations, and the fear-avoidance belief in chronic low back pain patients were explored. The authors conclude that physical capacity in the spine in CBP patients is not explained merely by the sensory perception of pain, and reported that the anticipation of pain and the fear-avoidance about physical activities were the strongest predictors of the differences in physical performance. Similarly, Al-Obaidi et al. (2003) examined the influence of anticipation of pain, sensory perception of pain and pain-related fear and disability beliefs on the gait characteristics of patients with chronic low back pain. They reported that pain anticipation and fear of pain accounted significantly for the velocity deficits in walking. Standard clinical gait assessments therefore must incorporate psychological measures of pain experience. Additionally, it was suggested that pain sensation measures are insufficient for the assessment of CBP with a strong emphasis on the importance of including multidimensional measures for the assessment of CBP (Baron, et al., 2012; Karayannis, Jull, & Hodges, 2012b). According to Shehab et al. (2003), who investigated the life and point prevalence rates and studied the characteristics of work-related and non-work-related low back pain among physical therapists in Kuwait and its effect on their regular activities, hospital staff such as physiotherapists and nurses were vulnerable to developing back pain, due to the demand of their jobs, the lifting of patients and occupational stress which might lead to socio-economic losses and physical injuries.

The physical demands of the job among hospital staff, such as lifting and handling patients, might affect the spine directly through an increase in the load on the spinal structure, whereas occupational stress might have an indirect effect on spinal health by mediating the pain mechanism in the brain (Jalalvand, et al., 2008). Lundberg et al. (1999) found that occupational stress might also have a direct effect on the muscular system, by increasing muscle tension and tone during the work, leading to prolonged hyperactivity of the muscles, which eventually causes muscle aches and soft tissue spasm. They evaluated the relationship between occupational stress and muscular pain in

72 supermarket cashiers and found that more than 70% of the participants were complaining of neck and upper back pain, with higher electromyographic (EMG) activity. Shehab et al. (2005) explored factors associated with low-back pain among Kuwaiti children and adolescents, particularly their relationship with social activities and school performance. Their findings suggested that students in Kuwait are liable to CBP and its associated risk factors, such as older age, female gender, an increase in physical activity and time spent watching television.

Muslims' illness perceptions and health beliefs are highly affected by the Islamic rules and restrictions, especially cultural factors arising from religious beliefs and practices that can have a profound impact on health (Odeh, 2008). Muslims believe that God created humans and gave them their bodies as gifts to take care of. On the Day of Judgment, God will ask them what they did with their bodies and their health. Muslims express gratitude to God for their good health through worship and by not harming their bodies (Rahman, 1987). there are some Islamic tenets that might hinder health promotion, such as modesty, provider gender preference and the misinterpretation of predestination (Rajaram & Rashidi, 1999). The Islam contains many spiritual practices and beliefs such as prayers, invocation and Quran reading that could be used as positive coping strategies to cope with pain and co-morbid symptoms. Previous works have shown that religious and spiritual practice is helpful for patients with chronic pain and illness as coping behaviours by changing the expectations and inducing placebo analgesia (Benedetti, Carlino, & Pollo, 2011; Elmholdt, et al., 2017; Jegindø, et al., 2013; Meissner, et al., 2011).

Study Aims

Back pain risk factors among Kuwaiti adults are an under-researched area. The identification of back pain risk factors in Kuwait based on the biopsychosocial model will help in developing culturally appropriate clinical protocols that account for patients' daily activities and habits. The aim of this study was to identify predictors of disability and low mood among Kuwaiti patients with back pain, and to identify the association between reported aggravating factors such as lifestyle and activities such as prolonged sitting with self-reported pain intensity. We hypothesised that different intensity of self-reported pain measured with a numerical pain rating scale would not correlate with the physical activities listed by the participants as the three most aggravating symptoms from physical activities and personal and psychosocial factors listed by the participants as the three most aggravating symptoms.

Method and material

Design: A cross-sectional online survey among Kuwaiti patients with CBP.

Research questions:

1. What are the most commonly reported pain-aggravating activities and psychosocial factors among patients reporting high and mild pain intensity?
2. What are the emotional and belief-based predictors of pain, disability and low mood?

The University of Birmingham ethical review committee approved the study (reference ERN_13_1275) and permission from physiotherapy departments from the involved hospitals and clinics was obtained (see Appendix 3A and 3B).

Participants and procedures

Patients who were aged eighteen years or older, had been diagnosed by physicians, orthopaedic surgeons or physical medicine specialists with CBP (defined as pain that lasts for three months or more and is located in the neck, upper back, lower back or shoulder girdle), and who had been referred to physiotherapy were considered eligible for the study (see Table 1). When patients attended appointments, the main author (or a colleague physiotherapist) met them, explained the study and provided them with an information sheet, which was available in English and Arabic (see Appendix 4 and 5). When the patient read the information sheet and agreed verbally to participate in the study, a link to the online questionnaire was provided so that they could fill it using a smartphone, laptop, or any device connected to the internet. Surveymonkey.com was used to design and create the questionnaire; however, a hard copy of the questionnaire was available for those who did not wish to use the online service. No consent form was used, but the patient's response to the questionnaire was considered as consent to participate in the study. This process of consenting was reported in the ethics approval form and accepted by the ethics committee.

A total of 562 participants (219 male and 343 female) met the criteria and were identified to take part in the study, and 358 (159 males and 199 females) completed the questionnaire (response rate = 63.7%). All participants were recruited from two hospitals (Al-Amiri General Hospital and Shikhan Al-Afarsi Rheumatology & Sport Rehabilitation Hospital) and one private musculoskeletal clinic (KUMP Clinic for Spine and Musculoskeletal Rehabilitation) in Kuwait.

Table 1: Participants demographic data

	Male (n = 159)	Female (n = 199)	Total sample (n = 358)	
Age	Mean = 43, range = 18-68	Mean = 41, range = 18-68	Mean = 42, range = 18-68	
Numerical Pain Rating Scale	Mean = 5, SD = 2	Mean = 5, SD = 2	Mean = 5.1, SD = 2.3	
Mild pain (0-5)	Mean = 3, SD = 2	Mean = 4, SD = 1	Mean = 3.5, SD = 1.5	
Severe pain (6-10)	Mean = 7, SD = 1	Mean = 7, SD = 1	Mean = 7.2, SD = 1.1	
Outcome measures				Alpha
Roland and Morris Disability Questionnaire	Mean = 5, SD = 5	Mean = 6, SD = 4	Mean = 5.5, SD = 4	0.8
Illness Perception Questionnaire	Mean = 41, SD = 11	Mean = 44, SD = 12.5	Mean = 43, SD = 12	0.5
Insomnia Severity Index	Mean = 10, SD = 6	Mean = 11, SD = 6	Mean = 10.5, SD = 6	0.9
Pain Coping Scale	Mean = 23, SD = 10	Mean = 23, SD = 10	Mean = 23, SD = 10	0.6
Treatment Adherence Rate	Mean = 7, SD = 2.5	Mean = 7, SD = 3	Mean = 7, SD = 3	0.7
Hospital Anxiety and Depression Scale-Depression subscale	Mean = 9, SD = 2	Mean = 9, SD = 2	Mean = 9, SD = 2	0.3
Hospital Anxiety and Depression Scale-Anxiety subscale	Mean = 11 SD = 2.5	Mean = 10, SD = 3	Mean = 10, SD = 3	-0.3
Pain location				
Neck pain	N = 50 (41.3%)	N = 71 (58.7%)	N = 121 (33.8%)	
Upper back pain	N = 56 (43.1%)	N = 74 (56.9%)	N = 130 (36.3%)	
Lower back pain	N = 134 (45.7%)	N = 159 (54.3%)	N = 293 (79%)	
Pelvic pain	N = 33 (50.8%)	N = 52 (49.2%)	N = 65 (18.1%)	

3.1.1 Outcome measures

The questionnaire consisted of ten outcome measures (see Appendix 6 and 7) and were translated into Arabic for the purpose of this study; these were not tested for reliability and validity, something which will be discussed later. Some of these measures are now available (tested for reliability and validity) in Arabic, while others have not yet been translated and validated. The translations were carried out by the main author (AA) and another PhD student (JA), who are both fluent in Arabic and academic English.

3.1.1.1 Numerical pain rating scale (NRS) (Longo, et al., 2010)

The pain NRS is a unidimensional assessment tool of pain intensity in adults and is the numerical version of the visual analogue scale (VAS). The pain NRS is a single numerical 11-point scale, where 0 indicates ‘not feeling any pain’ and 10 indicating extreme pain (‘unbearable pain’ or ‘excruciating pain’). High test-retest reliability has been reported on both literate and illiterate patients with rheumatoid arthritis (r = 0.96 and 0.95, respectively) before and after medical consultation (Ferraz, et al., 1990). Based on Boonstra, et al.’s (2016) findings, scores ≤5 corresponds to mild (low) pain, whereas scores ≥6 was considered moderate to severe pain. This outcome measures was translated into Arabic but was not culturally adapted nor was it tested for psychometric properties.

3.1.1.2 Roland and Morris Disability Questionnaire (RMDQ) (Roland & Morris, 1983)

This measure was created by Roland and Morris (1983) and originated from the Sickness Impact Profile, focusing on daily physical and functional abilities such as walking, bending, sitting, lying down, dressing, sleeping, self-care and other daily activities. The RMDQ encompasses twenty-four polar (yes/no) questions that are related to the last 24 hours. The score is obtained by summing the items with a positive answer (yes), which range from 0 (fully functional), to 24 (severe disability). Test-retest reliability for the 24-item, intra-class correlation of the original English language version (Roland & Morris, 1983), the correlation coefficient was 0.9. This outcome measure was translated into Arabic but was not culturally adapted nor were the psychometric properties analysed.

3.1.1.3 Hospital Anxiety and Depression scale (HADS) (Zigmond & Snaith, 1983)

The HADS has two subscales – anxiety and depression – with seven items in each subscale. Each item is scored on a 4-point Likert scale, ranging from 0 to 3, and each subscale has a score ranging from 0 to 21, with higher scores indicating more severe symptoms. Scores for each subscale were divided into one of three categories: 0-7 representing normal levels of anxiety and depression; 8-10 representing subclinical anxiety and depression levels; and 11-21 indicating clinical distress (anxiety and depression) (Crawford, et al., 2001). The anxiety subscale had a Cronbach's alpha of 0.93 and the depression subscale was alpha = 0.9 (Moorey, et al., 1991). The HADS was further tested on a healthy population and the internal consistency for anxiety and depression was 0.82 and 0.86 respectively (Crawford, et al., 2001). The test-retest reliability for a healthy sample was 0.92 for the depression scale and 0.89 for the Anxiety subscale (Snaith & Zigmond, 1983). This outcome measure was translated into Arabic but was not culturally adapted nor were the psychometric properties analysed.

3.1.1.4 Brief illness perception questionnaire (B-IPQ) (Broadbent, et al., 2006)

The B-IPQ is used to assess patients' cognitive and emotional representations of their illness, using the constructs of consequences, timelines, personal control, treatment control, identity, coherence, concern, emotional responses and cause. Each question is rated on a five-point Likert-type scale, the total score ranging from 1 to 8. Additionally, at the end of the questionnaire, there is an open question asking the participants to list the three most significant causes for their condition. According to Broadbent, et al. (2006), Pearson's correlations demonstrate that all the items have good test-retest reliability. This outcome measure was translated into Arabic but was not culturally adapted nor were the psychometric properties analysed.

3.1.1.5 Insomnia Severity Index (ISI) (Schramm, et al., 1993)

The ISI identifies sleep quality. This measure is rated on a 5-point Likert-type scale, ranging from 0 to 4, with 0 indicating normal sleeping and 4 suggesting clinical insomnia. Higher scores indicate a higher tendency for insomnia or sleep problems. The total score, ranging from 0 to 28, could be interpreted as follows: absence of insomnia (0-7); sub-threshold insomnia (8-14); moderate insomnia (15-20) (Yang, et al., 2009) and severe insomnia (21 and above) (Morin, et al., 2009). The ISI focuses on the personal perception and consequences of insomnia, and the level of impairment and unproductivity as a result of the insomnia. The ISI encompasses seven questions evaluating the severity of sleep-onset and sleep-maintenance problems (both nocturnal and early morning awakenings), satisfaction with the current sleep pattern and any interference with daily functioning, noticeability of impairment attributed to the sleep problem and the degree of distress or concern caused. High internal consistency coefficients have been observed in the general population (Cronbach $\alpha = 0.90$) and clinical samples (Cronbach $\alpha = 0.91$) in the original English language version. This outcome measure was translated into Arabic but was not culturally adapted nor were the psychometric properties analysed.

3.1.1.6 Behaviour Measurement

An open question format was used where participants were asked to list physical activities and movements that elicited their pain. Each participant was asked to provide up to three responses. The answers were categorised into specific behaviour groups, such as sitting, standing and walking.

3.1.1.7 Pain coping questionnaire (PCQ) (Jensen, et al., 1995)

The PCQ measures chronic pain-coping strategies that incorporate the following eight subscales: guarding, resting, asking for assistance, relaxation, task persistence, exercise/stretch, seeking support and coping. Significant internal consistency, test-retest stability and concurrent validity are reported in a sample of chronic pain patients (Hallegraeff, et al., 2013). For each question, participants select the number of days required to cope with the pain from zero to seven days, and the total pain coping score is obtained by the summation of the number of days. The higher the score, the more days the patient needs to cope with the pain. This outcome measure was translated into Arabic but was not culturally adapted nor were the psychometric properties analysed.

3.1.1.8 Multidimensional Health Locus of Control Scale (Wallston, et al., 1978)

The Multidimensional Health Locus of Control Scale (MHLC) was first used by Wallston, et al., and has 3 forms, A, B and C. Forms A and B are used to evaluate patients' beliefs toward their control on their health and pain while from C is condition-specific and is adapted for the condition before use (Wallston, Stein, & Smith, 1994; Wallston, et al., 1978). It consists of three subscales: internal health locus of control (IHLOC), power health locus of control (PHLOC) and chance health locus of control (CHLOC). Each subscale evaluates an individual's tendency to believe that health outcomes are due mainly to the respondent's own behaviour (IHLOC) or are affected by others such as medical professionals or family (PHLOC) or by chance (CHLOC). PHLOC and CHLOC are classified as external beliefs whereas IHLOC represents internal beliefs. Previous studies have shown that people with low socioeconomic status or poor health-related behaviours tend to have higher external scores, while people with high socioeconomic status or positive health behaviours tend to have higher internal scores (Wallston, Wallston, & Devellis, 1978). This outcome measure was translated into Arabic but was not culturally adapted nor were the psychometric properties analysed.

3.1.1.9 Patient self-report scale of home-based rehabilitation adherence (Sluijs, Kok, & Van Der Zee, 1993)

This measure is used to evaluate participants' adherence to the treatment. For each question, there are five answers: 1 = not at all; 2 = a little; 3 = rather regularly; 4 = very regular; and 5 = as advised. This is a three items tool: item one is exercise; item two is taking rest from aggravating activities; and, item three is the application of the recommended modalities, such as a hot or cold pack. The total scores range from 3 to 15, and the higher the score, the more adherent the participants are. This outcome measure was translated into Arabic but was not culturally adapted nor were the psychometric properties analysed.

3.1.2 Analysis

Participants' demographic data (age, gender) and clinical characteristics (primary pain site, pain intensity, level of depression and anxiety, level of insomnia, illness perception, level of pain coping and adherence rate) are described in Table 1. The pain score was divided into two categories; mild pain (from 0-5) and severe pain (from 6-10) (Boonstra, et al., 2016). To address research question 1, the association between self-reported pain intensity (including both severe and mild pain groups) and the reported pain aggravating factors and activities was identified using frequency analysis and the chi square test. For research question 2, the emotional and belief-based predictors of pain, disability and mood, a stepwise regression was performed. Stepwise regression is a combination of the forward and backward selection techniques, and it is a modification of the forward selection so that after each step in which a variable was added, all candidate variables in the model are checked to see if their significance has been reduced below the specified tolerance level. If a non-significant variable is found, it is removed from the model.

An all-models summary is shown in Tables 5, 6, 7 and 8. The level of significance for all statistical tests was set at $P < 0.05$, and all analyses were completed using SPSS ver. 22.0.

Results

There were 358 participants recruited in this study: 159 male and 199 female. The mean age was 42 (male, 42.85 years, SD = 15; female, 41.37 years, SD = 14.9) and there was no difference between each gender group in terms of age (table 1). The mean pain score was 5.1, SD = 2.3 (male mean = 4.71, SD = 2.3; female mean = 5.38, SD = 2.2) and 205 participants reported mild pain (male = 103, female = 102) while 153 participants reported severe pain (male = 56, female = 97). The Ronald and Morris Disability Questionnaire (RMDQ) score, Hospital Anxiety and Depression Scale (HADS), Illness Perceptions Questionnaire (IPQ), Insomnia Severity Index (ISI), pain coping questionnaire (PCQ) and adherence rate showed no differences between male and female. The results are summarised in table 2.

Table 2: Main outcome measures

Scale	Total sample	Mild pain group	Severe pain group
Ronald and Morris Disability Questionnaire	Mean = 5.5 SD = 4	Mean = 5 SD = 4	Mean = 2.5 SD = 5
Hospital Anxiety And Depression Scale – anxiety	Mean = 10 SD = 3	Mean = 10.5 SD = 3	Mean = 10 SD = 2.5
Hospital Anxiety And Depression Scale – depression	Mean = 9 SD = 2	Mean = 9 SD = 2	Mean = 9 SD = 2
Insomnia Severity Index	Mean = 10.5 SD = 6	Mean = 10 SD = 6	Mean = 11 SD = 6
Illness Perceptions Questionnaire	Mean = 43 SD = 12	Mean = 41 SD = 12	Mean = 45 SD = 12
Pain Coping Questionnaire	Mean = 23 SD = 10	Mean = 23 SD = 10	Mean = 23 SD = 10
Adherence Rate	Mean = 7 SD = 3	Mean = 7 SD = 3	Mean = 7, SD = 3

3.1.3 Correlation matrix

The inter-correlations among the subscales are reported in Table 3, and logical relationships among the subscales were apparent. For example, participants who reported a higher disability rate also reported higher insomnia severity and required more days to cope with their pain. It was also shown that the greater the age of the patient with CBP was, the greater the disability rate. However, many of the reported alpha coefficients were below 0.5, which indicated poor reliability or internal consistency of the data. Anxiety and depression had acceptable alpha coefficients when correlated with HADS, 0.8 and 0.6 respectively.

Table 3: correlation matrix

	RMDQ	HADS	Anxiety	Depression	IPQ	ISI	PAIN-Cope	Internal	Chance	Power	Adherence	Pain L/H	Age	NRS	Gender
RMDQ	1	-0.15**	-.194**	0.005	0.36**	0.3**	0.2**	-0.05	0.13*	0.04	0.14**	0.15**	0.13*	0.2**	0.05
HADS	-0.15**	1	.811**	0.6**	-0.24**	-0.13*	-0.15**	-0.03	-0.09	-0.02	-0.00	-0.1	-0.06	-0.07	-0.0
Anxiety	-0.2**	0.8**	1	0.007	-0.36**	-0.25**	-0.12*	-0.06	-0.16**	-0.09	0	-0.04	-0.03	-0.02	-0.072
Depression	0.005	0.6**	0.007	1	0.1	0.12*	-0.07	0.03	0.06	0.09	-0.00	-0.12*	-0.05	-0.08	0.07
IPQ	0.36**	-0.24**	-0.36**	0.1	1	0.36**	0.1	-0.15**	0.25**	0.07	-0.02	0.14**	0.00	0.15**	0.11*
ISI	0.3**	-0.13*	-0.25**	0.12*	0.36**	1	0.02	-0.07	0.2**	0.05	0.05	0.12*	0.02	0.06	0.07
PAIN-Cope	0.2**	-.15**	-0.12*	-0.09	0.1	0.02	1	0.03	-0.004	0.05	0.3**	0.04	-0.00	0.06	0.01
Internal	-0.05	-0.03	-0.1	0.03	-0.15**	-0.07	0.03	1	0.02	0.23**	0.05	-0.1	0.08	-.12*	-0.02
Chance	0.13*	-0.1	-0.2**	0.06	0.25**	0.20**	-0.00	0.02	1	0.2**	-0.07	0.02	-0.05	0.01	0.05
Power	0.04	-0.02	-0.1	0.09	0.07	0.05	0.04	0.23**	0.2**	1	0.00	0.03	-0.06	0.08	0.05
Adherence	0.14**	-0.001	0	-0.00	-0.02	0.05	0.31**	0.05	-0.07	0.00	1	-0.01	0.02	-0.01	0.04
Pain L/H	0.15**	-0.01	-0.04	-0.12*	0.14**	0.12*	0.04	-0.08	0.02	0.03	-0.01	1	0.06	0.8**	0.14*
Age	0.13*	-0.05	-0.03	-0.05	0.001	0.02	-0.001	0.08	-0.05	-0.06	0.02	0.06	1	0.04	-0.04
NRS	0.19**	-0.07	-0.02	-0.08	0.15**	0.06	0.06	-0.12*	0.01	0.08	-0.01	0.81**	0.04	1	0.15**
Gender	0.05	-0.02	-0.07	0.07	0.11*	0.07	0.01	-0.02	0.0	0.05	0.04	.14*	-0.04	0.15**	1

*P<0.05 **P<0.005

NRS = Pain Numerical Rating Scale, RMDQ = Roland and Morris Disability Questionnaire, ISI = Insomnia Severity Index, IPQ = Illness Perception Questionnaire, pain-cope = Pain Coping Inventory,

Internal = Internal Health Locus of Control Scale, chance = Chance Health Locus of Control Scale, power = Power Health Locus of Control Scale, Pain L/H = Pain score that classified into two groups; mild (0-5) and Severe (6-10)

3.1.4 Research question one

What are the most commonly reported pain aggravating activities and psychosocial factors among patients reporting and mild and severe pain intensity?

There were 12 reported activities (see Table 4) and 10 reported personal psychosocial factors (Table 5) that the participants reported that would aggravate or elicit their back pain. Using stairs, jumping and driving for a long time were the most reported pain-provoking activities, which were reported by 96% of participants. These were followed by: running (94%), lying prone (93%), activities involving twisting of the spine (92%), lying supine (91%), bending and walking (71.5%), lifting (68%), standing (64%) and sitting (42%). Some 96% of the participants reported ageing as a main cause of their back pain, but the following factors were also reported as provoking the symptoms: emotional and psychological factors (89%), a previous episode of back pain (88%), pregnancy (85%), obesity and lack of sleeping (82%), heavy workload (66%), current spinal problems (57%), poor posture (52%) and unhealthy lifestyle (45%). There was a trend towards a significant difference between the severe pain and mild pain groups in the poor posture factor and previous episode of back pain, both p values being equal to 0.053.

Table 4: physical activities reported to be causing pain				
Activity	Numerical rating scale	Mild pain n=205	Severe pain n=153	P-value
Stairs	96%	97%	96%	0.5
Standing	64%	66%	62%	0.3
Walking	71.5%	67%	78%	0.015*
Sitting	42%	41%	43%	0.4
Lifting	68%	68%	68%	0.5
Driving	96%	97%	95%	0.4
Bending	71.5%	73%)	70%	0.3
Swimming	99%	98%	99%	0.6
Running	94%	93%	95%	0.2
Jumping	96%	96%	97%	0.5
Supine	91%	90%	93%	0.2
Twisting	92%	91%	93.5%	0.2
Prone	93%	92%	93.5%	0.4
* P<0.05				

Table 5: personal/ psychosocial factors reported to be causing pain				
Factors	Numerical rating scale	Mild pain n=205	Severe pain n=103	P-value
Unhealthy lifestyle	45%	50%	83%	0.
Wrong posture/ position	52%	56%	46%	0.05
Current spine problem	57%	50%	67%	0.001*
Heavy workload	66%	68%	63%	0.2
Sleep related problem	82%	83%	80%	0.2
Obesity	82%	83%	81%	0.4
Pregnancy related problems	85%	86%	84%	0.3
Accident / previous injury	88%	85%	91.5%	0.05
Emotional/ psychological	89%	90%	88%	0.3
Ageing	96%	96%	96%	0.5
* P<0.05				

3.1.4.1 Research question two

What are the emotional and belief-based predictors of pain, disability and low mood (anxiety and depression)?

A stepwise regression was run to develop a model for predicting pain intensity, disability and mood (anxiety and depression) using the scores obtained from the self-reported pain scale, mood measure, disability measures, illness perception questionnaire, pain coping scale, insomnia level measure, adherence rate and age. See Tables 6, 7, 8 and 9 for full details on each regression model.

3.1.4.2 Pain predictors

The result of the stepwise regression indicated that the disability level (score of the Roland and Morris questionnaire) significantly predicted chronic pain in patients with CBP ($R^2 = 0.04$, $p<0.01$, $F = 13$, $\beta = 0.2$, $p<0.01$) (Table 6).

Table 6: Stepwise regression for pain predictors

	Model 1
Disability	$\beta = 0.2$**
ANOVA-information	$R^2 = 0.04$**, adjusted $R^2 = 0.03$, $F = 13$

*P<0.05 **p<0.01

3.1.4.3 Disability predictors

As shown in Table 7, five variables were able to predict the disability level significantly. These predictors were illness perception, coping strategy, insomnia severity, pain and age ($R^2 = 0.5$, $p<0.01$, $F = 19$, illness perception $\beta = 0.3$, coping strategy $\beta = 0.2$, insomnia $\beta = 0.2$, pain $\beta = 0.1$ and age $\beta = 0.1$, $p<0.01$).

Table 7: Stepwise regression for disability predictors					
	Model 1	Model 2	Model 3	Model 4	Model 5
Illness perception	β = 0.36**	β = 0.34**	β = 0.3**	β = 0.3**	β = 0.3**
Coping strategy		β = 0.16**	β = 0.2**	β = 0.2**	β = 0.2**
Insomnia			β = 0.2**	β = 0.2**	β = 0.2**
Pain				β = 0.1**	β = 0.1**
Age					β = 0.1*
ANOVA-info	$R^2 = 0.127$**, adjusted $R^2 = 0.125$, F = 52	$R^2 = 0.154$**, adjusted $R^2 = 0.149$, F = 32	$R^2 = 0.181$**, adjusted $R^2 = 0.174$, F = 26	$R^2 = 0.189$**, adjusted $R^2 = 0.189$, F = 22	$R^2 = 0.213$**, adjusted $R^2 = 0.201$, F = 19
*P<0.05 **p<0.01					

3.1.4.1 Anxiety predictors

Both illness perceptions and insomnia level were significantly able to predict the anxiety level in patients with CBP ($R^2 = 0.2$, $p<0.01$, F = 30, illness perception β = 0.3, insomnia β = 0.1, $p<0.01$) (table 8).

Table 8: Stepwise regression for anxiety predictors		
	Model 1	Model 2
Illness perception	β = 0.36**	β = 0.3**
Insomnia		β = 0.1*
ANOVA-information	$R^2 = 0.13$**, adjusted $R^2 = 0.13$, F = 52	$R^2 = 0.15$**, adjusted $R^2 = 0.14$, F = 30
*P<0.05 **p<0.01		

3.1.4.2 Depression predictors

The insomnia level (score of insomnia severity index) proved to be a significant predictor of depression in patients with CBP ($R^2 = 0.1$, $p<0.01$, F = 5, β = 0.1 $p<0.05$) (table 9).

Table 9: Stepwise regression for depression predictors	
Predictor depression	Model 1
Insomnia	β = 0.1*
ANOVA-information	$R^2 = 0.1$**, adjusted $R^2 = 0.01$, F = 5
*P<0.05 **p<0.01	

Discussion

The aim of this study was to identify predictors of pain, disability and low mood among Kuwaiti patients with back pain, and to identify the association between reported aggravating factors and activities with self-reported pain intensity. Most of the findings in this study are consistent with findings from other studies (Oliveira, et al., 2015; Ramond, et al., 2010; Taylor, et al., 2014). For the first part of the study, our findings suggest that there is a poor association between the reported physical activities, personal factors and the reported pain intensity, except for prolonged walking, a sedentary lifestyle and a current episode of pain. The second part of the study revealed that disability level was the only predictor for pain severity in patients with CBP. Illness perceptions were shown to be a significant predictor of disability and anxiety and the insomnia level was a significant predictor of disability, anxiety and depression. Pain severity, older age and the number of coping days were also shown to be major predictors for back pain disability levels.

The findings in this study show that none of the reported psycho-emotional variables were correlated with the pain, in contrast to many previous trials that reported a strong correlation (Foster, et al., 2010; George & Beneciuk, 2015; Van Wijk, et al., 2008). The general findings of question one were along similar lines to findings from previous studies (Oliveira, et al., 2015; Ramond, et al., 2010; Taylor, et al., 2014), which showed that the common risk factors for back pain do not necessarily influence the pain or co-morbid symptoms in patients with CBP. Mokdad et al. (2014) reported that chronic musculoskeletal problems such as CBP increased greatly between 1990 and 2010 from 7th to 4th life-disabling health problem in Arabic countries with higher incomes such as

Kuwait due to an unhealthy and sedentary lifestyle such as in the prolonged use of motor vehicles, low exercise rates, the consuming of unhealthy food and high stress rates (Mokdad, et al., 2014). This might explain the reported pain in the current study, which might indicate poor health habits rather than medical conditions such as disc problems. By taking this issue into consideration, physiotherapists in Kuwait could focus on the long-term goals to reduce the episodes of back pain such as improving people's lifestyle by increasing their awareness instead of focusing merely on the acute symptoms (Moseley, 2002; Traeger, et al., 2014). This could be achieved by including pain education and specifically back pain education in the public awareness campaigns that are commonly held by the Ministry of Health.

3.1.5 The association between pain intensity and the reported physical and personal factors

The findings of this study showed that there was an association between prolonged walking, sedentary lifestyle and a current episode of pain with reported pain intensity. The participants in this study reported that dynamic physical activities such as running, walking, using the stairs and jumping aggravated their pain. Dynamic activity such as walking is a simple and efficient physical activity that activates most of the muscles, including the back muscles, and is recommended for back pain patients (Hendrick, et al., 2010), improving cardiovascular fitness (Morton, et al., 2010) and helping to relax tight muscles (Fukunaga, et al., 2001). The ability to perform functional activities might also increase self-confidence and improve psychological and emotional status because of the hormonal changes that occur with physical movements due to muscle recruitment (Kopp, et al., 2012). Many protocols and guidelines recommend patients with CBP to be engaged in gentle physical activity, such as walking or swimming (Chou, et al., 2007; Hildebrandt, et al., 2004; Savigny, et al., 2009). Several studies also report that low to moderate daily physical activities are beneficial for chronic musculoskeletal problems, including CBP (Ainsworth & Youmans, 2002; Van Middelkoop, et al., 2011) and that strenuous leisure time physical activity decreased the risk of in-patient hospital care for back disorders among industrial employees (Kääriä, et al., 2014). As a result, a reduced walking rate among Kuwaitis is likely to increase reported pain. Patients with severe pain are expected to avoid any physical activity, including walking, because of the pain that would lead them to engage in more guarded and protective behaviours. Thus, fear-avoidance behaviour and fear of movement are common in patients with severe back pain, such as avoiding walking and negative resting (i.e., staying in the bed for most of the time).

Hypothetically, patients with CBP should exhibit a form of a typical guarded movement to control spinal movement during physical activities (Main & Watson, 1996; Van Der Hulst, et al., 2010), although an agreed definition of guarding in CBP is currently not available in the literature. Overall, guarded movements are characterised by a stiffened body and reduced flexibility while performing physical activities in CBP patients (Geisser, Haig, Wallbom, & Wiggert, 2004). In acute pain, patients might adopt such mechanisms to reduce the pain, which, in the long term, might turn into unhealthy habits, leading to chronic stiffness (Verbunt, et al., 2003). As a result, it was expected that patients with severe CBP might exhibit pain during dynamic activities, such as walking. Multiple trials report that CBP is often followed by an alteration in gait pattern and cycle (Keefe & Hill, 1985; Lamoth, Beek, & Meijer, 2002; Spenkelink, et al., 2002; Van Der Hulst, et al., 2010). It is also commonly known that CBP patients move more slowly than people with healthy spines. This slow movement pattern suggests an associated fear of movement behaviour and pain during movement. Riener, Rabuffetti, and Frigo (2002) stated that daily activities, including walking and using stairs, required the involvement of a wide group of muscular activity, and more muscle engagement is expected with complicated activities. Therefore, CBP can affect any dynamic activities that require the recruitment of the spinal muscles, including walking. Having said that, the association between physical activity and CBP is complicated and does not follow a specific standard. For example, a review by Heneweer et al. (2011) concluded that factors such as a heavy workload, cumulative loads and frequent lifting were significantly associated with CBP, and that frequent bending and twisting were linked to lumbar spine problems, whereas the same authors reported inconsistent findings, with regard to leisure time physical activities, like sports and physical exercise.

Unfortunately, there is a lack of evidence exploring the effect of culture-specific daily activities and their association with CBP. Elements such as the nature of the activity and the intensity of the load may correlate with CBP. However, physical workloads could be classified into different groups and intensities, which makes it challenging to attribute the cause of back pain to a single activity, as all the contributed activities are interacting, leading to back pain.

Our findings also reported that an unhealthy lifestyle was associated with the severe pain group, whilst a current spinal problem was positively correlated to the mild pain group. It is not surprising to find that an unhealthy lifestyle was affecting the pain, as CBP is a multidimensional problem and every single aspect of life would interfere with the problem and affect the recovery process. Unfortunately, modern lifestyles, with the dominance of smart devices and digital entertainment, are encouraging people to be engaged in a sedentary lifestyle. Holth, et al. (2008) reported that a sedentary lifestyle was associated with numerous chronic illnesses and joint problems, such as CBP. Therefore, it is unsurprising to find a negative link between lifestyle and the reported intensity of pain. However, current problems in the spine, as patients reported, could be classified as acute back pain which is usually accompanied with inflammation (Carr &

Goudas, 1999; Kidd & Urban, 2001), a reduction in physical abilities (Lin, et al., 2011) and psychological and emotional consequences such as frustration and anger (Dow, Roche, & Ziebland, 2012; Linton & Shaw, 2011; Philips & Grant, 1991).

Other factors that are commonly associated with low back pain such as bending (Balaguier, et al., 2017), lifting (Coenen, et al., 2014a), poor posture (Meziat, et al., 2015) and heavy workload (Heuch, et al., 2017), were not found to be associated with back pain in our study.

A recent review reported inconsistent evidence for the relationship between physical activity and low back pain in both a healthy sample and school children (Sitthipornvorakul, et al., 2011). This might happen for many reasons; back pain-related complications are not limited to the pain only and instead might affect the functional and daily activities, mood, quality-of-life and productivity (Syahnaz, Azimah, & Khairani, 2010). Pain measurements are also highly subjective (Jurth, Rehberg, & Von Dincklage, 2014), and would not reflect the whole image or the extent of the problem. Many patients with CBP might not have function-limiting pain (Haig, et al., 2006); instead, they might have a restricted range of movement, difficulties in achieving some activities or referred symptoms (Kose & Hatipoglu, 2012). Finally, CBP and psychological factors have been shown to be correlated (Ramond, et al., 2011), thus the patient's psychological status during the answering of the survey might affect the accuracy and judgment of the answers (Jung, et al., 2014).

The cultural differences between the participants in our study and other studies might also have affected the results, as many studies have shown that different cultures and ethnicities have different illness beliefs and behaviours (Kwok & Bhuvanakrishna, 2014; Peacock & Patel, 2008). These reasons might explain the conflict in findings between our study and previous work. For example, a previous study reported that depression is a strong predictor of pain in CBP (Currie & Wang, 2004), whilst in our study depression failed to show a significant predictive ability.

3.1.6 Pain, mood and disability predictors

The findings of this study reveal that disability level was the only predictor for pain severity in patients with CBP. Illness perceptions were shown to be a significant predictor of disability level and anxiety. The insomnia level was a significant predictor for disability, anxiety and depression, and pain severity, older age and the number of coping days were shown to be significant predictors for the back pain disability level. If people at high risk of CBP could be identified during their initial primary care visits, treatment could be tailored to the level of individual risk (Foster, Hill, & Hay, 2011; Linton & Boersma, 2003; Whitfill, et al., 2010). For example, more intensive, multidisciplinary interventions might be offered to those at high risk of developing chronic pain, whereas short-term pain management and reassurance that back pain was likely to improve could be offered to patients at low risk. A risk-prevention plan has been shown to result in improved back pain outcomes and lower costs of care (Leresche, Turner, Saunders, Shortreed, & Von Korff, 2013).

The result of this study indicated that pain intensity and the disability level have mutual relationship and could predict each other. Previous research has reported that pain intensity and disability levels are positively associated in patients with CBP (Mittal & Joshi, 2015; Stefane, et al., 2013), however, mild pain intensity might have a mild effect on functional ability (Garbi, et al., 2014). A recent study reported that patients with chronic pain have different pain behaviours and coping strategies, which might or might not lead to functional disability (Meints & Otis, 2017). Due to the multidimensional nature of chronic pain (O'Sullivan, et al., 2016), pain intensity alone might not be a sufficient predictor of disability level in patients with CBP. The findings also suggest that understanding patient illness perceptions and coping strategies could be used to predict anxiety and the disability level in Kuwaiti patients with CBP. Previous studies of British, Norwegian, Chinese and Canadian populations have shown that misperceptions about CBP such as a wrong anatomical understanding or negative beliefs were reported to predict disability in CBP patients (Gross, et al., 2006; Ihlebæk & Eriksen, 2005; Moffett, et al., 2000; Tan, et al., 2014).

The relationship between illness perception and CBP was described in a study involving a group of 810 patients visiting their GP (Foster, et al., 2008). Patients with a higher risk of chronic low back pain had the following illness perceptions: they believed that their symptoms would last longer; they did not feel that they had much control over their symptoms; and they did not have high expectations of treatment success. This suggests that people develop personal representations about their illness which influence how they react to the illness (Petrie, et al., 2002; Petrie & Weinman, 1997). A recent cross-sectional study by Jaremo et al. (2017) of patients with chronic widespread pain found that the participants that showed worse health status and poor treatment response were those with multiple physical and mental symptoms, poor illness beliefs and adopting catastrophising behaviours (Järemo, et al., 2017). Similarly, in another cross sectional study with 400 participants comparing illness perception in people with CBP and the healthy population, the researchers found that CBP participants correlated their symptoms with radiological investigation result, and did not believe in the impact of psychosocial factors or have fear of movements (Van Wilgen, et al., 2013). Hence, patients develop their own ideas about their back pain and what it means to them, and these ideas shape their behaviour and, consequently, the quality of the outcome. The results are in keeping with other studies that report that patients' illness perceptions are important determinants of function and outcome (Hagger & Orbell, 2003). For example, Botha-Scheepers, et al. (2006) found that patients with lower limb osteoarthritis (OA) who strongly believed that their OA had a significant effect on their functioning and that their problem would be of long duration, were at increased risk of functional limitation. Similarly, Frostholm, et al. (2007) showed that primary care patients' perceptions (timeline, acute or chronic, consequences and emotional representations) predicted physical and mental health up to two years after consulting their general practitioner.

The perception of pain would affect a patient's behaviours toward the pain and daily activity, which either aggravates or reduces the pain. Patients with inappropriate and negative perceptions of illness tend to adopt a protective behaviour and coping strategy, both mentally and physically. A meta-analytic review of the self-regulatory model (Hagger & Orbell, 2003) which assessed the association between illness perceptions, mental health (Eiser, et al., 2001) and quality-of-life (Boddington, Myers, & Newman, 2002) across various chronic illnesses, found that the association is not related to a specific disease. A group of studies also revealed that emotional regulation strategies would affect the level and intensity of the psychological diseases (increase or decrease) through the modification of emotional experiences and the associated behaviour and physiological wellbeing (Campbell-Sills, et al., 2006; Hofmann, et al., 2009). Some adaptive strategies such as cognitive reappraisal, acceptance and problem-solving generally demonstrated their ability to improve the unwanted behaviours by controlling negative thoughts (Goldin, et al., 2008) to improve pain tolerance (Hayes, et al., 2012), an improvement in lifestyle (Richards & Gross, 2000) and to diminish maladaptive cardiac reactivity (Campbell-Sills, et al., 2006). By contrast, strategies like rumination, suppression, avoidance and worry have been linked with maladaptive consequences, including aggressive reactions after experiencing events that provoke their emotions (Campbell-Sills, et al., 2006), poor memory (Richards, Butler, & Gross, 2003), sympathetic nervous system hyper-activation and weak autonomic flexibility (Hofmann, et al., 2005). These strategies have also been linked with the experience of chronic psychological disorders, such as anxiety and depression (Mennin, et al., 2007).

This study found that the insomnia level was predictive of disability, anxiety and depression in CBP patients. Similar results have been reported in multiple studies in which insomnia was often associated with functional limitations and anxiety and depressive disorders (Benca & Peterson, 2008; Harvey, 2008; Papadimitriou & Linkowski, 2005) and, by itself, insomnia is a frequent health issue leading to a decrease in daily activity, an increase in work absenteeism and a high load on health services (Bin, Marshall, & Glozier, 2012; Roth, et al., 2006). Previous work reported that about 50% of individuals who complained of back pain and chronic pain also reported insomnia (Alsaadi, et al., 2011) and that insomnia was ranked highest among CBP associated co-morbidities (Tang, Wright, & Salkovskis, 2007). In this study, 27% of participants complained of clinical insomnia. McKenzie (2012) reported that it is likely that the number of chronic pain patients who suffer poor sleep at a sub-clinical level is far higher than those with clinical insomnia. Sleep is considered a crucial determinant of a global quality-of-life (Kyle, Morgan, & Espie, 2010); its disruption in individuals with primary insomnia leads to impaired occupational, social and relationship functioning, even in the absence of medical co-morbidity. In healthy individuals, restricting sleep experimentally can impair emotional regulation, cognitive function and heighten pain perception by compromising an optimistic outlook and psychosocial functioning (Haack & Mullington, 2005). In contrast, studies have reported that there are significant health benefits that could be gained from improving sleep quality and hygiene, such as improved mood (Espie, 2003; Rybarczyk, et al., 2005). Harvey’s (2002) cognitive model of insomnia posits that people with poor sleeping quality could undergo mental exhaustion and fatigue, experiencing negative thoughts throughout the day. This unhealthy mental experience most likely brings negative thoughts regarding sufficient sleep and the quality of functional performance the following day, whilst suffering from daytime symptoms of insomnia (e.g., fatigue, poor mood and struggling with concentration).

Chronic and psychological stress might function as a mediating mechanism that connects insomnia with CBP. Sufferers with insomnia view their lives as depressive and are liable to experience chronic physical and mental exhaustion (Roth, Roehrs, & Pies, 2007). As a result of that, muscle tension may increase and decrease micro-pauses in muscle activity leading to back pain (Elfering, et al., 2008). Insomnia is also mutually connected with chronic stress, which in turn is strongly linked to hyper-activation of the sympathetic nervous system, leading to the production of norepinephrine which is known to exaggerate muscle tone and increases the risk of pain and injuries of muscle tissue (Vgontzas, et al., 2004). Higher norepinephrine levels have been positively correlated to chronic joint and back pain (Elfering, et al., 2008). Prolonged activation of the sympathetic nervous system also augments the inflammatory process (Black & Garbutt, 2002); thereby, the concentration of cytokines and inflammatory mediators rises, leading to poor sleeping quality (Meier-Ewert, et al., 2004). A recent meta-analysis of 34 cohort studies concluded that insomnia is significantly associated with an increased risk of depression which has implications for the prevention of depression in non-depressed individuals with insomnia symptoms (Li, et al., 2016).

Being older was found to be a predictor of disability in CBP patients in this study. Previously, a group of studies showed that the impact of pain in older adults is significant and that chronic pain has a direct impact on physical functional outcomes in an elderly population (Covinsky, et al., 2009; Eggermont, et al., 2009; Melzer, Gardener, & Guralnik, 2005; Muller, Thomas, & Peat, 2012). In 2013 in the US, about 50% of the elderly population (those aged 65 and older) reported unexplained pain, which was significantly associated with limited functional abilities (Patel, et al., 2013). Pain is one of the most widely cited symptoms underlying disability among older adults (Melzer, et al., 2005). For example, in a sample of disabled women who complained of sub-threshold symptoms, pain was the most frequently defined reason for limited ability in the basic activities of daily living (e.g., bathing), instrumental activities of daily living (e.g., housework) and mobility (Melzer, et al., 2005). Having said that, participants in our study were middle aged and had a mean age of 42 years; however, we found that greater age is associated with greater disability. One explanation could be that disability by itself is a broad concept that has different definitions based on each participant's experience and knowledge. For example, what is considered a disabling signal for one patient might be acceptable for another. Another explanation is that the relationship between disability and ageing is a perception, meaning that aging is a perception rather than a number of years. In the Middle East, many people in their forties consider themselves old, and they correlate the term 'old person' with physical disabilities. Therefore, some patients might associate the age of the forties with physical disabilities.

Study limitations and future research

There are some issues with the methodology of this study that might create a threat to the quality of the data obtained. First, the participants were not provided with a written consent form which contravenes ethical guidelines such as those of the Health Research Authority (2013) on informed consent for UK-based research. However, no such guidelines existed at the time in Kuwait. It was stated at the beginning of the questionnaire that 'by completing this questionnaire you are indicating your consent to participate in this research'. It was also indicated that the obtained data would be used for scientific purposes such as research and publication, and that by answering the questions participants were giving their consent for the data to be used in this way. This type of consent is called explicit consent, and gives the full right for the participants to accept or refuse to participate in the research (Al-Shahi, Vousden, & Warlow, 2005). The consent can be given by action (e.g., participants agree to participate by answering the question), in writing (signing the consent form) or verbally (e.g., participants agree verbally to participate; this agreement must be documented by recording or video) (Doyal & Tobias, 2001). In any case, the research ethics committee at the University of Birmingham approved this procedure. Additionally, the participants were not asked to report any personal information that would identify them (e.g. name, civil ID number); instead they were assigned a unique number and codes.

The second issue was the lack of cross-cultural adaptation of the measures employed, which might lead to systematic bias violating the content validity and the reliability of the data (González-Calvo, Gonzalez, & Lorig, 1997; Guillemin, Bombardier, & Beaton, 1993; Hendricson, et al., 1989; Herdman, Fox-Rushby, & Badia, 1997). For this research, the measures were translated into Arabic by the researcher (AA) and another PhD student (JA) using lay language, but was not tested for content validity nor did the translation follow any specific guidelines. This could affect the reliability of the data, potentially leading to unreliable conclusions. For example, the alpha coefficient of some of the measures, such as the Illness Perceptions Questionnaire (IPQ), the Pain Coping Scale (PCS) and the Hospital Anxiety and Depression Scale (HADS) were not adequate (Broadbent, et al., 2006; Jensen, et al., 1995; Zigmond & Snaith, 1983) (see Table 1). According to Nunnally (1978), reliabilities of 0.70 or higher were recommended for basic research and between 0.90 and 0.95 in cases where important decisions are to be made on the basis of the test scores. Nunnally and Bernstein (1994) are one of the sources of the rule-of-thumb that states that alphas below 0.70 indicate poor reliability and imply poor predictive validity. The lack of proper cross-cultural adaption and content validity of the translated measures in this study might have led to this inadequacy in the alpha coefficients (Crocker & Algina, 1987). Some researchers have proposed that if an item is poorly written and was not tested with a large and diverse population, both the validity and reliability of the measure would be violated (Crocker & Algina, 1987; Gregory, 2004; Messick, 1995).

Beaton et al. (2000) proposed a six-stage guideline for the cross-cultural adaptation of self-reporting measures. In stage one, the initial translation, it is recommended that at least two forward translations be made of the instrument from the original language to the target language. In stage two, the two translators (or more) and a recording observer sit down to synthesise the results of the translations. After that, the back-translation stage comes; a translator translates the questionnaire back into the original language. This is a process of validity checking to make sure that the translated version is reflecting the same content as the original. In stage four; a group of experts form a committee to validate the content of the measure after the forward and backward translation. Testing the pre-final version is stage five, which is the final stage of the adaptation process in which testing of the new questionnaire seeks to use the pre-final version with participants from the target setting. Ideally, between 30 and 40 participants should be tested. Finally, all the reports and forms are submitted to the developer of the instrument or to the committee that keeps track of the translated version. They verify that the recommended stages were followed. In effect, it is a process audit with all the steps and necessary reports followed. It is not for this body or committee to alter the content; it is assumed that by following this process a reasonable translation has been achieved.

In 2014, when this research was conducted, culturally adapted measures that were translated into Arabic were not available for use in the study. However, recently many of the measures used in this research have been culturally adapted and validated to be suitable for Arabic speaking population, such as RMDQ (Maki, et al., 2014), NRS (Alghadir, Anwer, & Iqbal, 2016), HADS (Terkawi, et al., 2017), ISI (Ahmed, 2015) and B-IPQ (Saarti, et al., 2016). Additionally, Alhaliqa et al. (2015) validated and culturally adapted a medication and treatment compliance measure that might be used to explore patients' compliance and adherence with physiotherapy prescribed exercises and could be used to substitute the 'patient self-report scale of home-based rehabilitation adherence' that was used in our research to measure adherence.

When our translations were compared to the translated and validated measures, it was found to have many similarities in the language and words used in the RMDQ, HADS, NRS and ISI. For future research, these adapted and validated measures should be implemented to overcome the translation validity issue. Another study limitation was that there might be inadequate understanding of some of the questions in the questionnaire, especially those that have emotional or cultural aspects. For example, a pain score rating is a highly subjective measure and overrating or underrating is expected with such measures. More reliable and objective measures are required, such as a pain pressure threshold (Park, et al., 2011) or a more clinical self-reported pain measure such as the short-form McGill Pain Questionnaire (SF-MPQ) (Melzack, 1987).

This study is cross-sectional and with such a design, a few limitations must be expected. According to Carlson and Morrison (2009), there is poor association between the type of mechanical load and outcomes in cross-sectional studies, because they are both evaluated simultaneously. Therefore, cross-sectional work might provide weak evidence that back pain risk factors are causing back pain. The mean age of our participants was 42 years, which is relatively young. This issue is important with regard to disability and cognitive outcome measures, as many studies (Hoy, et al., 2012; Moayedi, et al., 2012; Patel, et al.,

2013) report that ageing is a significant predictor of chronic pain, related to symptoms and co-morbidity. One reason for the younger participants was that the survey was mainly conducted electronically using surveymonky.com, which is usually more attractive to younger people (Gigliotti & Dietsch, 2014; Yetter & Capaccioli, 2010). However, the questionnaire was also available as hard copy. Another limitation was that more than 77% of participants had sub-clinical depression and insomnia. This would explain why the depression score failed to predict any of the outcomes and that insomnia was only predicted in two measures, in spite of previous findings. Several studies have shown that depression and insomnia have a significant ability to predict multiple outcomes (Ericsson, et al., 2002; Glombiewski, Hartwich-Tersek, & Rief, 2010a; Purushothaman, et al., 2013; Tang, et al., 2008). In the future, qualitative studies should explore patients' and health care providers' perceptions and beliefs about CBP and its effect on the treatment process. The authors also recommend that a study that focuses on different age groups, different occupational loadings or genders would be useful to explore the effect of sub-grouping on CBP, with clinical symptoms in the baseline.

Conclusion

Chronic back pain is a common musculoskeletal problem among the Kuwaiti population. Unhealthy lifestyles, a lack of physical activity and current back pain, were found to be associated with the reported pain. CBP is a multifactorial health care problem that requires a multidimensional evaluation system to assess and diagnose patients' symptoms as accurately as possible. To predict patients' prognosis, a pain intensity measure might not be sufficient, and further dimensions such as disability level, mood, insomnia level and coping strategies are recommended as evaluation criteria. Understanding a patient's illness perceptions and beliefs must be the primary tool for the assessment of patients' symptoms among physiotherapists. Physiotherapists should start to look at CBP as a multidimensional and multifactorial problem, keeping in mind that pain intensity is not the only measure of pain. Based on the findings of this study, we recommend that psychosocial interventions be used for the management of CBP in Kuwait.

Chapter 4. The effects of chronic backpain – the effect of patients’ beliefs, culture and lifestyle on the illness and care

Introduction

There are a number of reported factors that have been found to affect patients’ expectations (Stone, et al., 2005), such as socio-demographic characteristics (Krieger, 2005), prior experience (Brody, 2010; Thompson, Ritenbaugh, & Nichter, 2009), family and friends’ support (Chesla, 2005; Simpson, 2004) and therapeutic interactions (Brody, 2010; Caspi, 2003). In a culture like Kuwait where religious and spiritual beliefs play a key role in people’s behaviours and attitudes, a patient’s spiritual beliefs and their effect on reported pain must be investigated. Patients’ beliefs, pain perceptions and patient decision-making regarding the management of the pain could be greatly influenced by their religious beliefs (Koenig, King, & Carson, 2012). Indeed, a patient’s spirituality and religion have a strong effect on their pain beliefs, coping strategies and their adherence rate to the treatment plan (Kretchy, Owusu-Daaku, & Danquah, 2013; Parsons, et al., 2006). Health professionals may have difficulty in understanding those beliefs because many believe that spiritual issues are perceived as personal and private (Unruh, 2007).

Prior studies (Ashby & Lenhart, 1994; Keefe, et al., 1997; Keefe & Dolan, 1986) identified that people with chronic pain might turn to religion to cope with their pain. In the Kuwaiti culture, turning to religion and being spiritual are expected and highly encouraged behaviours by most of the community. There is one crucial issue regarding this point; that is, different people have a different interpretation and understanding of religion. Due to the different Islamic schools (Sunni, Sh’ia), there may also be some differences in beliefs (Ameli & Molaei, 2012). For example, different groups inside the Sh’ia schools might hurt themselves during some special religious occasions such as the

Tatbir, causing pain, (Elbadri, 2009) in order worship God (Nasser, 2004). This act is rejected by other groups in the same Sh'ia school and the Sunni school (Elbadri, 2009). These differences in beliefs and attitudes within the same Islamic school come from the fact that each group has their own leader or influencer that would set rules and guidelines that would impact on people decision making.

One of the most common problems in Kuwait with some of the patients who turn to religion is the tendency to follow spiritual 'influencers' who give medical instruction without any medical background. For example, some religious leaders might step outside of their role and responsibilities and offer medical advice because they believe that their job is to lead the people in every aspect of life. It is not uncommon within Kuwaiti communities to find people stopping their medical care and starting to use herbs or traditional medicine, such as burning the area of pain with a piece of metal or using traditional Chinese medicine. These behaviours could put the patient at higher risk for increased pain (De Smet, 2004; Ladenheim, et al., 2008; Werneke, et al., 2004).

Understanding the patient's beliefs, the effect of the sociocultural beliefs and their knowledge, will aid the understanding of pain behaviours and coping strategies, and could help clinicians to adjust the treatment plan to accommodate the patients' beliefs and behaviours toward their pain and the treatment. Therefore, the aim of this study was to explore the cultural and spiritual beliefs about back pain of Kuwaiti patients with CBP and experience with physiotherapy management.

Method

Interviews were conducted with nineteen participants, aged 18 years and above (13 female and 6 male). Participant demographic details are outlined in Table 1 and all interviews were held in August 2014. All the participants were CBP patients who were referred for physiotherapy by a general practitioner, orthopaedic or physical medicine specialist and recruited from two hospitals (Al-Amiri General Hospital and Shikhan Al-Afarsi Rheumatology & Sport Rehabilitation Hospital) and one private musculoskeletal clinic (KUMP Clinic for Spine and Musculoskeletal Rehabilitation) in Kuwait. Participants were identified as part of a larger questionnaire study (see Chapter 3), where participants had been asked to provide their contact details if they were interested in taking part in an interview study. Participants who showed an interest and provided their contact details were contacted by phone by the main author and provided with information about the study and the study aims were discussed. If participants wished to proceed, they were offered an appointment.

Of the 83 participants who provided their details, 19 agreed to an appointment for the interview. Participants were given a hard copy of the information sheet and signed a written consent form (see Appendix 8, 9, 10 and 11). All interviews were conducted by the main author (AA) in a private room in the physiotherapy department at Al-Amiri Hospital. The average duration of the interview was 30 minutes (ranging from 20 to 60 minutes). The interviews were conducted in Arabic, then transcribed and translated to English by the author, and then a reviewer (JA) translated the English transcript back into Arabic. After that, both researchers (AA and JA) discussed the two Arabic transcripts to check for any differences or misunderstanding (see appendix 12 for example). Both AA and JA have a background in physiotherapy and good proficiency in academic English.

Table1: Participant's demographic data

No.	Age	Sex	Back pain history	Work status	Treatment history
1	26	F	Chronic, 5-6 years ago. Up and down	HE student	M
2	29	F	Chronic, > 2 years	Office job	PT, M
3	30	F	Chronic, > 15 years. Multiple relapses	Field job	Exe, M
4	29	F	Chronic, > 6 years, after her first baby	Nurse	PT, M, Exe
5	22	F	8-9 years, multiple relapses on weekly basis	Student	M
6	30	F	10 years ago never subsided. Just fluctuation in intensity	Office job	PT, M
7	26	F	Pain started 3-4 years ago.	Office job	M
8	23	F	5-6 years ago	Teacher	Exe
9	25	F	8 years ago, however, the pain is bearable	Unemployed	Nothing
10	28	M	8 years ago, increasing over time	Office job	Exe
11	20	M	2-3 years ago, no obvious reason	Student	Nothing
12	29	M	7 years ago, sudden onset	Field job	PT
13	77	M	Chronic pain > 35 years	Retired	PT
14	63	F	The main pain started 3 years ago, bot she has v. old pain	Housewife	M, PT
15	52	F	7 years ago, after wrong work out	Office job	PT, M
16	32	F	Chronic, > 14 years ago	Teacher	M
17	33	M	15 years ago	Office work	PT, M
18	35	F	3 years ago, after childbirth	Teacher	PT, M. Exe
19	33	M	10 years ago due to wrong lifting	Field work	Nothing

Respondent's details, PT = physiotherapy, M = massage, EXE = exercise.

4.1.1 Ethics issues

Ethics approval for this study was obtained from the ethics committee at the University of Birmingham (reference ERN_13_1280) and permission was obtained from the Physiotherapy department in Al-Amiri General Hospital and Shikhan Al-Afarsi Rheumatology & Sport Rehabilitation Hospital and KUMP Clinic for Spine and Musculoskeletal Rehabilitation, all based in Kuwait (see Appendix 3B and 13).

4.1.2 Interview schedule

The method of data collection was an interview with open-ended, semi-structured questions related to the topic being investigated (Britten, 1995). A topic guide was developed; however, the interviewer also explored participants' personal experiences, opinions and any newly raised issues (May, 2001). Interview questions (see Appendix 14) were developed from reviewing the literature (Foster, et al., 2008; Nijs, et al., 2013; Osborn & Smith, 2015), and the clinical experience as a physiotherapist of the main author (AA), and focussed on the patients' beliefs and perceptions on CBP and the effect of lifestyle and psychosocial factors on the condition and its care. The main concepts of the biopsychosocial model of pain (Engel, 1977; Sanders, et al., 2013) were used to create the interview questions, exploring the biomechanical aspect of the problem (e.g., activities and movements aggravating the symptoms), and the emotional (e.g., anxious and depressive symptoms because of the problem) and sociocultural (e.g., effects of the lifestyle in Kuwait, religion and cultural norms) factors and their influence on CBP.

4.1.3 Data analysis

There are many methods of analysis for qualitative data including phenomenology (Heitink, 1999; Larkin & Thompson, 2012), grounded theory (Martin & Turner, 1986) and framework analysis (Ritchie, et al., 2013). Phenomenology was created to explore phenomena and to investigate previously unanswered questions through the exploration of the experience and significance of this experience. It clarifies what seems to be vague and gives value to the phenomena, rather than making inferences. Such methodology enriches and increases the depth of understanding of the investigated phenomena. Grounded theory is a widely used qualitative methodology helping to categorise clinical findings into meaningful groups through the analysis and study of the investigated theory. It can be used as a process for developing a theory based on understanding and analysing participants' perceptions, beliefs, cultures and experience about the topic being studied. Framework analysis is a form of thematic analysis. Thematic approaches focus on identifying similarities and differences in qualitative data, then establishing relationships between the obtained data, thereby trying to provide meaningful categories about the formed themes. Framework analysis is commonly used for homogenous groups that share similar experience and concerns about similar issues. It is a recommended method to be used in health-related studies that involve multidisciplinary data due to its flexibility and systematic orientation (Gale, et al., 2013) and was used in this study to analyse the obtained data.

The process consisted of five stages. In stage one, the researcher familiarised himself with the data gained through listening to the interviews, reading the transcripts and field notes and then transcribing the interviews. Transcripts had large margins and adequate line spacing for later coding and making notes. In stage two, the researcher tried to identify the general themes of the framework through analysing the data into main themes and subthemes. This is called the coding stage. During this stage, the researcher carefully read the transcripts line by line, applied a label or code that described what he had interpreted in the passage as important. In more inductive studies, at this stage open coding takes place, in which coding is extended to anything that might be relevant from as many different perspectives as possible. Codes could refer to substantive things such as particular behaviours, incidents or structures, values that inform or underpin certain statements, emotions or more impressionistic or methodological elements such as something the interviewee found difficult to explain, and became emotional (Saldaña, 2015).

Coding aims to classify all the data so that it can be compared systematically with other parts of the data set. Indexing and charting the data followed as stages three and four respectively, where the researcher classified the data according to the final framework and grouped it under the correspondent theme and subtheme and provided it with a unique code. During the indexing stage, the researcher applied the working analytical framework by indexing subsequent transcripts using the existing categories and codes. Each code was assigned a number and abbreviation for easy identification and written directly onto the transcripts. In the final stage, the charting stage the researcher summarised the data by category from each transcript. The chart included references to interesting or illustrative quotations. The reliability of the analysis was improved through a structured process; the identification started with the appropriate themes, through comparing and examining the main script several times, until the final version of the themes was selected.

Results

Data saturation was reached when no new themes were identified in two consecutive interviews. This occurred after 14 interviews, however, the remaining five participants were also interviewed, as they had already agreed to participate. Of those 19 participants, 13 were female and 6 were male. The mean age of the participants was 34 years (ranging from 20 to 77). One patient discontinued the interview as he felt tired, but he allowed the use of his data obtained thus far. Five main themes were identified (see Table 2). These were: (a) patient demographic characteristics' beliefs, specifically about gender and age; (b) the effect of patient's beliefs on back pain and its effect on quality-of-life; (c) patient's experience with physiotherapy in Kuwait; (d) the effect of sociocultural factors on the pain; (e) common back pain coping strategies; and (f) the impact patient's lifestyle on the pain.

4.1.4 Theme One – Patient demographic characteristics

Table2: Themes and sub-themes definition

Theme	Definition	Example
Patient demographic characteristics beliefs (gender/age).	Patient's beliefs about gender, age and how these variables would affect the pain.	Beliefs about back pain and being female. Do older people have less pain tolerance?
The effect of patients' beliefs about back pain and it's affect on the quality-of-life	How patients' knowledge and experience would affect their behaviour, activities, work and relationship with others.	Patient's previous experience with back pain, might impact the way the person move or lift to avoid the pain.
Patient's experience with physiotherapy in Kuwait	The impact of patients' previous experience with physiotherapy on expectations and acceptance of future physiotherapy treatment.	In a previous physiotherapy session, patient felt pain or found it be unhelpful, so he might expect that physiotherapy is painful or useless.
The impact of sociocultural factors on the pain	How would the lifestyle, norms, spiritual life and culture in Kuwait affect the pain and patient's abilities to cope with pain?	The affect of patient's parents beliefs about back pain on his/her pain behaviour.
Common back pain coping strategies	Actions, activities and behaviours that patients would practice and apply to control the symptoms	Some patients prefer to do stretching exercises when they feel the pain, others might prefer just to relax and apply a cold pack on the painful area.
The impact of patient's lifestyle on the pain	How patients' every day practice, type of activities and routines would affect the pain?	Does the patient have a sedentary lifestyle? Does he go to the gym? Is he working in an office job? Sitting all day? And how this impact on pain?

Patients held different beliefs about the effect of age and gender on the pain and their abilities to cope with pain and comorbid dysfunction. Some believed that age led to what they called 'weak bones', which might cause more pain and dysfunction. Some also reported that, with age, people start to lose muscle strength and their overall ability to exercise and build muscles is reduced.

> *'I think that one of the main reasons for back pain is ageing. When people become older their bones become weaker especially the spine because we depend a lot on the spine and this will cause back pain.' (No.9, female, age 25, pain > 9 years).*

> *'Maybe because when we get old, we start to lose muscle or because old people don't exercise or don't move in a good way, which makes back pain very common among old people.' (No.1, female, age 26, pain > 5 years).*

Changing unhealthy habits such as incorrect sitting postures was believed to be difficult in older people. Some participants reported that because they had engaged in these habits for many years, the learning of new habits would take long time.

> *'When you get older, it is difficult to change your habits. That's why old people always complain from their back, because they can't change the wrong habits like sitting for a long time and not moving which usually causes pain.' (No.2, female, age 29, pain > 2 years).*

The physiological and psychological ability of both genders and their effect on the pain management process was also discussed by participants. Some stated that they believed that men were better than women in tolerating the pain because of their physiology. However, some women reported that pain tolerance was not related the gender, and it depended on the severity of the pain. In fact, they believed that women were stronger than men because they can tolerate labour pain, which they reported to be more painful than back pain.

> *'I think men are stronger than women, you know scientifically that male can tolerate more pain and effort than female, so I think females are suffering more when they have back pain.' (No.1, female, age 26, pain > 5years).*
>
> *'Females are stronger than males in regard to pain tolerance, they can tolerate delivery pain. Definitely back pain is not easy, but I think we as*

> *women are designed to tolerate even severer pain than men' (No.4, female, age 29, pain > 6 years).*

Some participants discussed their experiences in terms of the gender of the therapists and reported different opinions. For example, many female patients reported that they preferred a male therapist because they believed that female therapists are not as professional as the male therapists or that females, in general, are emotional and their performance in the treatment could be easily affected by the hormonal changes such as menstruation or menopause.

> *'Sorry for saying this, but I don't trust female therapist. One day, I was in treatment room waiting my therapist to start the session. I think she was fighting with her husband over the phone, because I was able to hear her voice next door. Then she came to the room with a very rude attitude and the whole session went very bad with a lot of tension in the room.' (No.7, female, age 26, pain > 4 years).*

4.1.5 Theme Two – The effect of patient's beliefs on back pain and its effect on quality-of-life.

During the interview, many participants expressed their beliefs about what caused their back pain and then reflected on the impact of the pain on their quality-of-life. Some reported that biomechanics such as poor position or sitting posture might lead to pain in the spine.

> *'I have bad posture, this what my therapist told me. You have bad posture and this is what is causing your pain. I know that, because I always sit for a long time for reading or watching TV, but didn't imagine that bad posture would cause such pain.' (No.7, female, age 26, pain > 4 years).*

> *'I used to sleep on my stomach, I enjoy sleeping on my stomach. I think this sleeping position caused my pain because one of my friend's father is a doctor and he told me that stomach sleeping causes back pain.' (No.1, female, age 26, pain > 5years).*

Others reported that because they have a pathological problem in the spine such as a disc prolapse and spinal stenosis, they had back pain.

> *'My doctor told me that I have a severe disc problem in my neck, and that is what causes my pain in the spine. I was shocked because I'm still young, I didn't expect to have a disc problem at my age. I'm not sure why, still thinking of what I've done to hurt my back?.' (No.2, female, age 29, pain > 2 years).*

> *'One day I woke up in the morning with severe back pain that prevented me from moving from the bed. It was the worst pain in my life. I was crying in bed because of the pain, I wasn't able to breathe deeply too. My daughter gave me some painkillers and the pain became less. I went to my physician and she asked my to get x-Ray done. When the results came, she diagnosed me with 2nd degree of spinal stenosis I guess!! She told me that canal where the spinal cord passes was narrower than the normal people and this happened because I'm getting old.' (No.14, female, age 63, pain > 3 years).*

Most reported that their sleep quality and the ability to sleep was affected by the pain. Other stated that their back pain led to stress and negative mood, which in turn affected their daily productivity.

> *'Pain wakes me up, this is one of my main issues with the pain. I can't*

> *maintain long good sleeping without interrupting it because of pain. It is very difficult for me keep on that for a long time. I mean for how long am i going to suffer? Fatigue started to accumulate and I'm getting tired day after day.' (No.2, female, age 29, pain > 2 years).*

> *'I had very bad experience because of my back pain. One day I was playing with my son, he came to me to hugged me but I wasn't able to lift him. It was so painful like something stabbed me in my back. Recently, I feel that I'm always in stress and always fighting with my colleagues' (No.6, female, age 30, pain > 10 years).*

> *'I'm a nursery teacher, I deal with very active kids. My work requires me to move and sit on the floor. Maybe twisting my body, I don't know, but I have to be very flexible to be in the level with the kids. Also I can't stand or sit for a long time, my back hurts me all the day. You know that feeling, when you feel that someone very heavy is sitting on your back.' (No.18, female, age 35, pain > 3 years).*

4.1.6 Theme Three – Patients' experience of physiotherapy in Kuwait

Several participants talked about their experience of physiotherapy in Kuwait. Some expressed their happiness and satisfaction, while others were not satisfied and found that physiotherapy was not helpful. Mainly, there was a major issue with the result of the treatment as many patients discussed their treatment expectations and treatment outcomes.

> *'I think that physiotherapy in Kuwait is very good, may be better than most of the physiotherapy services in the Middle East. We can't blame the health professionals for the bad results all the time; maybe the patients*

> *didn't follow the instructions or the exercises. I don't know, but I've been doing physiotherapy in Bahrain and I can tell you that here in Kuwait they are much better than there.' (No.4, female, age 29, pain > 6 years).*

> *'I had bad experience with the physiotherapy. One time, the therapist applied a hot pack on my shoulder and that made my pain much worse. Then I discovered that she should have been applying cold modalities not hot because I had inflammation, which aggravated my symptoms and made the pain worse I think this is very basic, like you should know when to use hot or cold modalities.' (No.5, female, age 22, pain > 9 years).*

The majority reported that poor communication skills such as a lack of positive interaction with the patient and not listening to them were the main issues with physiotherapy because it led to a poor diagnosis and outcomes and discouraged the patient to follow the treatment programme.

> *'It is very important that the physiotherapist learns how to listen to the patients and try to understand them. I mean they should learn to respect patients' knowledge and experience with the pain. Many physiotherapists think that we (the patients) don't have any information about our illness and underestimate what we know.' (No.6, female, age 30, pain > 10 years).*

> *'I have one advice for the physiotherapists in Kuwait: they need to listen to the patients. They don't listen at all. Like when I go to the treatment room, I'm expecting that the physio is going to ask me about my major problem or what causes my pain, but instead of that, he directly started putting hot towel on my back with some electrotherapy modalities then*

> *telling me to do some exercise and that's it!!' (No.13, male, age 77, pain > 35 years).*

Another issue raised was the lack of consistency between physiotherapists when explaining the problem and the advice they provide for the same complaint. For example, some patients found that some physiotherapists recommended rest and reduce the level of activities while others encouraged movements and staying active. Participants also discussed the inconsistency when explaining the cause of the pain. Most participants reported that most of the physiotherapists asked to check the medical investigations first and then focused their explanations on the damaged structures like a herniated disc or deconditioned muscles. Others reported that the physiotherapists begin the assessment with some testing on the bed followed by clinical examinations.

> *'..., and I have this pain for many years. I have been to many doctors, clinics and therapists. I have seen many physiotherapists for many years, and I'm always receiving different advices, which make me get confused and honestly a bit hesitated to follow the instructions. Don not get me wrong, but when you complain of back pain for long time and your therapist tells you to not stop lifting heavy objects as them might hurt your back, and then you another one that told you that you need to start going back to the gym and lift some weights, what do you think? Both of them are qualified and both of them are asking you to ignore other physios(therapists) and just listen to him.' (No.15, female, age 52, pain > 7 years).*

> *'I had physiotherapy sessions multiple times during my journey with the pain. Some of them were asking me to do MRI before coming to the clinic as they said it was important to diagnose my pain. but there was other*

> *group of therapist that usually tell me that MRI is not accurate or not helpful in my case, and performing some physical examinations would be more than enough to diagnose my problem.' (No.16, female, age 32, pain > 14 years).*

4.1.7 Theme Four – The impact of sociocultural factors on the pain

Several patients talked about the relationship between their back pain and the sociocultural factors in Kuwait. There was some debate about the impact of cultural habits such floor sitting and its effect on the pain and the spine. Some believed that the obligation to sit on the floor during occasions such as family gatherings and in mosques might aggravate the pain, while others believed that sitting on the floor was not harmful as many people in the past used to sit on the floor and did not complain of pain.

> *'One of the main aggravators of my back pain is floor sitting; you know when you sit on the floor crossing your legs. It is a very common sitting position in Kuwait and the Middle East. Sometimes, we have to sit on the floor during family gathering or in the mosque. For now, I'm trying to reduce the amount of times I sit on the floor, but other times I have to. You know, these cultural things that are difficult to avoid and cause pain at the same time.' (No.1, female, age 26, pain > 5years)*

> *'No I don't think that floor sitting causes pain, every old person in Kuwait used to sit on the floor, my father and grandfather used to eat on floor for many years and nothing wrong happened to them. The problem with this generation is that they are used to sit on the chair for a long time, and now they feel pain as soon as they sit on the floor. Their spine is weak.' (No.13, male, age 77, pain > 35 years).*

Some participants reported that they are regularly involved in charity activities, despite these activities sometimes causing pain or aggravating their symptoms; they stated that they would continue participating in such activities because it is spiritually and religiously important to them.

> *'I enjoy doing charity work, yes sometimes I feel tired and my back hurts me but it is a wonderful experience. I will stop only if the pain was so intense that I couldn't move or walk. I can't explain my feeling when I help poor people and they start to smile and thank me, but it is amazing and blessing. You know when you feel tired and exhausted, your back and neck hurt you, every joint in your body is in pain but at the same time you feel satisfied and happy. The Islamic rules always encourage us to help others and try to make people happy.' (No.8, female, age 23, pain > 5 years).*

> *'I like to do charity; I participate in charity activities regularly, which is fine. But sometimes these activities became body depleting because they are intensive and very hard leading to pain and fatigue. My doctor told me to stop doing charity but I can't, I'm ready to sacrifice my health but not stop charity work. You know, God will appreciate my effort when I do charity, every pain I suffer now, will help me to purify my soul.' (No.1, female, age 26, pain > 5years).*

Many participants believed that the social life in Kuwait and the commitments and obligations would create extra pressure. For example, family gatherings, friends visiting and cultural activities would put extra pressure on them leading to pain and difficulties to cope with the illness.

> *'I don't know if you agree with me or not, but social life and social commitments might put pressure on you and affect your pain. Like when you have people to visit and social or family activities that you have to attend, there is no time to take care of my body or myself. Sometimes no time to exercise or not enough time to sleep or even see a doctor or go for physiotherapy.' (No.4, female, age 29, pain > 6 years).*

> *'When I go to the university, usually I use a cross shoulder bag to carry my books and tools. After a while I started to feel pain in my back and shoulder especially during walking. I went to see a therapist, who recommended that I use backpack instead of cross shoulder bag. See you can't backpacks because your image will not be good among the students at the university. In Kuwait University students don't wear backpacks, it is just different. They think that backpack are for schools only.' (No.8, female, age 23, pain > 5 years).*

4.1.8 Theme Five – Common back pain coping strategies

The participants reported using different coping strategies to control the pain. Some of these strategies were physical such as stretching exercises and yoga, some were cognitive strategies such as meditation and relaxation techniques, while others preferred to take painkillers and reduce their level of activities.

> *'The best solution ever is just to stay on my back, not moving or doing any effort. I used to do this for a long time, even before my back problem became a serious issue. I lay on my back for 30-45 min, just relaxing closing my eyes, doing deep breathing exercises and usually my pain starts to diminish after that.' (No.6, female, age 30, pain > 10 years).*

> *'I have a general rule: avoid movement and activities that increase your pain. For example, I try to avoid sitting on the floor for a long time. Also, I don't lift or carry heavy weight. I'm trying to protect my back, because my back is weak and stiff. You can't do a lot in such situation.' (No.10, male, age 28, pain > 8 years).*

> *'A few years ago, my daughter signed me up in a small studio where teach old yoga and light exercises for old people. It was fun and helpful. After awhile, I felt much better with my movement, especially in the morning. My back and knee stiffness were better and less sore. Unfortunately, I couldn't keep going to the classes because they changes their location which was very far from my home' (No.14, female, age 63, pain > 3 years).*

Some reported coping strategies to handle the sociocultural stress that would play a role in aggravating the symptoms. These strategies included social isolation or physical strategies such as avoiding sitting on the floor. Such strategies would help patients to avoid the pain and maintain a functional level.

> *'Recently, I figured out that doing extra works that's not mine, you know when sometimes other people might ask us to help them finish some old work but then they leave it all on our shoulder?? I really have to learn how to say no and refuse doing things my body can't tolerate. I think it would help me a lot to focus on my health and save energy.' (No.1, female, age 26, pain > 5years)*

> *'One of my main issues is that sitting for a long time causes pain in my back, this issue could be controlled in my personal life. However, I*

> *couldn't control it when I attend social events like the weekly family gathering. Therefore, decided to avoid social events, because I can't stay on the floor for a long time for example or sit on an uncomfortable chair. This helped me so much especially when the pain is severe and my back is burning.' (No.17, male, age 33, pain > 15 years).*

4.1.9 Theme Six – The impact of patients' lifestyle on the pain

The majority of participants discussed the nature of their lifestyle. Some were active, while others reported a sedentary lifestyle. Examples of an active lifestyle included home exercises, going to the gym or having a 'physically' active day. Some of the active participants still reported experiencing pain and that being active aggravated their pain. A sedentary lifestyle included a reduced level of physical activity such as watching the TV for long periods, avoiding walking, and parking the car near their destination and using the elevator instead of the stairs.

> *'I'm active. Very active. I have a lot of work to do everyday. I don't have a housemaid, I need to work at my house then clean and wash by myself. But my pain keeps increasing and annoying and bothering me more and more. I decided then to reduce my workload, I hired a maid that comes and helps me every weekend. Honestly, it didn't help a lot, like my pain didn't change much. Yes it became less a bit, less annoying but still bothers me when I get busy' (No.4, female, age 29, pain > 6 years).*

> *'I'm a very active and healthy person, I go the gym everyday, I eat healthy food and do Yoga regularly. However, I have back pain and neck pain!! I'm shocked; I mean if I'm so active and healthy, why do I have back pain?? I know that lazy people who don't exercise are prone to pain*

> *and stiffness in their joints, but why do I have this pain?' (No.15, female, age 52, pain > 7 years).*

> *'… honestly, when the weather is war in the summer, my level of physical activity reduces. i don't like to get sweat especially when I need to visit different places or go for shopping. You know, the temperature in Kuwait is very high in Kuwait it will make you sweat a lot. Especially in the summer, usually I don't walk a lot, instead I use my car all the time. Even for short distances, I prefer to park my car as close as possible to the location that I'm aiming to go to.' (No. 11, male, age 20, pain 2-3 years).*

Other participants reported a sedentary lifestyle, which mainly focused on staying at home and relaxing. Some of the sedentary participants reported that exercise was only for obese people, and they were inactive because they were 'thin'. Most sedentary people reported that the hot weather in Kuwait demotivated them to move and become active. All these factors of sedentary lifestyle would eventually play an indirect role in aggravated patients' pain and might lead to further health issues.

> *'You have a lot of life stress, my life fluctuates between active and sedentary lifestyle. Some days I get very busy, other days I just lay in my bed, relaxing my body. During the weekdays, I don't like to go out after finishing my work. During the weekends I enjoy the weekend with my kids and husband, going to the seaside or to the mall. It depends on the weather, when it is so warm outside; we just go to the mall.' (No.6, female, age 30, pain > 10 years).*

> *'My friends and family always tell me that I'm lazy because I don't like to exercise or be active. But why shall I do exercise?? I mean I don't*

> *exercise because I'm very thin, exercise is for obese people. Also I don't have severe back pain; it's only bothering me some days at night before sleeping. See, usually I have long days at the university, starting at 9 in the morning and finish at 6 pm, I don't have time to exercise or anything, just eat and sleep until the next day' (No.9, female, age 25, pain > 9 years).*

One participant reported that she would like to be active and have an active lifestyle, but she adopted a sedentary life because of her pain and fatigue that usually prevented her from being fit enough to engage in an active lifestyle.

> *'I don't move a lot, I can't because my joints are hurting me. My doctor told me that I need to do some exercise and walk everyday, but I can't. See, it is not easy for a lady who's age is 63 to do exercise like young people, these exercises require a lot of flexibility and muscle strength that I lack. Also, gyms are designed to suite young people, they have loud music and are crowded with machines that I feel I can't move around safely.' (No.14, female, age 63, pain > 3 years).*

Discussion

The aim of this study was to explore the cultural and spiritual beliefs about back pain of Kuwaiti patients with CBP and experience with physiotherapy management. The results of this study showed that patient's beliefs about back pain, sociocultural and spiritual beliefs affected their coping with physiotherapy treatment. The overall findings of this study were similar to studies in other cultures, such as British, Chinese, African-American, Hispanic, Filipino and Korean cultures (Abubakari, et al., 2013; Kim, et al., 2012; Yan, et al., 2011). All those studies found that illness beliefs and cultural beliefs influenced patients' illness behaviour, affected treatment outcomes and determined coping strategies. To the best of our knowledge, this is the first study that explored patients' beliefs about back pain in a Kuwaiti sample. The findings from this and other studies demonstrate that CBP is a multifaceted health problem that is affected not only by physical factors, but also psychosocial factors which could lead to further disability (Hashmi, et al., 2013).

Many participants reported their concerns in regards to some demographic issues such as the gender of the therapist and the relationship between their age and the pain. There is broad evidence indicating that illness perceptions, or patients' personal thoughts about the symptoms they experience predict health behaviour (e.g., visits to a physician, medication adherence) and activity limitations in a variety of illnesses and conditions (Benyamini, Diefenbach, & Patrick-Miller, 1997; Hagger & Orbell, 2003), including low back pain (Foster, et al., 2008; Foster, et al., 2010).

Leventhal's self-regulation model (SRM) provides a theoretical foundation for these findings, showing that maladaptive illness perceptions can lead to maladaptive behaviour such as activity limitations (Benyamini, et al., 1997). Demographic factors affect the therapy process in terms of the clinical and interpersonal experiences which affects therapy beyond the actual intervention (Wintersteen, Mensinger, & Diamond, 2005). Most participants in this study preferred a therapist of the same gender as them. Recent research provides evidence that matching client gender with therapist gender results in better outcomes by increasing the compliance and adherence rate (Lambert, 2016; Wintersteen, et al., 2005). However, a recent meta-analysis exploring the influence of gender and gender matching in therapy combined data from 64 studies (Bowman, et al., 2001). The authors concluded 'the effect sizes for female and male clients were not significantly different than zero, suggesting no advantage for female or male therapists when seeing clients of the same or opposite gender'. Taken together with the relatively low overall effect size, this data indicated that there was essentially no difference in the effect associated with therapist gender.

Several participants expressed a belief that they have the pain because they are getting old and that having such pain indicates that they are advancing in age. A study on aging self-perception showed that negative self-perception of age is an indicator of risk for future disability in activities of daily living. Factors such as a low-economic status, living alone, multiple chronic medical conditions and depressive feelings contribute to a negative self-perception of aging but do not explain the relationship with poor functionality and disability level (Moser, Spagnoli, & Santos-Eggimann, 2011). Buntinx recently reported that people with a negative self-perception of aging are more prone to negative outcomes with cancer (Buntinx, et al., 2017). Schroyen et al. (2017) reported that older patients with cancer face double stigmatisation, due to the negative self-perception of aging and of cancer, and these stigmas have impacts on global physical and mental health, leading poor treatment outcomes.

This study revealed stereotypical views of back pain in the Kuwaiti culture and among Kuwaiti patients that might increase symptoms or aggravate the problem. For example, some patients decided to implement a sedentary lifestyle and avoid exercise because of the pain and believed that exercise might exacerbate the symptoms. Previous experiences with pain, knowledge, culture, society and family all have a strong effect on reported beliefs (Feinstein, et al., 2006; Seeman, 2000; Subbotsky & Quinteros, 2002). In Kuwait, people's behaviour and attitudes are strongly influenced by their religion and the by cultural norms of the family, in addition to the general cultural beliefs and heritage that have been passed from generation to generation. For example, in some families, it is considered a tradition to tolerate pain or to receive a treatment recipe from their grandparents, which is known as ‘traditional medicine’ (e.g., using herbal remedies or burning the area of pain with metal). It is important for physiotherapists to recognise that patients’ behaviours are controlled by their beliefs and these beliefs sometimes prevent them from following the instructions and accepting the diagnosis (Biddle & Mutrie, 2007; Jack, Mclean, Moffett, & Gardiner, 2010).

Several patients reported visiting more than one clinician because the first clinician’s diagnosis or treatment did not match their expectations or beliefs. However, some patients may have unrealistic expectations, especially patients with poor health literacy and limited knowledge of CBP (Briggs, et al., 2012). A common example in Kuwait would be in patients with CBP who might ask for a treatment similar to a friend’s treatment because it was effective for them and because they have similar symptoms. Patient self-diagnosis and treatment without knowledge might worsen the problem and lead to further complications (Ruiz, 2010). These types of behaviours among Kuwaiti patients would affect the treatment plan, and sometimes lead to therapists’ frustration, which might explain why many patients complain about doctors’ and therapists’ lack of listening and communication skills (Krebs, Garrett, & Konrad, 2006; Sharpe, et al., 1994).

Although each community has its own culturally adapted beliefs, previous studies reported that therapeutic interventions that target maladaptive behaviours and unwanted beliefs could result in better outcomes, such as improved sleep quality (Wagley, et al., 2013) and increased levels of daily activities (Koopman, et al., 2010). Chronic pain might lead to unhealthy cognitions and behaviours, leading to reduced daily activities, higher psychological distress and longer lasting pain (Thibault, et al., 2008). Patients with CBP frequently complained of psychological problems such as depression (Bair, et al., 2003) and anxiety (McWilliams, et al., 2003). Casey et al. (2008) showed that psychological distress has a reciprocal relationship with chronic pain, as they have been recognised as playing a key role in the transition from acute pain to chronic pain. In addition, patients with chronic pain may develop sub-clinical anxiety and depression, that interferes with the patients' life; however, in most cases they go undiagnosed (Geenen, et al., 2012). In the long term, chronic pain patients are known to adopt unhealthy behaviours such as fear of movement (Leeuw, et al., 2007) and unhealthy beliefs, such as catastrophising beliefs (Sullivan, et al., 2001b).

Fear of movement is maladaptive, characterised by movement and activity avoidance to reduce the pain, which in turn might foster the pain (Samwel, et al., 2006) and increase disability (Zale, et al., 2013). Patients with catastrophising beliefs tend to exaggerate their pain response and hold negative expectations with regard to illness prognosis and treatment outcomes (Crisson & Keefe, 1988; Hamilton, Karoly, & Zautra, 2005; Keefe, et al., 1989; Mankovsky, et al., 2012; Sullivan, Bishop, & Pivik, 1995; Wollaars, et al., 2007). Psychological intervention such as CBT might help to target and manage the maladaptive behaviours and cognitions, by fostering positive thoughts, reducing psychological distress and the development of effective coping behaviours (Day, Thorn, & Burns, 2012; Gatzounis, et al., 2012; Mccracken & Eccleston, 2005; Vowles, McCracken, & Eccleston, 2008; Williams, et al., 2012b).

Participants discussed their dissatisfaction with physiotherapy due to poor communication, which could weaken the rapport between the patient and the therapist and reducing the adherence rate (Jin, et al., 2008). The advice to patients should be culturally adapted or modified in a way to suit their lifestyle. For example, many therapists would recommend that the patient should not to sit on the floor because it would increase their pain and symptoms. This type of advice might be helpful physically; however, it only addresses the physical aspect of the problem, not the social or cultural beliefs that encourage floor sitting. In this case, the physiotherapist might encounter strong resistance from many patients to this advice, because the therapist did not consider the sociocultural importance of the behaviour (Jack, et al., 2010). Generally, most physiotherapists and clinicians give more attention to the physical aspect of CBP, and overlook other factors (Astin, 2002; Levinson, Gorawara-Bhat, & Lamb, 2000). This could affect the long-term treatment for CBP (Stålnacke, 2011).

Risk factors usually interact with each other to create the experience of pain, and are rarely separate or working alone (Richmond, 2012). In physiotherapy management of CBP, focusing on one area of the illness only, which in most cases is the physical domain, would result in poor treatment outcomes and relapse would be expected (Boersma, Carstens-Söderstrand, & Linton, 2014; Rainville, et al., 2011; Wong, et al., 2014). Unfortunately, most physiotherapists and clinicians in Kuwait tend to neglect these dimensions, as is demonstrated by several studies (Kendall, et al., 1997; Chou, et al., 2010). Overlooking other pain dimensions such as the psychological aspects comes from the biomedical model of pain, which is a model that the majority of healthcare providers in Kuwait follow. The model posits that any pain in the body originates from damage to anatomical tissue (Bendelow, 2013b). This approach is limited and excludes the psychosocial and cultural elements of the problem (Wade & Halligan, 2004b).

Many interviewees reported that they did not follow the advice because it did not fit with their lifestyle or culture. Healthcare providers often report that patients do not follow instructions and do not adhere to the treatment plan, which might lead to unwanted outcomes such as worsening of the symptoms, functional limitations and failure to achieve treatment goals (Turk & Rudy, 1991). Although CBP as a multifactorial disease has been investigated widely in industrialised countries (Waddell, 1998), further investigation on the effect of sociocultural factors on CBP in developing countries is required. For instance, to improve the adherence rate, the literature emphasises the importance of respecting gender preferences during the decision-making process (White, et al., 2005) as it has been demonstrated to be associated with treatment satisfaction (Williams, et al., 2016). It has also been reported that sociocultural factors have a strong impact on illness behaviour and, consequently, the adherence rate (Kroll, Barlow, & Shaw, 1998). Therefore, instead of giving advice that targets only one dimension of the problem, physiotherapists should understand patients' cultural beliefs about the pain, and then modify the instructions accordingly. For example, in the previous example about floor sitting, the physiotherapist could teach patients the proper way of floor sitting or use a graded activity approach so that patients are encouraged to follow the advice. It is thus beneficial for the physiotherapist to create a positive, but professional, relationship with patients, to understand a patient's beliefs and illness behaviour (Carroll, et al., 2012). According to Kawabata, et al. (2009), the patient-physician relationship could be affected by four main factors: physicians' attitude; patients' attitude; other medical professionals' attitudes; environmental factors; and with physicians' attitude identified as the most dominant influence. Moreover, understanding of a patient's health beliefs, values and preferences is a crucial factor in the patient-therapist relationship (Epstein & Peters, 2009; Epstein & Street, 2007). Healthcare providers' communication and interpersonal skills, such as effective history-taking from the patients, providing accurate diagnoses, appropriate advice and a positive rapport with the patients are important (Bredart, Bouleuc, & Dolbeault, 2005; Duffy, et al., 2004; Van Zanten, et al., 2007).

In a culture like Kuwait where people believe strongly in their traditions and religion, social factors have a key role to play in aggravating symptoms and illness (Koenig, 2014; Weber & Pargament, 2014). Sociocultural aggravating factors are multifactorial in themselves and include activities, behaviours and beliefs learned from society and culture that would create physical or psychological distress and exacerbate the symptoms. Ruiz-Montero et al. (2015) examined the effect of cultural differences in people with fibromyalgia and found that the cultural background of the patients influenced illness perceptions and beliefs. Kim, et al. (2012) stated that a person's sociocultural background might potentially influence their coping behaviour and the ability to handle the pain, which is strongly associated with illness perceptions. Therefore, it is crucial for healthcare providers to understand the meaning and value of the patient's health and illness, as the evidence previously suggested its relationship with treatment outcomes. These beliefs and behaviours might be important barriers to effective pain management (Dawson, et al., 2005) and are associated with anxiety and depression (Husain, et al., 2008), and poor treatment adherence (Foster, et al., 2008). Previous trials that investigated illness perceptions in numerous groups of chronic pain sufferers have found that patients' personal beliefs with regard to their own health significantly affect health behaviour and clinical outcomes (Alsén, et al., 2010; Hermele, et al., 2007; Searle, et al., 2007), which resulted in poor outcomes and delay in the recovery process.

It is well documented that chronic pain patients use a variety of strategies to cope with the pain and the co-morbid problems (Boothby, et al., 1999; Jensen, et al., 1991). People tend to employ coping strategies according to their internalised cultural values and beliefs, judging which would be most valued in their cultural context (Folkman, 2013; Lam & Zane, 2004). Coping strategies may change depending on the context and types of the stressors, available coping resources and situational factors (Folkman, 1984; Kerdijk, Van Der Kamp, & Polman, 2016). Coping with pain can be classified into general active strategies for relieving, controlling or functioning with pain and general passive strategies that include withdrawal, avoidance and negative self-statements about pain. They can be divided into cognitive and behavioural strategies. Pain-coping actions and cognitions can be positive or negative, respectively adaptive or maladaptive, depending on their immediate or long-term consequences regarding pain, physical functioning, psychosocial functioning, or a combination of all three (Kraaimaat & Evers, 2003). Studies among adult pain patients suggest that general passive coping categories (withdrawal, resting, worrying and catastrophising) are associated with poorer outcomes, such as decreased physical functioning and increased psychological distress (Smith, et al., 1997). General active coping strategies (continuing activities despite pain, ignoring pain), hypothesised as beneficial by many authors, were not found consistently related to beneficial outcomes (Brown & Nicassio, 1987; Smith, et al., 1997), possibly because the effects of active coping are more context sensitive than those of passive coping (Smith, et al., 1997), as reported by a participant in this study who found that yoga and exercises reduced her back pain.

Pain coping efforts usually involve cognitive and behavioural strategies to minimise pain and pain-related distress and disability (Dyer, Sylvester, Traupman, Mackelprang, & Patterson, 2014). Cognitive and behavioural reactions to pain are significant because they may affect pain, functional capacity, and psychological functioning and may be amenable to change brought about by interventions. These reactions to pain are commonly studied under the category ‘pain coping’ and defined as people’s behavioural and cognitive attempts to manage or tolerate pain and its effects (Brown & Nicassio, 1987; Jensen, et al., 1991).

In this study, participants used different coping strategies for a similar problem. For example, some preferred to perform stretching exercises and yoga to cope with pain, while others preferred to rest and relax and take analgesic medication. Differences in coping strategies have been hypothesised to explain some of the variation in adaptation among this group of patients with CBP (Lazarus and Folkman, 1984). Lazarus and

Folkman's stress and coping theory (1984) outlines several important factors involved in the coping process guiding this study. These are the person's stress experience, evaluation of resources (appraisal) and their thoughts and behaviour to manage the demands (coping) (Folkman, 2013). Folkman et al. (1986) define psychological stress as 'a particular relationship between the person and the environment that is appraised by the person as exceeding his or her resources and endangering wellbeing' (Folkman, et al., 1986).

Cognitive appraisal determines the meaning of the person-environment relationship and the person's emotional response to chronic pain (Lazarus and Folkman, 1984). When the pain-related stressors are appraised as exceeding the person's resources, wellbeing is threatened. Appraising stress as a threat refers to the potential for harm or loss and produces a negative emotional response, which is closely related to vulnerability. appraising stress as a challenge is a positive response, which focuses on growth and mastery (Folkman, 2013). Patients with pain often have negative and maladaptive appraisals about the situation and their own ability to control the pain, and thus tend to appraise their pain as a threat (Gatchel & Turk, 1999) and rely on emotion-focused coping strategies (Smith & Wallston, 1992). Emotion-focused coping strategies often attempt to regulate negative emotions that appear as a result of the stressful events (Lazarus & Folkman, 1984) that usually occurred as a result of the prolonged pain (Abdallah & Geha, 2017). These strategies could be divided into active strategies (Brown & Nicassio, 1987) such as positive reframing of the situation and passive or avoidant strategies (Folkman & Lazarus, 1985) such as self-distraction, for example by excessive eating or in case of CBP specifically by being less active. Problem-focused coping strategies are strategies aimed at decreasing or controlling specific threats or negative consequences, such as problem solving, time management or finding ways to overcome illness-related barriers to engaging in work tasks (Leventhal & Ian, 2012).

Coping efforts have been proposed as one means of accounting for these differences in adaptation, and numerous studies have documented the importance of individual coping efforts in helping ill adults maintain reasonable levels of emotional wellbeing (Cohen & Lazarus, 1979; Moos & Schaefer, 1984). These studies have found typical coping strategies to include denial, selective ignoring, information seeking, taking refuge in activity, avoidance, learning specific illness-related procedures, engaging in wish-fulfilling fantasy, blaming others, and seeking comfort from others.

Specific types of coping strategies are more or less effective depending on the type of stress being faced. Pearlin and Schooler (1978) found that coping strategies involving commitment and engagement with others were most effective in dealing with stresses arising in close interpersonal relations. In contrast, cognitive manipulations that distanced the person from the problem were most effective for stresses in occupational and economic areas, domains which are more impersonal and less amenable to control (Pearlin, Menaghan, Lieberman, & Mullan, 1981). Folkman and Lazarus (1980) found that palliative, or emotion-focused coping, was more likely to be used than instrumental, or problem-focused coping, for health problems, especially when the problem was appraised as uncontrollable. The participants in study three also discussed the impact of the lifestyle on their symptoms and pain. Previous research demonstrated that poor lifestyle such as lack of physical activities, tobacco use, stress and obesity are all associated with back pain (Green, et al. 2016; Steelman, 2016). The Kuwaiti population has amongst the highest rates of obesity in the world due to depression and lack of physical activity (Al-Otaibi, et al., 2007; Hallal, et al., 2012; Organisation, 2017). In 2010, a systematic review and meta-analysis study (Luppino, et al., 2010) was conducted to explore the relationship between obesity and depression. The research team concluded that both depression and obesity have a reciprocal relationship as overweight people have a higher risk of having depression, and depression was a strong predictor for future obesity. Similarly, a cross-sectional study among women in 11 Latin-American countries found that obesity, depression and a sedentary lifestyle are interacted and related to each other (Blümel, et al., 2015).

Participants in the current study provided some explanations as to why they did not exercise. Reasons included lack of time, the weather and lack of motivation. Senba and Kami (2017) stated that exercise and increasing physical activity in daily life may be important in treating and preventing chronic pain, a life-style related disease. Just by increasing the number the daily walking steps, the rate of neck and back pain could be improved (Sitthipornvorakul, Janwantanakul, & Lohsoonthorn, 2015), therefore walking could be recommended as a preventive measure for back pain generally, especially for people with a sedentary lifestyle (Palfreyman, 2015).

Limitations and recommendations

This study involved a small sample size, which could affect the generalisability of the findings. However, the number of recruited participants for qualitative trials is generally smaller than samples in quantitative trials. According to Ritchie, Lewis and Elam (2013), a saturation point is reached in qualitative research such as interview-based studies, meaning that additional interviews do not add further information. When conducting qualitative research, investigators must be critical and effective during data collection and avoid unnecessary data that might consume time and effort. Qualitative studies often focus on the value and meaning of the phenomena (Crouch & McKenzie, 2006) therefore, the number of participants in qualitative studies must be sufficient to ensure that all the available opinions and views have been explored. Simultaneously, balance is required to avoid recruiting unnecessary participants and gathering redundant data. Usually, sampling and recruitment in the majority of qualitative studies follow the saturation concept, providing that the investigator adhered to the basic elements of qualitative methodology (Glaser & Strauss, 2009). Saturation is described as the point in the data collection when further data is not adding any further information.

One possible limitation to the current study is that the recruited participants' average age was noticeably young, with a mean age of 42. Previous studies (Aldwin & Gilmer, 2013; Levy & Myers, 2004; Rodin, 2014) have shown that illness perception and beliefs change with advancing age and different age groups may report different illness perceptions. Therefore, the obtained data in this study might only reflect the opinions of younger patients with CBP.

Another limitation was that the author of the study was the same person who conducted the interviews and analysed the findings. This issue could affect the validity of the data by establishing a researcher bias and social desirability bias, such as giving different answers to please the researcher or having a good impression (Dillman, 2011; Hagan, 2012). Although the interviewer tried to be neutral during the interview, some of the participants were providing answers that were ideal to what the interviewer was expecting, which might indicate unintentional nonverbal and social cues that were affecting the reliability of the interview (Opdenakker, 2006). This disadvantage could be diminished by using an interview protocol and by the awareness of the interviewer of this effect (James, 2015). Being from similar cultural and religion as the participants were helpful in understanding the cultural and spiritual aspects of patients' opinions. There were a few comments from the participants that were very culturally and religiously orientated, and I do not belief that a non-Kuwaiti researcher would have understood them and interpreted them in depth. This issue was important so patients' cultural and religious opinions could be turned to practical and useful advice for clinical practice.

Another issue was that the participants were not provided with adequate time to sign the consent form after reading the information sheet, as some participants might need to discuss participation with peers or family to take a final decision without feeling embarrassed or pressurised; 24 hours or more are recommended in some guidelines (Nicholson, 2006; Wiles, et al., 2005).

The recruitment process, which limited the sample of the population to be selected to participants in study two, might lead to selection bias (Hamilton & Bowers, 2006), as this process could prevent some patients with CBP who did not participate in study 2 from participating in this study. This could harm the validity and reliability of the obtained data (Haneuse, 2016). This issue could be countered by using advertising channels within an organisation that might include a group email, internet, notice boards or internal mail (Robinson, 2014).

Another problem was that one researcher conducted this study. This might create interviewer and confirmation bias, which occurs when a researcher forms a hypothesis or belief, and uses respondents' information to confirm that belief (Davis, et al., 2009; Hennekens & Buring, 1987). This takes place as researchers' judge and weigh responses that confirm their hypotheses as relevant and reliable, while dismissing evidence that does not support their hypothesis (Nickerson, 1998). Confirmation bias then extends into analysis, with researchers tending to remember points that support their hypothesis and points that disprove other hypotheses (ibid). Therefore, the researcher's own beliefs might have an impact on the translation and transcription process of the interviews. Confirmation bias could be minimised or eliminated if the interviewer is blinded to the outcome of interest or if the outcome of interest has not yet occurred, as in a prospective trial (Pannucci & Wilkins, 2010). To minimise confirmation bias, researchers must continually re-evaluate impressions of respondents and challenge pre-existing assumptions and hypotheses (Nickerson, 1998). However, because the data collection was conducted in Kuwait and the author had a limited amount of time to stay in Kuwait, the author had to do the data collection by himself.

The lack of data validation in study 3 and 4 (chapter 4 and 5) could be also considered as a limitation for this research, which could lead to poor study credibility (Rolfe, 2006). It was recommended that strategies such as the involvement of other investigators in the research to evaluate the data and themes (Sandelowski, 1993), however due to the study circumstances and demands, it was challenging to find such investigator in Kuwait. Additionally, Participants' validation could be used as a validation strategy, which includes inviting participants to comment on the interview transcript and whether the final themes and concepts created adequately reflect the phenomena being investigated (Long & Johnson, 2000).

Finally, it is difficult to generalise findings from a thematic-based qualitative analysis (Braun & Clarke, 2006; Guest, Macqueen, & Namey, 2011). In the future, further studies could explore physiotherapists' and clinicians' perceptions of the sociocultural and psychological factors. A larger team of researchers could also be recruited to conduct such studies to overcome research bias.

Conclusion

This study demonstrated that patients' health beliefs have an important role in their coping behaviours and strategies. Sociocultural norms and beliefs and patients' lifestyle have significant effect on shaping their behaviours and illness beliefs. Patients' previous experience with physiotherapy, whether it was personal or peer experience, might affect patient adherence with the treatment and treatment expectation. Therefore, it is important for physiotherapists to understand patients’ illness from a biopsychosocial point of view to promote acceptance and adherence to a treatment plan.

Chapter 5. A qualitative exploration of physiotherapists' beliefs about chronic back pain

Introduction

An important factor affecting the quality of the management is therapists' attitudes and beliefs (Foley, et al., 2006) in determining the implementation of the evidence-based findings into clinical practice. There is strong evidence (Huse, et al., 2001; Larme & Pugh, 1998; Yarzebski, et al., 2002) that healthcare providers' attitudes and beliefs are associated with the decision-making process. Kahneman reports that most health and medical-related decisions are made quickly and enhanced by current emotions and feelings, previous experiences and unconscious habits (Kahneman, 2011). More research is required to better understand the role of therapists' beliefs and behaviour on patients' pain (Foley, et al., 2006). A group of studies (Beisecker, 1994; Nicklas, Dunbar, & Wild, 2010) indicates that the physician's personal beliefs are often dominant in decision-making for the treatment, and have a significant impact on patient-therapist interaction during the decision-making process, which could influence patient outcomes. The relationship between the therapist and the patients and patient expectations are strongly affected by such beliefs and attitudes (Van Wilgen, Koning, & Bouman, 2013).

Chronic pain burden is associated with economic costs that are both direct and indirect (Ltd, 2012). Recently, Gaskin and Richard (Gaskin & Richard, 2012) attempted to estimate the annual economic costs of chronic pain in the US in terms of direct and indirect costs. They estimated the costs range from USD 560–635 (KWD 170–192 billion), equally divided between direct and indirect costs. There are no published studies that attempt to estimate the economic burden of pain in the Arab world. However, statistics for the prevalence of pain in Kuwait are similar to its global distribution (Hadi, 2006). Assuming a similar estimate to the economic burden of the Kuwait gross domestic product (GDP), costs in the billions of Kuwaiti dinars can be projected. Cognitive behabioural therapy (CBT) for chronic pain is a non-pharmacological treatment that is typically delivered via individual or group counselling sessions that occur over several weeks (Ehde, Dillworth, & Turner, 2014). CBT for chronic pain reduces pain perception and psychological distress by improving an individual's ability to cope with their pain (Ehde et al., 2014; Kerns, Sellinger, & Goodin, 2011). The result from first study in thesis (see chapter two) showed that physiotherapists might be able to integrate CBT into their practice for the management of CBP with appropriate training and supervision. A recent systematic review also concluded that integrating operant conditioning and behavioural oriented CBT into physiotherapy practice have promising outcomes for the management of CBP (Brunner, De Herdt, Minguet, Baldew, & Probst, 2013).

The aim of this third study was to explore physiotherapists' beliefs, experience and knowledge, regarding the management of chronic back pain (CBP) in Kuwait, and to explore their perceptions of the role of cognitive behavioural therapy (CBT) in the management of CBP.

Method

Interviews were conducted with 22 physiotherapists (11 male and 11 female). Participants' demographic details are outlined in Table 1, and were conducted between December 2014 and January 2015. All participants were physiotherapists who specialised in musculoskeletal physiotherapy and were experienced in working with CBP patients. They were recruited from three major hospitals in Kuwait: the Al-Amiri General Hospital, the Physical Medicine and Rehabilitation Hospital and the Skikhan Al-Farisi Rheumatology and Sport Rehabilitation Hospital. A letter outlining the aim, information about the study and contact details was sent to the physiotherapy department in each hospital and a poster about the study was placed in each department on the announcement board. The invitation invited interested therapists to send an SMS to a contact number. Physiotherapists who showed their interest were contacted by phone by the author and provided with an appointment for the interview, which was held in a private room booked at each department. Prior to the interview, each participant was provided with an information sheet and a written consent form, which they were asked to sign if they were still interested in participating (see Appendix 15 and 16). The average duration of the interviews was 15 minutes (range = 12-30 minutes). The interviews were conducted in Arabic/Kuwaiti, then transcribed and translated to English by the author (AA), and then a second physiotherapist (JA) translated the English transcript back to Arabic (backward translation). After that, both AA and JA discussed the two Arabic transcripts to check for any differences or misunderstanding. Finally, the first and second English scripts were compared to each other and modified, to ensure better understanding (see Appendix 17). Interviews were short because the therapists were busy, and interviews were conducted during their break time.

Table1: Participant’s demographic data

Participant	Age	Sex	Experience	Field	Nationality
1	33	Male	10	SPT /SR	N/K
2	31	Male	9	SPT /SR	K
3	41	Male	18	SPT /SR	N/K
4	24	Female	1.5	MSK PT	K
5	24	Female	1	MSK PT	K
6	29	Female	7-8	NM PT	K
7	32	Male	8	Spine PT	K
8	35	Male	11	NM PT	K
9	30	Female	7	MSK PT/ GPT	N/K
10	27	Female	4-5	NM PT	K
11	30	Male	8	MSK PT	K
12	26	Female	3	NM PT	K
13	32	Female	9	SPT /SR	K
14	25	Female	3	MSK PT	N/K
15	24	Female	1	NM PT	K
16	34	Female	10	NM PT	K
17	25	Female	2	MSK PT	K
18	31	Male	9	Spine/ MSK PT	K
19	41	Male	16	NM PT/ SPT	K
20	26	Male	2	SPT /SR	K
21	30	Male	9	SPT /SR	K
22	29	Male	6	MSK PT	K

SPT = Sport physiotherapy, SR = sport rehabilitation, PT = Physiotherapist, MSK PT = Musculoskeletal physiotherapist, NM PT = Neuromuscular physiotherapist, spine PT = Spine physiotherapist, GPT = geriatric physiotherapist, N/K = Non Kuwaiti, K = Kuwaiti

5.1.1 Interview schedule

Semi-structured, open-ended questions were used during the interview to obtain data about the topic to be investigated (Britten, 1995). According to May (2001), a topic guide is recommended to ensure consistency in the areas discussed during the data collection process; nevertheless, this should not stop the emergence of other opinions and views related to the topic for discussion. Interview questions (see Appendix 18) were developed from reviewing the literature (Bishop, Thomas, & Foster, 2007; Daykin & Richardson, 2004; Ostelo, et al., 2003), and the clinical physiotherapy experience of the author, and focused on physiotherapists’ beliefs, knowledge and experience of CBP, and its effect on the assessment and treatment of CBP in Kuwait. Additionally, we focused on understanding physiotherapists' beliefs about CBT and their perception of how CBT could be implemented in the care plan in Kuwait. The main concepts of the biopsychosocial model of pain (Engel, 1977; Sanders, et al., 2013) were used to create the interview questions.

5.1.2 Analysis plan

All participants were assigned an identification number which was used in place of their name. To analyse the data, framework analysis (Ritchie & Spencer, 2002) was used (see Section 4.1.3).

5.1.3 Ethics approval

Ethics approval was obtained from the ethics committee at the University of Birmingham (reference ERN_14-1253) and permission to conduct the study was obtained from physiotherapy department in Al-Amiri general Hospital and Shikhan Al-Afarsi Rheumatology & Sport Rehabilitation Hospital and KUMP Clinic for Spine and Musculoskeletal Rehabilitation (see Appendix 19A and 19B).

Results

Data saturation was reached when no new themes were identified in two consecutive interviews, which was achieved after 18 interviews. However, the remaining four participants were interviewed, as they had already agreed to participate. The mean age of the participants was 32 years, (ranging from 24 to 49); the mean years of experience as a physiotherapist was 9 (range 1 to 23). The analysis of data produced four themes related to the research questions (see Table 2). The first theme was the physiotherapists' beliefs about back pain risk factors, which focused on the factors and activities that aggravate the pain such as prolonged sitting, stress or cultural behaviour that induces pain. The second theme was the physiotherapists' perceptions about patients' beliefs and its effect on the illness (what the physiotherapists in Kuwait think about the effect their patients' beliefs and lifestyle have on the problem and its management). The third theme was physiotherapists' perceptions about their beliefs and the effect on the illness and its management. This theme included the effect of the therapists' own cultural backgrounds, personal beliefs, knowledge and experience of management effectiveness, such as the therapists' beliefs about age groups and gender differences. The final theme included the physiotherapists' thoughts and perceptions about CBT and its implementation in Kuwait.

Table2: Themes and sub-themes definition

Themes	Definition	Example
Physiotherapists' beliefs about back pain risk factors	Physical, psychological and social factors and activities aggravating the pain	Lifting heavy objects, floor sitting, and stress.
Physiotherapists' perceptions about patients' beliefs and its effect on the illness	The beliefs that the patients hold which would affect the pain and the treatment	When I have pain, I prefer to rest in the bed.
Physiotherapists' perceptions about their beliefs and the effect on the illness and its management	Beliefs that the therapists hold, which would impact on patient assessment and treatment	I think that some nationalities have better tolerance than other nationalities.
Physiotherapists' thoughts and perceptions about CBT and its implementation in Kuwait.	What do physiotherapists in Kuwait know belief about CBT and the implementation of CBT for patients' management	It is important therapy because back pain is not only physical, but psychological too

5.1.4 Theme one – Physiotherapists' beliefs about back pain risk factors

Participants reported different factors that they believed might cause back pain in Kuwait. Factors included wrong sitting positions, a sedentary lifestyle, incorrect ergonomics, job workload and pregnancy. Participants also spoke about their beliefs about the assessment of CBP and the treatment (e.g., home programmes), and preventive measures to reduce CBP.

> *'Sedentary lifestyle, bad posture either at work or at home or while driving or in the social gathering. However, I think mainly it's the workload and the daily physical load such as lifting and prolonged sitting.' (No. 2, male, age: 31, 9 years' experience, Kuwaiti).*

> *'In my experience as physiotherapist and personal trainer, I can tell you that the lack of activity or wrong exercise technique are the most (and may be the only) real factor that would cause back pain…but because they have strong muscle, they were able to avoid the pain' (No. 20, male, age: 26, 2 years' experience, Kuwaiti).*

All the participants expressed a belief that prolonged floor sitting is the main cultural aggravating factor of back pain among Kuwaitis and how it was a challenge to convince patients to avoid floor sitting because of the strong cultural connection between the Kuwaiti lifestyle and this position.

> *'Prolonged floor sitting, cross leg sitting especially during gathering and family gathering are the most common provocation of back pain among Kuwaitis' (No. 4, Female, age: 24, 1.5 years' experience, Kuwaiti).*

Male physiotherapists expressed a belief that women are more vulnerable to back pain and stated that being a female by itself is enough to create a lot of joint and muscular pain, including back pain. This is because they believed that women in Kuwait needed to work harder to prove themselves to society. Sometimes, they need to ignore the pain or supress the tiredness from a male competitor.

> *'For example, those who came from a house with a lot of females may act like females and thus might have a low pain threshold …the sociocultural beliefs will affect the treatment outcomes and the way patients cope with*

> *the pain and adhere to the treatment.' (No. 1, male, age: 33, 10 years' experience, Non-Kuwaiti).*

All participants agreed that they must first advise the patients about the mechanism of the injury, then educate them about the anatomy and physiology of the spine and provide them with ergonomic instructions. However, there was no consistency in the advice suggested. Some physiotherapists believed that the patients must first improve their posture, whereas other physiotherapists believed that it is all about staying active and functional. In contrast, a group of participants believed that patients must limit their movements to control the symptoms and provide enough time for the healing process.

> *'First it is important for me to educate them about their problem, causes and aggravating factors. Then I would give them general advice about the spine, exercises and work ergonomic.' (No. 16, female, age: 34, 10 years' experience, Kuwaiti).*

> *'Usually I like to advice my patient about their posture, gait, sitting and standing issues. Patient with sever or chronic pain, I like to instruct them about bed movements and ergonomics changes and movement restriction especially activities that trigger their symptoms.' (No. 10, female, age: 27, 4 years' experience, Kuwaiti).*

5.1.5 Theme two – Physiotherapists' perceptions about patients' beliefs and its effect on the illness

Most of the participants reported patients' beliefs about back pain impact on their illness behaviour but not the treatment. Some stated that patients' knowledge, previous experience and culture norms would affect their coping strategy and the way they react when they have back pain episodes. However, when it comes to treatment, it is the physiotherapists' responsibility to provide the best available interventions and try to overcome physical and mental resistance from the patient. Others stated that physical intervention such as therapeutic exercises and manual therapy would help in changing patients' beliefs and illness perceptions. The participants believed that exercises and manual therapy would improve patient's self-confidence by reducing the pain and increasing the functionality.

> *'For sure, in some groups of patients, their pain would be influenced by their beliefs and life experience with pain. However, this group is only very minor. It's not the main concept behind the pain. Back pain mostly is affected by physical stress… Those who used to read a lot about the pain or have a lot of knowledge about back pain might suffer at the end because they tend to focus a lot on the pain' (No. 1, male, age: 33, 10 years' experience, Non-Kuwaiti).*

Most of the participants reported that patients' negative psychological status, such as being anxious or depressed, affected their motivation to adhere to treatment. Some reported that they had had bad experiences with 'moody' patients, and that the reason for poor outcomes was that the patients were 'depressed'. However, some physiotherapists reported that patients with a positive mood usually had better outcomes and a faster recovery.

> *'The psychological status affects more than 60% of the diagnosis and the treatment. The more the patient is stable emotionally, the better the outcomes will be and even he would have better pain tolerance. Another point is the ability to cope with the pain mentally will help to control the pain and have better outcomes. I found, also, that patient who used to complain a lot tend to have poor pain tolerance' (No. 7, male, age: 32, 8*

> *years' experience, Kuwaiti).*
>
> *'Patient who has a lot of stress usually lose their ability to interact with therapist and the treatment, their mind only concentrated on their pain and can't think functionally or positively. Anxious and depressed patient always focus on the negative issue, which in turn would reduce the treatment effectiveness and increase or maintain the pain. They might blame the therapist for treatment failure or think that their problem in incurable then having frustration and other negative consequences.' (No. 13, female, age: 32, 9 years' experience, Kuwaiti).*

Some attributed the low adherence rate among the patients to the belief that the patients are not willing to improve their health, due to stereotyping and lifestyle in Kuwait. Some physiotherapists reported a belief that people in Kuwait live a luxurious lifestyle with high salaries, weak rules and 'massive corruption', which shifted the patients' priorities from being healthy to being 'spoiled'. They believed that patients might not be encouraged to improve their health because they would like to 'enjoy the advantages' of being ill in Kuwait, such as free treatment abroad when the Ministry of Health sends patients to Europe or the US to receive treatment and cover the expense. Other physiotherapists felt that adherence was poor in patients with a low level of education and lack of understanding about their condition. A small number reported that a therapist's attitude toward the patient and the way the therapist dressed or behaved during the session would affect patient adherence.

> *'Physiotherapist personality, the way he looks. I think each physiotherapist must look professional in his looks, talk and thoughts because they have a strong impact on the patient's cooperation with you' (No. 21, male, age: 30, 9 years' experience, Kuwaiti).*

All physiotherapists agreed on the importance of increasing patient awareness about CBP and general joint pain. They stated that a patient's education during the first session is an essential part of the treatment plan. Some encouraged the use of social media to increase people's awareness about back pain, especially the younger generation. Others suggested that awareness about back pain and other joint diseases could be taught in school. Finally, it was suggested that public health campaigns could be conducted to educate people about back pain.

> *'We must focus on people's education, to teach them about back pain. Maybe we can start to teach student in schools about back pain and general health' (No. 6, female, age: 29, 7 years' experience, Kuwaiti).*
>
> *'Lectures for the public, brochures, TV programmes. Also physiotherapists must be involved everywhere, in the schools, gym, in the media, everything going to be better' (No. 10, female, age: 27, 4 years' experience, Kuwaiti).*

5.1.6 Theme three – Physiotherapists' perceptions about their beliefs and the effect on the illness and management

Three different opinions emerged when therapists were asked about the effects of their beliefs, knowledge and experience in the management of back pain. The first group reported that their beliefs would affect the assessment and the treatment option. The second claimed that the management of the patient, including the assessment and treatment, would not be affected by their beliefs because it was the physiotherapist, not the patient, who had control over these. The last group believed that there might be a minor effect but that this would not change the quality of the management.

> *'I'm not sure, because the patient is the one who feels the pain, not me.*

> *So, whatever I believe or I feel is not related to the patient. Maybe it would affect him indirectly, but very rarely. But I found that male patients feel less pain when a female therapist treats him. So maybe my gender will affect patients' pain, but not my beliefs' (No. 4, female, age: 24, 1.5 years' experience, Kuwaiti).*

> *'Yes, they would. I tend to treat female patients for a long time. One day I had to treat a male patient, and it was difficult for me to adjust the way I think when I was giving exercises for him. I was very soft with him, and the treatment was not effective because I gave light exercises. But now, I think I've learned from this experience' (No. 5, female, age: 24, 1 year's experience, Kuwaiti).*

There were three issues raised when the therapists were asked about their feelings about the issue of management. Some participants believed that stress should not affect the quality of the treatment, as they believed that they were professionals and must learn how to control their feelings. However, other participants stated that no one could control the effects of stress, as therapists are human, and it is expected that they might have some stress and emotional issues on some days and that would affect the treatment. A third group claimed that it is normal that the treatment would be affected if the therapists had emotional problems, and that is what makes every treatment unique because the treatment process is interactive and a mixture between physical and emotional dimensions from both the therapist and the patient. The effect could be positive such as motivating the patient to adhere to the treatment, or negative such as poor communication between the patient and the therapist.

> *'Well, the textbook said no it shouldn't be affected and the patient must receive complete treatment and shouldn't allow his personal issue to*

> *interfere with the treatment. However, therapist stress will affect the treatment because at the end the physio(therapist) is a human that has emotions and feelings. Yes we should try our best to prevent that from happening but we can't guarantee anything, we are human and we have emotions. And even if the stress we had was very severe, at least we have to preserve the quality of the treatment' (No. 6, female, age: 29, 7 years' experience, Kuwaiti).*

The interviews revealed that most therapists preferred to treat patients of the same gender as themselves, either for cultural or religious reasons, or because they would have better understanding of the biological abilities of that patient.

> *'I think females are more difficult to be managed and they have fewer prognoses than males. First because of their anatomical design, their body physiology, and the type of work the usually perform in their daily activities' (No. 3, male, age: 41, 18 years' experience, Non-Kuwaiti).*

Some therapists also spoke about patient age and most participants stated that they preferred the youth and middle-aged group of patients because they are cooperative, adaptive and easy to communicate with. Older patients (or very young patients) were seen to be associated with the greatest communication barriers and a lack of motivation to follow the therapists' recommendations.

> *'Between 30's and 40's, because this age group is the best age to follow the instructions, whereas young people don't follow the instruction because of their busy life and lack of knowledge. Similarly, I don't prefer old people because they have limited abilities and they are very pain sensitive, also because of their illness and weakness they might have*

> *different concerns or priorities that can be unrealistic or inappropriate. Old people prefer passive treatment only, mainly electrotherapy. They don't like to do exercise and they don't follow the home programme. These issues would affect the quality of the treatment and reduce the success rate in my opinion' (No. 3, male, age: 41, 18 years' experience, Non-Kuwaiti).*

All therapists suggested that they needed more education and training in physiotherapy-related skills such as dry needling and manual therapy, and equipment and facilities, to improve the physiotherapy services in Kuwait. Others suggested that better rules and regulations (e.g., physiotherapy direct access) were required to improve their performance, their efficacy and patients' satisfaction. By receiving more attention from regulators, the image of physiotherapists in Kuwait would also improve and become more trusted and valued.

> *'Continues educational programmes through courses, lectures, and workshops' (No. 22, male, age: 29, 6 years' experience, Kuwaiti).*
>
> *'We need updated rules and regulations. Maybe we need training and courses' (No. 12, female, age: 26, 3 years' experience, Kuwaiti).*

5.1.7 Theme four – Physiotherapists' thoughts and perceptions about CBT and its implementation in Kuwait.

Most participants reported a belief that it was important for patients with CBP to receive some form of psychotherapy, whether it was CBT or any other technique. They reported that the application of CBT would help to change maladaptive behaviours and correct unwanted habits. Additionally, participants believed that CBP has components of psychosocial issues that could not be addressed by standard physiotherapy techniques.

> *'Sure, we can't separate physical factors from psychological or social factors. We must mix them all in one session. As I mentioned previously, a patient's physical pain can be affected by his mood, and his pain can affect the mood. Both issues are correlated. Treating one side will not be effective, treating both sides will give an optimum effect' (No. 12, female, age: 32, 9 years' experience, Kuwaiti).*
>
> *'Not a must: OK, it is important to manage unwanted behaviour and beliefs but we are already doing that – if necessary – during the sessions. I don't know what we called it but we are doing things similar to CBT and they are effective' (No. 20, male, age: 26, 2 years' experience, Kuwaiti).*

However, there were different opinions with respect to implementing CBT in the rehabilitation plan. Admitting that CBT is important for a CBP patient is one things, but the ability to apply CBT was seen as another and there was variability in the terms in which participants believed they should deliver CBT. Some participants believed that physiotherapists could deliver CBT if they had received appropriate training. Others believed that physiotherapists can already deliver CBT without additional training, or with minor training, such as from reading. Others claimed that psychotherapy is not a physiotherapists' job, and they should hire specialised professionals to deliver it.

> *'Not sure, because we have already a lot of thinking to do in the session. I think it's easy to learn it from the Internet, so if any physio feels that his patient need CBT, he can go to the net and learn it, then apply it. But see, if the physio feels that the patient needs more mental treatment than physical treatment, he must refer him to some psychotherapist to manage him then receive him back proceed with the treatment.' (No. 4, female, age: 24, 1.5 years' experience, Kuwaiti).*

> *'No, we don't need to do that. I'm not saying it is not important, bear with me, but we don't have time. We have a lot of other things that we have to do during the session. We don't have time to add psychological things in the session. May be we can use psychotherapists to help us, or refer the patient to psychotherapists. Also keep in your mind that we are not prepared and not trained to deliver psychotherapy techniques' (No. 10, female, age: 27, 4 years' experience, Kuwaiti).*

Discussion

The aim of this study was to explore physiotherapists' beliefs, experience and knowledge regarding the management of CBP in Kuwait, and to explore perceptions of the role of CBT in the management of CBP. The results reveal that the beliefs, knowledge and experience of healthcare providers influence the assessment and treatment of CBP patients. A previous study highlighted that the appropriate integration of patient beliefs and therapist beliefs regarding illness and using it to create tailored treatment programmes would lead to better treatment outcomes (Nijs, et al., 2013). Because of the multifactorial nature of CBP, these beliefs could be related to any physical, psychological or social factors. Leventhal et al.'s (1977) self-regulation model proposed theoretical principles for such findings, showing that unhelpful illness perceptions can lead to harmful behaviour such as activity limitation. All participants expressed a belief that prolonged static postures, vigorous activities and awkward biomechanics would provoke pain in the spine. These findings were in line with studies that reported a strong correlation between mechanical factors and back pain. (Lis, et al., 2007; Mitchell, et al., 2010; Yoon, Shiekhzadeh, & Nordin, 2012)

The therapists reported that floor sitting, which is a common physical and cultural behaviour among Kuwaiti patients, is believed to play a crucial role in aggravating back pain and provoking symptoms among Kuwaiti patients. Floor sitting is a common physical behaviour among people in Middle East countries. People in Kuwait have many daily activities that require sitting on the floor, such as worshiping in a mosque. During family and social gatherings, especially informal ones, they prefer to sit on the floor for chatting and eating. Young people, too, sit on the floor during TV watching, videogames or playing cards. Some restaurants in Kuwait provide a special section for those who enjoy sitting on the floor whilst eating. Therapists from different cultures might not understand the importance of floor sitting in Kuwait. It is not easy to ask the patient to avoid floor sitting and the adherence rate is expected to drop to 30% when the treatment plan required modifications of lifestyle or changing regular habits that are detrimental to a patient's health (Chesney, 2000; Li, et al., 2000). Floor sitting might not be acceptable from a physical point of view, but it is acceptable socially and culturally. As a culturally competent solution, physiotherapists might try to educate the patient in how to sit on the floor, instead of preventing them from doing it. A suggestion would be using a pillow under the buttocks, supporting the back with a back support or a pillow, reducing the amount of sitting time, and taking short breaks to move and perform regular stretching. The literature on CBP describes multiple biomechanical relationships between the physical factors and back pain, such as physical workload, bending, twisting and lifting (Hartvigsen, et al., 2001; Hoogendoorn, et al., 1999; Macfarlane, et al., 1997; Thorbjörnsson, et al., 2000).

There is strong evidence that patients' beliefs about CBP are associated with their clinicians' beliefs (Darlow, et al., 2012). Such beliefs might influence the assessment process and treatment plan (Pincus, Santos, & Vogel, 2012), and have a negative effect on patients' pain behaviour (Vlaeyen & Linton, 2006). The findings from this study revealed that physiotherapists have mixed beliefs about the risk factors for CBP; these beliefs mostly depend on their knowledge and experience (Briggs, et al., 2012; Slater, Briggs, et al., 2012). The variations in physiotherapists' opinions might create confusion among patients, as it would direct them to different interventions, eventually affecting the outcomes (Graham & Brookey, 2008).

Another important issue raised during the interviews was the effect of therapist and patient mood. According to Howell et al. (2007), a positive emotion is linked to better attention towards wellbeing. Therapists' mood and emotion during a session has also been linked to treatment outcomes. Chui et al. (2016) investigated the effect of the therapist's mood on the success rate of psychotherapy and found a direct relationship. It was reported that when therapists were initially positive in affect and when therapists became more positive during the session, clients rated the session quality to be high. Conversely, when therapists were initially negative in affect and when therapists became more negative during the session, clients rated the session quality and working alliance low. Therefore, therapist state affect at pre-session and change in affect across a session may contribute to the process and outcome of therapy sessions. Our participants reported that patients with a negative mood and emotion tend to have poor outcomes and higher pain. In study two (see Chapter 3), almost 90% of the participants reported that negative emotions such as depression and anxiety would aggravate their pain. Nicholas, et al. (Nicholas, Linton, Watson, & Main, 2011), emphasised the importance of the early identification of patients at psychological risk and to manage the psychological factors, as these might interfere with the outcomes. Psychological distress such as depression and catastrophising beliefs has also been proposed as playing a key role in the development of disability related to musculoskeletal conditions (Lintonl, et al., 2011). Psychological distress has been linked to unhealthy illness beliefs, and both have been associated with the chronicity of joint and spine pain (Campbell, et al., 2013). Patients with CBP were also reported to have inappropriate illness beliefs compared to patients without CBP, such as believing that movement can aggravate back pain, (Van Wilgen, et al., 2013). Pillastrini et al. (2012) conducted an study on the overview of the clinical guidelines for CBP management in France, and suggested that spine therapists must consider psychosocial factors and patients' illness perception in their assessment and treatment.

The relationship between psychological factors such as anxiety, depression and emotional exhaustion with back pain has been reported to be positively correlated (Hoogendoorn, et al., 2000; Ramond, et al., 2011). CBP is often accompanied by symptoms such as anxiety (Leeuw, et al., 2007; Kadimpati, et al., 2015), depression (Bair, et al., 2003; Surah, Baranidharan, & Morley, 2013) and difficulties in emotional expression (Lumley, Schubiner, Carty, & Ziadni, 2015). Markakis, et al. stated that it is important for health care providers to recognise patient emotion without getting involved in or experiencing that state (Markakis, et al., 1999). In other words, despite the importance of empathy (Squier, 1990), it is important for physiotherapists to acknowledge and understand patients' emotions, without allowing these emotions to influence their decisions or the quality of care. Some of our participants stated that it was not part of physiotherapy to deal with psycho-emotional problems.

The system of physiotherapy in Kuwait depends on the physiotherapist's job description guidelines, which were established at the beginning of the last decade. These guidelines divided physiotherapists into categories, according to their years of experience, and set specific roles and responsibilities for each category, such as treatment, staff and student training, supervision or administrative work. The guidelines also prevent physiotherapists from undertaking other professional medical jobs but encourage them to ask for assistance, if needed. In the case of CBT, if the physiotherapists considered it to be part of a psychotherapist's role, they cannot use it in their own role. Hunt, et al. (2013) showed that physiotherapists could deliver CBT for CBP patients, if they received appropriate training (Hunt, et al., 2013).

Teaching CBT to physiotherapists could be achieved through setting a long-term plan, however, acceptability and feasibility studies are first needed. In recent years of physiotherapy practice in Kuwait, physiotherapists have struggled to change the medical rules to increase their autonomy and decision-making. In many physiotherapy departments in Kuwait, for example, the treatment plan must be set and designed by a higher-ranked healthcare provider, such as a physician or orthopaedist. This means that, to introduce CBT into the practice, not only would physiotherapists need to be convinced and trained, but the supervising doctors would also need to agree. Many physiotherapists felt that they did not have the fundamental knowledge to be able to learn a non-physical intervention such as psychotherapy because therapists believed that, to learn CBT, they needed to have a background in psychology and psychotherapy. This might reflect a lack of understanding of CBT among physiotherapists in Kuwait because prior studies reported successful outcomes of CBT being delivered by trained physiotherapists (Johnson, et al., 2007; Moffett, et al., 2005). In a recent study by Nielsen et al. (2014), it was concluded that physiotherapists are able to deliver pain-coping skills-training, a form of CBT, if they received sufficient training.

Recently, numerous clinical guidelines related to the management of CBP have recommenced the utility of multidimensional treatment programmes based on the biopsychosocial model of health (Airaksinen, et al., 2006; Hildebrandt, et al., 2004). Over recent decades a great change has occurred focusing on active rather than passive measures, and a recommendation to pay more attention to psychotherapy (Gross, et al., 2006; Koes, et al., 2006). However, patients are usually dissatisfied with the management outcomes. Some studies have pointed out that it is important to take patients' beliefs about CBP into consideration that reduce the quality of the outcomes and to encourage the changing of unwanted beliefs and maladaptive behaviours (Gross, et al., 2006; Snelgrove & Liossi, 2009; Verbeek, et al., 2004). For instance, patients who believe that they have lost control over their health may not accept the concept of staying active, despite the pain (Foster, et al., 2010). Some evidence suggests that a patient's illness beliefs and perception about the symptoms experienced (Leventhal, et al., 1997) could be used as predictors of health behaviour and functional disability in many disorders (Hagger & Orbell, 2003), including CBP (Foster, et al., 2008; Foster, et al., 2010).

A final issue was that the physiotherapists in Kuwait required more training courses and workshops to keep them updated and skilful to a standard level. The Kuwait Ministry of Health, or the Kuwait Physiotherapy Office, must take responsibility for this issue. Having said that, in the last five years there has been a great shift towards improving continuing professional development by providing courses, workshops and counterparts for physiotherapists in Kuwait. For example, Rajashree (2011) reported that training healthcare providers in communication skills such as information gathering, diagnosis, treatment and patient education is essential for a high quality healthcare service and productive, safe clinical practice (Rajashree, 2011). Other studies (Grimshaw, et al., 2004; Grol & Grimshaw, 2003; Harting, et al., 2009) highlighted that using active implementation strategies such as healthcare provider and institutional education and training about the implementation of the clinical guidelines would improve the quality of service and the adherence rate.

Recent years have witnessed the birth of a new concept of clinical practice, in which nurses and physiotherapists are involved in an extended scope of practice, using advanced skills and knowledge to reduce the load on primary care services (Health, 2000a, 2000b). Such practice has become popular in orthopaedic and musculoskeletal outpatient departments, where they have long waiting lists. Physiotherapists were assigned as orthopaedic assistants for managing patients, which helped to reduce waiting times, the working hours of junior doctors and the number of unnecessary consultations with the orthopaedists and physicians (Wagstaff, 2001). Specially trained physiotherapists with extended skills could manage between 30% and 85% of the regular orthopaedic patients (Byles & Ling, 1989; Hockin & Bannister, 1994), and between 41% and 54% of back pain patients (Hourigan & Weatherley, 1994; 1995). Patient satisfaction rates with the extended roles were as high as 88–89% (Byles & Ling, 1989; Hockin & Bannister, 1994; Hourigan & Weatherley, 1994).

5.1.8 Limitations of the study and future recommendations

The first limitation of this study was a lack of detailed responses from participants. The interviewer tried to encourage participants to elaborate, but some were quite reserved. This may be because most of the participants knew the author personally due to the small physiotherapy community in Kuwait. This might pose a risk of bias, as some participants might provide answers to please the author because of the relationship between them. To avoid this issue, an external interviewer might be involved to conduct the interviews.

Another point was that the participants were asked to sign a consent form just before the interview. Interview guidelines recommended to provide the participants with a window of 24 hours to give them the opportunity to think and make their decision about participating in the research without pressure (Nicholson, 2006; Wiles, et al., 2005). However, the participants in this research were not provided with this period as none of the participants showed any hesitation or issues with participation. To reduce the chances of interview bias that would violate the validity of the findings, the window of 24 hours or more should have been offered.

Another limitation was the short interview duration, which will have affected the validity of the data; interviews were conducted during the break of each participant. During the break, which was one hour, many therapists take the time to pray, eat and relax before commencing work. Many participants, therefore, might have provided short or incomplete answerers so they could finish the interview quickly and return to their break. Interviewing the therapist during their working day might also have affected the validity of the answers as they might have been affected by their current emotional state and recent experiences with patients (Holtan, Strandbu, & Eriksen, 2014). Research of this nature might be better conducted away from the workplace, or during a period of time when there were no other pressures. This might produce more detailed, richer qualitative data.

The average years of experience of the participants was seven years, ranging from one to sixteen years, which might be considered a sample of quite junior physiotherapists. In future research, the inclusion criteria for the participants might be restricted to more experienced physiotherapists as newly graduated physiotherapist might not have sufficient experience to judge on clinical issues in the practice. Finally, the number of participants was small; however, in qualitative studies, data collection stops when reaching saturation point (Fusch & Ness, 2015). For future research, it is recommended to conduct a study that stratifies participants according to their years of experience, to explore changes of physiotherapists' opinions with advancing experience and the effect of clinical experience on therapists' illness perceptions.

Conclusion

Previous studies have shown that healthcare providers' beliefs, knowledge and experience can affect health outcomes and decision-making in treatments. In Kuwait, physiotherapists reported paying little attention to psychosocial and cultural factors during the assessment and management of CBP. They also lacked the skills to deliver updated interventions, including simple CBT techniques. In addition, despite being effective for the management of CBP, CBT in the management of patients in Kuwait might not succeed if the provider lacks the appropriate skills and training or find it incompatible.

Chapter 6. Thesis discussion

This research investigated beliefs about CBP (CBP) and its management among patients and physiotherapists in Kuwait, the effect of these beliefs on the management of CBP and the acceptability of CBT (CBT) as a treatment for the CBP. Previous studies have identified that psychosocial factors (e.g., mood and anxiety) affect CBP and have therefore recommended using psychological interventions such as CBT, for the management of such pain (Alsaadi, et al., 2011; Demyttenaere, et al., 2007; Gore, et al., 2012). CBT is a psychological intervention that targets maladaptive behaviours and unhealthy beliefs, encouraging patients to substitute them with healthy or more adaptive ones.

The first study (Chapter 2) was a systematic review evaluating the effect of the deliverer and intensity of CBT programmes for the management of CBP. Findings from the review showed that brief CBT sessions ranging from 4-8 sessions for the management of CBP might be enough to produce clinically significant changes in pain, disability and quality-of-life measures. The study also showed that a physiotherapist with proper training and expert supervision might be able to deliver CBT to patients with CBP and sub-clinical psychological symptoms. This is important to overcome the lack of access to psychotherapy in some areas, saving time and cost and providing up to date health care services.

In the second study (Chapter 3), a quantitative study was conducted which involved an online survey to collect data from patients with CBP in Kuwait. The aim of the study was to explore risk factors and predictors of CBP in Kuwait. It explored the association between reported physical and personal factors and reported pain intensity. The findings suggested that there is a poor association between the reported physical activities, personal factors and the reported pain intensity, except for prolonged walking, a sedentary lifestyle and a current episode of pain. The study also examined predictors for pain, disability, mood and quality-of-life in CBP patients. The results revealed several findings. First, disability level was the only predictor of pain severity in patients with CBP. Second, illness perception was a significant predictor of functional disability and anxiety in CBP patients. Illness perceptions are cognitive platforms and concepts that the patients create to understand, interpret and explain their illnesses and symptoms. These cognitive interpretations of health issues often help patients to cope with chronic illnesses (Leventhal, Nerenz, & Purse, 1984). Levels of insomnia significantly predicted functional disability, anxiety and depression and pain severity, older age and the number of coping days were also shown to be significant predictors for back pain disability level. The findings also showed that none of the reported psychological variables were correlated with pain severity.

Based on the findings from study two that understanding patient's beliefs and illness perceptions could be key factors for the management of CBP, study three was therefore conducted. Study three (see Chapter 4) was a qualitative study that collected data through face-to-face interviews with CBP patients. It focused on exploring the effect of the Kuwaiti patients' beliefs and illness perceptions on the management of CBP. The findings showed that patients' beliefs about the pain and illness perception influenced the management of CBP, directly and indirectly. Participants reported multiple physical, biological and sociocultural factors that they believed would affect their symptoms and expressing their opinions about their experience with physiotherapy and how it was affecting their ability to cope. It was interesting to see that many participants reported that sometimes they would not follow the therapist's instructions if they were not satisfied with the communication level between them. This would show that issues other than the treatment plan such as patient-therapist rapport might affect the outcomes.

Previously, several studies have stated that positive patient-therapist rapport plays a key role in producing successful treatment outcomes, higher treatment adherence and overall satisfaction (Fuentes, et al., 2014; Hush, Cameron, & Mackey, 2011; Schönberger, et al., & Teasdale, 2006). Furthermore, on many occasions during the interviews, patients reported that they felt that sometimes the therapist did not understand their culture, beliefs or social life, which created barriers to effective interaction between them. A good example was the advice for not sitting on the floor, as the therapists believed that it might exacerbate the problem while patients believed floor sitting was an important position for sociocultural activities. Clearly, it was shown that beliefs regarding back pain and the meaning of the pain were shaping the way the participants were responding to the treatment plan.

To further explore the impact of illness perceptions and beliefs on the management of CBP in depth, study four (Chapter 5) explored the effect of the physiotherapists' beliefs, experiences and knowledge on the management of CBP in Kuwait. Like study three, this study also involved face-to-face interviews with physiotherapists who work with CBP patients. Generally, the healthcare providers in study four agreed that the management of chronic pain requires more than treating the physical and anatomical problems. Caring for patients with chronic pain must target all the affected aspects, including the biological, neurological, psychological, social and spiritual (Engel, 2012; Sulmasy, 2002). One interesting finding in this study was that therapists' own experience with pain, including back pain, would impact the management and treatment plan. For example, therapists who had previously experienced back pain would understand patients' complaints differently to those who had never experienced back pain. Green et al. (2003) reported that pain is a learning experience that could be influenced by many factors such own body physiology, culture and other life experiences (Green, et al., 2003). Recently, a systematic review was conducted to explore the influence of physiotherapists' beliefs and attitudes on the clinical practice with patients with chronic low back pain (Gardner, et al., 2017). The authors concluded that physiotherapists' illness beliefs and attitudes have significant effect on the decision-making process and thus might influence clinical practice. Another issue raised in this study was the barriers for implementing CBT in physiotherapy practice. In our study, many therapists believed that implementing any psychological intervention would improve treatment outcomes; however, issues such as a lack of skills, time and resources would interfere with their ability to incorporate CBT and other similar psychological interventions in their practice. Similar findings were reported previously in by Beissner et al. (2009), Callan et al. (2012), Ehde et al. (2014) and Nielsen et al. (2014).

Synthesis of findings

Based on the findings from the systematic review reported in Chapter 2, brief sessions of CBT could help patients with CBP by improving pain, disability, function and quality-of-life. The review also revealed that physiotherapists can successfully deliver CBT programmes for patients with CBP if they receive proper training and supervision. A recent Cochrane systematic review and meta-analysis, conducted by Kamper, et al. (2015) found that adding CBT to physical therapy interventions for the management of long-term pain and disability has only limited evidence (Kamper, et al., 2015). The same study found an imprecise and weak strength of evidence for the effect of CBT on CBP, co-morbid depression and anxiety. Hoffman et al. (2012) reported mixed results, in terms of the effect size for the effectiveness of CBT for the management of chronic pain, such as CBP; however, the outcomes of CBT on chronic pain frequently produce small to moderate effect sizes. Nevertheless, they reported that CBT is effective for the management of depression, compared to waiting list or no treatment, but is no better than other active and psychological interventions. Previous studies (American Psychiatric Association, 2002; Elkin, et al., 1995) have stated that CBT effectiveness for the management of anxiety and depression depends on the severity of the symptoms at its baseline, suggesting that CBT has a non-significant effect on severe and clinical symptoms. In contrast, a more recent meta-analysis by Richmond et al. (2015) reported that CBT has a greater effect when combined with active rehabilitation than active rehabilitation alone and showed a clinically significant effect on pain and disability in both, short- and long-term effects. Such evidence might suggest the importance of categorising the patients into groups that might benefit of the CBT intervention and other groups that might require to see specialised professionals such as psychotherapists (Furukawa, et al., 2017). In a future work, we would try to categorise patients who would benefit from CBT using a psychological screening tool, such as psychological screening inventory (Lanyon, 1970).

There were a few factors that might affect the reported effectiveness of CBT and cause fluctuated outcomes. For instant, the systematic review presented in Chapter 2 identified that each study had its own unique CBT content and variable intensities and frequencies of provision. For example, several studies (Bergström, et al., 2012; Glombiewski, et al., 2010b; Haldorsen, et al., 1998; Luedtke, et al., 2015) used therapeutic exercises for the back as part of the CBT protocol, whereas others (Brox, et al., 2006; Brox, et al., 2003; Moore, et al., 2000; Smeets, et al., 2006) used a CBT programme that consisted of psychological strategies only. In addition, back pain exercise is an umbrella term that contains many types of treatments involving different concepts and biomechanics. For example, yoga and Pilates have similar concepts, which aim to connect the body with the mind to improve the movement of the body and reduce joint pain such as back pain (Sorosky, Stilp, & Akuthota, 2008), yet different studies might use different terms to describe similar activities. Another reason would be the recruited sample, which might have a direct effect on the outcomes. For example, most of the studies in this review used inclusion criteria that focused on recruiting patients with CBP. However, patients themselves have different illness perceptions, expectations and beliefs about the effectiveness of the treatment, and these were found to have a strong influence on the treatment outcomes (Dovidio & Fiske, 2012; Dwarswaard, et al., 2016; Heapy, et al., 2006). A third reason would be the pre-treatment symptoms and the quality of the CBT programmes. Some studies recruited participants with higher symptom scores such as clinical depression and anxiety, whereas others recruited participants with sub-clinical symptoms. Usually, patients with clinical depression or anxiety require medication in addition to the CBT; therefore, patients' symptoms at the baseline would affect the outcomes (Dovidio & Fiske, 2012; Turner, et al., 2007).

Finally, not every participant in these studies received the same quality of CBT, as some received it from expert psychologists, whereas others received it from trained physiotherapists. Although previous studies (Dysvik, Kvaløy, & Natvig, 2012; Kazdin & Blase, 2011; Turner, et al., 2011) have reported that healthcare providers who have received training in CBT could deliver the treatment as efficiently as psychologists and specialists in psychotherapy, continuous training and monitoring are required to maintain the quality of the treatment. Moreover, the quality and use of CBT in the management of musculoskeletal problems could be hindered by factors such as environmental (e.g., lack of providers in the clinic where the patient receives the treatment), patient attitude (e.g., psychological factors are not related to back pain and the belief that symptoms could only be controlled by medications or certain procedures), and health care system barriers (e.g., therapists lacking the skills to provide CBT, the regulation of the clinic not allowing therapists to provide non-physical intervention and only psychologists being allowed to practise the psychotherapy). Factors such as a lack of cultural competence, patient-therapist language barriers and poor communication may also present obstacles for optimal care (Ehde, et al., 2014). Another challenge is the level of a patient's concentration and the degree to which the patient understands and remembers information provided during the treatment session. As a consequence, therapists should not only focus on a patient's attendance, but also on their ability to understand the content of the CBT programme.

According to the international association for the study of pain (Treede, et al., 2008), there is high possibility that what the physiotherapist evaluates and treats are patients' symptoms that are present on the treatment day; however patients might report different symptoms and pain on a different day (Knechtle, Rüst, & Rosemann, 2015). Patients' symptoms, both physical and psychological, are dynamic and changeable due to an interaction of factors such as mood, circumstances, spirituality, culture and environment (Keefe, et al., 2001; Mclean, et al., 2014; Wachholtz & Pearce, 2009), rather than static anatomical and structural factors. Physiotherapists should expect that the patient might present with different symptoms each clinic visit, and therefore, the treatment plan must be flexible and interactive, according to the patient's needs. Tailoring a CBT programme has been explored previously (Evers, et al., 2002; Kerns, et al., 2014; Nordgren, et al., 2014; Van Koulil, et al., 2010); however, these studies reported variable results. For example, several studies have reported that a tailored CBT programme helps in improving the outcomes for patients with chronic pain and anxiety (Nordgren, et al., 2014; Van Koulil, et al., 2010). However, Kerns et al. (2014) reported that both standard CBT (SCBT) and tailored CBT (TCBT) improved all CBP outcomes, suggesting that involving the patients in selecting components of CBT did not increase the adherence rate and both SCBT and TCBT have similar effectiveness (Kerns, et al., 2014). Beck, et al. (2015) found that tailoring CBT to patients' needs requires additional time and resources that it is impossible to accommodate within a busy clinic. Adapting CBT programmes for every condition and every patient group would not be feasible.

Two studies (Savigny, et al., 2009; Toonstra, 2014) suggested that targeting patients' priorities and expectations during the treatment improved the adherence rate and the outcomes, therefore this issue is important when designing CBT programmes. However, the high rate of dropout and poor adherence rate is attributed to the complexity of the physiotherapist's recommendations, treatment content and the sheer number of skills that patients are expected to learn (Jensen, et al., 2000) and, consequently some patients might reject the idea of applying CBT. In Kuwait, CBP patients used to receive three types of treatment during the physiotherapy sessions: electrotherapy, therapeutic exercise and manual therapy, but never expected to receive psychotherapy. Providing a treatment that is against patients' expectations is a challenge because it could jeopardise the patient's satisfaction level and reduce the desired outcomes. To reduce the chance of resisting or rejecting CBT, patient's beliefs about CBT could be assessed and potentially challenged through education and awareness. This is important issue as, in Kuwait, people might have stigma about seeking psychological therapy in general, and many of them have misconnects about it, such as people who referred to psychotherapy are mentally unstable (Scull, Khullar, Al-Awadhi, & Erheim, 2014). People in Kuwait might withdraw from the treatment if they believed that it was related to psychotherapy and many refuse to be referred to psychological assessment and evaluation (Almazeedi & Alsuwaidan, 2014). Therefore, CBT techniques could be seamlessly woven into physiotherapy treatment for CBP, so that patients are not aware that they are also receiving CBT. This might seem deceptive, but an integrated approach might be more acceptable.

The importance of the patient's beliefs and perceptions was further emphasised with findings from the quantitative predictor study, study two (see Chapter 3). The data from study two indicated that there is a poor association between the reported physical activities, personal factors and the reported pain intensity, except for prolonged walking, sedentary lifestyle and a current episode of pain that have been associated with reported pain intensity. The data also showed that pain could be predicted with disability measures, whereas illness perceptions were a strong predictor of disability and anxiety, and functional disability could be predicted with the insomnia measure. Finally, pain severity, age and the number of coping days were shown to be significant predictors of back pain disability level. The findings in this study showed that none of the reported psychological variables were correlated with the pain. In contrast to our data, Yue, et al. (2012) reported that, among school teachers, there was a strong association between physical and occupational factors such as prolonged standing, static sitting, twisting, uncomfortable ergonomics and job related stress, and CBP. In some recent European and Asian studies, it has been reported that occupational stress such as incorrect biomechanics and mental stress are strong predictors of CBP (Coenen, et al., 2013; Ramond-Roquin, et al., 2013; Sadeghian, et al., 2014). Incorrect biomechanics included cumulative spine loads, bending, standing and sitting, and mental stress included work related anxiety, financial pressure and poor supervision.

In the quantitative study presented in Chapter 3, psychological factors were not associated with back pain. Shaw, et al. (2013) indicated that sociocultural factors play a crucial role in CBP, as they might lead to unhealthy beliefs (i.e., 'I have slipped a disc in my back, so I should reduce my working hours'), and cause psychological stress, and unhealthy physical behaviours (fear of movement and activities). My research found that illness perceptions and beliefs were strong predictors of disability and anxiety in CBP patients. Illness perceptions encompass interactive illness beliefs and their meaning for an individual's health. The concept of illness beliefs largely consists of understanding the causes and prognosis of the symptoms, the sociocultural impact of the illness, co-morbid illnesses and the available treatment. Hence, research has suggested that illness and health beliefs are inconsistent and vary, even among patients with similar diagnoses (Petrie & Weinman, 2012). Understanding a patient's illness perceptions and targeting their beliefs about their health conditions are important steps toward addressing the chronicity of the pain. Jorgensen (2014) recommended that pain specialists and physiotherapists should identify patients' illness beliefs and implement cognitive/psychological interventions to address those beliefs and to improve patient outcomes and increase adherence with treatment. Glattacker, Heyduck and Meffert (2013) stated that illness perception and beliefs were strong predictors for rehabilitation outcomes and recommended more attention and research on this topic. Including patients' beliefs and illness perception in the management plan, therefore, would add more depth and create a better understanding of the problem, especially to address why patients choose different coping behaviours to handle with the illness (Foster, et al., 2008).

According to Folkman (1984), coping is an assessment process of a patient's own stressful events, involving multiple evaluations of any potential causes and the best expected solutions. Coping with a long-term condition could be affected by the patients' previous experiences with illnesses and their emotional states during the incidence of pain (Rachman, 2013). Even unconscious and habitual coping strategies that people often select, in response to any threat, would have a potential effect on the clinical outcomes. Prior studies on CBP (Perrot, et al., 2008; Prior & Bond, 2004; Somers, et al., 2009) reported a significant correlation of symptoms such as pain and disability, and the selected coping behaviours. For example, catastrophising behaviour, which is described as focusing on the negative aspects of the event or the illness (Sullivan, et al., 2001a) is a common coping response amongst patients with chronic illnesses, and has been reported to be associated with poor clinical outcomes in multiple clinical trials (Keefe, et al., 2000; Rapp, Rejeski, & Miller, 2000; Somers, et al., 2009). Passive coping strategies such as smoking, alcohol addiction and letting the illness control a patient's life are associated with exacerbated symptoms in chronic osteoarthritic patients (Perrot, et al., 2008; Prior & Bond, 2004). However, studies that explored the association between coping strategies and chronic pain failed to show the ability to use a coping strategy as a predictor for chronicity.

Insomnia has been shown to be a major risk factor and predictor of back pain (Agmon & Armon, 2014), especially among older people (Bramoweth, et al., 2016). Lack of sleep is known to reduce the quality of recovery that usually occurs at night during the REM phase, which in turn modulates the pain producing hyperalgesic changes associated with pain chronicity (Lautenbacher, Kundermann, & Krieg, 2006). Collier et al. (2003) reported that people with insomnia were not underestimating the harm of sleep deprivation and frequently reported negative symptoms and health issues when they have insomnia (Collier, Skitt, & Cutts, 2003). However, issues such as a lack of awareness about the available solutions, fear of stigmatisation, lack of understanding from the doctor and demographic issues such as level of education and income were all factors influencing help-seeking and delaying the decision to seek medical help (Aikens & Rouse, 2005; Green, Hicks, & Wilson, 2008; Hogan, Clark, & Scott, 2003; Stinson, Tang, & Harvey, 2006).

Findings from the qualitative study in Chapter 4 (patients' interview) showed that patients' experience and beliefs about back pain and illness influenced the management of the problem, as did social and psychological factors. Ditto et al. (1995) argued that a patient's adherence rate is associated with satisfaction with medical advice, and that a healthcare provider's understanding of a patient's emotion and culture rather than medical knowledge and experience had a strong impact on the satisfaction rate and subsequent adherence to treatment regimens. Clinicians often fail to provide appropriate recommendations that encourage self-dependent activities targeting the patients' beliefs. This might be due to the absence of the resemblance between the physiotherapist's and the patient's perceptions and concerns (Cooper, Smith, & Hancock, 2009). For example, some physiotherapists in Kuwait might ask the patients to practice yoga, as this activity comprises useful movements and manoeuvres to improve spine mobility. However, many patients in Kuwait, especially the elderly and devout patients, believe that yoga is comprised of ideas that are not accepted in Islam, such as the philosophy of Hinduism (Radhakrishnan & Radhakrishnan, 1966). Koeing (2013) suggested that a patient's religiosity and spirituality might affect the acceptability of some of the strategies used in CBT, such as relaxation, hypnosis, guided imagery and mindfulness meditation, if these strategies were incompatible with the patient's religious and spiritual beliefs. However, the core elements of CBT are the challenging of thoughts and beliefs that would hinder patients' improvement and progression and then trying modifying these beliefs and thoughts with different forms of cognitive and behavioural strategies (Fenn & Byrne, 2013). Therefore, it would be important for therapists who use CBT to understand which elements and strategies of CBT are unacceptable in the Kuwaiti culture or Middle Eastern society.

Patient involvement in decision-making is usually accepted in theory but infrequently implemented in practice (Elwyn, et al., 2009). Unfortunately, some healthcare providers still believe that patients are incapable of making decisions (Hawkes, 2009), and this explains why several patients in study three (Chapter 4) complained about the suitability of the provided instructions and advice and thus did not adhere to them. Despite the continued recommendations (Kamper, et al., 2015) to use CBT for the management of CBP, CBT is not familiar to physiotherapists in Kuwait. In fact, the use of psychological therapies such as CBT is a global problem amongst healthcare providers (Eaton, et al., 2011) and some factors have been identified as barriers to the implementation of CBT in medical practice.

Naeem, et al. (2011) divided the barriers for the adoption of CBT into three groups: service related barriers (e.g., lack of clinics that provide CBT); therapist related barriers (e.g., therapists lacking the knowledge and skills to provide CBT) and patient-related barriers (e.g., patients' beliefs and preference against CBT) (Naeem, et al., 2011). Sue et al. (2009) suggested that psychological therapies might conflict with the patient's culture, values, behaviour and language, and thus recommended that CBT must be designed in a way that tackles these conflicts, to secure an appropriate and high quality adaptation of CBT. Sometimes, the same activity that the therapist believes aggravates the symptoms could be a pleasure for the patients (Nijs, et al., 2013). For example, in the qualitative study in Chapter 4 (patients' interview), one of the participants stated that the physiotherapist asked her to avoid charity activities because she needed to reduce the load on her body, however the patient refused to follow the instruction, presumably because she derived pleasure from these activities. From a therapist's point of view, reducing the physical load is an important step in controlling the symptoms (Gnudi, et al., 2009) because it provides the soft tissue with extra time to recover and heal (Hildebrand, et al., 2005). However, other studies (Aknin, et al., 2013; Lyubomirsky, Sheldon, & Schkade, 2005) have shown that participating in prosocial activities and helping others improves the mood and quality-of-life, which are mediated by hormones (cytosine, endorphin, dopamine and serotonin) known to be natural pain killers (Rokade, 2011). Chronic pain conditions such as CBP present a great challenge for the biomedical model, due to the associated psychosocial factors that interplay with the physical causes and increase the complexity of the problem (Manchikanti, et al., 2003). Furthermore, clinical guidelines for the management of CBP such as the NICE Guidelines (De Campos, 2017) have been encouraging the use of biopsychosocial model rather than the biomedical model (Kamper, et al., 2015). Physiotherapists, however, tend to adhere poorly to such recommendations (Hanney, et al., 2016). A main reason for that is that the traditional study and training in most physiotherapy schools focus on the biomedical approach rather than the biopsychosocial model (Gardner, et al., 2017).

In the qualitative study in Chapter 5 (physiotherapist interview), the participants reported that psychological and social factors could affect the treatment and the therapist's decisions about the treatment. However, when they were asked what type of advice they would provide for their patients, the focus was predominantly biomedical such as posture and exercises. Recent studies, however, suggest that physiotherapists may still be poorly equipped to address the challenges presented by patients with low back pain, including the expectation that they provide a more patient-focused and broader biopsychosocial approach to care (Parsons, et al., 2007; Slade, Molloy, & Keating, 2012). For example, elements of a biopsychosocial approach that appear to be lacking in physiotherapy practice as reported in recent research are: a) explanation of a clear diagnosis or cause for the symptoms to patients (Parsons, et al., 2007; Slade, et al., 2012); and b) different expectations about the benefits of physical therapy, beliefs about the natural course of back pain, and the degree of responsibility patients should exercise over their care (Hestbaek, et al., 2003; Verbeek, et al., 2004). However, the most effective means of delivering a biopsychosocial approach is not well understood (Frantsve & Kerns, 2007;

Ghaemi, 2009).

Due to the lack of understanding of the biopsychosocial approach, and that the practice is leaning more toward the biomedical approach, most of the participants showed a lack of interest in implementing the CBT in their practice. This issue by itself might be considered a barrier to incorporating CBT and other psychological interventions within the physiotherapy practice in Kuwait. CBP clinicians must, therefore, first identify the patients' illness beliefs and sociocultural barriers, including spiritual and religious issues that might hinder the outcomes, and then work with the patient to establish the treatment plan (Bensing, et al., 2011).

Sometimes, a patient's aim for the treatment is unachievable, either due to the lack of resources or to the unrealistic nature of the goal and working on such goals would waste time and effort. For example, Hudson, et al. (2012) surveyed more than 950 patients in primary care in New Zealand and found that the majority overestimated the benefits of cancer screening and chemo-preventive medications. Previous studies (Coulter & Collins, 2011; Coulter & Ellins, 2007) have shown that healthcare providers may overestimate their abilities and underestimate their patients' knowledge, and suggest that the key to a fruitful treatment is to acknowledge that patients are experts in their own illnesses and life situations.

Within the last couple of years in Kuwait, most healthcare providers have embraced a new trend in which they use social media to educate the people about different health topics. Now there are more than 2,000 accounts on social media in Kuwait alone that discuss and educate about different diseases and their management, using lay language. This approach may help improve patient's awareness and elevate the level of understanding about certain conditions such as CBP (Lapointe, Ramaprasad, & Vedel, 2013; 2014). During the patient interview study (Chapter 4), many patients acknowledged the role of social media awareness in informing them about and guiding them through treatment. Therefore, it is expected that the patients are more aware about their illness and healthcare providers must consider this level of awareness when discussing the problem with their patients. A survey study on the effect of social media-based education on patients with breast cancer reported that the targeted population reported more awareness and less anxiety regarding their situation (Attai, et al., 2015). The study concluded that by selecting the social media platform and the right population and appropriate content, social media could help the patients to stay motivated and supported. Similarly, a small pilot study involving 12 weeks' use of social media education for CBP for patients on a waiting list reported that they learned how to self-manage while waiting for their appointment (Merolli, et al., 2015). Cherkin et al. (1996) reported that a back pain intervention that focuses merely on education has only short-term effect on CBP patients' symptoms and could produce a non-significant improvement in term of functional ability. By contrast, in a recent systematic review exploring the impact of an educational programme that focused on neurophysiological pain education for patients with CBP it was found to have moderate impact on pain and disability that could be maintained up to 3 months after the intervention (Tegner, et al., 2018). In clinical practice in Kuwait, most physiotherapists incorporate patients' education with other physiotherapy modalities such as exercise or electrotherapies. However, it might be the content of the educational programme or the method of education that could make the difference.

In study four (physiotherapists' interviews), all the physiotherapists reported that it is important to educate every patient prior to the initiation of the treatment. Previous studies have also emphasised the importance of including patients' education and neurophysiological education, as part of the treatment plan, to increase patients' awareness, change maladaptive beliefs and behaviour and, consequently, to improve outcomes (Engers, et al., 2008; Moseley, 2004; Robinson, King, Ryan, & Martin, 2016; Wälti, Kool, & Luomajoki, 2015). In a study that compared Arabic and non-Arabic speaking nurses in Kuwait, nurses who shared a similar language to their patients showed reasonable accuracy in estimating a patient's pain intensity, compared to those with a different language (Harrison, 1988; Harrison, et al., 1996). Kulwicki, Miller, and Schim (2000) found that a difference between Arab participants' and non-Arab healthcare providers' perceptions of what culturally competent care could mean. Non-Arab healthcare providers believed that all patients should receive equal quality of health services, irrespective of their cultural background. The Arab participants stated that treating Arab patients without consideration to their cultural features is an indication of culturally insensitive care. Therefore, healthcare providers and physiotherapists in Kuwait might need education about the effect of their beliefs and perceptions on the management of CBP, otherwise poor outcomes can be expected. Kagawa-Singer and Kassim-Lakha (2003) reported that many healthcare providers are unable to understand, evaluate and bridge the cultural differences in values and practices among patients with chronic illnesses because they lack sufficient skills and knowledge. Patients in this study reported that poor communication skills discouraged them from focusing on the treatment goals and led them to disregard the advice from physiotherapists. Patient-therapist communication was always an area of conflict, due to the different expectations and treatment concerns.

Nápoles-Springer et al. (2005) identified two obstacles to effective treatment: the interpersonal characteristics of the therapists (e.g., respecting patients' privacy) and communication skills (e.g., effective listening). They concluded that a therapist's beliefs and experiences would influence their interpretation of the patient's illness behaviour and treatment plan. Furthermore, the ability to facilitate communication and interaction with the patient during the treatment session would create a positive rapport between the therapist and the patient, leading to better outcomes. Failure to overcome these obstacles and understand patients' beliefs and perceptions may lead to underestimating their pain and symptoms (Calvillo & Flaskerud, 1993).

Tongue Eppsn and Forese (2005) surveyed orthopaedic surgeons and found that 75% believed that their patients were satisfied with the level of communication between them. However, their patients were interviewed and asked about their satisfaction with the communication with their surgeons, and only 21% reported that they were satisfied. Similarly, in the qualitative study in Chapter 4 (patients' interview), many participants reported poor communication with therapists and emphasised the importance of physiotherapists and healthcare providers understanding and demonstrating respect for their emotions and feelings. It is important for healthcare providers to recognise the rationale behind patients' behaviours, especially those that interfere with the treatment process or aggravate pain. Identifying factors that influence a patient's decision-making and selection of a coping strategy, such as cultural practices and daily life stressors (Kalibatseva & Leong, 2011), would help in establishing a more accurate treatment plan and efficient treatment (Kai, et al., 2007).

Igwesi-Chidobe et al. (2016) published a study exploring CBP in rural Nigeria and found that the patient's disability is strongly impacted by beliefs that would influence the coping strategies, therefore recommend that CBP management must target maladaptive beliefs and correct unhealthy behaviours. Illness perceptions describe connected beliefs, thoughts and ideas that the person holds to understand and cope with the illness and its consequences (Leventhal, et al., 1984), which helps patients to re-define the meaning of life after illness. It is uncommon that patients with similar symptoms and illnesses would hold different beliefs, based on their unique experience with pain (Petrie & Weinman, 2012). Furthermore, identifying unwanted beliefs and modifying them would lead to better outcomes, and taking into consideration patients' lifestyles and designing the treatment to fit into their lifestyle. Strong rapport between the therapist and the patient would enable the therapist to discuss and understand even sensitive topics such as religiosity and spirituality which are known to have a strong impact on a patient's health (Mcauley, Pecchioni, & Grant, 2000; Pargament, et al., 2001; Rippentrop, 2005).

Religiosity and spirituality have a significant impact on a patient's illness perception, coping strategies and the success of the treatment; however, these beliefs are often overlooked by healthcare providers because religious and spirituality issues are perceived as 'taboo' topics and difficult to raise in the clinic (Koenig, et al., 2012). Chronic pain sufferers might start to question and develop concerns about the meaning and purpose of life, especially after a prolonged journey with pain (Frankl, 1963). In Germany, for example, a study that recruited 580 patients with chronic pain reported that 22% showed an interest in religious and spirituality issues as a result of their suffering (Büssing, et al., 2009). Previous research (Mohr, et al., 2012; Rippentrop, 2005; Russinova, Wewiorski, & Cash, 2002) has found that many people with chronic illnesses such as CBP and co-morbid psychological problems such as depression and anxiety use their religion and spirituality such as prayer, meditation and the consumption of religious media as their main coping strategies. Illness perceptions and beliefs, pain behaviour coping strategies and treatment adherence of older people around the Arabian Gulf appear to be strongly influenced by their strong connections to Islam and their traditional culture (Ypinazar & Margolis, 2006). Several studies have recommended the use of religious-based psychotherapy for Muslim patients diagnosed with depression, anxiety and negative emotions (Azhar & Varma, 1995a; 1995b; Razali, et al., 1998). These studies reported that patients who received religious-based psychotherapy reported significant and faster outcomes than patients in the control group. In this method, unwanted beliefs were recognised and modified or substituted with beliefs originating from Islamic-based CBT (Azhar & Varma, 1995a; 1995b). Muslim patients also reported a fear that their values would be threatened by psychotherapists who do not follow Islamic rules (Jafari, 1993), and many Muslim patients who received psychological interventions asked for psychotherapy with a consideration for Islamic concepts (Kelly, Aridi, & Bakhtiar, 1996).

Kuwaiti patients are like other Muslim patients. For example, Kuwaiti people believe that men should not express their pain because this is not a masculine behaviour, which was similar to what was reported among Egyptian men (Jalal, Samir, & Hinton, 2016). Many people in Muslim countries might also prefer to seek advice from faith healers (Furnham, Raja, & Khan, 2008). Muslims also believe that God controls an individual's health and that illness is coming from God for certain reasons such as testing an individual's faith, testing loyalty or purifying the soul from sins (Ypinazar & Margolis, 2006). A study from the United Arab Emirates found that some patients blame themselves for becoming sick because they have poor faith in God (Daar & Khitamy, 2001), and as a result they are being punished with illness (Kelsey, 1973; Wachholtz & Pearce, 2009). It has also been reported that some Arab people believe that if you talk about a disease, you will get that disease; therefore, discussing the history of a patients' health might be uncomfortable for some (Kulwicki, 1991). Such beliefs might hinder the adoption of CBT, especially as most of the CBT programmes were designed and based on Western beliefs and Western values (Naeem, et al., 2015).

Cultural values and beliefs strongly affect the ability to implement evidence-based therapies (Bhui, 2010; Bhui & Morgan, 2007). Therefore, it is important to modify CBT to match the culture and society in which it will be implemented (Padesky & Greenberger, 2012). In Islam, there are many concepts and behaviours that can be used as modified beliefs and behaviours that could help the patients to cope with the pain, such as *Khosho'a*, *Alqadar* and daily prayer (Lane & Redissi, 2016). *Khosho'a* means the absolute attention and focus on God and his positive gifts for us, and this concept could be used to replace meditation or mindfulness. Another important concept is *Alqadar,* which means 'the destiny'. This concept is articulated in the fact that even being severely ill is considered as a gift from God therefore, a positive destiny. *Alqadar* could be used to enhance acceptance, which has been shown to be associated with positive psychological outcomes in chronic pain conditions (Van Damme, et al., 2006). Because Muslims must pray five times a day, the therapist can include these prayer moves in their therapy sessions. A Muslim's prayer includes exercise-like movements, such as bending and kneeling (Yosef, 2008) and an emotional connection with God. Reviews on religiosity and spirituality among chronic pain patients have identified that prayer was a frequent habit and a commonly used coping strategy for managing physical symptoms (Koenig, 2001; Rippentrop, 2005). About 60% of chronic pain sufferers depend on prayer as a main pain coping strategy (McCaffery, et al., 2004). Overall, prayer is classified as a positive coping strategy that is associated with physical, psychological and emotional wellbeing (Bush, et al., 1999).

Although religiosity and spirituality can be effective in coping with chronic illness, sometimes over-reliance on them could reduce productivity and have a negative effect (Pargament, et al., 2003). Positive religiosity and spirituality represent a secure relationship with God, family and society, and positively affects self-esteem (Pargament, et al., 1998). Patients with a negative religiosity and spirituality coping strategies feel insecure with God and others, report self-blame and are doubtful about the meaning of life, which are associated with poor psychological and emotional wellbeing (e.g., depression, anxiety and fear) (Nooney & Woodrum, 2002; Pargament, et al., 1998). Therefore, it is important to identify the appropriate candidates who could benefit from psychological therapy based on religiosity and spirituality (Paukert, et al., 2011). According to Hodge (2011), religiosity and spirituality strategies could be used in clinical practice by account for client's preference and a focus on evaluation of related evidence, clinical skills and cultural competency. Pargament et al. (2000) stated that religiosity and spirituality coping strategies include many options and mechanisms; therefore, clinicians must first identify any potential advantages and disadvantages of adopting this technique and then select the most appropriate options, rather than viewing religiosity and spirituality as a single compulsory option. Pearce et al. (2015) proposed a CBT programme that focused on the religious and spiritual aspect for depressive patients with chronic medical illness. It was stated that religious integrated CBT (RCBT) might be more efficient than the traditional CBT for devout and religious patients.

Therapists in study four (physiotherapist interviews) expressed concerns regarding the challenges of implementing CBT. Previous work by Beissner et al. (2009) suggested barriers to the implementation of CBT in physiotherapy practice, such as lack of knowledge about CBT, cost and payment problems, time limitations and patient unwillingness to try the techniques. Some physiotherapists in this study stated that they did not need training in CBT because they are already providing CBT-like instructions for patients during the education segment of the session. However, selectively implementing CBT components rather than delivering the full treatment protocol results in poor clinical outcomes, which may serve to reinforce clinicians' concerns about the applicability of CBT to the population which they serve (Stirman, et al., 2013). CBP researchers often face difficulties in using findings from evidence-based practice (e.g., CBT) to their clinical practice and therefore continue using less efficient options such as medication (Martell, et al., 2007), and the implementation process of evidence-based findings into clinical practice is difficult for many reasons, such as the lack of reliable and valid tools for evaluating patients' perceptions (Sitzia, 1999; Wensing & Elwyn, 2003), the unavoidable non-responsive bias when recruiting people for this task (Mazor, et al. 2002; Rosenthal & Shannon, 1997; Wensing & Elwyn, 2003), the high ceiling effects in the patient satisfaction rate (Cheraghi-Sohi & Bower, 2008; Rosenthal & Shannon, 1997), the subjective characteristics of patient evaluations (Rao, et al., 2006), the heterogeneity of the assessed case mix (Donabedian, 2005; Rosenthal & Shannon, 1997), and the lack of a standardised frame of reference (Elwyn, et al., 2007; Rosenthal & Shannon, 1997). Patients in real clinical environments are more heterogeneous than those involved in research studies, and often present with more complicated illnesses that are associated with other health conditions, both physical and psychological. Therefore, findings from effectiveness studies are sometimes less relevant to real clinical practice and the implementation of these findings becomes less important (Berry & Haddock, 2008; Ringle, et al., 2015). Supporters of this view argue that scientific experiments are highly structured, planned and controlled, whilst the real-life situation is usually unstructured, unpredictable and uncontrollable (Rosenthal & Shannon, 1997). It could even be argued that research and trials are conducted as 'proof of concept' efforts, to demonstrate that a specific intervention is effective in structured situations, rather than investigating effectiveness in clinical practice (Goodheart, Kazdin, & Sternberg, 2006).

Novelty of this thesis

This thesis explored the effect of psychological, social and cultural beliefs and behaviour on the management of CBP in patients and physiotherapists in Kuwait. The acceptability of CBT amongst physiotherapists was also explored. Although several studies have been carried out in Kuwait and the Middle East, none have gone into similar depth and recruited such large samples. This work is believed to be the first of its kind in Kuwait that has attempted to associate lifestyle and culture in the Arabian Gulf with people's health and illness. Instead of the 'classic' one-dimensional studies that explore one aspect of CBP, this study was multidimensional, investigating multiple factors – physical, psychological and social – that cause and aggravate CBP among the people of Arabian Gulf. It also established a database and resource of information for further research in Kuwait and the Middle East. The dissemination of this work could help increase the uptake of CBT among physiotherapists and healthcare providers in Kuwait and other Gulf health sectors. Patients will benefit from such exploration, therefore leading to a better quality-of-life and increase the effectiveness of treatments.

Thesis limitations

This thesis has several limitations which affect its final conclusions. First, there was a lack of prior research in Kuwait in related topics, which makes it difficult to compare our findings. Secondly, in study two (the quantitative predictors' study) the researcher used outcome measures that have not been validated nor culturally adapted when translated into Arabic, which might affect the reliability of data. This issue was discussed in detail in Chapter 3. Another issue was that the researcher did not use reflective notes during the interview studies. In qualitative research, it is recommended that the researcher captures participants' emotions and reactions and their own actions toward participants' responses during the data collection using a reflective diary or field notes (Taylor, Bogdan, & Devault, 2015). Field notes are notations made by the researcher during qualitative research to remember and record the behaviours, activities, events and other features of an observation at the time. Field notes are intended to be read by the researcher as evidence to produce meaning and an understanding of the culture, social situation or the phenomenon being studied (Schwandt, 2014) and the researcher's own thoughts, feelings, impressions and insights (Flick, 2014; Morrow, 2007). Field notes are also often used in conjunction with theoretical memos and researcher journals to record the researcher's conceptual reasoning and methodological decisions (Flick, 2014; Montgomery & Bailey, 2007). The researcher did not keep a diary of reflection for either of the interview studies and although this would not affect the quality of the date collected (Fook & Gardner, 2007), such a diary could have added more details to the analysis and act as a critical step in proceeding to higher levels of analysis and interpretation (Hammersley, 2007; Montgomery & Bailey, 2007).

Clinical implications and recommendations of the thesis

To manage all aspects of CBP, a multidimensional assessment tools must be used that includes pain, coping strategies, depression, anxiety, insomnia and illness perceptions. In particular, therapists might focus on exploring and understanding illness perceptions and beliefs amongst patients, as they were found to be major predictors of CBP and co-morbid symptoms. One of the recommended interventions for managing and correcting unhealthy illness beliefs and perceptions is CBT. However, the process of the implementation of CBT in clinical practice requires mental preparation for both patients and therapists before the implementation. This plan requires a deep understanding of patients' and therapists' beliefs, knowledge and previous experiences with psychotherapy, identifying any concerns and objections. The health system's rules and regulations are also required to be reviewed and modified to facilitate the implementation process.

Tailored and culturally sensitive CBT programmes are recommended for CBP patients. However, a culturally based CBT depends on understanding cultural norms and beliefs, and they must be interpreted carefully to avoid stereotyping (Powell Sears, 2012) and poor standardisation (Engebretson, Mahoney, & Carlson, 2008). Patients with a religious or spiritual orientation could be encouraged to use their religious beliefs and behaviours as coping strategies (Baetz & Bowen, 2008); however, therapists must be cautious when discussing these topics. Patients with severe psychological symptoms (e.g., clinical depression) or severe pain might require intensive treatment, such as medication or more doses of CBT than patients with sub-clinical symptoms (Flink, Sfyrkou, & Persson, 2016).

Digital forms of CBT such as internet delivered CBT may appeal to younger patients (Mychailyszyn, et al., 2012) who are familiar with technology. This could be used to remind patients of skills acquired during treatment sessions and therefore reinforce positive changes (Bauer, et al., 2003). Additionally, instead of keeping patients on the waiting list waiting weeks for their appointment without receiving any treatment, basic CBT programmes that focus on changing patients' maladaptive beliefs or which help them to reduce anxiety level (breathing exercises, stress management tips, brief pain education) could be provided to prepare patients for treatment. A study by Parker et al. (1995) found that patients with rheumatoid arthritis who received early CBT reported better long term outcomes and early intervention possibly reduced the chance of negative consequences and poor outcomes, such as irreversible joint degeneration. The programme must be flexible, dynamic and interactive, which means that there is no fixed content or dose of CBT. Patients should receive the strategies and techniques that target their symptoms when required with the appropriate number of sessions (see Chapter 3).

Previous research on CBT for CBP has focused on changing patients' beliefs and strategies; however, there are other components in the formula, such as the deliverer of the CBT and the family of the patients. For example, it is recommended that the patient's family and care-providers be included during the educational sessions (Nápoles-Springer, et al., 2005), as it is important for them to understand the patient's circumstances and difficulties and, therefore, provide appropriate support. Several studies have emphasised the importance of involving the patient's family and care-providers in the treatment plan (Martire, 2005; Martire & Schulz, 2007).

Physiotherapists who are open to providing CBT for their patients must receive training in CBT and then have appropriate supervision and assistance before getting permission to use the technique. This is recommended to ensure high quality provision. We recommend that when physiotherapists want to use CBT for the management of CBP, the programme must be adapted and applied during the treatment session, combined with exercises; instead of providing CBT as a separate treatment session. Physiotherapists in Kuwait are busy and have long waiting lists, and only by mixing CBT with the other treatments can they save time and effort. For example, while performing manual therapy, the physiotherapist could educate the patient, using CBT strategies. However, this suggestion needs to be tested and in clinical settings to determine its effectiveness and acceptability.

Conclusion

CBP is a common multifactorial musculoskeletal problem that has psychological, emotional and sociocultural consequences. In Kuwait, CBP is commonly treated with medication and physiotherapy, but studies report only poor to moderate effects for these treatments, with high rates of relapse. CBT is suggested as an option to improve outcomes. It has been shown to be effective for the management of CBP and the co-morbid disability and mood disturbance. Due to the nature of CBP symptoms, CBT programmes must be flexible, adaptive and interactive with patients' symptoms, rather than using a fixed dose and content. Programmes for Kuwaiti patients with CBP must also be sensitive to cultural beliefs and to religion. Kuwaiti patients with CBP have demonstrated awareness of the relationship between their beliefs, emotions and the symptoms; however, they are unaware of CBT or the role of psychological therapies as a treatment option for CBP. Patients also reported poor communication with and negative attitudes from therapists, which discouraged them from adhering to recommendations. Physiotherapists in Kuwait also reported that a patient’s beliefs and psychological status might affect the outcomes. However, they are resistant to the idea of implementing CBT for the management of CBP for reasons such as lack of time and high workload. In Kuwait, the lack of activity and poor lifestyle are correlated with the incidence of CBP. Therefore, a major step towards reducing the prevalence of CBP in Kuwait is to improve the lifestyle by changing health beliefs and associated behaviours. Culturally sensitive CBT programmes are recommended for the management of CBP in Kuwait, with a strong emphasis on the inclusion of religious and spiritual content, especially for the older population. Digital format CBT could be an option for younger patients in Kuwait, many of whom use social media daily.

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Appendices

Appendix 1: PRISMA check list

Section/topic	#	Checklist item	Page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	
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.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	
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.	
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.	
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.	
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	
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).	
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.	
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	
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.	
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	

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.	
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).	
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	
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.	
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.	
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).	
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.	
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	
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).	
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).	
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	
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.	

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097
For more information, visit: **www.prisma-statement.org**.

Appendix 2: Cochrane Back Review Groups (CBRG) risk of bias assessment

Domain	Description	Review authors' judgment
Random sequence generation		*Selection bias (biased allocation to interventions*) due to inadequate generation of a randomised sequence Low risk/high risk/unclear
Allocation concealment		*Selection bias (biased allocation to interventions)* due to inadequate concealment of allocations prior to assignment Low risk/high risk/unclear
Blinding of participants Outcome:		*Performance bias* due to knowledge of the allocated interventions by participants during the study Low risk/high risk/unclear
Blinding of personnel /care providers Outcome:		*Performance* bias due to knowledge of the allocated interventions by personnel/care providers during the study. Low risk/high risk/unclear
Blinding of outcomes assessors Outcome:		*Detection bias* due to knowledge of the allocated interventions by outcome assessors Low risk/high risk/unclear
Participants dropout report Outcome:		Reporting the dropout of the participants during any phase of the research Low risk/high risk/unclear
Group similarity at baseline		*Selection bias* due to dissimilarity at baseline for the most important prognostic indicators Low risk/high risk/unclear
Co-interventions		*Performance bias* because co-interventions were different across groups. Low risk/high risk/unclear
Compliance		*Performance bias* due to inappropriate compliance with interventions across groups. Low risk/high risk/unclear
Intention-to-treat-analysis		*Risk of bias* if all randomised patients are not reported and analyzed in the group to which they were allocated by randomisation. Low risk/high risk/unclear
Timing of outcome assessments		*Detection bias* if important outcomes were not measured at the same time across groups. Low risk/high risk/unclear

Appendix 3A: ethical approval for study two

On 11 Dec 2013, at 13:48, ‘Aer-Ethics’ <[redacted] > wrote:

Dear Aly

Many thanks for this application, which has been assigned reference ERN_13-1275.

Please be aware that the Research Governance and Ethics Teams will be involved in supporting the University’s Good Clinical Practice inspection by the MHRA from the 16th to the 19th December. This means the availability of staff to respond to requests and queries not related to the inspection will be very limited, and anything which is not urgent will now be dealt with after the Christmas break.

Therefore, while we would usually advise that the ethics review process takes 4-6 weeks, it may take longer at the current time.

If you feel that your matter is critical, please phone Susan Cottam on [redacted]. If you have not already stated in your application that you require ethical approval by a specific date (e.g. it is a requirement of your funding body), please ensure that you notify us as soon as possible and include details of why approval is required by the date provided.

Kindest regards

Sam

Samitri Kumar

Research Governance & Ethics Administrator Research Support Group

Finance Office

Aston Webb, B Block

Edgbaston, Birmingham

B15 2TT

Tel: [redacted] Email: [redacted]

Web: www.birmingham.ac.uk/researchsupportgroup

Remember to submit a new Self-Assessment Form **for each project!**

Please click Ethical Review Process for further details regarding the University’s Ethical Review process, or email [redacted] with any queries

Please click Research Governance for further details regarding the University’s Research Governance and Clinical Trials Insurance processes, or email [redacted] with any queries

The contents of this email may be privileged and are confidential. It may not be disclosed to or used by anyone other than the addressee, nor copied in any way. If received in error please notify the sender and then delete it from your system. Should you communicate with me by email, you consent to The University of Birmingham monitoring and reading any such correspondence

Appendix 3B: Hospital permission letter for study two and three

UNIVERSITY OF
BIRMINGHAM

Dear Sir/Madam,,

Aly Alatar, PhD candidate at University of Birmingham, would like to ask for permission to allow him to conduct a research in your department. We know that patients with chronic back pain who are referred for treatment in your physiotherapy department will be of help for our study and we will be grateful if you will permit us to do so. Hoping for your kind consideration.

The aim of the study is divided in two parts, first to identify risk factors and predictors of chronic back pain in Kuwait, and then to explore the effects of patient's beliefs, cultural beliefs, and experience on the pain and the treatment in patients with chronic back pain.

The researcher is going to give each recruited patient a link to an electronic (on-line) questionnaire about different aspect of back pain, then in phase two the researcher is going to perform face-to-face, 45 minutes interview with those who wish to participate the interview to discover the more in more details. The findings, then, will be analysed and used to develop better understanding about chronic back pain in Kuwait. Our big aim of the research is to develop a rehabilitation protocol for the management of chronic back pain that is suitable to Kuwaiti society.

The researcher will ensure that the interview will not disturb the work or affect the patients.

Respectfully Yours,
Aly Alattar

*Attachment 1: information sheet

*Attachment 2: consent form.

*Attachment 3: interview questions

Appendix 4: English information sheet for study two

UNIVERSITY OF
BIRMINGHAM

School of Psychology

Frankland Building

University of Birmingham

Edgbaston, Birmingham

B15 2TT

Date:

Research Study Participation: The effects of cultural beliefs on back pain patients in Kuwait

We would like to invite you to take part in a research study examining the role of people’s beliefs and experiences on their back pain. The research involves completing a set of questionnaires related to your back pain problem.

We have approached you to take part as you are a patient at one of the back pain clinics involved in undertaking this research.

If you choose to complete and return the questionnaire then we will assume that you consent to your data being included in the analysis and any publications associated with the work. The information you provide will be confidential –each person who takes part will be given a unique number which means that no-one outside of the direct research team will know that you have provided answers.

Please note that you do not have to take part in this research. If you decide not to take part and not to complete the questionnaires your care will not be affected in any way.

If you have any questions you would like to ask before taking part, you can contact Aly Alatar by e-mail: [redacted] or post on the above address.

Kind regards,

Ali Alatar

PhD Researcher

Appendix 5: Arabic version of the information sheet for study two

كتيب استبيان عن الام الظهر

هذا الكتيب يحتوي على مجموعه من الاستبيانات المتعلقه بالام الظهر. و من خلال هذه الاستبيانات، سوف يتم التعرف على العوامل التي تؤثر على الام ظهرك و قد تتسبب في عدم فعاليه العلاج. ايضا، سوف يساعد التعرف على هذه العوامل على من منع تكرار حدوث المشكله في المستقبل و التقليل من فرص حدوثها.

المعلومات التي سوف يتم الحصول عليها في الاستبيان، سوف يستخدمها د. علي العطار، دكتور علاج طبيعي في مستشفى الاميري و طالب دكتوراه في جامعه بيرمنجهام البريطانيه من اجل تكوين قاعده بيانات عن العوامل المسببه لالم الظهر عند المرضى الكويتين. ايضا سوف يتم الاستفاده من هذه المعلومات لمعرفه تاثير العوامل السلوكيه على مرضى الام الظهر، و وضع برنامج علاجي لتعامل مع هذه العوامل.

سوف لن تحتاج لذكر اسمك، عنوانك، او تي بيانات خاصه كتعلقه بك. كذلك قان هذه المعلومات التي سوف يتم الحصول عليها من الاستبيان سوق يتم حفظها في كمبيوتر خاص مزود برقم سري و سوف يتم مسحها تماما بعد 15 سنه.

الرجاء الاجابه على جميع الاسئله قدر المستطاع، و لكن في النهايه لك الحريه قي ترك اي سؤال لا تريد جوابه. نتمنى ان يتم الاجابه على الاسئله في اسرع وقت ممكن. يرجى تسليم الكتيب الى الباحث الرئيسي او الى معالجك الذي بدوره سوف يسلمه للباحث.

يمكنك التواصل مع الباحث الرئيسي على:

د. علي العطار

Email: [redacted]

Mobile 1: [redacted]

Mobile 2: [redacted]

What’sApp: [redacted]

Appendix 6: English version of the booklet for study two

Back pain booklet questionnaire

This booklet contains questionnaires related to your back pain problem. It will help to identify factors that affect your problem and might lead to slow down your improvement. In addition, the identification of these factors would help to prevent and reduce the recurrence rate, which used to be high.

The obtained data will be used by Ali Alattar, physiotherapist at Al-Amiri Hospital and PhD candidate at the University of Birmingham to create a database about back pain related factors among Kuwaiti patients. Additionally, we will use these data to understand the behavioral factors that influence your back pain. We hope to use this information to develop a support package based around cognitive behavioral therapy, which is a support package looking at helping people change the way that they think and behave with regards to their back in order to help reduce their back pain.

You will NOT need to mention your name, address or any private information about you. Additionally, all the data will be saved in highly secured computer and will be destroyed after 15 years.

Please try to answer all the questionnaires, but still you are free to leave any question blank if you do not wish to answer it.

Please return the booklet as soon as you can. We are expecting to receive the booklet back at the next session (two or three days from this session). However, you are free to take extra time (few more days). You have to give the booklet to the main author or to your physiotherapist who in turn will deliver it to the main author. Another method for submitting the booklet by scanning it and email it to the provided email in the contact details.

If you have any question or concern, please contact the researcher (see below):

Contact details:

Ali Alattar

Email:[redacted]

Mobile 1:[redacted]

Mobile 2:[redacted]

What'sApp:[redacted]

Questionnaire information

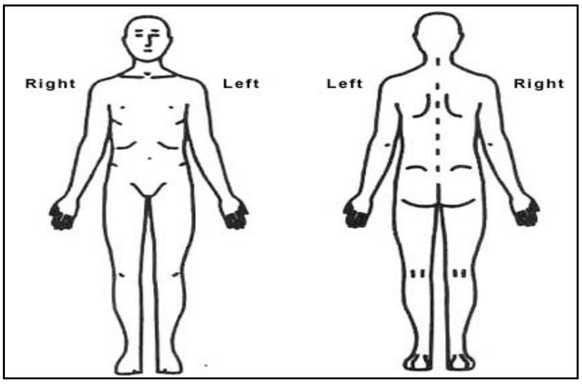
This questionnaire is divided into a number of sections with questions examining back pain intensity, the disability level, the degree of anxiety and depression, your perception about your back pain, your sleeping quality, and your beliefs and behaviors regarding your back pain.

Responses to the questions require you to circle the number that represents your health over the last week. For example if you feel that your overall health has been very poor over the last week you would circle 1,2 or 3; if you feel that your health has been good or excellent over the last week you would circle 5,6 or 7. The specific number you select depends on how you rate your health.

Please try to answer all of the questions

Please state date that you completed questionnaire:__/__/

1- pain location
Locate your pain by marking your pain locations on the figure



2- pain intensity

“Please indicate the intensity of current, best, and worst pain levels over the past 24 hours on a scale of 0 (no pain) to 10 (worst pain imaginable)

0	1	2	3	4	5	6	7	8	9	10

3- disability level

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 *for the past week*. 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.

☐ I stay at home most of the time because of my back
☐ I change position frequently to try and get my back comfortable
☐ I walk more slowly than usual because of my back
☐ Because of my back I am not doing any of the jobs that I usually do around the house
☐ Because of my back, I use a handrail to get upstairs
☐ Because of my back, I lie down to rest more often
☐ Because of my back, I have to hold on to something to get out of an easy chair
☐ Because of my back, I try to get other people to do things for me
☐ I get dressed more slowly then usual because of my back
☐ I only stand for short periods of time because of my back
☐ Because of my back, I try not to bend or kneel down
☐ I find it difficult to get out of a chair because of my back
☐ My back is painful almost all the time
☐ I find it difficult to turn over in bed because of my back
☐ My appetite is not very good because of my back pain
☐ I have trouble putting on my socks (or stockings) because of the pain in my back
☐ I only walk short distances because of my back
☐ I sleep less well because of my back
☐ Because of my back pain, I get dressed with help from someone else
☐ I sit down for most of the day because of my back
☐ I avoid heavy jobs around the house because of my back
☐ Because of my back pain, I am more irritable and bad tempered with people than usual
☐ Because of my back, I go upstairs more slowly than usual
☐ I stay in bed most of the time because of my back.

4- Mood evaluation

Instructions: Read each item and circle the reply, which comes closest to how you have been feeling in the past week. Don’t take too long over your replies: your immediate reaction to each item will probably be more accurate than a long thought out response.

1.	I feel tense or ‘wound up	Most of the time	A lot of the time	From time to time, occasionally	Not at all
2.	I still enjoy the things I use to enjoy	Definitely as much	Not quite so much	Only a little	Hardly at all
3.	I get a sort of frightened feeling as if something awful is about to happen	Very definitely and quite badly	Yes, but not too badly	A little, but it doesn’t worry me	Not at all
4.	I can laugh and see the funny side of things	As much as I always could	Not quite so much now	Definitely not so much now	Not at all
5.	Worrying thoughts go through my mind	A great deal of the time	A lot of the time	Not too often	Very little
6.	I feel cheerful	Never	Not often	Sometimes	Most of the time
7.	I can sit at ease and feel relaxed	Definitely	Usually	Not often	Not at all
8.	I feel as if I am slowed down	Nearly all the time	Very often	Sometimes	Not at all
9.	I get a sort of frightened feeling like ‘butterflies’ in the stomach	Not at all	Occasionally	Quite often	Very often
10.	I have lost interest in my appearance	Definitely	I don’t take as much care as I should	I may not take quite as much care	I take just as much care as ever
11.	I feel restless as if I have to be on the move	Very much indeed	Quite a lot	Not very much	Not at all

12.	I look forward with enjoyment to things	As much as I ever did	Rather less than I used to	Definitely less than I used to	Hardly at all
13.	I get sudden feelings of panic	Very often indeed	Quite often	Not very often	Not at all
14.	I can enjoy a good book or radio or television programme	Often	Sometimes	Not often	Very seldom

5- illness perception										
For the following questions, please select the number that best corresponds to your views:										
How much does your back pain affect your life?										
0	1	2	3	4	5	6	7	8	9	10
No affect at all										Severely affects my life
How long do you think your back pain will continue?										
0	1	2	3	4	5	6	7	8	9	10
A very short time										Forever
How much control do you feel you have over your back pain?										
0	1	2	3	4	5	6	7	8	9	10
Absolutely no control										extreme amount of control
How much do you think your treatment can help your back pain?										
0	1	2	3	4	5	6	7	8	9	10
Not at all										extremely helpful
How much do you experience symptoms from your back pain?										
0	1	2	3	4	5	6	7	8	9	10
No symptoms at all										many severe symptoms
How concerned are you about your back pain?										
0	1	2	3	4	5	6	7	8	9	10
Not at all concerned										extremely concerned
How well do you feel you understand your back pain?										
0	1	2	3	4	5	6	7	8	9	10
Don’t understand at all										understand very clearly
How much does your back pain affect you emotionally? (e.g. does it make you angry, scared, upset or depressed?										
0	1	2	3	4	5	6	7	8	9	10
Not at all affected emotionally										extremely affected emotionally

Please list in rank-order the three most important factors that you believe caused your back pain. The most important causes for me:-

1. ________________________________

2. ________________________________

3. ________________________________

6- sleeping quality									
For each question, please CIRCLE the number that best describes your answer. *Please rate the CURRENT (i.e. LAST WEEK) SEVERITY of your insomnia problem(s).*									
During the past week, how many days did you use each of least once in the day to cope with your pain? Please include days when you use to prevent or minimize the pain, even if you didn't have pain at that time									
	Items	Number of days							
1	Limited my standing time	0	1	2	3	4	5	6	7
2	Lay down on a bed	0	1	2	3	4	5	6	7
3	Asked for help with a chore or task	0	1	2	3	4	5	6	7
4	Focused on relaxing my muscle	0	1	2	3	4	5	6	7
5	I didn't let the pain interfere with my activities	0	1	2	3	4	5	6	7
6	Exercised to improve my overall physical condition for at least 5 minutes	0	1	2	3	4	5	6	7
7	I got support from a friend	0	1	2	3	4	5	6	7
8	Told my self the pain will get better	0	1	2	3	4	5	6	7

7- behavioural measurement

3. List the activities or movements that produce or increase your back pain (start from the most painful activity to less and lesser):

a-
b-
c-
d-
e-

8- How do you co-op with your back pain									
During the past week, how many days did you use each of least once in the day to cope with your pain? Please include days when you use to prevent or minimize the pain, even if you didn't have pain at that time									
	Items	Number of days							
1	Limited my standing time	0	1	2	3	4	5	6	7
2	Lay down on a bed	0	1	2	3	4	5	6	7
3	Asked for help with a chore or task	0	1	2	3	4	5	6	7
4	Focused on relaxing my muscle	0	1	2	3	4	5	6	7
5	I didn't let the pain interfere with my activities	0	1	2	3	4	5	6	7
6	Exercised to improve my overall physical condition for at least 5 minutes	0	1	2	3	4	5	6	7
7	I got support from a friend	0	1	2	3	4	5	6	7
8	Told my self the pain will get better	0	1	2	3	4	5	6	7

9- your focus on your health control						
Instructions: Each item below is a belief statement about your back pain with which you may agree or disagree. Beside each statement is a scale, which ranges from strongly disagree (1) to strongly agree (6). For each item we would like you to circle the number that represents the extent to which you agree or disagree with that statement. The more you agree with a statement, the higher will be the number you circle. The more you disagree with a statement; the lower will be the number you circle. Please make sure that you answer **EVERY ITEM** and that you circle **ONLY ONE** number per item. This is a measure of your personal beliefs; obviously, there are no right or wrong answers.						
1. If I get sick, it is my own behaviour, which determines how soon I get well again	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
2. No matter what I do, if I am going to get sick, I will get sick	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
3. Having regular contact with my physician is the best	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE

way for me to avoid illness						
4. Most things that affect my health happen to me by accident	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
5. Whenever I don't feel well, I should consult a medically trained professional	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
6. I am in control of my health	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
7. My family has a lot to do with my becoming sick or staying healthy	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
8. When I get sick, I am to blame	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
9. Luck plays a big part in determining how soon I will recover from an illness.	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
10. Health professionals control my health.	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
11. My good health is largely a matter of good fortune	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
12. The main thing which affects my health is what I myself do	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
13. If I take care of myself, I can avoid illness	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
14. Whenever I recover from an illness, it's usually because other people (for example, doctors, nurses, family, friends) have been taking good care of me.	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
15. No matter what I do, I 'm likely to get sick	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
16. If it's meant to be, I will stay healthy.	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
17. If I take the right actions, I can stay healthy	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE
18. Regarding my health, I can only do what my doctor tells me to do	STRONGLY DISAGREE	MODERATELY DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	MODERATELY AGREE	STRONGLY AGREE

10- your adherence to the treatment				
How would you describe your adherence to the given management for your back pain?				
Exercise				
Not at all	A little	Rather regularly	Very regularly	As advised
1	2	3	4	5
Refraining from undertaking the sporting and daily activities that the rehabilitation personnel advised not to				
Not at all	A little	Rather regularly	Very regularly	As advised
1	2	3	4	5
Application of hot/cold therapy				
Not at all	A little	Rather regularly	Very regularly	As advised
1	2	3	4	5

Participation in a phase two of the study

We are also conducting an interview study to explore the influence of cultural beliefs on the behaviours and attitudes of patients with chronic back pain, and its affect on the healing process. The interview would last about 45 to 60 minutes (or less) and will be audio taped to ensure clarity of data collection and transcription.

Please could you indicate below whether you would like to participate in the interview study:

Yes ( ) No ( )

If yes, please provide a contact number: ________________

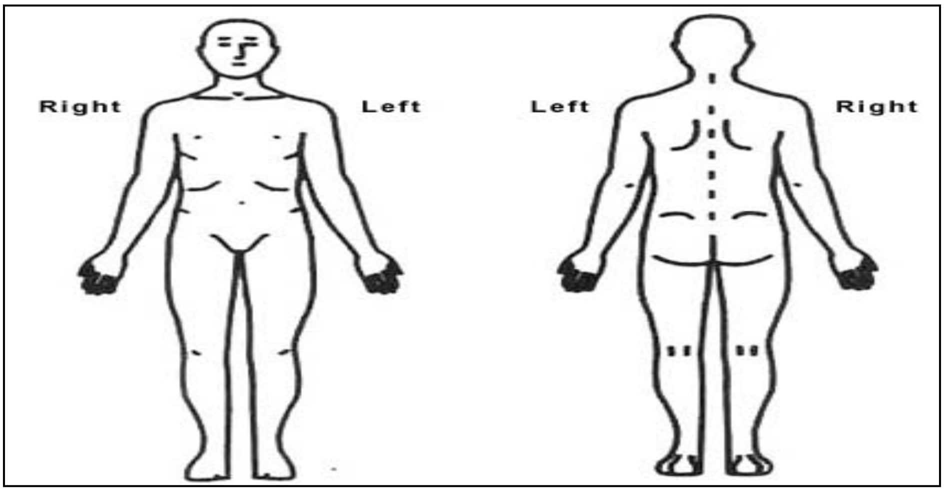
Appendix 7: Arabic version of the booklet for study two

بيانات الكتيب:

هذا الكتيب يحتوي على مجموعه من الاستبيانات او الاسئله التي تتعلق بالام ظهرك من عدة نواحي، مثل: شدة الالم، مكان الالم، القلق و الاكتئاب بسبب الالم، تاثير الالم على نشاطك اليومي، تاثير الالم على النوم، تاثير الالم على اتخاذ قرارتك في الحياه، وكدى قدرتك على التعايش مع الالم.

الرجاء الاجابه على الاسئله قدر المستطاع

تاريخ اتمامك للكتيب:

1- مكان الالم:
حدد الاماكن التي تعاني منها بالالم على الرسمه التاليه بتظليل مناطق الالم:


4.

2- شدة الالم:-										
حدد مقدار الالم الذي تشعربه **الان** على المسطره الرقميه امامك:										
10	9	8	7	6	5	4	3	2	1	0

3 -تاثير الالم على النشاط الحركي
عندما تشعر بألم في الظهر، قد تجد صعوبة في القيام ببعض الأمور التي اعتدت علي القيام بها في الأحوال العادية. عندما تقرأ هذه العبارات، تحتوي هذه القائمة علي بعض العبارات التي يستخدمها الناس في وصف حالتهم حينما يشعرون بألم الظهر. قد تلفت بعض العبارات انتباهك حيث تصف حالتك عند قراءة هذه القائمة، فكر في حالتك, عندما تقرأ عبارة تصف حالتك ضع علامة "√" أمامها. إذا لم تصف العبارة حالتك، اترك المربع فارغا وانتقل إلي العبارة التالية. **تذكر، عليك وضع علامة فقط أمام العبارة إذا كنت متأكدا من أنها تصف حالتك**
أظل معظم اليوم في المنزل بسبب الألم في ظهري.

أقوم بتغيير وضعي كثيرا كي أشعر بالراحة في ظهري
أمشي ببطء عن المعتاد بسبب الألم في ظهري
بسبب الألم في ظهري، لا أقوم بأي من الأعمال التي اعتدت علي القيام بها في المنزل.
بسبب الألم في ظهري، أستعمل الدرابزين عند صعود السلالم.
بسبب الألم في ظهري، أرقد للحصول علي الراحة أكثر من المعتاد.
بسبب الألم في ظهري، أحتاج إلي الإمساك بشئ ما كي أتمكن من القيام من على كرسي منخفض.
بسبب الألم في ظهري، أحاول الاستعانة بالآخرين كي يقوموا بالأمور بدلا مني.
أرتدي ملابسي ببطء أكثر من المعتاد بسبب الألم في ظهري.
أقف لفترات قصيرة فقط بسبب الألم في ظهري.
بسبب الألم في ظهري، أحاول عدم الانحناء او الركوع.
أجد صعوبة في القيام من الكرسي بسبب الألم في ظهري
ظهري يؤلمني معظم اليوم.
أجد صعوبة في التقلب في الفراش بسبب الألم في ظهري.
شهيتي ليست جيدة جدا للطعام بسبب الألم في ظهري.
أجد صعوبة في ارتداء الجوارب بسبب الألم في ظهري.
أمشي مسافات قصيرة فقط بسبب الألم في ظهري.
أنام أقل من المعتاد بسبب الألم في ظهري.
بسبب الألم في ظهري، أحتاج لمساعدة شخص آخرلارتداء ملابسي.
أجلس معظم أوقات اليوم بسبب الألم في ظهري.
أتجنب المهام الشاقة في المنزل بسبب الألم في ظهري.
بسبب الألم في ظهري، أصبحت عصبي ومعكر المزاج أكثرمن العادة مع الناس.
بسبب الألم في ظهري، أصعد السلالم بشكل أبطأ من المعتاد.
أظل في الفراش معظم اليوم بسبب الألم في ظهري.

4 الام الظهر و علاقتهم بالاكتئاب
اقرا كل سؤال ثم اختر اقرب اجابه تناسبك. لا تفكر كثيرا، اختر اول اجابه تعتقد انها المناسبه

اشعر انني اتحرك بشكل بطيئ	**اشعرر انني متوتر او متنرفز:**
تقريبا كل الاوقات	اغلب الاوقات
غالبا	في الكثير من المرات
احيانا	احيانا، بين الوقت و الاخر
ابدا	اطلاقا لا اشعر انني متوتر
اشعر بحاله من الخوف و المغص في المعده	**لا ازال استمتع بالامور التي احبها**

ابدا
احيانا
اغلب الاوقات
دائما

طبعا، بشكل دائم
ليس كالسابق
قليلا جدا
ابدا

فقدت اهتمامي بمظهري:
بكل تاكيد، بشكل كامل
نعم، نوعا ما لم اعد اهتم كالسابق
قليلا، ليس كالسابق
ابدا، لازلت اهتم في نفسي كما السابق

اشعر بحاله من الترقب بان شيئا سيئنا سوف يحدث
بكل تاكيد، و بصوره بشعه
نعم، ولكن ليس بتلك البشاعه
قليلا، ولكن لا يؤرقني
ابدا

اشهر بالارهاق كانني بذلت مجهود
بشكل كبير جدا
نوعا ما، نعم
بشكل قليل
لا، ابدا

لازلت اضحك و ارى الجواتب الايجابيه في الامور:
نعم، كما كنت في السابق
ليس كما السابق
قليلا جدا
ابدا

اتطلع للامور بساعده و بهجه:
كما كنت في السابق
ليس كما اعتدت
بشكل قليل جدا
صعب جدا، لا اعتقد

هناك افكار سلبيه تخطر على ذهني:
بصوره مستمره جدا
في اغلب الاوقات
بين الفتره و الفتره
احيانا قليله

اشعر بحاله مفاجاه من الذعر:
بصوره شبه دائمه
الكثير من الاوقات
قليلا
لا، ابدا

اشعر بالمرح:
ابدا
قليلا جدا
احيانا
اغلب الاوقات

استطيع ان استمتع بوقت فراغي في قراءه كتاب او الاستماع للراديو او مشاهدة التلفزيون:
غالبا
احيانا
قليلا
نادرا جدا

استطيع ان اجلس باسترخاء:
بكل تاكيد
احيانا
قليل جدا
ابدا

5 استيعابك للالم:										
كم تقيم تاثير الم ظهرك على حياتك؟										
10	9	8	7	6	5	4	3	2	1	0
مؤثرا جدا									غير مؤثرا اطلاقا	
في اعتقادك، كم ستطول مدة الام ظهرك؟										
10	9	8	7	6	5	4	3	2	1	0
الى الابد									لمدة قصيره	
ما مدى تحكمك في الام ظهرك؟										
10	9	8	7	6	5	4	3	2	1	0
سيطره كامله على الالم										لا استطيع ان اسيطر عليه
كم تعتقد ان العلاج الذي تحصل عليه سوف يساعدك في التغلب على الم ظهرك؟										
10	9	8	7	6	5	4	3	2	1	0
غير مفيد اطلاقا									مفيدا جد	
ما مدى تعرضك للام و اعراض الم الظهر؟										
10	9	8	7	6	5	4	3	2	1	0
بشكل مستمر									لا اشعر باي اعراض	
ما مقدار قلقلك حيال الام ظهرك؟										
10	9	8	7	6	5	4	3	2	1	0
قلق شديد									لا يوجد اي قلق	
ما مدى فهمك لمشكلتك (الام الظهر) و اسبابها؟										
10	9	8	7	6	5	4	3	2	1	0
واضحه تماما								غير قادر على فهمها اطلاقا		
ما مقدار تاثير الم ظهرك على مشاعرك و حالتك النفسيه (شعورك بالعصبيه و الغضب و القلق)؟										
10	9	8	7	6	5	4	3	2	1	0
بشكل كبير جدا									لا تاثر اطلاقا	
سجل اكثر 3 عوامل تعتقد انها السبب الرئيسي لالم ظهرك (بالترتيب التنازلي من الاكثر تاثيرا الى اقلها): - - -										

6 تاثير الالم على قدرتك على النوم				
هل تشعر بصعوبه في النوم؟				
ابدا	قليلا	نوعا ما	نعم، هناك صعوبه	
هل تشعر بصعوبه في المحتفظه على نومك؟				
ابدا	قليلا	نوعا ما	نعم، هناك صعوبه	
هل تشعر بصعوبه في الاستيقاظ مبكرا؟				
ابدا	قليلا	نوعا ما	نعم، هناك صعوبه	
ما مدى رضاك عن نومك ؟				
راضي تماما	راضي	مقبوله	لست راضي	ابدا غير مقبوله
هل يعتقد الاخرين انك تعاني من مشكله بالنوم مؤثره على حياتك؟				
لا	قليل جدا	نوعا ما	الكثير يعتقد	تقريبا الكل
هل انت قلق او متوتر بسبب مشكلة النوم التي تعاني منها؟				
ابدا	بشكل بسيط	نوعا ما	نعم، هناك قلق كبير	قلق جدا ومتوتر
هل تؤثر مشكلة النوم التي تعاني منها على حياتك اليوميه (عدم التركيز في العمل او الشعور بالارهاق)؟				
لا تؤثر	قليل جدا	نوعا ما مؤثره	بشكل كبير	نعم، تغيرت بسبب الارق

7 اسباب الالم:
سجل 3 الانشطه و الحركات التي تؤدي الى تسبب لك الام في العمود الفقري او تهيج و تزيد الالم في العمود الفقري (من الاكثر تسببا للالم الى اقلها تسببا للالم):
- - -

8 تاثير الالم على اتخاذ القرارت في حياتك اليوميه:					
1	اعتقد انه من المهم ان نصرف اموالنا باعتدال حتى نتجنب الفقر عنما نتقدم بالسن	1	2	3	4
2	عندما اواجه مشكله فانني ابادر في العمل على حلها				
3	اتخذ قراراتي بعد التفكير بحذر في المشكله				
4	اقوم بعمل قائمه احدد فيها اولوياتي و اقوم بالتركيز عليها اولا				
5	اقوم بتحضير العديد من الاحتمالات في ذهني حتى استطيع ان اكون جاهزا لجميع التوقعات				
6	غندما انجح في تحقيق هدف، اطمح لتحقيق هدف اخر اكثر تحدي				
7	احب التحديات و قلب التوقعات				

8	افكر بجميع المخرجات المحتمله للمشكله قبل التعامل معاها				
9	اتخيل نفسي احل جميع المشاكل التي قد اواجهها مستقبلا، قبل وقوعها				
10	عندما اواجه مشكله مع مسؤولي، صديقي او قريبي فانني اتخيل كيف اتعامل معها بنجاح قبل التعامل الفعلي مع المشكله				
11	انا شخص يمكن الاعتماد عليه				
12	عندما يحدث سوء تفاهمفانني احاول ان اتدرب على ما ساقوله قبل ان اقوله بالفعل				
13	قبل ان تتعقد المشكله، اقوم بالاتصال على صديق و التحدث معه بشانه				
14	عندما اواجه بعض المشاكل، فانني امون قدرا على حلها بالاستعانه باصدقائي				
15	انا اثق في مشاعري اتجاه الاخرين حتى استطيع ان ابني علاقات قويه معهم				
16	احيانا اترك المشاكل لتتعالج لوحدها				
17	لدي تصور عما سيكون شكل مستقبلي				
18	بدلا من التصرف بتسرع، افكر على مهلي في كيفيه حل المشاكل				
19	اعمل بجد حتى احمي نفسي من الفشل				
20	قبل العمل، اقوم بوضع خططي حتى استطيع تغير المواقف				
21	اتخيل نفسي احل المشاكل الصعبه				
22	عندما اواجه مشكله، افضل الا اشغل بالي بها				
23	عادة، استطيع التعرف على الاشخاص الذين بامكانهم مساعدتي على ايجاد حلولي الخاصه				
24	عندما اكتئب، فانني احاول ان ارفه عن نفسي و اتحدث مع اصدقائي				
25	احاول ان اتحدث عن مشملتي و اشرحها لاصدقائي حتى استطيع ان احصل على حلول منهم				
26	حول مشاكلي الى تجارب ايجابيه				
27	عندما احاول ان احل مشاكلي، فان نصائح اصدقائي عادة تكون مفيده				
28	النصائح التي اتلقاها من الاخرين، غالبا ما تكون مفيده في تعاملي مع مشاكلي				
29	اصدقائي دائما يعتنون بي				
30	عندما اواجه مشكله، عادة ما اتركها تهدء قليلت قبل الشروع بحلها				
31	على الرغم من العثرات، الا انني استطيع النجاح في النهايه				
32	اخذ اراء الاخرين حلو ما سيفعلونه لو كانوا مكاني				
33	التحدث مع الاخرين مفيد جدا لحل المشاكل، لانه يضيف افكار و حلول جديده				
34	اعرف من يمكن الاعتماد عليه عندما تكون الظروف صعبه				
35	بدلا من صرف جميع اموالي، افضل ادخار بعض الاموال للحاجه				
36	افكر بجديه حتى امنع المواقف السيئه المحتمله من حدوثها				
37	دائما احاول افكر بجميع الحلول للتغلب على العقبات، لا شي يمكنه ايقافي				
38	عندما يتحداني شخص ما بانني لا استطيع النجاح، يمكنك التاكد انني سانحج				

39	اتغلب على العقبات عن طريق التفكير بحلول بديله منطقيه				
40	احاول تصور ما احتاج من اجل تحقيق النجاح				
41	اذا واجهت مشكله صعبه الحل، فانني افضل ان اركنها قليلا حتشى اكون جاهزا للتعامل معها				
42	دائما ما اتخيل نفسي افشل حتى لا ارفع احلامي غير واقعيه				
43	اكون عندما حزين، انا اعرف بمن اتصل حتى يجعلني سعيدا				
44	انا اقسم المشكله الى اجزاء صغيره، ثم اتعامل مع كل جزء على حد				
45	عندما اكون عائلتي، سوف اعتني بهم و احميهم من الاخطار				
46	دائما ما اجد حلول لتجاوز العقبات الصعبه				
47	اخطط للامور قبل ان تحدث المشاكل الصعبه				
48	قبل ان اصاب بالفشل، انا مستعد ذهنيا لعواقبها ايضا				
49	انظر للمشكله من اكثر من ناحيه حتى اجد الحل المناسب				
50	عندما احتاج لتجاوز العديد من المشاكل، فانني ارسم خطه و اتبعها				
51	دائما اضع الخطط للحصول على افضل النتائج الممكنه				
52	اتصور احلامي و احاول ان احققهم				
53	قبل ان اتجاوز العقبات، اتخيل انني نجحت في تجاوزهم				
54	عندما اواجه مشكله، غالبا ما اتخيل نفسسي غير قادر على حلها				
55	عندما اتخيل مستقبلي المهني، اشاهد نفسي احصل على الوظيفه التي اتمناها				

9 قدرتك على التحكم في حياتك الصحيه:_							
هذه الاسئله تتعلق بما تحكمك بصحتك و على الاخص الام ظهرك. اختر اجابه واحده من كل سؤال 1=غير موافق بشده,2 = غير موافق, 3 = غير موافق قليل,4 = نوعا ما موافق,5= موافق, 6= موافق تمام							
1	اذا اصبحت مريضا، قان تصرفاتي هي التي تحدد سرعه تحسني من المرض	1	2	3	4	5	6
2	مهما افعل، لو قدر لي ان الامرض، سوف امرض	1	2	3	4	5	6
3	اتصالي بشكل منتظم مع طبيبي الخاص يساعدني على الحفاظ على صحتي	1	2	3	4	5	6
4	اغلب الامور التي تؤثر على صحتي، تحدث لي بالصدفه	1	2	3	4	5	6
5	في كل مره اشعر فيها انني لست على ما يرام، يجب ان استشيرطبيب متخصص	1	2	3	4	5	6
6	انا قادر على التحكم في صحتي	1	2	3	4	5	6
7	عائلتي لها تاثير كبير على صحتي، سواء ان اكون مريض بسببهم، او اكون بخير	1	2	3	4	5	6
8	عندما اصاب بالمرض، لا احد يلام غيري	1	2	3	4	5	6
9	الحظ يلعب دور كبير في تحديد متى سوق اصبح معافا اذا ما اصبت بالمرض	1	2	3	4	5	6
10	الاطباء و الفريق الطبي هم من يتحكم في صحتي	1	2	3	4	5	6
11	الحياه الصحيه الجيده هي دليل على حسن الحظ	1	2	3	4	5	6

12	لكثر شيئ يؤثر على صحتي هو ما افعله انا في نفسي	1	2	3	4	5	6
13	اذا اعتينيت قي نقسي، استطيع ان اتحاشى الالم	1	2	3	4	5	6
14	في كل مره اتعفى فيها من المرض، يكون الاخرين هم السبب الرئيسي في شفائي	1	2	3	4	5	6
15	لا يهم ما افعل، فانا دائما ما اصاب بالمرض	1	2	3	4	5	6
16	لو الامر بيدي، لبقيت سليما بدون مرض مدى العمر	1	2	3	4	5	6
17	اذا اتخذت الاجراءات السليمه، استطيع البقاء صحيحا بدوم امراض	1	2	3	4	5	6
18	في ما يتعلق بصحتي، انا استطيع فقط فعل ما يخبرني به الاطباء	1	2	3	4	5	6

10 التزامك في العلاج:			
كيف تصف و تقيم مدى اهتمامك و التزامك بالنصائح و التوجيهات الموجهه لك من معالج؟			
لا استطيع الالتزام	قليل	نوعا ما ملتزم	ملتزم بشده
كيف تصف و تقيم مدى اهتمامك و التزامك بالتمارين اليوميه؟			
لا استطيع الالتزام	قليل	نوعا ما ملتزم	ملتزم بشده
كيف تصف و تقيم مدى اهتمامك و التزامك باستخدام الكماده الدافيه او البارده؟			
لا استطيع الالتزام	قليل	نوعا ما ملتزم	ملتزم بشده

هل ترغب في المشاركه في المرحله الثانيه من التجربه و هي عباره عن مقابله شخصيه لاخذ بعض المعلومات عن مشكلتك؟		
١	نعم ارغب، مقابله عن طريق الهاتف	
٢	نعم ارغب، مقابله وجه لوجه	
٣	لا ارغب	
	في حال الاجابه بنعم، يرجى تزويدنا برقم هاتف للاتصال بك و التنسيق معك:	

Appendix 8: Study 3 consent form English version

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The effects of chronic back pain patients' beliefs, culture and lifestyle on the illness and care: interview with Kuwaiti patients

Consent Form for Participants

5. -I have read and understood the information sheet for the above study and have been given the opportunity to ask questions.

6. -I understand that my participation is voluntary and that I am free to withdraw from the without having to give any reason and without me being affected or this having any negative consequences on my circumstances.
7.
8. -I agree to provide information that will be used for research purposes only, and understand that all the information relating to myself obtained as part of the study will be strictly confidential, and that I will not be personally identified in any write-up of the results.

9. -I understand that information will be stored in secured manual and electronic files and is subject to the provisions of the Data Protection Act.

10. -I consent to being audio taped for the purpose of transcription and data collection in this interview.

-I wish to participate in this study under the conditions set out here and in the Information Sheet for Participants.

Signed:____

Printed Name:______________________________________

Date:____

Thank you very much for agreeing to participate in this study!

Interview Guide for study three

Thank you for agreeing to take part in this interview. This research is undertaking to gain more understanding about the effect of cultural beliefs on your pain behaviour and attitude.

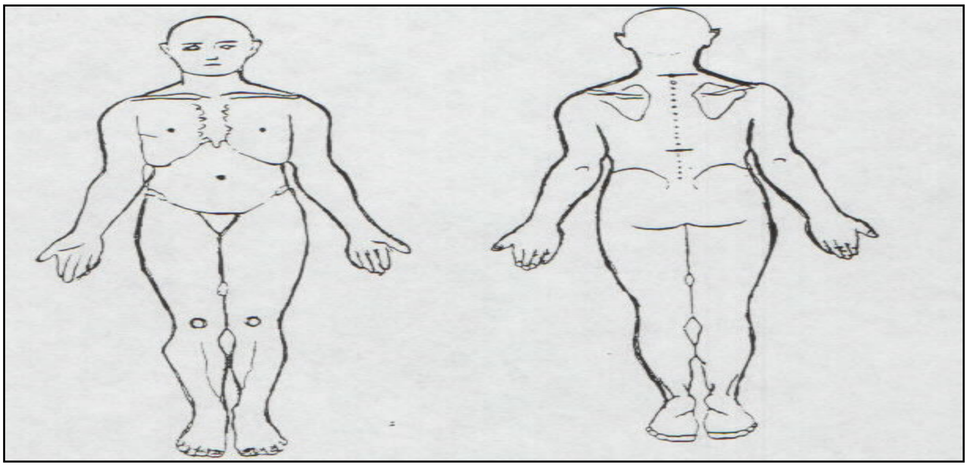
Interview guiding question:

1- Can you tell me about your back pain? (Onset date, mechanism, location, severity)
2- Do you understand your problem?
3- Do you think your daily activities would affect your pain?
4- Are there any cultural beliefs or behaviours you think they may affect your back pain or make it worse?
5- Can you specify the cultural beliefs that would make your pain worse?
6- Have you tried to turn or change these beliefs into positive? Why?
7- Do you think that your job (or life style) has an influence on your back pain? How?
8- Do you experience any stress? Does it affect your pain?
9- If your treatment requires you to change or adopt a new habit, such not sitting on the floor any more or not crossing your leg while sitting, would you accept that?
10- Finally, do you wish to change? Why?

*These questions will used to guide the interview, there will be other questions depending on the answers and the needed to find more especially if the patient raise interesting point or new point.

Thank you for taking part in the interview and for sparing your time.

Do you have any questions?

Participants details					
Gender	Male	Female			
Age					
Job title					
Education level	Higher education	University Level	Secondary school	Primary school	No education
Date of diagnosis					
Treatments received					
Duration of pain	>3 months	3-6 months	7-12 months	<12 months	
Pain region	Lower back	Shoulder girdle	Upper back	Neck	
Body pain diagram					
					

Appendix 9: Study 3 information sheet

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Information Sheet for Participants

Study title	The effects of cultural beliefs on back pain patients in Kuwait
Introduction	You are being invited to take part in the present study. Please take the time to read through the following information. Ask the relevant person who provided you with the information sheet if you have any questions or would like more information.
What is the purpose of the study?	The purpose of the present study is to explore the influence of cultural beliefs on the behaviours and attitudes of patients with chronic back pain, and the influence the healing process. The interview will be audio taped to ensure clarity of data collection and transcription.
Why have I been chosen?	You have been chosen to participate in this study because you have been identified as a potential respondent for the study.
Do I have to take part?	It is entirely up to you whether you decide to take part in the present study or not. If you decide to take part, you will be given this information sheet to keep and a meeting in the form of an interview will be arranged for you.
What happens if I take part?	You will be asked to take part in an interview lasting 45 to 60 minutes (or less). During the interview we will ask you questions about your experience with the back pain, your beliefs about the causes, the effects of your lifestyle and habits on the pain. Also we would like to know about the effect of the society and cultural beliefs on your pain. We would record the interview (as it is not possible to write everything down) and later transcribe this into written format. We do this so that we can analyse the data. You can choose to withdraw from the study at any time after taking part by contacting the researcher. Withdrawing from the study will not affect you or have any negative consequences on your circumstances
What happens to my information?	All information that is obtained from the interview will be uploaded onto a password-protected computer for use of transcribing. Only the research team will have access to these materials. This information will then be entered into a computer database, where your information will be assigned a number. The information in the database, as well as all study material (i.e., audio files), will be identified by numbers, and can therefore not be traced back to you or anyone else. Once the audio files are transcribed all digital copied and original files will be deleted. Your name will only appear on your consent form, and the researcher will be the only person who has access to a list linking your name with your number. All study material, will be kept in a locked filing cabinet at the University of Birmingham.
Will my taking	All information that is obtained during the course of the study will be kept strictly confidential.

part in this study be kept confidential?	No identifiable information will be included in any publication using the data of this study.
What will happen to the results of the study?	The results of the study will be analysed by the research team to identify the effects of cultural beliefs on back pain patients in Kuwait. The results may be presented at a conference or published in an academic journal. Please note that no identifiable information will be released in any write-up of the results. If you choose to participate in the study and would like to receive a copy of the results or final paper you may state this at the start of the interview and a copy of the results will be sent to you via the contact information you provide.

Please contact **Aly Alatar** with any questions you may have.

Aly Alatar PhD Researcher School of Psychology University of Birmingham Edgbaston, Birmingham B15 2TT [redacted]	**Dr. Beth Grunfeld** Senior Lecturer/Research Supervisor School of Psychology University of Birmingham Birmingham B15 2TT [redacted] [redacted]	**For Kuwait contact:** Aly Alatar Al-Amiri General Hospital Physiotherapy Department Sharq [redacted] [redacted]

Appendix 10: Study 3 Arabic version consent form

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استمارة موافقة على المشاركة في البحث

- اقر اني قرأت و فهمت ورقة الملعومات المتعلقه بهذا البحث، و اتيح المجال لي للاسفستار و توضيح اي نقطه لم افهمها
- انا اعلم ان مشاركتي في هذا البحث هي مشاركة تطوعيه، و يحق الانسحاب من البحث دون الحاجه لتبرير سبب انسحابي و دون تعرضي لاي ضرر او عواقب سلبيه في المستقبل.
- افر بانني سوف اقوم بتقديم المعلومات اللازمه لاستخدامها في هذا البحث فقط. كما اعلم ان اي معلومه شخصيه تتعلق بي، سوف تكون سريه و ان هويتي ستكون مجهوله و لن اتعرض لاي مسائله قانونيه نتيجة مشاركتي في هذا البحث.
- اعلم ان الجميع المعلومات الماخوذه مني سوف يتم حفظها في جهاز كمبيوتر مزود بارقام سريه و ستكون في الحفظ و الصون.
- اوفق على ان يتم تسجيل صوتي اثناء المقابله و ذلك بغرض منع المعلومات من الضياع اة التحريف.
- اوافق على مشاركتي في البحث تحت الشروط المذكوره اعلاه

اسم المشارك:

التوقيع:

التاريخ:

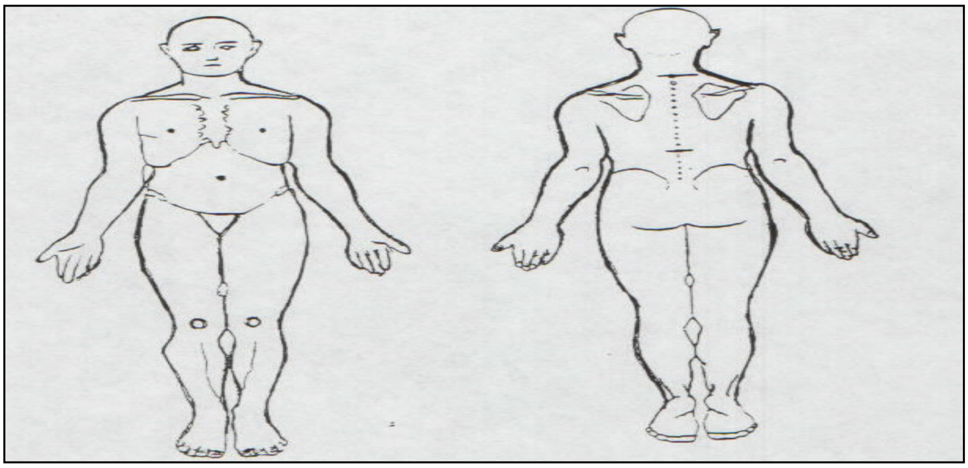
شكرا على قبولك المشاركه في هذا البحث

اسئله المقابله:

- هل يمكنك ان تخبرني عن المك؟ متى بدات؟ كيف؟ اين اماكن الالم؟ و كم استمرت؟
- هل انت قادر على فهم مشكلتك؟ الاعراض التي تعاني منها و اسبابها؟
- هل تعتقد ان طبيعه حياتك و انشطتك اليوميه تلعب دور في مشكلتك؟
- هل تعتقد ان العادات و التقاليد في المجتمع لها تاثير على مشكلتك؟
- هل تستطيع ذكر او مناقشة بعض التقاليد و الاعراف في المجتمع الكويتي التي من الممكن ان تهيج الالم؟
- هل حاولت ان تغير بعض من عاداتك و مفاهيمك التي من الممكن ان تاثر على الالم؟
- هل تعتقد ان حالتك النفسيه او العاطفيه قد تؤثر على الامك؟
- اذا كان علاجك يتطلب منك تغيير بعض العادات و الافكار و المفاهيم المترسخه لديك، هل لديك القدرة على ذلك؟

هذه الاسئله ستستخدم لتوجيه المقابله، و هي الافكار العامه التي نريد مناقشتها في البحث و قد نضطر الى توجيه بعض الاسئله الجانبيه المتعلقه باجوبتك.

شكرا لك مجددا على قبولك المشاركه في هذا البحث

معلومات المشارك						
الجنس	**ذكر**			**انثى**		
العمر						
طبيعه العمل						
المستوى التعليمي	**عليا**	**جامعي**	**ثانوي**	**متوسط**	**ابتدائي**	**غير متعلم**
تاريخ التشخيص						
انواع العلاج						
مدة الالم	**اقل من 3 شهور**	**من3--6 شهور**	**من6--12 شهور**		**اكثر من سنه**	
اماكن الالم	**الرقبه**	**اعلى الظهر**	**الكتف و اللوح**		**اسفل الظهر**	
ضلل اماكن الالم على الصوره						
						

Appendix 11: Study 3 Arabic information sheet

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ورقة المعلومات الخاصه بالبحث

مقدمه

بتم دعوتك للمشاركه في هذه الدراسه. يرجى اخذ الوقت الكافي لقراءة المعلومات التاليه. قم بسؤال الشخص الذي سلمك الورقه عن اي استفسار او سؤال او معلومه اضافيه تود معرفتها.

ماهو الهدف من هذه الدراسه؟

الهدف منها نعرفة اثير معتقدات المريض، تاثيرات المجتمع، العادات والتقاليد و نمط حياه المريض على المرض و العلاج.

لماذا تم اختياري للمشاركه في البحث؟

تم اختيارك لانه تنبطق عليك مواصفات الشخص المرغوب في مشاركته في البحث

هل يجب علي المشاركه في البحث؟

نحن نتمنى ان تشارك معنى في البحث، و لكن انت حر في المشاركه او عدمها. كما يمكنك الانسحاب في وقت من البحث دون الحاجه لاعطاء مبرر او تنبيه مسبق. و نضمن لك انك لن تتعرض لاي ضرر او عواقب سلبيه

ماذا سيحدث اذا شاركت؟

سوف نحدد معك موعد للمقابله. خلال هذه المقابله سوف نطرح عليك الاسئله الموضحه اعلاه. سوف يتم تسجيل المقابله من اجل تفريغها و حفاظا على صحه الملعومات من التحريف. يمكنك رفض الاجابه على اي سؤال لا ترغب في الاجابه عليه. كما يمكنك الانسحاب في لحظه من المقابله بدون الحاجه لتقديم عذر.

ماذا سيحدث للمعلومات التي ستاخذونها مني في البحث؟

سوف نقوم بتحليلها بطريقه علميه و استنباط الافكار و الحلول المناسبه من اجل التوصل لحل مناسب لالام الظهر. سوف يتم الاحتفاظ بالمعلومات بجهز كمبيوتر مزود بارقام سريه و سوف يتم اتلاف هذه المعلومات بعد خمس سنوات من البحث. جميع بياناتك الشخصيه سوف تظل سريه تماما.

ماذا سوف تفعلون بالنتائج المكتشفه؟

سوف نقوم بتحويلها الى مقالات علميه و محاضرات علميه و نشارك فيها في المؤتمرات و ورشات العمل

لاي استفسار او سؤال يرجى التواصل على البيانات التاليه

Aly Alatar PhD Researcher School of Psychology University of Birmingham Edgbaston, Birmingham B15 2TT [redacted]	**Dr. Beth Grunfeld** Senior Lecturer/Research Supervisor School of Psychology University of Birmingham Birmingham B15 2TT [redacted] [redacted]	**For Kuwait contact:** Aly Alatar Al-Amiri General Hospital Physiotherapy Department Sharq [redacted] [redacted]

Appendix 12: example of transcription and translation modification

English transcription 1: Before a cupule of years, I felt annoying pain in my lower back so I decided to visit a doctor who asked me to get an x-ray for my back. After that, the doctor told me that the x-ray showed that my spine is “fine” and only gave me some pain killer medication. He didn’t tell me that I need to exercise and he didn’t tell me how to avoid the pain in the future. It was not my fault; it was the doctors’ fault because they didn’t do their job well. If that doctor did his job well, I would be I better health now.

English transcription 2: Few years a go, I had pain in my back so I decided to visit doctor. The doctor asked me to do an x-ray for the spine and the result revelled negative findings and the doctor told me that my spine is healthy. He didn’t explain why I’m feeling this pain or how to avoid it and he only prescribed me some medications. I’m blaming the doctor because he didn’t do his job perfectly. Should the doctor instructed me to do the exercises, I would be in a better health and he was able to do better than what he did with me.

Final version: *“A few years ago i had back pain and i went to the doctor who asked me to do x-ray first. The result showed nothing, so he gave me some medication and that’s it. No body told me that i have to do exercise or explain my problem or my pain. i blame some of the doctors for their wrong acting. That doctor was able to do better than what he did.” (No.10, male, age 28, pain>8 years).*

Example from study three about the translation process:

First, the author listened to the audio and transcribed it in Arabic. Then he translated it to English. After that, the text was translated back to Arabic by another reviewer. Finally, both researcher sit together to finalize the transcription

Quote in Arabic after transcribed from the recorded audio

ايه, لمن الشخص يسمع من طرف احد ثاني يعرفه ويقوله عن تجربته وان هالدكتور عطاه تشخيص غلط طبيعي راح الانسان يفقد الثقه بالدكاتره ويخاف على نفسه ويصير فيه احباط وتخليه حتى يكره ان يروح المستشفى, وبهالحاله اضطر انا اني اطق تذكرتي واروح اسافر علاج بالخار ج بسبب الاخطاء الطبيه

Quote in English after translated

Do you think that people experience with physiotherapy would affect your own experience with physiotherapy?

Yes, defiantly. If a person heard from a friend or family member about their bad experience with physiotherapy, like receiving wrong diagnosis or painful treatment, that person would loss the confident and trust in physiotherapy and health care services, feeling scared of having a bad diagnosis too or wrong treatment. In that situation, I would feel

Quote in Arabic after 2nd translation

نعم بالتأكيد. اذا استمع المريض الى تجربة سيئه من صديق او قريب عن العلاج الطبيعي, مثلا انه تلقى علاج مؤلم او تشخيص خاطئو فان المريض سوف يفقد ثقته بالعلاج الطبيعي بشكل خاص و الخدمات الطبية بشكل عام. شخصيا, اذا تعرضت لمثل هذا الموقف فإنني سوف افقد ثقتي بالعلاج الطبيعي و قد ابحث عن علاج اكثر فعالية, مثلا العلاج بالخارج.

Study three: Example about the implementation of the framework analysis to develop study’s themes

Phase one is the familiarization phase, in which the researchers try familiarise themselves with

In the second phase, the general themes and subthemes are identified such as: *Patient demographic*

The third and fourth phases involve indexing and charting the data into the correspondent theme then provided with unique code. Example on the right box

Theme: Patient demographic characteristics beliefs

Subtheme: Patient’s beliefs about the aging and back pain:

-I think that on of back pain main reason is ageing. When people become older their bone become weaker especially the spine because we depend a lot on the spine and this will cause back pain ([redacted] 9: 25).

- In my opinion, back pain for old people only. Like you never hear young man complaining of back pain unless her was involved in a severe trauma like car accident ([redacted] 11: 25).

- May be because when we get old, we start to lose muscle or because old people don’t exercise or don’t move in a good way, which make back pain very common among old people ([redacted] 1: 38).

- Why I think I have pain in my back? I think I’m getting old.. I mean I might be still in my twenties but my body and my spine behave like 60 years old man ([redacted] 2: 62)

- When you get older, it is difficult to change your habits. That’s why old people always complaining from their back, because can’t change the wrong habits like sitting for long time and not moving which usually cause pain ([redacted] 2: 71).

The doctor told me you are young; I shouldn’t get back pain in my age. I mean he was surprised that im complaining from my back and im still young. So I guess im getting old! I don’t know but why he was shocked and relate my apin with the age? ([redacted] 7: 7)

Subtheme: Patient’s beliefs about the genders and back pain:

I think men are stronger than female, you know scientifically that male can tolerate more pain and effort than female, so I think females are suffering more when they have back pain. ([redacted] 1: 36)

- being a female makes difficult to be treated, especially being touched by a male therapist. That’s why I prefer to be treated by a female therapist. Adding to that, I thonk I female doctor or therapist could understand me more ([redacted] 1: 86).

- pain is pain, no matter what was your sex. No difference between male and female when it comes to pain and illnesses. See, when you are pain free, you talk as much as you, you can say that you are strong and don’t care about the pain. but in reality, when start to have a pain attack, for example low back pain, your life will change ([redacted] 2: 64).

- I don’t know why they always saying that men are stronger than female? I’m a female but I can tolerate even sever pain!! I think it is a myth or cultural myth. we are sharing the same physiology, it is all a matter of experience ([redacted] 4: 13)

- Females are stronger than male in regard to pain tolerance, they can tolerate delivery pain. definitely back pain is not easy, but I think we as women are designed to tolerate even severer pain than men ([redacted] 4: 34).

- I think males have better mental and physical abilities than women, that’s why we can tolerate more pain a stay functional even with bad back pain. for example, some days I have back pain during my exam period, in spite of the pain, I can perform very well and have the abilities to distract my brain from the pain to focus on the exam ([redacted] 11: 29).

Appendix 13: Ethical approval for study three

From: Samitri Kumar [mailto:[redacted]] **Sent:** 05 November 2013 16:24 **To:** '[redacted]' **Subject:** Confirmation of self assessment form

Dear Dr beth Grunfeld,

Thank you for submitting a University Ethics Self Assessment Form (SAF) for your project entitled:

The role of illness beliefs on chronic back pain

This was received and logged by the Research Support Group and has been assigned reference number **ERN_13-1280**. On the basis of the SAF you have submitted **this SAF has been referred to the Governance Team to confirm Sponsorship or initiate the Sponsorship process.**

If you disagree with the assessment above (e.g. you have already submitted the required ethics applications, or your project falls under an existing ethical approval), or if the nature of your project changes during its course, please contact the Research Ethics Officer, Mrs Susan Cottam, at [redacted].

Please quote this reference number in any subsequent correspondence regarding any ethical review of this project, or to the Research Governance Officer in the event that the project is subject to review by the NHS National Research Ethics Service. You should also quote this reference number on a Request for Contract Services form if you require RSG to prepare or review any contracts arising from this project.

You may also quote this reference number to Research Finance staff as proof of ethical submission in respect of any grant or contract relating to this project.

Please note that the reference number relates to **this project ONLY**, and should not be transferred to any other project, nor should any further SAF be submitted for this project.

RSG Research Ethics Team

Appendix 14: Interview guiding questions for study three

Interview guiding question for study three (interviewer version)

1- Can you tell me about your back pain? (Onset date, mechanism, location, severity)
2- Do you understand your problem?
3- Do you think your daily activities would affect your pain?
4- Are there any cultural beliefs or behaviours you think they may affect your back pain or make it worse?
5- Can you specify the cultural beliefs that would make your pain worse?
6- Have you tried to turn or change these beliefs into positive? Why?
7- Do you think that your job (or life style) has an influence on your back pain? How?
8- Do you experience any stress? Does it affect your pain?
9- If your treatment requires you to change or adopt a new habit, such not sitting on the floor any more or not crossing your leg while sitting, would you accept that?
10- Do you wish to change? Why?
11- Does your job influence your pain? Your working atmosphere? Your colleague? Your boss (understanding your pain, allowing you to go to your appointments)
12- Do you think that you can beat the pain if you want?
13- In general, do you think that there is a difference in pain perception between male and female? And do you think that you have been affected by this difference?
14- What about the environment when you've been raised does it has any influence on your pain? Your family, culture perception on pain?
15- Do you think that pain intensity would be affected by the physiological differences (Male vs female)?
16- Does that mean that all female would suffer more?
17- If you were younger/older, do you think that you would deal with your pain in different way?
18- If you were living in different environment or culture, do you think that your pain intensity and your believes would be influenced by this change?
19- Do you think that you have received the appropriate treatment? Are you satisfied?

With your situation, what is more important; pain reduction or improving functional abilities?

Appendix 15: Study four consent four

UNIVERSITY OF
BIRMINGHAM

A qualitative exploration of Kuwaiti physiotherapist's beliefs about chronic back pain and its causes

Consent Form for Participants

- I have read and understood the information sheet for the above study and have been given the opportunity to ask questions.

- I understand that my participation is voluntary and that I am free to withdraw from the without having to give any reason and without me being affected or this having any negative consequences on my circumstances.

- I agree to provide information that will be used for research purposes only, and understand that all the information relating to myself obtained as part of the study will be strictly confidential, and that I will not be personally identified in any write-up of the results.

- I understand that information will be stored in secured manual and electronic files and is subject to the provisions of the Data Protection Act.

- I consent to being audio taped for the purpose of transcription and data collection in this interview.

- I wish to participate in this study under the conditions set out here and in the Information Sheet for Participants.

Signed:____

Printed Name:____________________________________

Date:____

Thank you very much for agreeing to participate in this study!

Participants details		
Gender	Male	Female
Age		
Job title		
Education level	Higher education	Post-graduate
Years of experience		

Interview Guide for study four

Thank you for agreeing to take part in this interview. This research is undertaking to gain more understanding about the effect of cultural beliefs on your pain behaviour and attitude.

Interview guiding question:

1 - what are the common aggravating Factors?

2- what are the common aggravating Activities?

3- what are the affects of patient beliefs on the pain?

4- what are the affects of patient beliefs on the treatment?

5- what are the affects of cultural beliefs on the pain and treatment?

6- what are the affects of patient stress on the pain and treatment?

7- what are the affects of therapist belief on the treatment?

8- what are the affects of therapist stress on the treatment?

9- what do you expect from the patient?

10- does the facilities affect your conduction of the treatment? What do you think about facilities around you?

11- therapist experience and its effect on the treatment

12- do you think that CBT must be included in the treatment plan treatment?

13- do you think that therapist must learn CBT so they can provide it to the patients?

14- do you think that your gender influence the effectiveness of the treatment?

15- what are the behavioural factors that aggravate your patient's pain?

16- do they affect your treatment?

17- what are the cognitive factors that aggravate your patient's pain?

18- do they affect your treatment?

19- do you that their pain would affect their mood? Feelings? Behaviour?

20 do their mood; behaviour or feelings affect the pain?

21- does your treatment affected by your patient psychological problem?

22- what type of treatment you prefer to give for your patients? Why?

23- what are the advices and recommendation you would provide your patients with?

24- does your patient follow them? How do you evaluate patient's adherence to the treatment? Why?

25- what do you know about behavioural therapy? Do you think it is effective?

26- what do you know about cognitive therapy? Do you think it is effective?

27- do you think it is important to include CBT in the treatment program?

28- are you confident enough to deliver CBT if you received the appropriate training?

29- what does physiotherapists need in Kuwait in order to improve their skills?

*These questions will used to guide the interview, there will be other questions depending on the answers and the needed to find more especially if the patient raise interesting point or new point.

Thank you for taking part in the interview and for sparing your time.

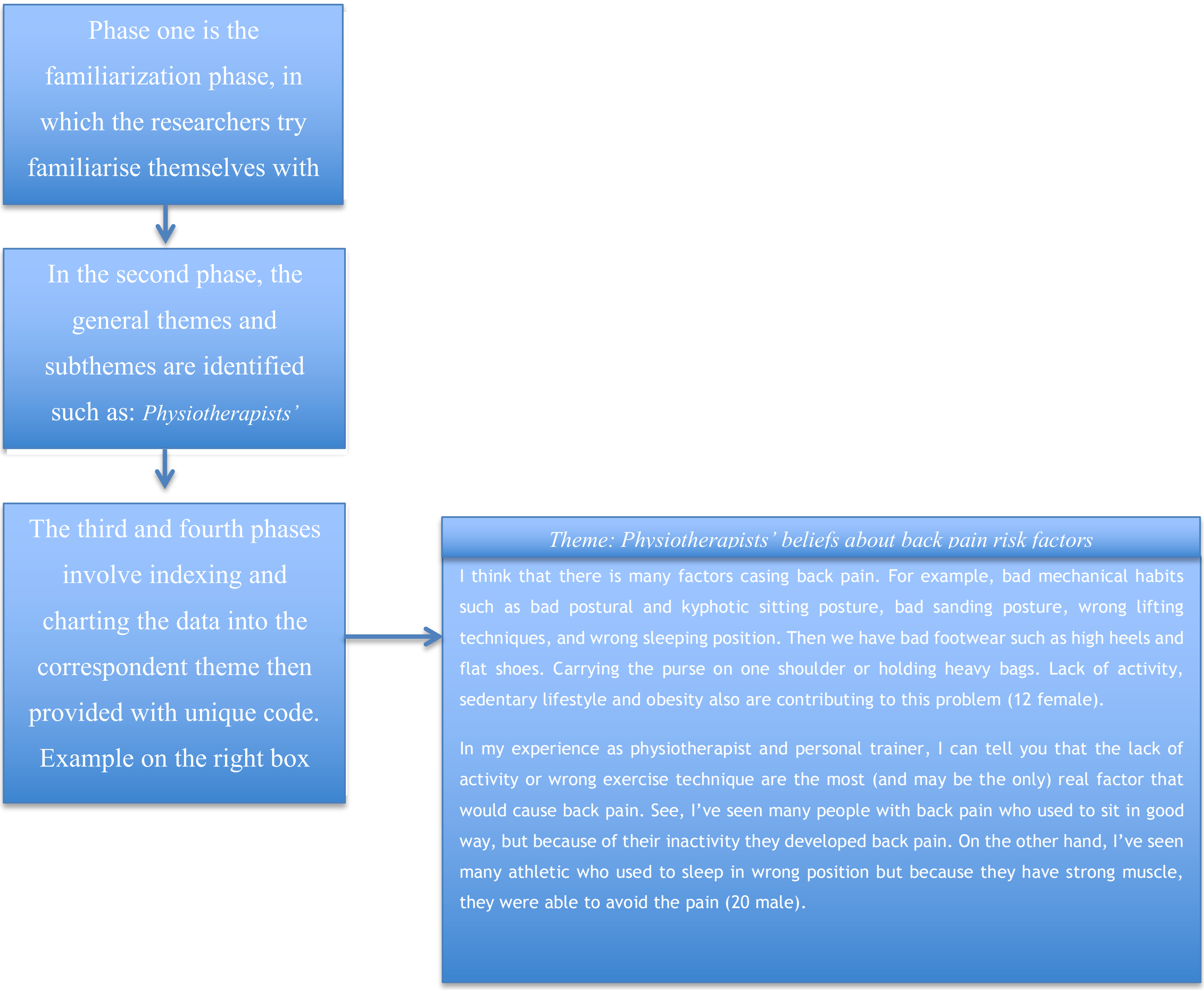
Do you have any questions?

Appendix 16: Study 4 information sheet

UNIVERSITY OF BIRMINGHAM	
Information Sheet for Participants	
Study title	The effects of therapist beliefs, knowledge and experience on patients' pain and treatment in back pain patients in Kuwait
Introduction	You are being invited to take part in the present study. Please take the time to read through the following information. Ask the relevant person who provided you with the information sheet if you have any questions or would like more information.
What is the purpose of the study?	The purpose of the present study is to explore the influence of therapist's beliefs on the pain behaviours and attitudes of patients with chronic back pain, and its influence on the healing process. The interview will be audio taped to ensure clarity of data collection and transcription.
Why have I been chosen?	You have been chosen to participate in this study because you have been identified as a potential respondent for the study.
Do I have to take part?	It is entirely up to you whether you decide to take part in the present study or not. If you decide to take part, you will be given this information sheet to keep and a meeting in the form of an interview will be arranged for you.
What happens if I take part?	You will be asked to take part in an interview lasting 45 to 60 minutes (or less). During the interview we will ask you questions about your experience with the back pain patients, your beliefs about the effects of beliefs, behaviour and cognitive of the therapist on the pain and on the treatment process. Also we would like to know about the effect of cognitive and behavioural therapy on the pain. We would record the interview (as it is not possible to write everything down) and later transcribe this into written format. We do this so that we can analyse the data. You can choose to withdraw from the study at any time after taking part by contacting the researcher. Withdrawing from the study will not affect you or have any negative consequences on your circumstances.
What happens to my information?	All information that is obtained from the interview will be uploaded onto a password-protected computer for use of transcribing. Only the research team will have access to these materials. This information will then be entered into a computer database, where your information will be assigned a number. The information in the database, as well as all study material (i.e., audio files), will be identified by numbers, and can therefore not be traced back to you or anyone else. Once the audio files are transcribed all digital copied and original files will be deleted. Your name will only appear on your consent form, and the researcher will be the only person who has access to a list linking your name with your number. All study material, will be kept in a locked

<table>
<tr><td></td><td colspan="2">filing cabinet at the University of Birmingham.</td></tr>
<tr><td>Will my taking part in this study be kept confidential?</td><td colspan="2">All information that is obtained during the course of the study will be kept strictly confidential. No identifiable information will be included in any publication using the data of this study.</td></tr>
<tr><td>What will happen to the results of the study?</td><td colspan="2">The results of the study will be analysed by the research team to identify The effects of therapist beliefs, knowledge and experience on patients pain and treatment in back pain patients in Kuwait. The results may be presented at a conference or published in an academic journal. Please note that no identifiable information will be released in any write-up of the results. If you choose to participate in the study and would like to receive a copy of the results or final paper you may state this at the start of the interview and a copy of the results will be sent to you via the contact information you provide.</td></tr>
<tr><td colspan="3">Please contact Aly Alatar with any questions you may have.</td></tr>
<tr><td>Aly Alatar
PhD Researcher
School of Psychology
University of Birmingham
Edgbaston, Birmingham
B15 2TT
[redacted]</td><td>Dr. Beth Grunfeld
Senior Lecturer/Research Supervisor
School of Psychology
University of Birmingham
Birmingham B15 2TT
[redacted]
[redacted]</td><td>For Kuwait contact:
Aly Alatar
Al-Amiri General Hospital
Physiotherapy Department
Sharq
[redacted]
[redacted]</td></tr>
</table>

Appendix 17: Example about the implementation of the framework analysis to develop study's themes in study four:



Phase one is the familiarization phase, in which the researchers try familiarise themselves with

In the second phase, the general themes and subthemes are identified such as: *Physiotherapists'*

The third and fourth phases involve indexing and charting the data into the correspondent theme then provided with unique code. Example on the right box

Theme: Physiotherapists' beliefs about back pain risk factors

I think that there is many factors casing back pain. For example, bad mechanical habits such as bad postural and kyphotic sitting posture, bad sanding posture, wrong lifting techniques, and wrong sleeping position. Then we have bad footwear such as high heels and flat shoes. Carrying the purse on one shoulder or holding heavy bags. Lack of activity, sedentary lifestyle and obesity also are contributing to this problem (12 female).

In my experience as physiotherapist and personal trainer, I can tell you that the lack of activity or wrong exercise technique are the most (and may be the only) real factor that would cause back pain. See, I've seen many people with back pain who used to sit in good way, but because of their inactivity they developed back pain. On the other hand, I've seen many athletic who used to sleep in wrong position but because they have strong muscle, they were able to avoid the pain (20 male).

Appendix 18: Interview guiding question for study four

Interview guiding question for study four (interviewer version)

This is open questions questionnaire aims to discover physiotherapist beliefs on chronic back pain in Kuwait. There is NO right or wrong here. Just put the answers that reflect your own beliefs and thoughts

- Years of experience as physiotherapist?
- What are the common aggravating back pain factors and activities in Kuwait (including habits and hobbies)?
- What are the affects of patient knowledge, experience and background on the back pain and the treatment success?
- What are the affects of cultural beliefs and behavior on the pain and treatment success?
- What are the affects of patient stress on the pain and treatment success?
- What are the affects of therapist knowledge, experiences and beliefs on the treatment success?
- What are the affects of therapist stress on the treatment success?
- What do you expect from the patient with back pain in Kuwait?
- What do you know about cognitive behavioral therapy (CBT)?
- Do you think that CBT must be included in the treatment plan?
- Do you think that physiotherapist must learn CBT so they can provide it to the patients?
- Do you think that your gender influence the effectiveness of the treatment?
- Which gender you prefer to treat? Why?
- Which age group you prefer to treat? Why?
- Do you that patient pain would affect their mood? Feelings? Behaviour?
- Do their mood; behaviour or feelings affect the pain?
- What are the advices and recommendation you would provide your patients with?
- Why does the patient ignore your instruction? (Factors affecting patient adherence)
- Are you confident enough to deliver CBT if you received the appropriate training?
- What does physiotherapists need in Kuwait in order to improve their skills?

Appendix 19A: ethical approval for study four

From: Aer-Ethics
Sent: 05 November 2014 12:05
To: Aly Alatar
Cc: Elizabeth Grunfeld
Subject: RE: ethical form

Dear Aly

Many thanks for this application, which has been assigned, reference **ERN_14-1253.**

The ethics review is likely to take approximately 4-6 working weeks. If this will cause you any problems, please let me know.

Kindest regards

Sam

Samitri Kumar

Research Governance & Ethics Administrator
Research Support Group

Finance Office

Aston Webb, B Block

Edgbaston, Birmingham

B15 2TT

Tel: [redacted]
Email: [redacted]

Web: www.birmingham.ac.uk/researchsupportgroup

Remember to submit a new Self-Assessment Form **for each project!**

Please click Ethical Review Process for further details regarding the University's Ethical Review process, or email [redacted] with any queries

Please click Research Governance for further details regarding the University's Research Governance and Clinical Trials Insurance processes, or email [redacted] with any queries

The contents of this email may be privileged and are confidential. It may not be disclosed to or used by anyone other than the addressee, nor copied in any way. If received in error please notify the sender and then delete it from your system. Should you communicate with me by email, you consent to The University of Birmingham monitoring and reading any such correspondence

Appendix 19B: Hospital permission letter for study four

UNIVERSITY OF
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Dear Sir/Madam,,

Aly Alatar, PhD candidate at University of Birmingham, would like to ask for permission to allow him to conduct a research in your department. We know that your staff (Physiotherapists) will be of help for our study and we will be grateful if you will permit us to do so. Hoping for your kind consideration.

The aim of the study is to explore the effects of therapist's beliefs, knowledge, and experience on the pain and the treatment in patients with chronic back pain.

The researcher is going to perform face-to-face, 45 minutes interview with those who wish to participate. The findings, then, will be analysed and used to develop better understanding about chronic back pain in Kuwait. Our big aim of the research is to develop a rehabilitation protocol for the management of chronic back pain that is suitable to Kuwaiti society.

The researcher will ensure that the interview will not disturb the work or affect the patients.

Respectfully Yours,
Aly Alattar

*Attachment 1: information sheet

*Attachment 2: consent form.

*Attachment 3: interview questions