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The Perceived Effectiveness of Brief Psychological Techniques for Acute Postoperative Pain

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The Perceived Effectiveness of Brief Psychological Techniques for Acute Postoperative Pain

By

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Author declaration

At no time during the registration for the degree of Doctor of Philosophy has the author been registered for any other University award without prior agreement of the Doctoral College Quality Sub-Committee.

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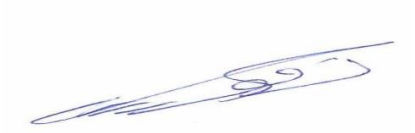

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Abbreviations appeared in the Thesis

BPI: Brief psychological interventions.

HCPs: Healthcare professionals.

APS: The American Pain Society

SA: Saudi Arabia

VAS: Visual Analogue Scale

NRS: Numerical Rating Scale

TKR: Total knee replacement

TNA: Total Knee Arthroplasty

THR: Total Hip Replacement

THA: Total Hip Arthroplasty

BMQ: Beliefs about Medicine Questionnaire.

PHQ-9: Patients' Health Questionnaire.

GAD7: General Anxiety disorder brief questionnaire.

BPI: Brief Pain Inventory.

IPA: Interpretative Phenomenological Analysis

TA: Thematic Analysis

OTC: Over-the-Counter

Abstract

Postoperative pain is still a challenge and patients are still suffering from postoperative pain, despite the administration of multiple analgesic methods for treating pain. In a systematic review and meta-analysis I found that brief psychological interventions such as relaxation techniques including simple breathing exercises or guided imagery, and simple distraction techniques such as listening to music, or practicing a script of self-hypnosis may help those patients to cope better with their pain. Although quality of these studies was not always of the highest level, the findings synthesized from 30 randomised controlled trials indicated that brief psychological interventions did reduce postoperative pain and anxiety 24 hours after surgery, and it was therefore surprising that these simple psychological interventions were not more widely adopted in clinical practice. I explored the perspectives of patients undergoing surgery, and healthcare practitioners involved in postoperative care. Interview data revealed a number of factors which may motivate patients and practitioners to adopt these interventions, as well as barriers to their wider use. Interviews conducted in both the UK and Saudi Arabia facilitated cross-cultural comparisons of patients' and HCPs' attitudes towards these brief psychological interventions. Most respondents expressed favourable opinions towards BPI: These opinions were often linked to concerns relating to painkillers, including side effects, tolerance, or dependence. Many patients reported spontaneous practice of non-drug interventions spontaneously to cope with their pain. However, interviews with patients revealed numerous barriers to the delivery of BPI in mainstream clinical practice: Lack of knowledge and expertise among HCPs, stigma associated with psychological treatments, and low self-efficacy. HCPs' were likewise positive towards the use of BPI in principle, but highlighted a perceived lack of the scientific evidence and lack of time and resources as the primary barrier to wider adoption.

These findings form an important foundation for the design, evaluation and dissemination of future BPI's for postoperative pain relief. Better understanding of perceived barriers to use will inform the structure and presentation of future BPI packages, and may motivate additional evaluation studies, using structured, well-documented interventions that are designed for ease of dissemination. Initial work in the final chapter suggests that new BPI packages, designed with these barriers in mind, may be successful in overcoming patient objections and prove more practical than previous intervention packages in real-world use.

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Overview of the Thesis

Post-operative pain management remains a challenge. Many patients continue to experience acute postoperative pain despite the many improvements made to multimodal analgesic techniques for relieving acute post-operative pain (Gan, Habib, Miller, White & Apfelbaum, 2014; Rawal, 2016). Inadequate post-operative pain management can have significant consequences for patients' health and quality of life (QoL) (Glowacki, 2015; Strassels et al., 2004). Furthermore, it can increase the risk of chronic pain (Joshi & Ogunnaike, 2005; Sinatra, 2010), thereby increasing the economic burden on the healthcare system. Consequently, implementation of cost-effective intervention for pain relief may be crucial in providing financial support for healthcare.

There can be various reasons for inadequate pain relief. Basically, physicians may prescribe an inadequate dose, patients may fail to adhere to the full dose prescribed or the analgesic itself may be insufficiently effective.

Several studies have highlighted potential barriers to the efficiency and the quality of pharmacological methods of post-operative pain relief in clinical practice. These include physicians' concerns about prescribing opiates (Bhamb et al., 2006; Wilson et al., 2013), and patients' fears and misinformation about treatment (Cogan et al., 2014; Lai et al., 2002). The risk of long-term opioid use (Chou et al., 2015) may increase the concerns of patients and physicians regarding the side effects of pharmacological analgesics which may result in poor surgical results in the long term and the short term.

In the multimodal analgesia strategy, various courses of analgesics and different locations of analgesic administration are utilised to provide enhanced pain relief with reduced analgesic-related side effects (Rosero & Joshi, 2014). However, a recent comprehensive review by Rawal (2016) emphasises the practical problems in achieving effective administration of multimodal analgesia. Opioids remain the backbone of post-operative pain treatment, despite the strong evidence of their disadvantages. Furthermore, despite the general acceptance of multimodal analgesic techniques, recent evidence suggests that implementation is inadequate (Rawal, 2016).

Rawal (2016) reports that opioids remain the mainstay of treatment for moderate to severe post-operative pain, despite the major disadvantages, including side effects and

reduced mobility, potentially impeding recovery, such as from joint replacement. Opioids remain the primary treatment because multimodal analgesia can be inconsistent in the analgesia level which can be achieved. This is also because effectiveness could depend on the administration context; moreover, current evidence for the effectiveness of multimodal analgesia emanates from many different analgesic modalities, using different doses and different drug combinations, thereby making decisive recommendations for specific clinical indications more difficult to formulate. This picture is further complicated by the introduction of new types of treatment; for example, those which have begun to replace epidural analgesia such as infiltrative techniques which are types of local analgesia-based alternatives that could be used alone or as a part of a treatment plan for post-operative pain (Rawal, 2016). There is also a complication as a result of the emergence of evidence for the role of psychological and information-based intervention in the effective management of acute pain (D. Gordon et al., 2005). Furthermore, this broader range of intervention appeared in the recent recommendations of the American Pain Society for post-operative pain management (APS; Chou et al., 2016), but with weak endorsements, particularly for the efficacy of psychological intervention.

Research into the effectiveness of brief psychological techniques for the relief of acute pain has been largely unrelated to the increasing interest in multimodal analgesia, but has nonetheless increased in both scope and quality during the past 20 years, underpinned by an increasingly firm understanding of the basic cortical structures responsible for, and cognitive influences on the experience of pain (Moseley & Butler, 2015).

Relaxation techniques have generally been extensively studied, and a systematic review of this evidence discovered that relaxation can be effective in the relief of pain across multiple pain conditions (Kwekkeboom & Gretarsdottir, 2006), although the studies included the review showed weakness in the methodology. The use of music as a distraction technique has also been found to be effective for the relief of intense pain, anxiety and medicine intake among surgical patients (Hole et al., 2015). Reviews of intervention, including hypnosis and related suggestion techniques of managing pain, also reported benefits for patients undergoing various medical procedures (Montgomery et al., 2002; Tefikow et al., 2013). Despite the effectiveness of brief psychological intervention in the context of acute pain, these studies did not report the effectiveness of such intervention on post-operative pain only. However, effectiveness has been assessed by synthesising research in a broad variety of acute pain conditions. Moreover, despite

clear overlaps in the theoretical rationale and practical implementation of many of these techniques, each has been investigated separately, thereby leading to difficulty in estimating the maximal potential of psychological intervention for post-operative pain.

Furthermore, research into the non-pharmacological management of acute post-operative pain has, to some extent, lagged when compared with research on the management of chronic or long-term pain conditions. Despite considerable development in our understanding of the neural and cognitive bases for pain (Moseley & Butler, 2015), insights have primarily been applied to the study of chronic pain (King et al., 2016; Hyland et al., 2016; Mansell et al., 2017), leading me to assume that less research has focused on the management of acute post-operative pain compared to the psychological research that has investigated the causes of and methods of relieving chronic pain or acute experimentally-generated pain. Consequently, the contribution of psychological interventions towards the relief of post-operative pain have been badly addressed in the guidelines and badly implemented in general practice. Moreover, it is inappropriate to apply results from studies of chronic pain management in the context of acute post-operative pain because of the major differences between chronic and acute pain such as the length of suffering, the intensity and the causes that trigger the pain, which could affect the management of each type of pain. For example, May (2008) reported that although there is some overlap in the areas of the brain which are activated by various pain conditions including phantom pain, chronic back pain, irritable bowel syndrome, fibromyalgia and two types of frequent headaches. Furthermore, changes in the 'grey matter' were observed among these pain syndromes which suggested that such changes may be caused by frequent exposure to nociceptive input among chronic pain sufferers. The researcher concluded that chronic pain may change the structure of the brain; therefore, the changes in the brain activations among chronic pain patients may enable chronic pain patients to respond to treatment differently from how acute pain patients respond.

Definitions

The thesis includes some terms that appeared frequently, such as acute pain and brief psychological intervention which may have different explanations; therefore, it should be explained and defined. Moreover, these definitions were linked to the context of this project.

Acute and Chronic Pain

While the complexity of pain experience and process are beyond the scope of this project, it would be helpful to provide a description of the basic terminology of pain in understanding this project's objective. Extended literature indicates the difference between acute and chronic pain. Chronic pain is generally defined by the International Association for the Study of Pain (IASP) as pain that has persisted beyond normal tissue healing time. It can be continuous or interrupted by a pain-free interval (British Medical Association, 2017). The guidelines used a three-month description of chronic pain to help in the treatment recommendation (The Faculty of Pain Medicine of the Royal Collage of Anaesthetists, 2015). The Faculty of Pain Medicine in the UK, (2015) describes acute pain as pain of recent onset, of limited duration and usually related to a pathological process, disease or injury. Although the faculty stated that post-operative pain is one type of acute pain, this type of pain can occur with trauma or episodes of acute illness. Furthermore, post-operative pain can be divided into acute pain and chronic pain. Acute pain is experienced immediately after surgery (up to seven days); pain which continues for over three months subsequent to surgery is regarded as being chronic pain (Gupta et al., 2010). This definition reflects the meaning of acute post-operative pain as applied in this project, which reflects the obvious description of acute pain.

Brief Intervention

The term 'brief', which occurs in this project, is common in the literature and was used to describe intervention in the field of psychology and healthcare. This intervention included patients suffering from various problems such as headache (Cathcart, et al., 2014) and burns (Haythornthwaite, Lawrence & Fauerbach, 2001). Furthermore, a brief intervention was conducted in a healthcare site to overcome communications' issues and barriers to pain management (M. Y. Smith, DuHamel, Egert & Winkel, 2010). In the literature on the topic of drinking or alcohol abuse, the term 'brief intervention' is described as a short and time-limited intervention of no longer that 30 minutes which needs no extensive training to be delivered. Therefore, it can be delivered by one of the treatment staff with or without self-help materials. The principal objectives of brief intervention should be motivational to participants to change their behaviour (Barry, 1999). In this PhD project, the description of brief intervention is relatively similar to that of Barry, which is a short and time-limited intervention. Furthermore, in my thesis,

brief intervention could deliver intervention by using self-help materials. I assumed that 'brief' would be a useful term to categorise intervention for numerous reasons. It is simply a convenient label that would help to identify intervention characterised as low intensity, which required less training and could be cost-effective. Some psychological intervention has been attempted to reduce pain such as CBT. However, these types of intervention appeared more complex and required more time and training to see the results of the intervention, which may be does not fit the nature of acute pain that comes in a very sharp intense moments. In the context of acute pain, the complexity of intervention or psychotherapy could be unnecessary. Moreover, simple intervention can be applied in the context of acute pain, which appears to be effective in reducing pain intensity. This will be explained in further detail in the next chapter.

Psychological Intervention

Psychological intervention has been applied in the area of pain management, particularly in healthcare settings for chronic pain. Cognitive Behavioural Therapy (CBT) is a common psychological intervention, whereas another new approach is Acceptance and Commitment Therapy (ACT). Despite the evidence of the effectiveness of these approaches, the work of this PhD project will focus on reviewing and exploring the effectiveness of simple psychological approaches in the process of delivering the techniques for acute post-operative pain management and to fit the nature of acute pain which is sharp and occurs while patients might be alone. Such techniques should require less effort or minimum involvement from treatment staff; therefore, these should be considered as self-help delivering techniques such as relaxation, guided imagery, self-hypnosis, music therapy and psychoeducation techniques. Relaxation includes various techniques such as progressive muscle relaxation, guided imagery, meditation/mindfulness, autogenic training and yoga (J. C. Smith, 2007). However, yoga does not fit the description of brief psychological intervention in this project because it involves physical stretching. Music therapy could be defined as the creative and professionally informed use of music in a therapeutic relationship with people who need physical, psychosocial or spiritual help in order to improve life satisfaction and quality (O'Callaghan, 1996). Hypnosis is described by the Society of Psychological Hypnosis as a state where people focus their attention away from their immediate realities or concerns including feelings, thoughts or imagery and focus on alterations such as feelings, thoughts, sensations perceptions and behaviour suggested by the

therapist to direct the person to imagine different situations that may occur in reality and could motivate changes (Elkins, Barabasz, Council, & Spiegel, 2015). Moreover, self-hypnosis could be practised by listening to a pre-audio records or by reading a script. Psychoeducational intervention in pain management is described as specific approaches that utilise psychological knowledge and advice as to how to provide basic knowledge about pain and how it operates in order to increase knowledge and reduce distress and any problems while dealing with pain. Furthermore, it involves informal activities which mainly attempt to change a patient's behaviour and enhance pain management (Linton, 2013).

The aforementioned psychological interventions would generally fit with the description of the brief psychological interventions that are included in this PhD project. These psychological interventions could help patients suffering from acute pain by distracting their attention from the pain experience and could stimulate their thoughts, emotions and behaviour to be more relaxed and comfortable during a painful experience. This means that other aspects of non-pharmacological interventions even if they have psychological aspects is are not in the scope of the interest of this project.

The aim of this thesis is to synthesise current evidence for the effectiveness of brief psychological intervention on acute post-operative pain among adult patients and to investigate the potential implementation of these techniques in primary care.

In view of this, the present report reviewed the existing evidence regarding the effectiveness of psychological techniques for reducing post-operative pain. The results of the included randomised clinical trials in the review (Chapter 3) indicate that these techniques effectively reduce post-operative pain, and may have significant implications for clinical practice. Psychological intervention may reduce drug-related burdens and may provide cost-effective pain-management methods which enhance the degree of control that patients experience over their care. These results consequently shaped the overall plan for the present PhD project.

The studies in chapters 4 to 6 of this project investigate the experiences, fears and preferences of non-clinical populations and post-operative patients regarding the use of such psychological techniques, and also explore the extent to which participants are willing to accept these techniques as a pain-relief strategy. Healthcare professionals' attitudes and beliefs about such techniques were also investigated in Chapter 7 in order

to determine whether the use of psychological techniques could be an efficient and potentially cost-effective method of pain management in clinical practice. Finally, a description of brief psychological intervention design was suggested in Chapter 8. This design was developed on the basis of the results from my qualitative data, further to conducting brief interviews with patients who had experienced surgical pain to refine the final shape or details of the proposed intervention.

Two major questions which guided the project followed the primary aim of thesis:

1. Are brief psychological techniques effective in the reduction of acute post-operative pain among adult patients?

   a) What do the results of previously randomised controlled trials tell us about the effectiveness of brief psychological intervention in the reduction of post-operative pain?

   b) What are the positive effects of brief psychological intervention on surgical outcomes?

   c) Are some types of psychological intervention more effective than others in this context?

   d) Do any factors have the potential to influence the effectiveness of brief psychological intervention; for example, age, gender, or the mode of delivery (audiotape vs. face-to-face, etc.) ?

2. What are the potential barriers to the delivery of brief psychological techniques to reduce acute post-operative pain in primary care?

   a) Is brief psychological intervention acceptable to members of the public as part of pain relief strategy?

   b) Is brief psychological intervention accepted by patients as part of pain relief strategies?

   d) Is brief psychological intervention accepted by healthcare professionals as a potential component of their overall pain-relief strategy?

   e) Do cultural differences between the UK and Saudi Arabia influence participants' views on brief psychological intervention?

f) What barriers do patients (during the pre-op, post-op, follow-up) and HCPs identify in the implementation of brief psychological intervention as a part of pain relief strategies in everyday practice?

The thesis contains nine chapters, the first of which provides a general introduction of the thesis on related issues of pain management. This is followed by a methodology chapter which demonstrates and evaluates the research within the appropriate research paradigms. Chapter 3 summarises the methods and results of the systematic review of the relevant literature of randomised controlled clinical trials of psychological techniques as adjunctive post-operative pain relief. Chapters 4 and 5 explore the attitudes, experiences and beliefs of non-clinical members of the public who have suffered from various painful experiences. Chapter 6 examines the attitudes of post-operative patients and potential barriers to the use of BPIs from their perspective. Chapter 7 explores the views and attitudes of healthcare professionals (HCPs) towards brief psychological intervention including potential barriers to the implementation of these techniques in everyday clinical practice. Chapter 8 documents an initial design of a BPI based on the proceeding qualitative work and the responses of a small population of potential patients to this work. The final chapter concludes the thesis and summarises the main outcomes of the PhD.

This research may contribute to the improvement of post-operative pain management, the effective design and evaluation of BPI's and their wider adoption in clinical practice. In conformity with the growing body of research that has confirmed post-operative pain to be managed inadequately, this project has a potential application in pain management programmes.

The effectiveness of brief psychological interventions may contribute to improved post-operative pain, distress and related outcomes including medication intake and the duration of hospital stays. By investigating patients' preferences towards pain relief and exploring healthcare acceptance to brief psychological techniques, the work provides an insight into the potential barriers that could affect the delivery of these strategies. Moreover, this research could lead to practical implications for both patients and healthcare professionals in supporting the self-management of pain.

Mixed methods are used in offering a pragmatic opportunity for greater understanding of the reality from the perspective of participants, such methods being common in social sciences research (O'Cathain et al., 2007). This project was dependent on triangulation

design that allow collecting and comparing same data by applying different methodologies approaches to gain a rich and detailed account from participants of their experiences of pain and possible options for pain relief. Consequently, this approach would provide primary data, enabling subsequent development in the research field.

I have outlined the extent of the research problem and the way in which this project addresses some research questions which required answers. In order to investigate these questions and to explore the effectiveness of brief psychological intervention, the next chapter begins by outlining the extent of the effectiveness of brief psychological intervention in the context of acute post-operative pain among adult patients.

Chapter 1 – The Literature Review

Introduction to Post-operative Pain Management

Substantial effort and investment is directed at improving analgesic pain management techniques, such as the administration of the pre-emptive approach including pre-operative nonsteroidal anti-inflammatory drugs, anticonvulsants and anxiolytics. This includes the administration of intra-operative treatment such as neuraxial analgesia, continuous local anaesthetic wound infusion, transversus abdominis plane block, epidural morphine and intravenous acetaminophen or ketamine. Furthermore, this involves the administration of post-surgical pain relief, including patient controlled analgesia PCA, opioid formulations (morphine-oxycodone) and other new drugs such as tapentadol (Argoff, 2014). Despite all these substantial efforts, such as the development of new drugs, surgical patients often experience acute post-operative pain. Management of this pain remains a complex medical challenge. In the United States, 80 percent of the 73 million patients who undergo surgical procedures each year experience acute post-operative pain and about 20 of these experience severe pain based on categorised scales (verbal categorical scales) (Hutchison, 2007). A recent survey of 300 different surgical participants discovered that 86 percent of the patients experienced pain subsequent to surgery, 75 percent experienced moderate to extreme pain immediately after surgery, and 74 percent still experienced this intense level of pain after their discharge from hospital. However, in their study, researchers did not provide any category of the type of surgery which could limit for the research (Gan et al., 2014). In a related study, Sommer et al. (2010) followed 1490 patients undergoing different types of surgery categorised on the basis of anatomic site (the location of the procedure, ranging from head and neck surgery to lower extremity surgery such as knee replacement, spinal cord, bowel surgeries.) as to whether these types of surgery are minor or major procedures. It was discovered in this study that, in the assessment of pain from the pre-operative to four days subsequent to surgery, about 40 percent of patients had an average pain score of ≥ 40 mm on 100 mm in the visual analogue scale (VAS) in the day before surgery. Of these, 15 percent still experienced moderate to severe pain (41 to 100 mm on VAS) four days after surgery (Sommer et al., 2010). According to Jensen's et al. (2003) clinical trials which interpreted

the meaning of VAS pain intensity, 100 mm VAS ratings of 0 to 4 mm can be considered no pain; 5 to 44 mm is mild pain; 45 to 74 mm is moderate pain and 75 to 100 is severe pain.

Previous studies showed that inadequate pain management can cause harmful physiological and psychological consequences that could be a financial burden to the healthcare system (Joshi & Ogunnaike, 2005; Sinatra, 2010). Unrelieved post-operative pain has been reported as impairing various aspects of patients' health and delaying discharge from the hospital. It could also involve increasing the likelihood of readmission, delaying patients' return to their daily activities, reducing the ability to participate in rehabilitation programmes, but increasing negative feelings, such as anger, anxiety and depression, and reducing overall satisfaction with the treatment (Joshi & Ogunnaike, 2005). Bad management of acute post-operative pain has been shown to lead to potential reductions in the quality of life (QoL) and physical functions and to greater sleep impairment (Sinatra, 2010). The impact of acute post-operative pain on QoL has been explored in a number of studies. In a prospective study, Wu et al. (2003) assessed the effect of pain severity within the two weeks immediately following surgery, on patients' health-related quality of life (HRQL). In the following results, Short Form (SF)-12, visual analogue scores for pain at rest and during activity, nausea and itching were measured at different points after surgery (one, five, seven and fourteen days) in patients undergoing elective total knee or hip replacement. The results showed that the severity of pain was correlated with a reduction in the physical and mental components of HRQL, whereas nausea was correlated with a reduction in the mental component only in HRQL. Similarly, Strassels et al. (2004) assessed pain and health-related QoL in the fourth week after discharge among patients who underwent either total hip or knee replacement or radical prostatectomy which is an operation to remove the prostate gland and tissue surrounding it. Pain and health-related QoL scores were compared with US norms. In each group, numerous outcomes were substantially worse than they were among the reference population, including pain, physical functioning and social functioning. The results showed that acute post-operative pain significantly impaired the ability of the patients to perform their desired activities such as sleeping or performing sexual functions. It would be interesting to see how Strasseles's study compares with the scores of post-operative pain and QoL between the study groups.

Despite the availability of effective analgesic pain relief techniques, over 80 percent of surgical patients experience moderate to severe post-operative pain. Unmanaged pain

adds to the economic burden of the healthcare system by extending recovery time and the length of hospital stays (Hutchison, 2007; Shang & Gan, 2003). A computerised search of an admission, discharge and transfer database was conducted, and it was discovered that 20,817 patients who underwent many different types of same-day surgery were identified. This search reported that pain was the most common reason why patients returned to hospital. Such returns, which cost US$1,869 per visit in this study, occurred in more than one third (38 percent) of the research participants (Coley, Williams, DaPos, Chen, & Smith, 2002). However, the study by Coley et al. neither specified nor explained why pain was indicated as the main reason for hospital readmission.

Moreover, it has been suggested in different reviews and epidemiological studies that acute post-operative pain is a predictor of chronic pain (Joshi & Ogunnaike, 2005; Sinatra, 2010). Visser (2006) summarised several predictors in his observational research of patients in clinical settings that may be responsible for the prevalence of chronic pain. Research discovered that these predictors included moderate to severe pre- and post-operative pain as a risk factor for high incidences of chronic pain following various types of surgery. Although not all post-operative pain leads to chronic pain, various clinical studies have emphasised that adequate post-operative pain relief or decreased severity of acute post-operative pain might reduce the risk of post-operative pain evolving into chronic pain months or years after surgery. Kairaluoma et al. (2006) demonstrated that the use of a pre-operative pre-incisional paravertebral block (PVB), which is a medical technique involving an injection of local anaesthetic in a particular place around the spinal cord to provide pain relief, in combination with the post-operative administration of an opioid can reduce acute post-operative pain and decrease the prevalence and severity of chronic pain for at least one year after breast cancer surgery. Kairaluoma et al. (2006) believed that the pre-operative administration of suitable analgesics, such as pre-incisional PVB) with this type of cancer surgery could have a positive effect on the surgery's outcome. Although this study measured six aspects of mood: depression, fatigue, anxiety, vigour, hospitality and confusion in both groups, the scores of these outcomes showed no difference between groups. A different study by Morrison et al. (2009), showed that a multi-component intervention, which included physical therapy and physician protocols for standing analgesia and pre-emptive analgesia, was used (Morrison et al., 2009). Pain level and physical function were measured in 249 patients who had undergone orthopaedic surgery at different follow-up times ranging from one

week up to six months. It was found that when compared to the control group during the seven days of rehabilitation, the intervention group showed significant improvements in walking speed, reported shorter lengths of stay and did not report experiencing any mild pain. At the six-month follow-up, patients in the intervention group were less likely to take analgesic medications, less likely to report moderate to severe pain and did not experience pain that hindered walking compared to the control group (Morrison et al., 2009). Despite these findings, which indicate an association between reduction of acute post-operative pain and occurrence of chronic pain, it should be noted that some studies have failed to find such an association. For example, in a study of 86 patients undergoing thoracotomy under general anaesthesia, pre-operative administration of ketamine improved immediate post-operative pain but did not reduce neuropathic pain or analgesic intake four months after surgery (Dualé et al., 2009). Therefore, further investigation is required in order to discover more mechanisms that could help to control acute post-operative pain and prevent chronic pain.

Pharmacological Treatment to Manage Acute Postoperative Pain is not enough

Most patients expect to experience some pain after surgery, and painkillers are prescribed for their post-operative pain relief. There are different types of over-the-counter painkillers which varied in their effectiveness in post-operative pain management. Furthermore, prescribed painkillers required investigation in order to identify which of them would be more effective in relieving pain, and which are the most likely to have the least adverse effects, which are yet to be explored. A group of researchers conducted a review that investigated 39 Cochrane reviews of oral painkillers which included about 50,000 people in 450 studies to assess the effectiveness of the most common oral analgesics for acute post-operative pain (Moore, Derry, Aldington, & Wiffen, 2015). These researchers found high-quality information on the effectiveness of 53 pairs of drugs and doses in painful post-surgical procedures. These included various fixed dose combinations and fast-acting formulations of some analgesics such as: ibuprofen 200 mg plus, paracetamol 500 mg, ibuprofen 200 mg plus caffeine 100 mg, ibuprofen 200 mg in fast-acting formulation and diclofenac potassium 50 mg in fast acting, all of which are effective in reducing pain. The researcher also found that the evidence for some medicines, included the reviews, is unreliable or lacking, a fact which should be emphasised. The length of time for which pain was relieved was reported, and the

effectiveness of the medicines was assessed by the number of patients who received at least half of the maximum possible pain relief, compared with placebo, which was expressed as the 'number needed to treat' (NNT). The NNT is an estimation of how many people need to have the treatment for one person in order to have a good outcome; the lower the NNT, the more effective the painkillers is considered to be (Moore et al., 2015). Although the review provided evidence for the effectiveness of some drugs and doses, researchers concluded that the most effective drugs have failed to produce a high level of pain relief to some of the participants, where more than half of the participants were treated in many cases. The main implication from the review by Moore et al. (2105) for patients with acute post-operative pain, the knowledge is that there are other types of techniques that may help to manage their pain together with medicines such as brief psychological techniques. Furthermore, the principal for healthcare professionals is that exclusive dependence on effective painkillers to provide a good post-operative pain relief for their patients is no longer the best solution to provide the best care for such patients.

A Cochrane overview (review of reviews) was conducted by Moore, Wiffen et al. (2015) in order to establish the efficacy of over-the-counter (OTC) painkillers which can be bought without prescription, in reliving moderate to severe acute pain. The review highlighted a list of OTC medicines which are available in the UK, USA, Canada and Australia. Researchers identified 10 systematic reviews and the data were analysed. The number of participants in each study varied over a range of 200 to 5000 with a total of 21 different painkillers including: Aspirin, Ibuprofen, paracetamol, Naproxen, Diclofenac potassium and Dexketoprofen in various doses, combinations and formulations which were identified and evaluated. The findings revealed that ibuprofen/paracetamol combinations in 400/1000 and 200/500 mg doses were at the top of the list for relieving acute pain with a success rate of almost 70 percent. Fast-acting ibuprofen (200mg and 400mg) was effective with a success rates of at least 50 percent, and paracetamol 500mg was helpful with success rates of 40 percent (Moore, Wiffen, et al., 2015). Furthermore, Moore, Wiffen, et al.'s review emphasised the adverse effects of painkillers when compared with the placebo effects which participants experienced when taking OTC medicines. Findings did not show any significant difference in the side effects between ibuprofen plus paracetamol compared to the placebo effects. These findings could provide some indications such as these painkillers that are apparently safe to consume for pain relief. However, the review data indicated that the more days patients consume

painkillers, the risk of the having side effects would increase. Furthermore, the monitoring of OTC painkillers consumption could be of concern regarding the extent to which the consumption of these painkillers (without prescription) is safe without and how they should be monitored, particularly with the absence of any record of the consumed painkillers and without the input of healthcare providers would a serious health issue (Bond & Hannaford, 2003). Moreover, Moore, Wiffen, et al.'s findings, retrieved from different studies, investigated acute pain experience generally and did not specify post-operative pain exclusively. Therefore, it is necessary to ask if the findings of the effectiveness of painkillers would remain the same or continue to be effective if the studies of other acute pain experiences separated from the studies that explored the effectiveness of painkillers on post-operative pain only.

Comprehensive clinical research on pain management has drawn attention to exploring and improving methods that will give adequate help in managing acute post-operative pain and in achieving patient satisfaction. Some researchers have suggested that a multimodal analgesic technique would be a good option for post-operative pain management (Buvanendran & Kroin, 2009; Skinner, 2004). Skinner (2004) concluded that a combination of analgesic techniques such as opioids, non-steroidal anti-inflammatory drugs and bupivacaine could provide adequate pain relief to patients who simply underwent arthroplasty surgery. Reduced pain would then decrease the length of hospital stay and medical complications as well as increasing patient satisfaction. However, other studies have found that even when analgesic techniques (medications) are used, post-operative pain management remains insufficient and patients still frequently suffer from post-operative pain.

A national survey by Apfelbaum et al. (2003) assessed US patients' satisfaction with their pain medication, patients' pain severity after different types of surgery and patients' perception of post-surgery techniques and medications. Examples of this are whether patients were concerned with post-operative pain prior to surgery, whether they thought that surgery would improve their condition, whether they received pain medication before or after discharge, whether they experienced adverse effects from such medications and what their attitude was regarding pain and pain medication. The survey found that although most of the 250 patients were satisfied with their treatment, and measurement pain using verbal categorical scales revealed that 86 percent of them experienced moderate to severe pain within two weeks after surgery, and that 58 percent of the patients experienced pain prior to discharge. Furthermore, 75 percent of patients

reported that their pain increased two weeks after discharge. Additionally, 25 percent of patients experienced adverse effects such as drowsiness, nausea, constipation, sleeplessness, vomiting, abdominal discomfort, itchiness, mood changes and difficult urination. Correll et al. (2014) argued that despite advancements in analgesic techniques between 1993 and 2012 and the widespread use of different techniques and drugs (e.g. epidural analgesia, patient-controlled analgesia, nerve block, multimodal analgesia for the treatment of acute pain), an improvement in acute pain management has not been reported; therefore, existing techniques remain inadequate.

It should be noted that these findings do not indicate that patients should stop using medications. Substantial evidence shows that these medications are effective and provide substantial benefits to patients when compared with a placebo as presented at the beginning of this section. However, the fact remains that variation in effectiveness between individuals and other factors, including imperfect prescription or adherence, may limit the total effectiveness, and mean that some pain is under-treated or not treated at all. In such cases, adjunctive interventions may have a role. It may be the specific case that psychological treatment could supplement existing pharmacological post-operative pain relief for a number of reasons. The influence of psychological factors in pain modulation (a top-down process) is that psychological factors could have a similar impact to that of pharmacological treatment on pain modulation in the brain. Moreover, patients' perceptions and beliefs (fears and misinformation on treatment) may contribute to their adherence to treatment, or prepare them psychologically which might help them to accept treatment. Furthermore, physicians' views on prescribing opiates would be one reason that outweighs the effectiveness of pharmacological treatment which subsequently affects the beneficial outcomes of surgical pain management. Further reasons would be related to the medication consumption of those are at risk from long-term opioid use and the side effects of pharmacological analgesia which will be summarised later in this report. Moreover, the substantial amount of literature on pain management has demonstrated the influence of psychological factors such as anxiety, depression or satisfaction on the surgical outcomes, will be explored in the next sections.

The Influence of Psychological Factors on Pain Perceptions

Pain is a complex phenomenon that cannot be explained by biological processes alone. Many factors contribute to pain, including sensation, affective factors and behavioural factors. Together, these contributors shape each individual's experience of pain (Moseley & Butler, 2015). The multifactorial nature of pain, including the psychological factors such as the state of a patient who has experienced a surgical procedure; for example, the level of anxiety and empathy. Therefore, psychological factors may contribute to pain relief together with the influence of pharmacological treatment. This is because these psychological aspects of pain would have a significant influence on pain-related brain activation which as a result shape a person's perception of pain. In this section, I shall briefly demonstrate the mechanisms that underlie the psychological factors which influence the top-down pain modulation such as cognitive modulation and expectations which underlie the impact of placebo treatment. These also illustrate the influence of psychological factors on surgical outcomes and the potential influence of patients' and physicians' perceptions on the effectiveness of pharmacological treatment.

Psychological Factors and the Top-Down Pain Modulatory System

Neuroimaging studies have provided an explanation for the interaction between various brain activities associated with pain modulation. Most research has focused on the influence of pharmacological treatment on pain modulation in the brain, but the research identified some mechanisms that could influence other modulation of pain within the brain. These mechanisms could be induced either by pharmacological treatment or psychological manipulations of attention, mood or expectations (Fields, 2000). With regard to the role of pharmacological treatment on pain modulation, the neuroimaging research showed that opioids can act throughout brain activities in cortical and subcortical regions which could influence the aspects of pain experience (affective and sensory aspects), and also, by activating descending pain inhibitory circuits (Ossipov, Dussor, & Porreca, 2010). Similarly, other cognitive modulations of pain such as emotional regulation and attentional pain modulation can influence the perceptions of pain by activating the same brain regions that are activated when pharmacological treatment is used.

Neurophysiological research has illustrated how psychological intervention could affect top-down and bottom-up brain processes and how such intervention could influence structural and functional changes within the brain. Such psychological treatment could act through brain mechanisms to control affective, motivational and cognitive effects, which subsequently influence the ascending and descending aspects of pain processing (Flor, 2014). This is a complex process which might include the activation of a different network in the brain at any time during a pain experience. Eventually, the completion of this process could lead to different ways of processing the experience of pain (Flor, 2014). On the basis of this brief explanation, I could argue that the activation of psychological factors; for example, by training or practicing in meditation or hypnosis, could have the power to influence the top-down or bottom-up modulations by distracting the focus on pain or by regulating the emotional state. A review of the work of Chiesa et al. (2013) on the impact of mindfulness training on emotion regulation has reported some evidence from different neuro-imaging studies which support the possible short-term training of the top-down regulation of emotions in the brain. This might include the development of the ability to observe thoughts, emotions and sensations with a concurrent of self-referential; by contrast, long-term training is associated with bottom-up regulation. I may hypothesise that mechanisms of action for current pharmacological interventions are probably not based on changing the attentional process as reported by Corlett et al. (2009) and explained how ketamine works with psychosis, but I cannot be certain that drugs have no attentional and motivational dimension to their action (Schreckenberger et al., 2004). Generally my argument is that these psychological interventions appear to relieve post-operative pain and could work in adjunct to pharmacological treatment.

Furthermore, evidence from behavioural laboratory studies and numerous clinical trials indicate that patients' beliefs and expectations can shape the efficacy of analgesics which underlie the effect of placebo treatment. The placebo effects can trigger pain modulation by different cues or conditioning such as verbal instruction to anticipate the benefits of treatment (Bingel et al., 2011) or by non-direct administration of placebo treatment (Benedetti et al., 2003; Colloca et al., 2004). Bingel et al. (2011) in their experimental study, investigated the effect of patient expectations on the efficacy of a potent opioid. In this study, the brain activity of healthy volunteers was recorded during various conditions. Three conditions of expectations were involved. In the first of these, the participants had no expectation of the analgesics while they were taking them. In the

second condition, the participants had a positive expectation of the effect of analgesics. In the third condition, the participants had a negative expectation of the analgesics, meaning that they were expected to experience hyperalgesia or exacerbation of pain. The study discovered that the participants' self-reported pain showed a significant enhancement in the impact of remifentanil in the positive expectation condition when compared with the negative expectation condition in which the effect of remifentanil was neutralised. Moreover, the recorded brain activity showed that positive expectations were related to activity in the endogenous pain modulatory system, whereas negative expectations were associated with activity in the hippocampus. A clinical study by Benedetti et al. (2003) reported that the specific effects of the treatment patient-controlled analgesia (PCA) were present in both experimental groups. However, the administration of the treatment was hidden from some participants in which case the medication was less effective compared to the other group where the patients were aware of the treatment. This indicates that even with no administration of direct placebo cue, the psychological factors triggered the patients' knowledge and expectations during their treatment which led us to investigate the influence of patients' concerns on medications. Before I proceed to discuss patients' concerns, it will help to summarise how the targeted psychological interventions in my review might work.

Potential Mechanisms of Psychological Treatment on Acute Postoperative Pain Relief

For the purpose of this review, a 'brief psychological intervention' involves the use of any self-help materials, including audio or videotapes and brief, face-to-face, individual training of patients in order to help them to overcome their post-surgical pain. This BPI does not include limited frequency to be practiced by patients, but it could be practised during the surgical days (four or five days), or the practice could extend beyond this period, possibly for months. For the purpose of this review, I did not include the temporal element because BPI could have positive effects beyond the post-operative days on pain and other surgical outcomes which ought to be investigated.

Although such intervention have different theoretical bases, it may share a small group of underlying mechanisms. For example, all these techniques could be described as being 'self-managed'. They are all relatively simple ways of managing acute post-operative pain, and make use of common and popular self-help materials such as audiotapes. Alternatively, they may require only a brief training time.

Furthermore, the physiological mediators of pain reduction, such as blood pressure, respiration and heart rate may be shared across brief intervention. It has been determined that much brief psychological intervention influences the same physiological variables. For example, music therapy has been found to improve oxygen saturation (Özer et al., 2013), systolic blood pressure and heart rate (Tse et al., 2005), whereas relaxation techniques have been reported to reduce heart rate, metabolism, blood pressure and breathing rate (Stefano et al., 2006). Moreover, guided imagery affects almost all physiological control systems in the body, including respiration, heart rate, blood pressure, metabolic rate and cortisol levels (Sheikh & Kunzendorf, 1984).

Brief intervention not only helps patients to switch their attention from pain to another activity, such as listening to music in a relaxing and special environment, but can also reduce emotional distress related to surgical pain, and subsequently reduce pain intensity itself. For example, relaxation has been found to reduce pain and distress (Seers & Carroll, 1998), and relaxation, when paired with listening to music has been found to reduce pain and distress (Good et al., 2001).

Moreover, brief psychological intervention can help to reduce pain intensity by creating a positive mindset and by helping patients to visualise positive images. For example, encouraging patients to use different hypnosis strategies both before and during surgery has been found to make them feel comfortable and also to reduce their pain (Marc et al., 2009).

Furthermore, psychological intervention appears to have a positive impact on the brain during a painful experience or procedure. Such positive effects are the work of various mechanisms, including distraction of attention (Fauerbach et al., 2002) or the creation of a positive emotional state (Luebbert et al., 2001). Moreover, positive suggestions can help to reduce adverse outcomes following a medical procedure (Williams et al., 1994) and can reduce stress in patients (Holden-lund, 1988; Nilsson, Unosson, & Rawal, 2005).

Psychological Factors and Surgical Outcomes

The decision whether or not to undergo surgery may be one of the most uncomfortable choices of patients in seeking relief for their suffering or pain. However, surgical outcomes may turn to different or unexpected/undesirable results among patients for

numerous reasons; for example; physical factors (age, weight) or psychological factors (anxiety, distress or satisfaction). Addressing each factor which affects the success of surgery is beyond the scope of this project. Nevertheless, a brief exploration of the literature associated with surgical pain and psychological features emphasised the significant input of psychological factors on surgical outcomes (R. S. Khan et al., 2011; Khatib, Madan, Naylor, & Harris, 2015; Mavros et al., 2011; Vranceanu, Jupiter, Mudgal, & Ring, 2010). Researchers found that pre-operative psychological factors such as anxiety, depression and catastrophising can predict or be associated with post-operative outcomes. For example, a review by R. S. Khan et al. (2011) investigated the role of pain catastrophising and its association with managing post-operative pain and post-operative quality of life. From the 10 studies included in different types of surgery (knee surgery, caesarean, elective surgery), researchers concluded that a high level of catastrophising is associated with increased pain intensity, increased incidence of development of chronic pain and poorer quality of life after surgery. Nevertheless, no clear association was found between catastrophising and medication consumption. However, this review did not provide sufficient information on the included number of patients in the review nor any information on the type of studies. Another systematic review by Khatib et al (2015) explored the role of pre-operative psychological factors in post-operative outcomes among total knee arthroplasty patients (TKA). The review summarised data from 19 studies and included 17 cohort studies and two cross-sectional surveys retrieved from 8704 adult patients. In 16 studies, psychological factors were found to be major predictors of satisfaction, pain and function at a minimum of six post-operative months. Furthermore, researchers found that mental health factors at the baseline may affect patients' satisfaction, their long-term pain perception, and their motivation to return to the desired level of function. Moreover, a study by Vranceanu, et al. (2010) aimed to assess the association between pre-operative psychological factors (depression, anxiety, catastrophising and self-efficacy) and coping mechanisms (maladaptive cognitive activities such as being helpless) and post-operative pain intensity and disability of the arm, shoulder and hand (DASH) among patients undergoing hand surgery. The study involves 120 patients (39 electing surgery for carpal tunnel syndrome, 65 for trigger finger, and 16 for a benign tumour). Researchers found that there was a significant correlation between pain intensity and depression ($r = 0.45$, $p<.001$), pain catastrophising ($r = 0.41$, $p<.001$), pain anxiety ($r = 0.32$, $p<.01$), and self-efficacy ($r = – 0.29$, $p<.01$), disability correlated with self-efficacy ($r = –0.34$, $p<.001$) and depression ($r = 0.49$; $p<.001$), but not with pain anxiety and catastrophising ($p>.05$).

Furthermore, multivariate analyses revealed that depression was the sole predictor of both disability and pain intensity and accounted for 26 percent of the variance in the disability questionnaire for DASH scores and 25 percent of the variance in pain intensity after removing the influence of pre-operative DASH and diagnosis, which accounted for 14 percent variance. The results from these studies generally emphasised the importance of managing the pre-operative psychological factors (depression, anxiety or catastrophising) which can influence the surgical outcomes. BPIs may benefit patients in this regard to be relaxed or distracted from the reason causing them to be stressed or anxious enabling them to prepare for their surgery.

Moreover, clinical studies in surgical pain showed that psychological outcomes can be different when similar types of surgery are compared to their patients' surgical outcomes. For example, a comparison of the psychological factors between knee and hip surgery reported differences between patients in post-operative outcomes. A study conducted by Caracciolo and Giaquinto (2005) assessed the connection between psychological distress and depression and reducing the functional improvement following arthroplasty. The study included 36 knee arthroplasty (TKA) patients and 36 total hip arthroplasty (THA), and anxiety and depression were assessed during their rehabilitation. The findings revealed that at admission, 44 % of THA and 58 % of TKR patients showed scores on anxiety and depression which were over the threshold. Moreover, the depression scores percentage was over the threshold among THA and TKA patients (55% and 61% respectively). Therefore, the functional improvement among TKA was significantly affected compared to THA because of the high score in depression scale. It is suggested that the importance of preparing patients psychologically, after surgery, for their rehabilitation to gain more benefits from the surgery and the rehabilitation programmes. Another prospective study by Duivenvoorden et al. (2013) investigated the prevalence of anxiety, depression and satisfaction among 133 TKA and 149 THA patients pre-operatively and three and twelve months post-operatively. This study also assessed the impact of these psychological factors on the surgical outcomes. The results revealed high scores in anxiety and depression pre-operative patients, whereas hip patients showed slightly higher scores in their anxiety and depression compared to knee patients. However, these scores decreased significantly 12 months after surgery. Anxiety symptoms decreased from 27.9 to 10.8 percent at 12 months after surgery in hip patients, and from 20.3 to 14.8 percent in knee patients. Depression scores also decreased from 33.6 to 12.1 percent from 12 months after surgery in hip patients, and from 22.7 to 11.7

percent in knee patients. Furthermore, the researchers discovered that pre-operative high scores on the depression scale predicted patients' dissatisfaction 12 months after surgery. Moreover, a study by Al-Ghazal, et al. (2000) supports the fact that different types of surgery have different psychological outcomes. The aim of the study was to assess and compare the psychological outcome and patient satisfaction among the 577 patients who had breast cancer and underwent three different types of surgery. One group of patients underwent wide local excision while the other underwent mastectomy alone, and the third group underwent mastectomy with breast reconstruction. Patients' psychological morbidity and satisfaction, measured by self-evaluation questionnaires and all surgical groups, were cross-matched into four different age groups. The researchers found significant statistical differences between the three types of surgery among patients in satisfaction and psychological morbidity (anxiety, depression, body image, self-esteem and sexuality) and the highest morbidity was seen in the mastectomy group. Patient satisfaction of cosmetic outcome and psychological aspects was greater with wide local excision than with breast reconstruction or mastectomy (Al-Ghazal et al., 2000).

The results of these studies indicated the differences in psychological aspects among patients who underwent different types of procedure, thereby emphasising the importance of introducing psychological interventions to educate patients and to help them to be more relaxed and comfortable before and after their surgical experience.

Patients' Concerns and Pain Perception

Patients' fears and misinformation about tolerance and addiction can also affect their adherence to analgesic treatment. This may influence the effectiveness of pain management techniques as the treatment plans may not be correctly followed. In a sample of 194 cancer patients, adherence to analgesic treatment was measured in a survey on pain beliefs which considered beliefs about control, emotions, medication and disability (Lai et al., 2002). Six pain beliefs were measured, including beliefs concerning the negative effects of opioids (that opioids had negative effects on the body) and beliefs concerning pain endurance, mainly the belief that one should endure as much pain as possible. Only 66.5 percent of the patients in this study adhered to their scheduled analgesic treatments because of their beliefs about the negative effects of analgesics and pain endurance (Lai et al., 2002). In a related study, 379 cardiac patients gave self-

reports following surgery. These reports revealed the patients' strong beliefs in certain statements. It was discovered that 36 percent of the patients believed that 'pain medication should be saved in case the pain worsens', whereas 31 percent believed that 'it is easy to become addicted to medication', and 20 percent believed that 'good patients do not speak of their pain' (Cogan et al., 2014).

Physicians' Concerns and Pain Relief

Physicians should encourage patients to adhere to their treatment protocols. However, this may be difficult if physicians have various concerns and views about prescribing opioids. In a recent survey of physicians' attitudes to pain medications, a nationally representative sample of 1,535 American physicians from different medical specialities were asked about their beliefs concerning opioid pain medication and its effectiveness (Wilson et al., 2013). The results revealed an increased awareness of the negative impact of opioids which was linked to a reduction in prescribing these medications as about 70 percent of physicians prescribed opioids to fewer than 30 percent of their patients with chronic non-cancer pain. Their concerns were associated with their level of experience and training in treating chronic pain. A similar survey examining 248 primary care physicians investigated the most commonly prescribed opioid type, the most common opioid prescription concerns and other related questions regarding opioid therapy (Bhamb et al., 2006). The results of this study revealed that physicians' concerns regarding opioid therapy included prescription drug abuse (84.2%), addiction (74.9%), adverse effects (68%), tolerance (60.7%), and medication interaction (32%), which indicate high rates of concern regarding opioid therapy in this group of physicians (Bhamb et al., 2006).

I should note that despite the contribution of the psychological factors in physicians' views and beliefs while they are treating their patients, I cannot ignore the occurrence of adverse medication effects and addiction or tolerance to opioids. These issues may indicate that several negative aspects might outweigh the efficacy of pharmacological treatment as I shall briefly summarise in the following part.

Additional Factors related to the Inadequacy of Pharmacological Treatment to Postoperative Pain

Besides patients' and physicians' beliefs, and concerns on medications treatment, an increasing body of research emphasises the potential risks of long-term opioid use, including the risk of addition. Long-term opioid therapy may be related to adverse outcomes in different organ systems such as sleep-disordered breathing, constipation, fractures, overdose, and hypothalamic pituitary adrenal dysregulation (Baldini, Von Korff, & Lin, 2012). A study investigating issues related to long-term opioid treatment and health behaviour among 13,281 adults, aged 16 years or over, suffering from non-cancer related chronic pain revealed six potentially addictive types of behaviour associated with long-term opioid users (Højsted et al., 2013). They were smoking daily, consuming a considerable amount of alcohol, and had used illicit drugs during the past year. They were also obese, long-term users of benzodiazepines benzodiazepine-related drugs (Højsted et al., 2013). Furthermore, recent work that has investigated the effect of long-term opioid use for non-cancer related chronic pain has concluded that there is no strong evidence to support the beneficial effect of long-term use (Kissin, 2013). meaning that long-term use of opioids for non-cancer related pain has not been proven to show any improvement in pain relief, QoL, or functional capacity (Eriksen et al., 2006).

In addition to the addiction issue, the common side effects of pain-controlling analgesics: constipation, dizziness, nausea, vomiting, and respiratory depression remain a major clinical concern (Ricardo Buenaventura et al., 2008). It has been reported that in cancer patients, analgesic side effects and pain severity can impair QoL. These impairments included difficulty performing life activities, depressed mood and poor health-related status (Ward et al., 1998), consequently outweighing the benefits of pharmacological treatment.

I should note that these limitations could be reduced by using non-pharmacological treatment such as psychological treatment approaches. The American Pain Society (APS; Gordon et al., 2005) has recommended a combination of multimodal analgesia and non-pharmacological techniques to balance the outcomes of pain medications and to improve the quality of pain management. However, recent guidelines from the American Pain Society and the American Society of Regional Anaesthesia and Pain Medicine and the American Society of Anaesthesiologists' Committee on Regional Anaesthesia, Executive Committee, and Administrative Council (2016) have reported the

effectiveness of psychological interventions (cognitive-behavioural modalities). Nevertheless, despite the moderate quality of existing evidence that has been reviewed, they recommended the requirement for more research to investigate these techniques further, particularly in children, and to discover which of them could be more effective to relieve surgical pain; moreover, the quality of this research should be consideration (Chou et al., 2016). Such weak recommendation to use psychological interventions would be of no help in implementing these techniques effectively in general practice. Furthermore, these recommendations are insufficiently specific to be acted upon by busy or non-expert doctors.

Effects of Psychological Treatment on Acute Postoperative Pain Relief

Non-pharmacological interventions of acute pain management include numerous psychological approaches and other complementary therapies, such as massage, aromatherapy, acupuncture, shiatsu, therapeutic touch and transcutaneous electrical nerve stimulation [TENS]; (Stevensen, 1995). However, the current review focused on psychological intervention and its contribution to post-operative pain relief.

The effectiveness of psychotherapies, including cognitive behavioural therapy (CBT), has been examined in the context of pain relief. CBT techniques may include various methods, including face-to-face training, online self-help materials and computerised interventions. An overview of the CBT methods for pain management indicates a gap in the current understanding of acute post-operative pain management. Up to the present time, CBT has mainly been applied for the management of chronic pain such as back pain (Buenaver, McGuire & Haythornthwaite, 2006). Little research has yet been conducted on the application of CBT for the relief of acute post-operative pain.

Furthermore, most CBT studies appear to focus on how a patient's emotions, such as anxiety and depression, relate to surgery. Relatively, CBT research, which explores pain reduction as its primary outcome, is lacking and a wide range of CBT studies in cardiac patients after surgery could confirm this viewpoint (Dao et al., 2011; Freedland et al., 2009). When used on patients undergoing coronary artery bypass surgery, CBT has been found to reduce the symptoms of depression and anxiety before surgery, reduce the length of hospital stay and increase patients' QoL (Dao et al., 2011). Moreover, it has been discovered that CBT reduces the symptoms of depression after surgery (B. Hwang

et al., 2015). None of these studies that has examined the use of CBT with surgery has measured its potential effect on pain intensity. It could also be argued that despite its potential efficacy, CBT is not an ideal method of treatment for acute post-operative pain relief for numerous reasons.

CBT may not be an ideal treatment method for pain relief because it is costly and time-consuming. It could indeed be considered as an intensive treatment which requires considerable expense and effort. Despite the use of computerised CBT methods (Velleman, Stallard, & Richardson, 2010) or self-help CBT interventions (Buenaver et al., 2006) in order to minimise the required contact and intervention cost, these approaches may take longer than anticipated and may require a considerable effort on the part of the patient to access and complete multiple sessions. Therefore, each intervention may need to be completed over a reasonably long period of time and may even include the completion of homework. Moreover, psychological treatment, such as CBT, needs to be applied before the incidence of acute pain onset because patients in acute pain might not be able to participate in the intensive treatment involved. Consequently, the process required for CBT may not fit the nature of acute post-operative pain since pain relief requires immediate and prompt action. This is particularly true when CBT is compared with other more brief psychological interventions which require only minimal effort from patients, such as lying on the bed or listening to a relaxation or music tape. Furthermore, existing research clearly indicates that the proper delivery of CBT intervention to participants might require a trained specialist (Westbrook et al., 2008). This requirement may not be practical for patients experiencing high levels of pain and who require immediate pain relief, and the use of a trained specialist may not be cost-effective.

In consideration of this, the review will explore brief psychological interventions for post-operative pain management, such as self-hypnosis, relaxation, guided imagery, psychoeducation and music as a form of distraction. Although these psychological techniques have not been investigated in one comprehensive study, their effectiveness for post-operative pain relief have been summarised in various systematic reviews.

The effectiveness of psychological treatment for the management of post-surgical pain was studied in a systematic review by Nicholls et al. (2018). This systematic review included six randomised controlled trials involving about 537 participants to investigate CBT interventions in order to reduce post-surgical pain among patients who had back or

cardiac surgery. The results revealed that most studies (four out of six) reported a reduction in pain intensity and that all found improvements in pain disability at the follow up period from one week to two or three years. I should note that this review provided valuable findings of the effectiveness of CBT treatment; however, it did not investigate the effectiveness of other psychological techniques such as hypnosis, relaxation, distract and others, in reducing post-surgical pain, which will be included in my review.

The effectiveness of hypnosis as a pain-management technique was explored in a meta-analysis conducted by Montgomery et al. (2002). This included 20 studies assessing the effectiveness of hypnosis for managing pain in surgical patients and revealed a significant impact size of hypnosis (D = 1.20). Patients in hypnosis treatment groups had better clinical outcomes such pain, use of pain medication, recovery, treatment time and physiological indicators when compared with patients in control groups. Moreover, a meta-analysis by Tefikow et al. (2013) included 34 RCT studies, which assessed the effects of hypnosis on adults undergoing surgery or medical procedures, discovered a significantly positive small to medium-sized impact of hypnosis on pain outcome (Hedges g = 0.44), emotional distress (g = 0.53), medication consumption (g = 0.38), recovery (g = 0.25), surgical procedure time (g = 0.25) and physiological parameters (g = 0.10). However, despite the positive effects of hypnosis, found in both meta-analyses. I should note that both reviews included studies on different medical procedures and not exclusively on surgery. Furthermore, despite the sensitivity analysis of Montgomery et al's. (2002) review which found no difference in the overall impact of hypnosis, intervention between randomised and non-randomised studies, and my review focused on randomised studies in the context of surgical pain only.

Another systematic review included thirty-two RCT studies to investigate the efficacy of therapeutic suggestions under general anaesthesia in adults undergoing surgeries or medical procedures compared to attention control (white noise) (Rosendahl, Koranyi, Jacob, Zech, & Hansen, 2016). Researchers investigated the effects of the intervention on pain intensity, mental distress, recovery and the use of medication. A total of 2102 patients included the studies, who used taped suggestions. The findings revealed no significant effects of the interventions on pain intensity nor mental distress. However, small positive effects found on the use of medication and recovery period. Although these findings were homogenous and reported small effects of the interventions, this provides an indication of the benefits of therapeutic suggestions in reducing the need for

medication and avoid potential side effects of the medicine. It is possible that these findings did not find significant effects because the studies included intervention performed during the surgery only. Thus in my review will investigate the effects of this type of interventions pre-operatively, during and post-operatively.

Relaxation techniques for pain management have also been reported in numerous systematic reviews. Kwekkeboom and Gretarsdottir (2006) conducted a review that included 15 studies, eight of whom were found to support the effect of relaxation techniques for the relief of various pain conditions. The review conducted by Kwekkeboom and Gretarsdottir (2006) studied different types of pain other than surgical pain, and a systematic review conducted by Seers and Carroll (1998) included seven RCT studies. No firm conclusions could be drawn regarding the effectiveness of the relaxation techniques in this review because only three of the seven studies reported any significant effect of the relaxation techniques. As the review by Seers and Carroll was conducted in 1998, and the fact that many new RCT studies have been conducted subsequently, a new review considering these new RCT studies might allow an improved assessment of the effectiveness of such techniques.

Regarding the efficacy of using music as a distraction from pain, the most relevant study is a recent meta-analysis conducted by Hole et al. (2015). This included 73 RCT studies in which adults underwent any form of surgical procedure with or without sedation or anaesthesia. Hole et al. (2015) discovered that music generally reduced post-operative pain, anxiety, and analgesia. The studies in the Hole et al, review included various medical procedures, but my review focused on surgical procedures only, making it more concise. Another review investigated the influence of preoperative music intervention on pain and anxiety among adult patients undergoing invasive surgeries (Kühlmann et al., 2018). The systematic review identified ninety-two RCTs with a total of 7385 patients, of which 81 studies included the meta-analysis. Findings revealed the significant reduction in anxiety and pain scores compared with control groups, equivalent to a decrease of 21mm for anxiety and 10mm for pain on 100-mm visual analogue scale. Also, the interventions reduced pain significantly while providing general anaesthesia compared with the control group. Meta-regression analysis did not show a significant association between the influence of music and factors such as age, gender, the timing of music and type of anaesthesia. These findings are promising, but they support the effectiveness of

BPIs partially. This is because Kühlmann et al.'s review involved music interventions only and the influence of the other features of BPIs, i.e. self-hypnosis, relaxation etc. were not investigated.

Justification for the Systematic Review Completion

The effectiveness of using brief psychological interventions for pain relief has been presented in numerous clinical studies. Such intervention may be equally important as pharmacological methods with regard to pain management, and the study of such intervention could contribute to the current understanding of acute post-operative pain management research for several reasons.

Firstly, brief psychological intervention can usually be self-administered and requires minimal physical effort from the patient, allowing him/her to manage the pain as it occurs. Research has shown that patients are more likely to experience pain after discharge or within the first two weeks after surgery (Chan et al., 2013). Therefore, practising these techniques could help patients to manage their pain even without the aid of a health specialist or a trained nurse.

Secondly, compared to pharmacological treatment, psychological intervention generally has less adverse effects and can be applied safely without additional side effects (Good et al., 2005; Lobe, 2006; & Kshettry et al., 2006). In a study by Kshettry et al. (2006), 104 patients who underwent open-heart surgery were easily able to use pre-operative guided imagery with light and post-operative music therapy to help manage their pain. These techniques were applied easily and safely without any reports of complications after surgery for these patients. Consequently, this therapy was highly accepted by the patients (Kshettry et al., 2006).

Thirdly, psychological interventions are cost-effective when compared with other types of intervention (Chiles, Lambert, & Hatch, 1999). Lang and Rosen (2002) compared the costs of using standard sedation to that of using standard sedation with adjunct self-hypnotic relaxation. Different cost elements were considered such as the cost of the hypnosis provider, the cost of the room and the cost of the procedure itself. They found that the cost associated with using only standard sedation during surgery was $638 per patient, whereas the cost of using both standard sedation and adjunct hypnosis was only

$300 per patient. There is potential to save money by using simple and common self-help materials in conjunction with multimodal analgesics.

Finally, this review gathered most of the research that has been undertaken regarding the management of acute postoperative pain. I conducted this review in order to evaluate the overall effectiveness of various brief psychological interventions. No such review presently exists, since current reviews have not examined RCTs to evaluate the brief psychological techniques of relaxation, self-hypnosis, guided imagery and distraction for the purpose of acute post-operative pain management. A review by Nelson et al. (2013) investigated the effectiveness of pre-surgical mind–body therapies on post-operative outcomes. The results appear optimistic, but the review did not include the effects of distraction methods, such as music, on post-operative outcomes (Nelson et al., 2013). Furthermore, compared to the review by Nelson et al. (2013), the present systematic review will include the effect of brief psychological intervention before, during, and after surgery.

Perspectives on Pain Relief among Non-Clinical Population

Pain is a major health, social, and economic problem worldwide. Evidence has suggested that about 20 percent of adults suffer from pain globally, 10 percent of whom are diagnosed with chronic pain each year (Goldberg & McGee, 2011). This problem has influenced different aspects of people's lives such as mood, physical movements and social life including work (Breivik et al., 2006; Chung & Wong, 2007; Gunnarsdottir, Ward & Serlin, 2010), which consequently affects their quality of life (QoL). Moreover, it is a massive burden to any healthcare economic system (Phillips, 2009). A recent survey of the American Pain Society estimated that chronic pain costs the US about $635 billion annually compared to the estimated costs in 2010 of the other major conditions such as cancer ([$243 billion], heart disease [$309 billion] and diabetes [$188 billion]. (Gaskin & Richard, 2012). Moreover, the estimated cost of back pain treatment was estimated to be between £5 billion and £10 billion in 1998 (Phillips, 2009), and the British Pain Society stated that the cost of treating adolescent pain was almost £4 billion per annum alone.

The prevalence of pain has been studied in various settings, including medical settings or within non-clinical population. In these studies, the estimation of pain prevalence varied because of differences in study settings and methodologies. Nevertheless, pain occurred regardless of these variations. A survey of the general population of Iceland, involving 599 participants, using the Brief Pain Inventory (BPI), found that about 40 percent had experienced pain during the past week. Those reporting pain had also experienced pain for more than three months with causes such as strain injuries related to work and sports activities, arthritis, mechanical problems (birth defects and slipped discs), diseases and injuries due to accidents and broken bones (Gunnarsdottir et al., 2010). Similarly, a large Spanish survey (N=5000) found that 29.6 percent of participants reported having pain the day before the interview and almost 43.3 percent had experienced pain in the last week. The most common sites of pain were lower extremities (22.7%) back, including cervical and lumbar levels (21.5%) and head (20.5%) (Català et al., 2002). These data are consistent with a survey of 975 participants conducted by the British Pain Society in 2005. Based on this sample, the authors estimated that almost 10 million Britons suffer pain resulting in a profound impact on their quality of life and working days. Pain was experienced most days by 21 percent of participants surveyed, and 25 percent were in pain on the day of the survey. Additionally, 49 percent of participants reported taking time off work, and 49 percent mentioned that they had been depressed because of the pain, and 26 percent said that their sex life had been affected.

Despite improvements in pain management research such as multimodal analgesics (Buvanendran & Kroin, 2009; Skinner, 2004), people still suffer from pain. Moreover, recommendations on pain management research has suggested the application of multimodal treatment approaches, including pharmacological and non-pharmacological therapy to obtain better outcomes of pain management (please see previous subsection p. 37). Other guidelines for managing low back pain recommended some variation of exercise as therapy and other small non-pharmacological approaches, such as manual therapy and psychological intervention as part of the treatment plan, but not as essential components (O'Connell et al., 2016).

Psychological intervention has been well established in the field of pain management research, although in practice, more research is required to strengthen the existing evidence and to ensure effective implementation (Tan et al., 2007; Tan et al., 2010). Revision of existing psychological pain management intervention (Tefikow et al., 2013; Gorji, et al., 2014; Finlayson et al., 2015) indicated that such intervention effectively

reduced pain intensity and distress among different pain experiences (see previous section in p. 38 for the effect of psychological treatments and acute postoperative pain). Psychological intervention varies in complexity which may require a lengthy follow-up period of treatment, which could be weeks or even months, in order to obtain optimal results from the treatment. The fact that people could be looking for effective and immediate relief from their pain, particularly when they have the experience anytime alone, encouraged us to investigate the effectiveness of supported self-help materials such as self-hypnosis, relaxation, distraction and other matters, as these techniques can be self-help administered and do not require the presence of healthcare professionals. Evidence for the effectiveness of brief psychological intervention to relieve various types of pain was critically evaluated according to reports from systematic reviews of clinical trials with different medical procedures. With regard to pain in the medical context, a summary of the effectiveness of BPI in the clinical context has been demonstrated in previous subsection (please review p. 38).

Results from experimental research on pain tolerance and distress has supported the fact that these brief psychological techniques could be effectively used as pain relief methods. For example, a study by Liu et al. (2013) induced pain experimentally by using a cold pressor task with healthy students who were randomised into one of three conditions: brief mindfulness strategies, distraction strategies or spontaneous strategies. The study discovered that listening to the intervention instructions for 15 minutes significantly improved the pain tolerance, reduced the distress during the immersion period in the brief mindfulness strategies and improved the pain tolerance in the distraction group, but did not affect the participants' level of distress during the immersion period. Another study by Finlay and Rogers (2015) investigated the role of practice effects in enhancing listening to music and progressive muscle relaxation for pain management. The study applied the cold pressor test to 70 healthy participants who were randomly assigned to one of three conditions: passive distraction (participant choice of preferred music), active distraction (Progressive Muscle Relaxation) or control group (no distraction). Participants were encouraged to practise distraction for about eight minutes between trials (a week). The results revealed that PMR and music reduced anxiety, improved pain tolerance and minimised pain perception and pain ratings. In PMR, participants increased their self-efficacy and demonstrated a better heart rate regulation when compared to the music group.

Consequently, the effectiveness of such intervention in both medical and experimental settings motivated a study to explore the extent to which people who are not included in any clinical categorisation or who do not belong to any diagnostic characteristic or classification, are confident and willing to use these techniques when they are required to do so, and how they could respond to such methods in real life. Breivik et al.'s survey (2006) of people's experience with pain indicated that people seek different approaches to relieve or manage their pain. This survey stated that the variation in people's approaches depended on the current state of pain, be it chronic or acute, and whether such techniques involve medication or other methods which may have an impact on their adherence to treatment and affect the outcomes of pain management. A meta-analysis, including 63 studies assessing patient adherence and medical treatment results reported that the outcomes' difference between high and low adherence rates is 26 percent. Furthermore, according to the analysis of the moderators of the adherence-outcome relationship, adherence was most strongly associated with the results of studies of non-medication regimens where measures of adherence are continuous and where the disease is chronic (DiMatteo et al., 2002). Results from this review indicate several factors which could influence patients' adherence to medication irrespective of the efficacy of the medication to treat the pain or disease. A survey by Laba et al. (2013) explored some facets which could influence osteoarthritis (OA) patients' preferences for adherence to medical treatment and their willingness to continue treatment. This survey revealed that preferences to continue with OA treatment were significantly influenced by four out of seven factors; medication side effects (high blood pressure, heart, liver and kidney problems, heartburn/reflux, stomach ulcers, drowsiness, and constipation), out-of-pocket costs, treatment schedule (daily taking of medication versus when required) and mode of action (medication that slow OA versus medication relieve the pain) (Laba et al., 2013). According to the results, the efficacy of treatment did not influence patients' preferences to treat OA and the relative likelihood of continuing glucosamine (GS) treatment to be taken regularly was positive. Contrastingly, the relative potential of continuing NSAIDs taken regularly was negative, meaning that treatment adherence was associated with mode of action whereby patients were more willing to continue with a slow-acting disease modifying medications (GS) more than the fast-acting immediate pain relief provided by NSAIDs (Laba et al., 2013). The authors of the study assumed that this is probably due to the increase in patients' awareness of the side effects of these analgesics but this remains unclear as it could be associated with a patient's personal preferences to other alternative pain medications. However, the study does emphasise

that patient adherence is higher when they are involved in decision-making regarding their treatment which will be explored later in this chapter.

Therefore, in order to improve pain management outcomes, including people's satisfaction with their treatment, it is important to gain a better understanding of people's preferences, including the influence of individual beliefs and attitudes which may influence preference and adherence to treatment (Main, Foster, & Buchbinder, 2010; Sale, Gignac, & Hawker, 2006). Furthermore, justification for the rationale for taking such a broad approach in relation to pain and included participants from the public who are not actual patients is as follows. In this qualitative study, the interest was not specifically in the pain experience, but was rather in the attitudes and views towards psychological intervention, which can be provided by anyone who may have experienced significant pain but is not characterised as a patient. Moreover, pain is a common experience; therefore, it is useful to know how anyone from a non-clinical population may think about such psychological techniques because everyone is likely to come in contact with this type of treatment at some point. Consequently, the focus on exploring the attitudes on psychological techniques, but not on the type of pain experience, was the main target of the study. Moreover, anyone could be in significant pain, so could be a patient at any time, but such person may not fit with any particular diagnostic criteria; therefore, everyone has the experience of pain, so this would be relevant to the research questions at this point of the study.

In consideration of this, the research focused on various types of pain experience rather than restricting the study to a specific population with specific pain conditions. Therefore, I conducted a study that aimed to discover individuals' beliefs and attitudes towards pain management treatment specifically, as well as psychological techniques regardless of the pain condition, whether acute or chronic. This approach would ensure a broad range of perspectives across the population in order to highlight potential barriers to practise and could contribute to improving the recommendations and current guidelines surrounding pain management.

Pain Relief and Post-Surgical Patients' Attitudes and Beliefs

The efficacy of all treatments increases when patients adhere to their treatment (Gustafsson et al., 2016). However, treatment non-adherence is common among patients who are experiencing pain (Timmerman et al., 2016), and it is a major issue which may threaten patients' quality of health and well-being as well as being an economic burden (Martin et al., 2005; Sabaté, 2003). Researchers have highlighted various factors which have influenced patients' decisions to adhere to a prescribed regime of medication (Jin et al., 2008; Martin et al., 2005; Vermeire et al., 2002). A comprehensive review of studies of patients' adherence to treatment discovered demographic variables such as age, gender or social level that were poor indicators of adherence and were inconsistent between studies when compared with other factors such as patients' attitudes, knowledge or beliefs about medications which are correlated with low compliance (Vermeire et al., 2002). Another systematic review aimed at determining the prevalence of medication non-adherence identifies patients who are at risk of non-adherence. Findings revealed that underuse of treatment was more common than overuse, and factors which associated negatively with non-adherence were age, pain intensity and the quality of the patient-caregiver relationship. Underuse was also positively associated with active coping strategies and self-medication while being negatively associated with a perceived need of medication (Timmerman et al., 2016).

It is worthy of mention that researchers have used different terms to describe patients' behaviour in taking their medicine such as adherence, compliance, and concordance (Aronson, 2007; Vermeire et al., 2002; Vrijens et al., 2012). Although these terms may be useful, they may also imply other meanings to describe the nature of the relationship between patients and healthcare professionals. For example, the term 'compliance' has been viewed as a word with negative connotations that patients obey the prescribed treatment plan as given and do not contribute to their treatment decision (Vermeire et al., 2002), while 'concordance' may imply that the prescriber and patient should come to an agreement about the treatment that the patient will take (Aronson, 2007). Therefore, the word 'adherence' is used in this report and in the following discussion because it is common in the literature and less theoretically loaded, meaning that it is simply related to whether patients take their pills or not, but not how this is achieved.

Researchers found that in studies of non-drug interventions, hospitalised patients and patients suffering from acute pain episodes subsequent to discharge may spontaneously

practise non-drug techniques to manage their post-operative pain. For example, Pellino et al. (2005) reported that between 19 and 28 percent of patients in the usual care control group used non-drug techniques such as deep breathing, music and meditation to manage their pain during the three post-operative days. Another study completed a secondary analysis by using data from 34 breast cancer patients who were recovering from surgery reported an increase in non-drug interventions among patients after discharge, particularly relaxation techniques (breathing, imagery, music, and meditation), and most participants used these non-drug interventions use together with their medication (Kwekkeboom, 2001).

Although evidence has shown that surgical patients may spontaneously use a variety of non-drug interventions, particularly psychological techniques to manage their pain better, evidence that describes the factors which may influence the adherence to brief psychological interventions in order to manage post-operative pain are very limited in comparison with the large body of research that has addressed patients' non-adherence to medical treatment (DiMatteo, 2004; Timmerman et al., 2016).

People's perceptions may form barriers which influence their acceptance to brief psychological interventions as methods to manage pain. Such perceptions could be associated with their self-efficacy and prejudice about psychological treatment generally which may consequently affect the delivery of these interventions in practice.

With this in mind, a summary of potential barriers that are more likely to predict patients' acceptability to brief psychological intervention and may influence the delivery of these interventions in practice was provided. The suggested factors are patients' lack of knowledge of various pain management approaches, the role of stigma related to psychological treatment and the influence of patients' emotions in their treatment adherence to psychological interventions. In this chapter, I also discussed numerous motivations for this study. The evidence was retrieved from various areas of literature on chronic pain and self-management programmes and from mental healthcare services.

Perceived Barriers to Practise Psychological Interventions

Patients' Lack of Knowledge

A potential barrier to the adaption of brief psychological intervention is the patient's lack of knowledge. Patients with different pain experiences such as burn patients (Yuxiang et al., 2012), cancer patients (Kirk, Kirk, & Kristjanson, 2004) and patients with chronic back pain (Verbeek et al., 2004) have revealed their desire for more information about managing their pain. Furthermore, patients undergoing surgery have rated the type of information that they need before surgery. A study by Kastanias et al. (2009) explored the content of information that adult surgical patients really considered important in terms of post-operative pain and pain management. Researchers conducted a telephone survey which included 150 patients from different units within 72 hours after they were discharged from a general day surgery. Most patients had eye, knee arthroscopy, hand and the minority had orthopaedic, hernia, ankle or other surgeries. This survey included three main pieces of information, namely, general information about pain, information about side effects of medication and information related to leaving hospital. Patients' answers showed a high importance for pain and pain management information, particularly for information associated with managing pain after discharge. Another study investigated what patients want to know about patient-controlled analgesia (PCA) (Chumbley, Hall, & Salmon, 2002). Researchers established what information patients wanted to know about PCA from seven focus groups, and then analysed patients' views and included them in a leaflet; subsequently, the information was combined into a new leaflet. Following this, the researchers randomised 100 patients to receive either the new or the current leaflet in order to discover if the new leaflet was clear and informative. Results from the focus group revealed that patients wanted more information about the drugs that are used in PCA, and the side effects. Patients also wanted reassurance that the drugs are safe and that they could not become addicted or overdosed. Additionally, the questionnaire revealed that the new leaflet was clearer and more informative. Patients' responses to previous studies indicated that they still need more information, not only on how to manage their pain effectively, but also on the safety of their pain medication use. Furthermore, if patients still require more information on conventional treatment which has been practised for a long time, it is possible that they also may need more information on non-drug intervention.

Patients may not always be satisfied with the pain relief they receive. Alami et al. (2011) explored patients' and physicians' views of knee osteoarthritis (OA) and reported that patients felt that their feelings are not taken seriously by physicians who acted as technicians because they are pay more attention to the knee rather than to the person. Patients in this study considered that insufficient time is spent on information and counselling, and reported negative views on drugs which led them to give less adherence to their medication and to seek alternative treatment such as acupuncture, osteopathy, homeopathy, naturopathy phytotherapy and Shiatsu. According to the Oxford English Dictionary, phytotherapy means the use of plants and plant materials for healing, rejuvenating or other therapeutic properties, and Shiatsu therapy is a form of Japanese-based therapy on the same principles as acupuncture, in which pressure is applied to certain points on the body using the hands.

Additionally, patients interviewed by Alami et al. (2011) mentioned their motivation for seeking alternative treatment was because medical doctors had little to offer. For example:

> *"I have had my current GP for two years now, and I had a family GP before that. He was my GP for a very long time. but the he took things lightly, so I stopped seeing him. He entered into the room; he took my pulse, listened, and nothing else. He never changed his views: he was not really active. He did not make me do any blood tests, X-rays… If I wanted one, I had to ask".*

The findings of Alami et al. indicate that patients suffering from chronic pain are willing to try alternative approaches to relieve their pain, if healthcare providers have offered them much information or more options to cope with pain. Other studies have revealed the positive views to practise non-pharmacological interventions among ICU/hospitalised patients (Gélinas et al., 2013). Gélinas et al. conducted eight focus groups, including two groups of patients and their families (n=6) and six groups of ICU nurses (n=32). Interviews explored participants' views of non-pharmacological intervention for pain management. The study revealed that 33 non-pharmacological interventions were discussed. The interventions were categorised into three parts; firstly was the cognitive behavioural interventions including music therapy, distraction, simple relaxation, meditation, and hypnosis. Secondly was the physical intervention including massage exercise, positioning, reflexology and therapeutic touch. Thirdly was the emotional support intervention including active listening, emotional support, hope instillation, reality orientation, and family presence facilitation. The top four

interventions that were perceived to be useful and feasible by most participants were music and distraction therapy, simple massage and family presence facilitation. This indicated that hospitalised patients were willing to participate in non-pharmacological intervention, including psychological interventions to relieve pain, if these interventions were recommended to them.

It is important to mention that different types of complementary and alternative treatment (CAM) became more popular among different populations. For example, herbal medicine and massage were the most comment CAM used in the UK (Posadzki et al., 2013), dietary supplement and yoga in the US (Clarke et al., 2015), biological-based therapies and mind-body techniques among Malaysian patients (Dhanoa et al., 2014), and spiritual type such as prayer and reciting Quran, and herbs among Saudi population (Alrowais & Alyousefi, 2017). This means that despite the variations in the prevalence of CAM among different populations, the utilisation of CAM become more acceptable which may indicate their potential acceptability to brief psychological interventions, especially when information is provided by healthcare workers.

The Role of Stigma

Stigma related to psychiatric treatment or mental illness could be a potential cause for reluctance to seek help or support from psychological services. Recently, it has been suggested that stigma has a role in the development of practice-oriented conceptual model in order to understand the reluctance to discuss and admit pain among chronic pain sufferers (Cagle & Bunting, 2017).

Evidence from counselling research has revealed that stigma could be a barrier which influences people's acceptance or willingness to seek psychological help for various problems. For example, Vogel et al's. (2005) research investigated the role of attitudes in mediating relationship between the following 11 psychological factors: social stigma, fear of treatment, self-concealment, anticipated utility, anticipated risk, social norm, distress, social support, previous therapy, gender of participant, and the intention to seek help for three problems, namely, interpersonal matters, academic issues and drug/alcohol issues. Attitudes toward seeking psychological help was measured by a shortened 10-item version of Attitudes Toward Seeking Professional Psychological Help Scale, where the items were rated on the four-point Likert-type scale ranging from one (disagree) to four

(agree), with higher scores reflecting more positive attitudes. The researcher reported that attitudes toward counselling mediated most relationships between the psychological aspects and the intention to seek help. Furthermore, the psychological factors and attitudes were strong predictors of the intention to seek help for interpersonal problems and for drug issues. Moreover, a recent meta-analysis which included qualitative and quantitative studies has investigated the impact of, and the association between, mental health-related stigma and seeking help for mental health problems (Clement et al., 2015). Outcomes that measured all type of stigma such as self-stigma, public stigma, mental health related to stigma and seeking help for mental problems were included. One hundred and forty-four studies were included in the review which revealed the connection between stigma and seeking help. The median association between stigma and help-seeking was a small to moderate negative-sized effect on seeking help (d= -0.27) and stigma was the fourth highest ranked barrier to seeking help, with disclosure concerns the most commonly reported stigma barrier.

Further to the influence of stigma on seeking help for health problems, the intervention labelling also appeared to have an impact on the results of the intervention. Evidence from experimental studies has shown the association between the intervention label and the results of this intervention. A study by Gandhi and Oakley (2005) indicated positive outcomes of the intervention when labelled as hypnosis versus relaxation. Researchers investigated whether hypnotic inductions continue to be effective when not labelled as 'hypnosis'. Findings from this study revealed that hypnotic procedure produced a modest increase in suggestibility when it was labelled as 'relaxation', but a considerably significant increase if it was called 'hypnosis'. Another study by Hylands-White and Derbyshire (2007) assessed the effectiveness of hypnotic suggestibility on the experience of pain (cold-pressor) (Study1) and the effects of labelling intervention as 'hypnosis' or 'relaxation' on pain experience (Study2). The results of Study1 showed that pain experience increased with hypnotic suggestibility during the performance of a visual distraction task. However, when the task was not performed there was no relationship between hypnotic suggestibility and pain experience. In Study 2, the use of the label 'hypnosis' to describe a relaxation recording increased feelings of being hypnotised and reduced pain experience relative to the same recording being labelled 'relaxation' outside the task involvement.

The overall indications of these studies are that although people may harbour particular beliefs or concerns regarding psychological terms which may prevent them from seeking

help, findings from experimental research have shown that labelling psychological intervention as hypnosis techniques should not be problematic; moreover, it could have a positive influence on pain intensity. However, the investigation of patients' opinions on psychological interventions as pain relief strategies may need to explore whether patients would be affected by the stigma of psychological treatment or whether they would be more open to try psychological pain management approaches.

The Role of Emotions

People may underestimate the importance of psychological interventions because they are unaware of their need of them. Although such people are not in pain, they do not realise how helpful psychological intervention could be. People's decisions to engage in any health intervention or health behaviour may be influenced by their current emotional state. When people are in a neutral or 'cold' emotional state they underestimate how they would feel in an effectively arousal 'hot' emotional state. This is known as the empathy gap (Loewenstein, 2005). Many medical decisions involve intense affective states such as fear, anxiety, pain and discomfort. Since these emotions change over time, the situation of 'hot-to-cold' empathy gaps is likely to emerge (Loewenstein, 2005). For example, a person who has just finished his meal, who decides not to have the next meal, may be likely to underestimate the impact of being hungry in the future because the judgment is made when he is in the not hungry 'cold' state.

Empathy gaps have been investigated in many areas such as addictions (Sayette et al., 2008), impulsive eating or hunger (Nordgren, van der Pligt & van Harreveld, 2007), and social pain (Nordgren, Banas, & MacDonald, 2011). In a study by Sayette et al. (2008) to explore the influence of empathy gaps, researchers recruited 98 smokers and assigned them to one of three conditions in order to investigate the effect of 'hot/cold' empathy gaps. The first was a hot group during a high-craving first session, and participants made predictions about a high-craving state in a second session. Secondly, there was a cold group during a low-craving first session when they made predictions about a high-craving state in a second session, and the third group was a comparison group, where they experienced a high-craving session only. Findings revealed that in contrast to smokers in the 'hot' group (craving) and smokers in 'cold' group (non-craving) under-predicted the value of their smoking during the second session.

Yang et al. (2012) suggested the application of a triangular framework consisting of three aspects that could explain peoples' engagement to healthier choices and avoid risks or pitfalls, which are 'colder', heuristics and visceral states which represent 'hot' states.

Although evidence of the influence of empathy gaps in pain management is limited, a study by Sanders et al. (2013) indicates the possible effect of patients' emotional status in their adherence to medication. Researchers of this study aimed to determine if pain-related factors and non-pharmacological interventions affect medication adherence among cancer patients in community-based hospices. Telephone interviews were completed during two time points which involved 65 patients. The study revealed that although the overall mean pain medication adherence scores for all patients were high (8.43 at (T1) and 8.38 at (T2) of maximum 9, data provided statistical evidence that patients with more hours of controlled pain in the past 24 hours were more likely to have had better adherence, whereas patients with higher levels of comfort over the last few days were more likely to have had worse adherence. This study may indicate that when patients feel more comfortable and their pain not severe ('cold' state), they are more likely to be unwilling to adhere to any treatment intervention. Contrastingly, patients who are in pain or in a discomfort state ('hot' state) might be willing to engage with any approach to relieve pain, such as psychological intervention.

Potential Motivations to Engage in Psychological Intervention

Identifying motivational features which may influence patients' acceptance of psychological techniques in clinical settings is equally important as identifying barriers to such intervention. A review of the self-management research strategies that applied with chronic pain patients has identified numerous factors which may predict the motivations of patients' health behaviour. Besides patients' attitudes or beliefs in pain and pain medication and their perceptions of related risk and benefits of treatment, their intention was identified as being a strong predictor to change/promote health behaviour and components such as self-efficacy and perceived behavioural control (PBC). All these factors are demonstrated below.

Concerns about Conventional/Pharmaceutical Treatment

Brief psychological intervention could be a strategy whose benefits patients might appreciate. This is because evidence from previous research and from my data (see Chapter 4) has indicated that patients have concerns regarding the risk of pain medications such as addiction, tolerance and side effects. Therefore, if patients believe that the practice of brief psychological interventions for pain relief is helpful and has a lower risk, such intervention would be applicable in practice.

Numerous studies have confirmed that patients' high rate of concern about medication reduced their adherence to treatment medication (Rob Horne et al., 2013). Fears of side effects or of becoming addicted or developing a tolerance for pain medication were the most common reasons for patients' concerns or negative attitudes toward pain medication, as mentioned in many studies (Berry, Bradlow & Bersellini, 2004; Eriksson, Wikström, Fridlund, Årestedt & Broström, 2016; Lewis, Combs & Trafton, 2010; Neame & Hammond, 2005; Sale et al., 2006). Neame and Hammond (2005) investigated patients' beliefs and concerns regarding medicine. Researchers conducted a cross-sectional survey administering the Beliefs about Medicine Questionnaire to 344 people with rheumatoid arthritis in order to investigate the factors related to particular beliefs regarding their medications, as their beliefs influence their adherence. Findings revealed that three-quarters of the participants had positive beliefs about the necessity of their arthritis medications, but their level of concerns about potential adverse effects of medication, particularly the long-term effects was higher and associated with helplessness and non-adherence (Neame & Hammond, 2005). Moreover, patients from Eriksson et al's. (2016) study which applied a critical incident technique analysis expressed their concern about side effects; for example, a quote 'it [analgesics] does not help against the pain, I refused a couple of times and said, "I do not need more morphine for I will become weird in the head"' Furthermore, a study by Sale et al. (2006) explored the experience of adherence to pain medication by interviewing 19 older adults with osteoarthritis. The patients' responses revealed their reluctance to take painkillers, and when they did, they generally took a lower dose or frequency than that which was prescribed; moreover, they claimed to have a high pain tolerance. Researchers assumed that this is because of their fear of addictions to pain medications. Results from these studies addressed people's avoidance behaviour towards painkillers or pain relief which may be a motivation to try a different pain relief approach with fewer side effects.

Moreover, other studies have indicated whether or not patients may be willing to adhere to treatment depending on their beliefs of the necessity of the treatment or the seriousness of the disease (DiMatteo, Haskard & Williams, 2007). This led to the next point which discusses their understanding of the risks and benefits of treatment and to what extent this would motivate them to use other options to relieve pain.

Risks and Benefits of Treatment

Patients are aware of the related risks or benefits of treatment; for example, they intend to use medicine associated with lower side effects compared to other medicines. Otherwise, if patients perceived pain treatment as being more risky to their health (causing ulcers or cardiac impairment) than the perceived benefits (pain relief), they may be more willing to use other pain relief options that could be safer or have a lower risk.

For example, a study was conducted among knee osteoarthritis patients to investigate their medical treatment preferences for knee osteoarthritis (nonselective NSAIDs, COX-2 inhibitors, opioids, Glucosamine and/or chondroitin and Capsaicin) (Liana Fraenkel, Bogardus, Concato & Wittink, 2004). Researchers discovered from this study that patients preferred medical treatment (Capsaicin) which is associated with lower adverse effects such as nausea, diarrhoea, constipation and gastrointestinal ulcer, even if this treatment was described as being less effective than other types of treatment in relieving pain (Liana Fraenkel et al., 2004).

Furthermore, findings from clinical studies have emphasised that patients are willing to trade-off their medicine or reduce the dose or frequency because of the side effects that may accompany their prescribed medicine. Milder et al. (2010) interviewed 15 arthritis patients to explore their perceptions of the risk related to their use of oral non-steroidal anti-inflammatory drugs (NSAIDs) for their osteoarthritis. The risks associated with these drugs could be gastrointestinal, ulcerations, myocardial infraction or cardiac impairment. The study revealed that although some patients engaged in a process of balancing risks and benefits, most were unware of the particular adverse effects of using NSAIDs, and viewed themselves as having a low risk of experiencing any of the adverse effects related to these drugs. They explained their attitudes to risk in two ways: firstly, patients transferred the responsibility of considering any specific risks related to these drugs to their GP, thereby assuming that their GP would not prescribe any unsafe

medicines. As one participant said: '… a lot of people don't read the fine print about anything do they… they trust their faith in the prescribing GP to have read it for them and say ok'. Secondly, most were aware of the general risks of taking medications and described medicine as addictive or a bunch of chemicals or poisoning, but are aware of the specific risks of NSAIDs. Moreover, they believed that by reducing the medication dose they would be protected from the adverse events (Milder et al., 2010).

Evidence has indicated that patients may be sensitive to possible side effects of treatment and may place greater weight on them when choosing treatment. Fraenkel et al. (2002) surveyed 100 arthritis patients who were asked to rate their willingness to take a medication associated with 17 specific adverse effects by using a visual analogue scale. Thirty-five percent of patients were unwilling to accept the risk of cosmetic changes, and 38 percent were unwilling to accept the risk of temporary discomfort, whereas 45 percent were unwilling to accept the risk of major toxicity. Although almost half of the patients who were unwilling to accept the risk associated with this treatment, findings of this study revealed that patients who had previously experienced adverse effects from treatment were more willing to accept the risks compared with those who had not experienced adverse effects of treatment. Similarly, Berry et al. (2004) measured the perceived risks and benefits of medication from a cross-sectional survey of 81 patients (44 already existing vs 37 new attended patients) with arthritis. The primary perceived benefits of medication were reduction of pain, stiffness and swelling, and the main perceived risks were side effects and concerns of being dependent on drugs; also 31 percent of the total number of new patients and 25 percent of the total number of patients ceased their medications because of side effects. However, their level of perceived risks of treatment was at a modest level and they were willing to tolerate the side effects and to take the medication. It is possible that those patients may be desperate to relieve their pain, which forces them into accepting the risk of treatment. This could be an indication of their willingness to accept any available pain treatment including psychological interventions which has low adverse effects.

Health Behaviour Changes Constructs

Patients may hold beliefs and attitudes about pain and pain treatment that could influence their expectations on treatment outcomes, or affect specific health behaviour

which would have a positive or negative impact on their intention to engage in or adhere to specific treatment intervention. Many social cognition theories of changing health behaviour such as the Theory of Planned behaviour (TPB) emphasise that intention is a strong predictor to changing unhealthy behaviour such as poor diet, or to engage in healthy behaviour such as physical activity (Schwarzer, 2008). It also emphasises the role of attitudes (their way of thinking or feeling about performing specific activities whether negative or positive beliefs i.e. practicing psychological interventions) and perceived behavioural control (PBC)/self-efficacy (their confidence in their own ability to perform or not perform particular behaviour) which can mediate or influence the relationship between intention and health behaviour (Schwarzer, 2008). Much research applied these constructs of health beliefs with different types of health behaviour such as engagement in physical exercise, quitting smoking or breast self-examination (Conner & Norman, 2005). However, research explored the role of these constructs in predicting changes in self-management interventions is limited.

Damush et al. (2016) investigated the longitudinal effects of pharmacological and behavioural intervention on self-efficacy to manage patients' symptoms and investigate the effect of self-management behaviour on the intensity of musculoskeletal pain and depression. The analysis showed that at 12 months, patients increased their time performing self-management behaviour including stretching and strengthening exercises, progressive muscle relaxation and visualisation. Participants reported greater self-efficacy in managing their pain and depression.

According to the research findings, I note that practising brief psychological intervention might encourage patients' PBC and increase their self-efficacy by training, consequently increasing their motivation to adhere to psychological interventions. This will be discussed in detail in the final chapter. Furthermore, Damush et al's. (2016) study addressed the point that the effects of psychological interventions cannot be isolated from those of physical interventions such as exercise and stretching, which indicates the importance of including psychological intervention in the package of pain management protocol.

Moreover, the exploration of barriers to practise brief psychological intervention among patients may reveal essential constructs that would help me to form an intervention-based theory to be more effective (which will be explained in details later in Chapter 8).

Motivations of the Qualitative Study with Patients

The principal motivations for this study are as follows:

- To discover if the barriers presented in the report; for example, lack of knowledge of psychological interventions to be used as pain relief strategies, stigma and so on, are similar to what I shall find.
- Conducting this study may enhance the understanding of the barriers related to psychological intervention which may be used to develop intervention which could be acceptable and used by most patients.
- This study may expand our understanding by exploring the role of the cultural differences between UK and Saudi patients' perceptions, opinions and attitudes on pain and pain relief, particularly their views on psychological intervention to relieve pain.
  Evidence has indicated that complementary and alternative treatment is popular in UK and Saudi cultures, and used by patients and healthy people for various reasons, in addition to the increase of the use of CAM (Posadzki et al., 2013; Alrowais & Alyousefi, 2016). Therefore, it may be worth exploring the influence of the differences between these cultures on their preferences and views on psychological treatment as pain management.

Pain Relief and Healthcare Professionals' Attitudes and Beliefs

As aforementioned, several brief psychological techniques may be effective for postoperative pain. These techniques, including music, relaxation, and positive suggestions, appear to reduce pain intensity and pain-related anxiety. However, they are not widely implemented in general practice in the UK.

The National Institute for Health and Clinical Excellence (NICE) UK guidelines are associated with post-operative pain management for adults, that is post-operative pain management. Best-practice statement (Scotland NHS, 2004) indicates that less attention has been paid to the role of psychological intervention in managing post-operative pain compared to the efforts and research which were dedicated to medical or drug intervention. However, the objective of a recent report by the American Pain Society was

to update the guidelines for post-operative pain management (Chou et al., 2016) and to review the literature of different approaches, including pharmacological and non-pharmacological techniques that were used to manage post-operative pain. In a review of the literature related to the effectiveness of psychological intervention, Chou et al. report that the quality of evidence which supports the effectiveness of such intervention was moderate. However, they gave no strong recommendation to apply these techniques in practice, but recommended more research. Consequently, it appears that some evidence has been established for the effectiveness of psychological intervention for post-operative pain management, but further considerations are needed regarding why these techniques are not delivered effectively in general practice or offered to patients more widely. For, example, Chou's report indicated that although psychological intervention is promising in the relief of post-operative pain, they were concerned about recommending such intervention due to a lack of substantial evidence that ensures the stability of the findings.

As aforementioned (pain and patients), patients' attitudes towards psychological techniques for pain varies widely. Although some practise simple psychological techniques spontaneously; for example, relaxation and distractions techniques, others reject the notion that psychological processes are important for pain relief. These opinions could limit the adoption of psychological intervention. If healthcare professionals believe that some patients do not value or would reject psychological treatment, they may be discouraged from offering them. However, it is possible that HCPs are themselves ambivalent about psychological intervention for pain, or harbour attitudes which make it less likely that this will be offered to patients or prioritised for service development.

Healthcare Professionals' Knowledge

It could be noteworthy to explain the reason for discussing healthcare professionals (HCPs) as a single group. Since pain is a complex experience that involves multifactorial causes, it is difficult for pain management to be the responsibility of one specific group of HCPs, such as doctors only, nurses only or consultants only. Consequently, it has been noted that an effective pain management plan requires the involvement of multidisciplinary teams of HCPs, including consultants in pain medicine and other

consultants in a different anatomy, such as: orthopaedic surgeons, neurosurgeons, nurses, psychologists and psychotherapists, physiotherapists and occupational therapists. This team needs to work in a single homogenous unit in order to deliver an effective combined plan of pain management to patients (Collett & Rockett, 2015).

HCPs such as anaesthetists, doctors, nurses, physiotherapists and psychologists have a major responsibility towards managing patients' post-operative pain. Their responsibilities include accurate assessment of patient's pain, improved treatment plan and continued regular adjustment of treatment plans as required (D. Gordon et al., 2005). At this point, it is important to consider the fact that HCPs may have different opinions of pain which may result in different opinions of pain treatment. For example, some HCPs may regard the pain experienced by patients as incidental in the sense that pain is a symptom of disease or injury, or as a reaction to treatment. Other HCPs, particularly pain specialists, regard pain as the principal focus of their practice.

Some evidence may support this concept that HCPs differ in their understanding of pain aetiology and their approaches to management which depends on their professional area or speciality. For example, conceptions of neurobiological underpinning of pain have changed considerably in the past 20 years, and this may not have been reflected to any great extent in HCPs training, although some HCPs may have access to new data in order to update their knowledge. An older survey by Lebovits et al. (1997) was conducted in order to evaluate pain knowledge among different HCPs (N= 686, nurses, physicians, pharmacists, and medical/nursing students from three hospitals) and to determine the factors that could influence their pain knowledge such as hospital setting, years of experience, country of origin. In a 17-item questionnaire which assessed HCP's pain knowledge, the overall percentage of correct scores was relatively low, at 56 percent. Physicians, particularly anaesthesiologists, scored significantly higher and pharmacists scored significantly lower; and among physicians, anaesthesiologists scored significantly higher than all other physicians whose professions were in other areas. Furthermore, nurses' scores were significantly less concordant than those of physicians on 11 of 17 items. Overall, the study indicated significant deficiency in their pain knowledge and demonstrated the differences among healthcare providers' knowledge of pain and pain management and how experience may be important.

A more recent survey reported by Al-Shaer et al. (2011) was conducted among 129 registered USA nurses from different specialist areas in order to assess pain knowledge

and attitudes regarding pain assessment and management. The authors scored respondents on a categorical letter system ranging from A (90-100, 13.9%) to D (60-69, 9.3%). Most nurses (N= 61) earned a letter grade of 'B' in their pain knowledge survey. However, findings indicated a significant influence of factors such as length of practice and unit of work on their pain assessment and practice. They discovered that nurses who had at least 16 years' experience on a unit had more knowledge of pain assessment and management than those who had only one to five years on that unit. Moreover, nurses working in oncology units were significantly more knowledgeable when compared to nurses from all other units. This study also indicated the variance among nurses in pain knowledge, assessment, and management.

Similar results were reported in an Arab context; for example, among Jordanian nurses (Al Qadire & Al Khalaileh, 2014). Al Qadire and Al Khalaileh (2014) organised the 40-item questionnaire of knowledge and attitudes regarding pain among 211 nurses from four different hospitals in Jordan. It was discovered that nurses reported lower levels of pain knowledge than was reported in other international surveys. The average correct score was 19.3 out of 40. Furthermore, 52 percent of nurses reported no previous pain education in the past five years. Although this study did not find significant variation in knowledge or attitudes related to nurses' gender or level of education, it was discovered that nurses who were exposed to previous pain education reported higher mean scores on the questionnaire.

Therefore, the standard to which HCPs improve their knowledge of pain management depends on their specialities and on having proper training for pain management which forms an essential part in the patient's treatment plan. It is worthy of mention that the curricula of pain education in medical college is insufficient to prepare medical students to assess and design care plan for patients competently with acute and chronic pain in practice (Tauben & Loeser, 2013). This could result in variability in the practice of pain management; for example, Green and Wheeler (2003) conducted a survey to investigate the variability in physicians' attitudes and knowledge as well as the influence of that in their decision-making in acute post-operative and cancer pain. The survey included 368 physicians who provide clinical care for patients with acute post-operative and cancer pain. Their findings implied that education and work experience could influence their decisions in the prescription of pain management treatment to patients in these clinical situations. Those who reported more pain education ,and physicians who had clinical experience treating pain reported better pain management choices overall (Green &

Wheeler, 2003). Moreover, evidence continues to emphasise the insufficient knowledge on pain management among HCPs (Francis & Fitzpatrick, 2013; Nuseir, Kassab & Almomani, 2016; Watt-Watson et al., 2002), which may cause inadequate pain relief. Watt-Watson et al. (2002) assessed the relationship between nurses' knowledge and pain management outcomes by assessing nurses' pain knowledge (N= 94) from three different hospitals, together with assessing pain in 225 patients from cardiac units on the third post-operative day. This revealed a critical deficiency in nurses' knowledge and misbeliefs about pain, and patients experienced moderate to severe pain. Although patients reported inadequate pain treatment, the analysis of this study showed no significant connection between nurses' knowledge and pain intensity and showed insufficient knowledge of pain among nurses (Watt-Watson et al., 2002).

Medical schools are probably not teaching pain as recommended by pain associations, and not providing sufficient information on this topic. This critique has been made by the team responsible of the development of pain curriculum in medical school. Their study showed that pain education among 117 medical schools in the USA and Canada were presented as part of general mandatory courses and did not cover many topics included in the International Association for the Study of Pain core curriculum (Mezei & Murinson, 2011). Furthermore, researchers stated that although medical pain curricula have been proposed for over 30 years, the time offered for pain education is brief and not integrated into case-based medical experiences (Tauben & Loeser, 2013). Moreover, it is possible that the efforts which seek to integrate social science and humanities into medical education are not always successful or could be still fringe topics. The importance of humanities to medical research and practice has become more recognised by most medical curricula and numerous studies have been conducted to suggest integrating humanities with medical education (Boudreau & Fuks, 2015; Kumagai & Wear, 2014). A lack of consistent delivery in the medical work environment can result in HPCs practising with variation in knowledge and attitudes about different subjects including pain management. For example, a recent study by Albert et al. (2015) indicated that the promises to integrate the interdisciplinary approaches within the academic medical research have still not been delivered in health research and in the work environment. The study concluded that most participants revealed that they changed their research practices, thereby resulting in a dissonance between the standard of academic excellence inherited from their training and from their new, amended research practices.

Research has consistently emphasised the insufficient knowledge of HCPs regarding pain management. This may be regarded as being a potential barrier, not only for adequate pain relief, but also a possible obstacle to accepting and implementing different approaches to post-operative pain including brief psychological interventions. This is because HCPs have been deficient in their pain knowledge in assessment and management, thereby indicating the possibility of their limited knowledge of other complementary types of treatment for post-operative pain. A study investigating registered nurses' knowledge and attitudes in pain management indicated that 49 percent of participants achieved the passing score of 80 percent or more, and questions related to pharmacology were the least likely to be answered correctly. Furthermore, the analysis showed a positive correlation between the scores of knowledge and attitudes about pain and the participants' level of education (Lewthwaite et al., 2011). This may indicate that generally, if nurses had insufficient knowledge of pharmacological treatment for pain management, with which they are meant to be more familiar they may be more likely to have limited or no previous knowledge of the possibility of using psychological interventions as strategies for pain relief.

In addition to HCPs limited knowledge of pain management, some researchers have identified that physicians' variability in pain management practices could be a barrier to achieving optimal pain relief for patients. For example, Nuseir et al. (2016) explored the knowledge of and attitudes to pain management among 662 HCPs from seven Jordanian hospitals. They assessed participants' knowledge and attitudes in a 16-item questionnaire with 'agree' and 'disagree' options. The questions were deliberately designed to discover common misconceptions of pain and pain management. Some examples of these questions are 'Giving narcotics on a regular schedule is preferred over giving them as needed (PRN) in the schedule for continuous pain'; 'A patient should experience discomfort prior to being given the next dose of pain meds'; 'When a patient requests increased amounts of analgesics to control pain, this usually indicates that the patient is psychologically dependent'; 'The most accurate judge of the intensity of the patient's pain is the patient'; 'For effective treatment of cancer pain, it is necessary to assess the pain continuously, as well as the efficacy of the therapy'; 'Staff can always pick up cues from children that indicate that they are in pain'; 'The most suitable dose of morphine for a patient in pain is a dose that best controls the symptoms; there is no maximum dose'; 'It may often be useful to give a placebo to a patient in pain to assess if he/she is genuinely in pain'; 'Lack of pain expression does not mean lack of pain'. Physicians and

pharmacists were substantially more often correct (36%, 73/202 and 22/62), respectively than nurses (24%, 95/394). The highest knowledge scores were among physicians, followed by pharmacists particularly in the area of cancer pain management. However, the overall percentage of incorrect answers in the questionnaire was surprisingly high (70%) although the questions were not technical or difficult. The mean number of total correct answers was 6.52, and none of the HCPs answered all the questions correctly. This indicated insufficient knowledge of pain assessment and management in general.

Another survey conducted by Kheshti et al. (2016) using a 46-item questionnaire (23 true and false questions, 9 multiple-choice questions, 12 questions using the Likert scale, and 2 case study questions) to investigate the differences in knowledge, attitudes and practice in chronic pain management among 99 medical residents (junior doctors in the UK medical system) and 114 nurses. Medical residents' mean score was 51.2 percent while nurses scored only 36.1 percent.

Moreover, researchers have continued to investigate healthcare providers' knowledge of and attitudes towards pain and have addressed some factors which may be accountable for the variations in their pain management practices such as their personal experience with pain and their work experience or speciality. For example, a study by Kiekkas et al. (2015) investigated the knowledge of and attitudes to post-operative pain in a sample of 182 registered and assistant nurses from different departments in the hospital using a three-section questionnaire. Part of this questionnaire was modified from the Knowledge and Attitudes Survey Regarding Pain (KASRP) for post-operative pain. Despite the low scores shown by nurses in the questionnaire, the researchers found that nurses who had personal experience with pain, being registered nurses and in continuing educational programmes, achieved higher scores in the questionnaire compared to other participants. Another study by Latina et al. (2015) investigated pain knowledge and attitudes among 286 nurses providing healthcare assistance in three different settings: intensive care unit (ICU), sub-intensive care unit (SICU) and in ordinary ward (OW). Findings showed lower scores of the overall correct answers to KASRP among nurses (OW 54%; SICU 55.5%; and ICU 58%) and highlighted that the satisfactory level of knowledge was better among ICU nurses, and SICU and ICU nurses had 'good assessment' compared to those in OWs.

A growing body of research has recommended improvements in the education of HCPs in order to increase knowledge of modern pain management approaches (Argyra et al.,

2015; Neumann, 2017). For example, a quasi-experimental pretest and posttest study utilised an evidence-based practice project (an educational session) to measure 20 nurses' knowledge of and attitudes to pain and pain management while working in an orthopaedic setting (Neumann, 2017). The results reported the efficacy of the pain educational session and the author recommended the adaption of educational pain management sessions in order to enhance patient's experience. This study could be an attempt to motivate HCPs to consider exploring different pain management approaches.

Professionals' Misunderstanding of Patient's Pain

Guidelines for post-operative pain management recommend that a plan to relieve post-operative pain should be adjusted or tailored to each patient (Chou et al., 2016; D. Gordon et al., 2005). In order to meet this recommendation, a better understanding of patients' pain is required as HCPs should empathise with patients' pain and take it seriously as a treatment target. Some studies have indicated that nurses continue to underestimate patients' pain, and fail to place sufficient emphasis on explicit verbal reports of pain, but rather, they rely on informal assessments based on patients' behaviour which is known to be highly variable and not strongly correlated with verbal reports. For example, a study by McCaffery et al. (2000) investigated nurses' personal opinions of patients' pain and their influence in decision-making about assessments and treatment to relieve severe pain. Researchers assessed the nurses' responses towards two patients' situations which were identical except for the patients' behaviour. One patient smiles and jokes while the other lies in bed quietly and grimaces. Findings revealed that nurses were influenced by patients' behaviour more than the patient's self-report of pain, particularly in the opioid doses where nurses are less likely to increase a previously safe but ineffective dose of opioid for smiling patients than for grimacing patients (McCaffery et al., 2000).

Another study in the Arab context discovered similar attitudes to and knowledge of pain among nurses (Eid, Manias, Bucknall & Almazrooa, 2014). Eid et al. (2014) assessed the knowledge and attitudes regarding pain among nurses (N= 593) who were working in three different units (acute care, intensive care and nursing education and administration settings) in a Saudi Arabian hospital. Their analysis revealed that nurses showed inadequate knowledge of pain and attitudes with a mean score of correctly answered

questions standing at 16.9 out of a total possible score of 40. Moreover, they under-estimated patients' pain intensity such as not giving the required dose of morphine to a smiling patient, although the patient was in pain.

Similarly, Sloman et al. (2005) surveyed a convenience sample of 95 patients and 95 nurses in adult surgical units from different hospitals in Israel. Pain was measured with the translated Short-Form McGill Pain Questionnaire (Melzack, 1987) and visual analogue scales for overall pain intensity, suffering, and satisfaction with treatment. The results revealed that nurses significantly underestimated all dimensions of pain included in the scales, although they did assess patient treatment satisfaction accurately.

Findings from these studies indicated that nurses failed to assess patients' pain accurately by relying on or selecting non-verbal signs only, which has not been recommended by the Agency for Health Care Policy and Research (AHCPR) as a validated instrument to measure acute pain (AHCPR, 1992). Consequently, HCPs may need to increase their awareness of better practice of pain assessment in order to manage post-operative pain effectively and subsequently be able to expand patients' alternative pain management options. However, reviewing evidence has exposed a shortfall in HCPs pain knowledge and attitudes and in using inaccurate pain assessment which usually causes an underestimation of patients' pain. These inadequate practices of HCPs may undermine the best efforts to explore other alternatives for pain management which may explain why brief psychological interventions are not recommended for patients. This is because patients' were not judged to be in significant pain, so the recommendation of psychological techniques could not be seen as required or necessary in this situation.

Personal Preferences

Modern medical practice places the patient at the centre of care, and autonomy and consent are judged critical to effective medical decision-making (Murgic et al., 2015). Nevertheless, personal attitudes and beliefs among HCPs are known to bias medical decisions. HCPs may practise types of cognitive bias regarding medical decision-making, meaning that their treatment decisions may not always be based on evidence (Croskerry, 2002; Dovidio & Fiske, 2012; Jeff Stone & Moskowitz, 2011). Therefore, their attitudes may be worth investigating. Saposnik et al. (2016) conducted a systematic review in order to explore the most common cognitive bias among HCPs and to evaluate the

influence of this cognitive bias on the accuracy of treatment and patients' outcomes. Twenty studies were included, and cognitive biases were identified in 19 situations which influenced diagnostic accuracy or suboptimal management, including overconfidence, the anchoring effect, information and availability bias, and tolerance to risk.

Furthermore, doctors may select different types of treatment intervention for themselves rather than for their patients; even if they thought that a particular treatment would help them, they do not take what they prescribe for their patients. Ubel et al. (2011) conducted a survey with two representative samples of US primary care physicians to explore their views on two clinical scenarios; namely colon cancer and avian influenza scenarios. Each included a better chance of surviving a fatal illness, but at the cost of a potential experience of unpleasant adverse effects. Participants were randomised into groups in order to indicate which treatment they would choose if they were the patient or they were recommending a treatment to a patient. Findings revealed that in comparison with their recommendation rates for treatment of their hypothetical patients, 24.5 percent and 48.5 percent in both scenarios, physicians were willing to choose the treatment with a higher death rate for themselves by 37.8 percent in the first scenario and by 62.9 percent in the second.

The one indication in this study is that HCPs may believe that they should act in the best interest of their patients in order to ensure their safety. However, if they see that drug treatment might cause more harm than benefit so that patients would be at risk by taking drugs, HCPs would probably prescribe psychological interventions more often.

Knowing the best for patients might require discussing the treatment options with them, including the risks and benefits of treatment, also including other available complementary and alternative treatments. Based on HCPs variability in knowledge and attitudes, this might have a considerable influence on patients' decisions to accept or refuse a particular treatment such as brief psychological interventions.

Summary of Evidence from Cross-Cultural Perspective on Pain Management

Practices of pain management have been widely investigated across various cultures. The influence of cultural factors has been found to influence the practices of HCPs and is more likely to affect medical recommendations. For example, Middle Eastern countries,

including Saudi Arabia, may adapt recommendations for pain management; for example, acute and post-operative pain that would fit more with their patients' diversity characteristics and needs (Ayad et al., 2011). In their article, Salti et al. (2016) have provided a summary of recommendations from the expert panel consensus for post-operative pain management in the Gulf region. This could be equivalent to the NICE guidelines for pain management that followed by Western countries such as the UK.

As aforementioned, evidence has shown the deficiency in HCPs' knowledge of and attitudes to pain management. SA HCPs have also shown similar indications for their knowledge of and attitudes to pain management and pain assessment; for example, a recent study by Albaqawi et al. (2016) investigated nurses' knowledge of and attitudes to pain management. The study applied an equivalent tool that had been used in previous research to measure knowledge of and attitudes to pain (KASRP) among 303 nurses from five different Saudi hospitals. The results revealed that irrespective of being local or expatriate nurses, the average correct answers to the questions was 41.75 percent which indicated a major deficiency in their knowledge of pain management and that they reported incorrect attitudes toward pain assessment.

Moreover, the evidence summarised above has shown that there are no significant differences in HCPs' knowledge of pain management and assessment across different cultures, including Western cultures and Arab clinical settings. A study by Eid et al. (2014) conducted in an SA setting (presented above) highlighted this issue among nurses working in SA hospitals. Furthermore, Francis & Fitzpatrick (2013) highlighted the limited knowledge of nurses regarding pain management and assessment in the US setting. This may indicate that if HCPs have limited knowledge of pain management generally, this may lead them to have limited or potentially no knowledge of the possibility of using a brief psychological intervention as part of post-operative pain strategies.

Regarding HCPs' different attitudes and views towards CAM that have been reported across different cultures, evidence generally shows that HCPs from cultures such as SA and the UK were inconsistent in their attitudes towards utilising CAM in their healthcare practices despite the increasing rate of using these types of treatment. For example, a cross-sectional survey conducted by AlBedah et al. (2012) included a random sample of 306 HCPs from 19 different hospitals in SA to investigate their attitudes to CAM in their practices. Researchers concluded that HCPs with a higher level of

qualification indicated better knowledge of CAM, the media being the main source of their knowledge. Moreover, HCPs generally yielded positive attitudes towards CAM particularly towards the religious practices of CAM, as recommended by their prophet Mohammed such as prayer, honey, medical herbs, Hijama, and camel milk and urine. Over 79 percent of physicians were ready to talk with their patients on CAM. From another perspective, although research showed a high prevalence of the use of CAM in European countries (Fischer et al., 2014), a qualitative study conducted by Maha and Shaw (2007) to explore NHS HCPs perception (N= 9) on CAM revealed different opinions towards CAM. HCPs' views and attitudes fell into one of three groups: 'enthusiast', 'sceptic' and 'undecided', but most were sceptic or undecided. HPCs also required more evidence-based practice of CAM.

Therefore, investigating the differences in SA and the UK attitudes and views on brief psychological intervention as post-operative pain strategies would help to discover potential factors that may play an essential role in delivering these techniques in practice.

Motivations for the Qualitative Study with HCPs

The main motivations of the study are as follows:

- A review of the previous research highlights numerous potential barriers to effective pain management among HCPs such as misconception of opioid prescribing (Wolfert et al., 2010), concerns about adverse effects, addictions, tolerance and death (C. S. Hwang et al., 2015). However, I have little direct evidence for the motivations of HCPs regarding brief psychological intervention for post-operative pain relief.
- As explored by research, regarding HCPs' attitudes to CAM, my research may help to explore more, such as barriers relevant to the acceptability and the implementation of brief psychological intervention in the context of post-operative pain management. Furthermore, it would investigate potential differences and similarities between the UK and Saudi culture.
- The treatment of acute post-operative pain is expensive, particularly when associated with factors such as the medication brand name (expensive medications), staying in hospital, type of surgery, and the type of pre-programme (intervention) patients have received during their treatment (Dalton et al., 2000).

Healthcare services are facing a critical issue of enhancing pain management protocols without an increase in cost. Although the provision of a comprehensive review of the cost-effectiveness of all available psychological pain management programmes is beyond the scope of this project, a brief summary of the cost effectiveness for such interventions is provided.

It has been established that psychological approaches play an important role in multidisciplinary and integrative approaches for pain management (Dusek, Griffin, Finch, Rivard & Watson, 2018; Golden, 2002). Psychological intervention can contribute greatly in terms of resource allocation and economic value of healthcare services; for example, by using self-help materials such as scripts or audiotapes. The cost-effectiveness of psychological intervention for pain management was evaluated in the context of chronic pain. Researchers discovered that psychological intervention for pain management is successful in reducing the use of healthcare services by patients (Pike, Hearn & de C. Williams, 2016). Moreover, psychological intervention can be cost-effective if delivered in a form of group session. In a randomised controlled study, Luciano et al. (2017) investigated the cost-utility of a group-based form of Acceptance and Commitment Therapy (AACT) in 156 patients with fibromyalgia compared to patients receiving recommended pharmacological treatment. They concluded that AACT was a cost-effective intervention compared with the usual recommended treatment for those patients. Moreover, patients' ignorance of prescribed medications after surgery can be considered a waste of healthcare resources and can influence the efficacy of pain management programmes. A recent systematic review by Bicket et al. (2017) investigated the use of opioids by patients after surgery. Researchers stated that among the six studies included in the review, 67 to 92 percent of patients reported unused opioids after surgery. Furthermore, all studies reported low rates of disposal, and in two studies, 73 to 77 percent of patients reported that their prescriptions are not stored in a safe locked containers after discharge. These findings may have some implications besides the importance of the growing awareness among patients of how to store and dispose of medical opioids safely, and the need for intervention that can be cost effective and more acceptable by patients.

Chapter 2 - Methodology

Introduction

The focus of this research is the exploration of the views on the effectiveness of brief psychological intervention as a pain management strategy among people who have experienced the substantial burden of pain (non-clinical sample) and people who underwent surgery (clinical sample). The previous chapter summarised the scope of this research by providing a brief overview of pain management practices. Furthermore, a summary of potential barriers and motivations to practice BPIs as pain relief strategies among patients and HCPs was noted in the previous chapter.

Objective of the Chapter:

Having finalised the research questions, the purpose of this chapter is firstly, to describe the methodology used to collect, analyse, and interpret data relating to perceptions, beliefs and attitudes towards brief psychological techniques as pain relief strategies among non-clinical participants and post-surgical patients. Its objective is also to describe the methodology used to collect, analyse and interpret data relating to HCPs opinions of brief psychological intervention as a pain management approach to be implemented in clinical practice.

Explanation for Research Methodology

Historically, research methodologies have been categorised as either quantitative or qualitative (Creswell, 1997). Researchers compared the data collected by these two methods and noted numerous strengths and weakness of both. For example, while quantitative data had the advantage of providing numerical data from large populations, the qualitative approach produces more detailed rich data from a small proportion of the population (Patton, 1987). Additionally, qualitative research most frequently originates from an interpretive framework and is usually informed by the belief that multiple

realities are shaped by personal opinions, context and meaning (Tariq & Woodman, 2013). Qualitative approaches are described as 'inductive' questions are which are often open-ended with the analysis allowing hypotheses to emerge from data. Furthermore, high-quality qualitative research can generate a robust theory which is applicable to contexts outside of the study area in question, helping to guide practitioners and policymakers (Tariq & Woodman, 2013). However, policymakers' plans required a large sample size to generalise the findings.

However, there has subsequently been an increasing amount of literature for utilising a combination of both quantitative and qualitative research methodologies known as 'mixed-methods research' (Gelo, Braakmann, & Benetka, 2008; Johnson & Onwuegbuzie, 2004). This method receives considerable support, not only in the social sciences research, from where it originated, but also due to its advantages, expanded into healthcare and medical sciences such as nursing, family medicine, social work, mental health and other disciplines (Wisdom & Creswell, 2013). These advantages included the ability to compare quantitative and qualitative data, reflection of participants' views, fostering scholarly interaction, providing methodological flexibility, collecting rich and comprehensive data that could not be addressed by applying the quantitative or qualitative approach alone (Wisdom & Creswell, 2013).

This sections presents a review of each of the three primary research methodologies: i) quantitative; ii) qualitative, and iii) mixed methods; as well as justification of the mixed-methods approach which was considered for this research.

Quantitative Research

The main concept behind quantitative methodology is 'quantity'. Quantitative research seeks to quantify or reflect with numbers and observations of human behaviour (Babbie, 2013). The quantitative method emphasises precise measurement, the testing of hypotheses and statistical analysis of the data (Babbie, 2013). The results of quantitative research can usually be explained in terms of relationships that can be tabulated or represented by simple graphs, normally by using an advanced software programme (Antonius, 2003). The nature of quantitative research is practical, and suitable for studying large numbers of people (Johnson & Onwuegbuzie, 2004).

The primary methods of collecting data in quantitative research are experiments and questionnaires (surveys), but such methods can involve complex experiments including multiple variables and techniques (Babbie, 2013).

Choy (2014) summarised the main advantages of the quantitative method as a survey approach as follows. Firstly, it can be administered and evaluated within a short time frame which saves the organisation time and effort as well as collecting the responses which can be tabulated in a short period. Secondly, the acquired numerical data by this approach enables comparison between groups or organisations and allows determination of the extent of agreement or disagreement. This is because the reliability of the data is critically evaluated and analysed. 'Generalisability' is one further advantage of quantitative data that can be used to extrapolate what might be happening across a wider population as long as there are sufficient numbers (Rahman, 2017).

Contrastingly, researchers identified several weaknesses in this approach, despite its wide application and contribution to research. For example, Carr (1994) claims that the nature of the quantitative method does not allow participants to express or explain their choices or the meaning that the questions may have for them. The lack of interaction between researchers and participants during the data collection can be addressed by applying the qualitative approach. Furthermore, quantitative research sometimes requires large sample sizes or several thousands of households, but the lack of resources which need to be included in the skills to conduct the research can sometimes be difficult (Choy, 2014). Moreover, this is no worse than having insufficient responses to provide reliable and valid data.

Qualitative Research

Researchers provided multiple views in the literature in order to describe qualitative research. For example, Babbie (2013) noted that qualitative research is a scientific method of observation to gather non-numerical information. The qualitative approach does not generally focus on one specific question, but rather considers the theoretical philosophical paradigm in a curious way and relies on critical social science to provide a specific point of view (Choy, 2014).

Unlike quantitative research, qualitative research focuses more on descriptions and explanations of behaviour, rather than on numbers. Qualitative research demands detailed descriptions of social practices or actions in an attempt to understand how and why an event happens (Lune & Berg, 2016).

The detailed description is usually collected by one of the following research techniques: interviews (one-to-one or focus groups); observations of participants and audio and video materials (Friedman, 2012; Lune & Berg, 2016). These techniques rely on the written or spoken word and convey a sense of richness of information that could not be extracted from table of statistics.

Interview is a qualitative research technique which collects data and in the literature, there are different types of interviews: face-to-face interviews which include unstructured, semi-structured and structured; group interviews; telephone interviews and internet interviews (Bolderston, 2012). Each type has its advantages and disadvantages and the use of one of these depends on the research questions and the aim of the study. In this PhD research, the semi-structured interview was the most appropriate technique of collecting data. This is because its format is flexible and the interview questions are set, but the interviewers are free to modify the questions during the interview according to the participants' thoughts (Bolderston, 2012).

The amount of the descriptive information produced by the nature of the data collected within the qualitative method requires particular approaches to be analysed and interpreted which differ from the approaches applied within quantitative methods. Grbich (2012) described a wide range of general and analytical approaches of the qualitative method that can help in analysing and interpreting the gathered information from participants or groups. Selection of the analysis strategy within qualitative methods is determined by the type of research questions and objectives (Grbich, 2012). It is not within the interest of this project to provide full details of these qualitative approaches of analysis or to interpret data. However, the justification for the selection of thematic approach would be applicable.

Thematic analysis is described as a method for identifying, analysing and reporting patterns (themes) within data which organises and describes the data set of the study in detail (Braun & Clarke, 2006). Thematic analysis differs from the other methods in that it seeks to describe patterns across qualitative data such as interpretive phenomenological analysis (IPA), grounded theory and content analysis. Studies based on IPA focus on

examining how people derive meaning from their life experiences in considerable detail, and place great attention on their personal accounts in analysing and interpreting data (Pietkiewicz & Smith, 2014). The more complex process of grounded theory is a systematic method of collecting and analysing data from social contexts with the intention of generating a theory (Urquhart, 2012). Although the GT approach has major advantages in building or establishing the required knowledge from the search, researchers may avoid bringing the burden of this theory to their data collection because it is such a complex method. Braun and Clarke (2006) noted that thematic analysis is required from the researchers to engage theoretical bases when analysing and interpreting the data if they do not wish to produce a full work of grounded theory. Therefore, the research questions of this PhD project are simple and do not require the construction or establishment of a theory. The question could be answered by simple research approach such as TA. Simple thematic analysis also differs from content analysis, despite the similarities in the way of searching for patterns and themes (Vaismoradi, Turunen & Bondas, 2013). The main highlighted difference between the approaches is that unlike thematic analysis, content analysis focuses more on quantifying the data which measures the frequency of different words, categories and themes in the content as this may imply significance in the interpretation of the data (Vaismoradi et al., 2013). Thematic analysis does not quantify data in this manner, and important themes are identified from the data by understanding which concepts are most meaningful to participants.

Pragmatism is a theoretical approach where a researcher uses the method most suited to answering a research question. Morgan (2007) stated that

"The great strength of pragmatic approach to social science research methodology is its emphasis on the connection between epistemological concerns about the nature of the knowledge that we produce and technical concerns about the methods that we use to generate that knowledge. This moves beyond technical questions about mixing or combining methods and puts us in a position to argue for a properly integrated methodology for the social sciences, p.73".

This body of work was focused on a pragmatic collection of qualitative data the better understand pain experiences and support techniques. This pragmatic approach made thematic analysis the most appropriate choice of methodology.

Mixed-Methods Research

This approach is considered as a result of the recognition of the weaknesses as well as the strengths of quantitative and qualitative research. Mixed methods is an integration between qualitative and quantitative methods. This is presupposed to provide more comprehensive data for research questions rather than using either quantitative or qualitative methods alone (Tariq & Woodman, 2013).

Mixed methods approach has been applied in healthcare services research and its contribution was recognised in health services research (O'Cathain, Murphy & Nicholl, 2007; Tariq & Woodman, 2013). O'Cathain et al. (2007) stated that mixed-methods research became common in health services research in the UK, and the necessity for this approach was driven by the need of pragmatic methods in order to help to explain the complexity in healthcare research which quantitative methods alone are unable to explain. For example, Doorenbos (2014) provided two examples of nursing research which applied the mixed-methods approach. The first example is 'understanding the pain management experience among American Indians, and the second is 'comparing the costs of two models for providing chronic pain care to American Indians'. The researcher reported the benefits of mixed methods in these examples. The triangulation design, which is one of the data collection design within mixed methods that refers to the application and combining of several research methodologies to support and strengthen findings from one methods with those of another (Denzin, 2007). The triangulation design was applied, enabling researchers to collect quantitative and qualitative data separately and combine them later. This approach was effective in the examples provided by Doorenbos (2014), thereby demonstrating specific benefits in understanding and the creation of a culturally congruent picture of chronic pain management for American Indians as well as the determination of a way to assess cost for providing chronic pain care (Doorenbos, 2014).

However, researchers may encounter some challenges when using mixed-methods research (Tariq & Woodman, 2013). Besides the philosophical inconsistency between the approaches that some quantitative researchers may claim, the application of mixed-methods research may need to develop a certain amount of knowledge of both quantitative and qualitative methodologies and allow sufficient time and effort to collect numeric and text-based data and to analyse them. Furthermore, the way of presenting

and integrating the data of mixed-methods research can challenge researchers (Bryman, 2007). The challenge that I may encounter in this project is whether I can combine the two approaches given that they come from very different theoretical backgrounds regarding the nature of scientific enquiry, which could be related to the beliefs about the nature of reality and humanity 'ontology' or relate to the theory of knowledge that informs the research 'epistemological' (Tuli, 2010). Despite the variance in the methodological framework, as thematic analysis is a pragmatic approach it can be easily combinable with quantitative data which is built on a pragmatic 'positivist' view of science.

Research Validity and Reliability

Research Validity

The criteria of validity concept originated from the positivism paradigm and is linked to the quantitative approach (Golafshani, 2003). Validity in research refers to the ability to give the intended precise measurement. Drost (2011) describes validity as being 'concerned with the meaningfulness of research components. When researchers measure behaviour, they are concerned with whether they are evaluating what they intended to measure'.

Researchers encounter a major challenge when attempting to establish the validity of their research, particularly in social science studies (Drost, 2011). However, researchers highlighted numerous methods of establishing the validity of studies in the quantitative approach. For example, Drost (2011) summarised the main types of validity researchers should consider in quantitative research, which are constructs validity, internal validity, and external validity. Each of these types is complex and requires a comprehensive description (see table A), which is beyond the focus of this project. However, it is worth mentioning them here as they are important methods of evaluating validity in quantitative studies.

Table A: ***Types of validity***

Type of validity	**Description**
construct validity	The extent to which a research tool measures the intended constructed behaviour, idea, or concept. It gathers different

	types of validity: face validity, content validity, concurrent and predictive validity, and convergent and discriminant validity.
internal validity	The extent to which the relationship within a study is casual, and avoiding confounding factors. The fewer confounders in a study is the high internal validity.
external validity	The extent to which the findings can be generalised to other setting, person or time.

In qualitative research, it is impossible to measure the validity of the interviews by the types of validity used in quantitative research. Therefore, different terms or synonyms appeared in the literature to explain the validity in qualitative research and to be more appropriate to the nature of this approach, such as credibility, rigour or trustworthiness (Hammarberg, Kirkman & de Lacey, 2016; Morse et al., 2002). 'Rigour or trustworthiness' refer to the quality and truth of data in qualitative research (Cypress, 2017). It is difficult to establish to value of trustworthiness in any setting and researchers can offer no comfort to the reader other than their personal guarantee that there is no reason to doubt the trustworthiness of the data collected from participants during their research. Pandey and Patnaik (2014) noted that trustworthiness involves: credibility which is similar to internal validity in positivist research; confidence in the truth of the findings; transferability which is similar to external validity and generalisability in the positivist paradigm showing that the findings can be applicable in different contexts; dependability which is equivalent to reliability in a positivist approach, showing that the findings are consistent and could be repeated; and confirmability which is similar to objectivity, showing the extent to which the findings of the study are shaped by the participants and not by the researchers' prejudice. A general summary of the main strategies to enhance the credibility of qualitative inquiry are presented in Table B (Noble & Smith, 2015, p35).

Table B:	**Strategies to enhance credibility in qualitative research**
Truth value	▸ Reflexivity and reflection on own perspectives:

	– Reflective journal maintained and decisions documented – Peer debriefing to assist the researcher to uncover taken for granted biases, or assumptions, for example, the initial qualitative interviews with patients were medically focused and subsequent interviews took a more holistic approach. ▸ Representativeness of the findings in relation to the phenomena: – The sample of patients or health carers who included the study and a willingness to share their experiences in depth and over time enabled clarification of findings as an ongoing process; – Semi-structured audio recorded interviews allow for repeated revisiting of the data to check emerging themes and remain true to participants' accounts of caring for patients with renal disease managed without dialysis; – Use of rich and thick verbatim extracts from carers of patients managed without dialysis assists the reader to make judgements about whether the final themes are true to participants' accounts; – Participants invited to comment on the research findings and themes
Consistency	▸ Achieving auditability: – Transparent and clear description of the research process from initial outline, through the development of the methods and reporting of findings. In addition maintaining a research diary documenting challenges and issues assisted in maintaining cohesion between the study's aim, design and methods; – Emerging themes discussed with research team members who had the knowledge in subject of study and expertise in qualitative research and able manage an open process where assumptions could be challenged and consensus reached.
Applicability	▸ Application of findings to others contexts: – Rich detail of context, the renal setting, including the patients managed within the service, facilitates the evaluation of study conclusions and transferability to other relevant settings.

Research Reliability

The criteria of the reliability concept originates from the positivism paradigm and is linked with the quantitative approach. Reliability, which refers to the consistency of a test, was described by Drost (2011) as 'the extent to which measurements are repeatable when different persons perform the measurements on different occasions and under different conditions with supposedly alternative instruments which measure the same thing'.

There are certain factors in the quantitative approach which can affect reliability, such as the nature of the test and how it is applied. The three main concerns in reliability testing are: equivalence, stability of the test and internal consistency which can be achieved by one of the following techniques: test-retest reliability, internal consistency, interrater reliability and split-half approach (Drost, 2011). Each of these techniques has specific instructions, and it is essential to follow the calculations in order to gain the desired results and to establish the reliability of the measure, which is a time-consuming task. Therefore, the measures used in the online survey for this PhD project were used as they are in order to maintain their established reliability.

Furthermore, respondents to survey questions were recruited as volunteer employees or for payment. They were mainly students of Plymouth University who had experienced pain, but they were non-clinical participants. I acknowledge that this could be a major weakness or threat to the data collected and analysed from this sample in order to represent the relevant population in a clinical setting. Although this appears to be problematic regarding the reliability of the data, the survey is still valid because of the responses assessed by the valid questionnaire. Moreover, the responses collected from the participants might not be clinically classified, but they had experienced pain, which adds value to their responses and can still provide their opinions on psychological intervention for pain relief. Therefore, the data collected and analysed by this online survey is still explanatory.

Online surveys have major advantages as well as possible weakness (Evans and Mathur, 2005). Researchers noted that the main highlighted advantages of online surveys are flexible, convenient, low administration costs, ease of data entry and analysis, easy to obtain large sample, questions diversity, ease of follow-up, control of answer order,

required completion of answer. However, there are number of potential disadvantages of online surveys which are that respondents may lack of online experience, it could have low response rate, unclear answering instructions, privacy issue (Evans Mathur, 2005).

The online survey conducted in this project was challenged by some of these weakness such as low response rate less than 30%, and small number of responses, which hinder the generalisability of the data. However, the revealed data supported the general views and attitudes that emerged from the qualitative studies.

Furthermore, the privacy of the respondents was not an issue in the survey, because responses were collected in a secured and unidentifiable way to protect participants' privacy.

Furthermore, the nature of qualitative research presents a challenge with regard to reliability assessment because the qualitative approach focuses on evaluating individuals and situations which makes it difficult to replicate the exact environment of the interview location or the exact questions because individuals and situations are changeable. However, researchers highlighted numerous approaches and strategies to ensure reliability and consistency within qualitative data analysis. Driessen et al. (2005) recommended many strategies to achieve credibility and dependability in assessing and achieving reliability of the research. These strategies are: triangulation involving the use of multiple sources; data collection methods and investigators to help to understand the phenomenon; prolonged engagement in the field of research requiring the researchers to engage themselves with the participants' environment in order to gain an insight into the context of the study; member checking which it is a strategy to allow the data and interpretations to be checked and reviewed by different investigators; audit trail and dependability audit which involves the examination of the research process and the decisions of how the data were collected, recorded and analysed which requires keeping a clear record of the data collected to maintain the accuracy of the findings. Pandey and Patnaik (2014) emphasised that enhancing the accuracy of the data collected requires keeping an accurate record of the process and information and how data were analysed as well as using feedback from an external investigator which can be attributed to the development of strong results. Morse et al. (2002) generally provided simple standard verifications to ensure both the reliability and validity of qualitative research, such as ensuring methodological coherence, sampling sufficiency, developing a dynamic

relationship between sampling, data collection and analysis, thinking theoretically, and theory development.

Threats of Validity and Reliability

Although it is important to establish the validity and reliability of research, some factors may influence its quality, one of which is bias. The Oxford English Dictionary defines the word 'bias' as 'inclination or prejudice for or against one person or group, especially in a way considered to be unfair'. In research, bias is an important issue, and researchers should be aware of this in their work because all research methods can be influenced by bias which could affect the reliability and validity of research. There are multiple sources of bias, including designing the study, during recruiting participants, collecting, measuring and analysing data (J. Smith & Noble, 2014).

In quantitative research, online survey can be an example of potential bias; because bias exists, these methods have already excluded participants who do not have access to the Internet which is the case in this PhD project. However, in order to minimise the risk of bias in the survey, recruiting participants who are representative of the study population can enhance the quality of study. Representativeness refers to 'how well the sample drawn for the questionnaire research compares with (eg, is representative of) the population of interest and the reader can evaluate the study findings with assurance that the sample of respondents reflects elements of the population' (Fincham, 2008). Statistical analysis cannot control the representativeness of any sample because selecting a representative sample is the result of careful planning of the study design, and analysis only can be performed after selecting the sample and not before (Ramsey & Hewitt, 2005).

Moreover, the quality of survey findings can be affected by the number of respondents who completed the questionnaire as well as those who withdrew or did not complete the survey. Lack of response to the questionnaire by potential respondents in a sample is referred to as non-response bias (Fincham, 2008). The response rate is calculated by dividing the number of returned responses by the total number of eligible participants in the chosen sample (Fincham, 2008). The acceptable response rate differs according to the methods used to collect responses (by mail or post), but researchers noted that although

the higher response rate is recommended and can be achieved, it appears that it is no longer the key issue in determining the quality of the study (Fincham, 2008; Meterko et al., 2015; Morton, Bandara, Robinson, & Carr, 2012).

In qualitative research, the sampling process and data analysis can be affected by bias; for example, recruiting patients having knee and hip replacement only may influence the findings because they are unlikely to represent all post-operative patients' perspectives towards brief psychological strategies for pain management. Moreover, during the data collections, some interviews were very short (less than 10 minutes) because the patients were too tired to continue the interview and HCPs were distracted by their very busy day in the workplace. The results were unlikely to capture detailed information of their actual perspectives towards brief psychological interventions as pain management strategies. However, research bias can be minimised in qualitative research by applying the validity and reliability strategies that were presented in the previous section such as reflexivity and member checking.

Description of Data Collection of the Research

Mixed Methods Data Collection

Systematic Review and Meta-Analysis Approach

Systematic review and meta-analysis are an essential part of evidence-based healthcare, but the process of conducting this research may be unclear; for example, selecting or rejecting studies, managing pool results or assessing their significance. Therefore, researchers provided an explanation of how to conduct this in five simple steps (K. S. Khan, Kunz, Kleijnen & Antes, 2003). The process of conducting the review follows a systematically structured way beginning from: 1) a clear framed question; 2) identifying relevant work; 3) assessing the quality of studies; 4) summarising or synthesising the evidence; 5) interpreting the findings. Each step involved a substantial effort which can be achieved with the help of a team in order to minimise the risk of bias. Step 1, which frames the question addressing the problem and the reason of conducting the review, then continues in helping to produce the protocol including the definitions of population,

interventions, outcomes and so on. In Step 2, the search process for studies begins with different resources without applying any restrictions at this point, but it is helpful to create the inclusion and exclusion criteria. In this step, keeping a record of the data extracted (inclusion and exclusion) is important. Step 3 assesses the quality of the extracted studies and describes the acceptable level of design. The assessment of the quality can be undertaken by using a guided or created checklist to refine more studies. When extracted and refined, this information can help to explore heterogeneity and check if the studies are suitable for conducting meta-analysis (a quantitative part). Step 4 synthesises the refined information that is extracted from the included studies which narratively or numerically depend on the amount and quality of information. Step 5 is the level where the risk of bias should be explored and the amount of heterogeneity should explain if the findings should be trusted. This step also draws the recommendations based on the strengths and the weaknesses (K. S. Khan et al., 2003).

In this PhD project, it was important to apply the systematic review in order to establish the knowledge of the effectiveness of psychological interventions as pain management strategies to reduce post-operative pain.

Qualitative Studies Approach

Study Design and Sampling

All qualitative studies utilised a thematic qualitative approach and semi-structured interviews to explore the participants' views and attitudes towards pain and pain management approaches.

Different types of adult participants were recruited in order to answer the PhD research questions. The first sample size was recruited from the general population (non-clinical participants), the remainder being recruited from the clinical setting (patients and HCPs) to explore their views and attitudes on psychological interventions as pain management strategies.

In the study of the non-clinical population, it may appear to be a problematic task to recruit non-clinical participants to assess pain experience. However, the interest was not in the pain experience specifically, but rather towards the attitudes and opinions which participants might share towards psychological intervention. These can be provided by

anyone who has experienced pain but are not classified as patients. Moreover, pain is a common experience, and it is relevant to know how everyone from the non-clinical or general population may think about these psychological techniques because it is probable that they all come into contact with these types of treatment at some point. Therefore, the focus is on the attitudes to psychological techniques, but not on the type of pain experience that was sought. Furthermore, anyone could be in significant pain and could be a patient at any time, but such person may not fit into any particular diagnostic criterion; therefore, they all have an experience of pain that would be relevant to the research questions (explained in previous chapter p. 49).

Data Collection and Analysis

Data were collected through semi-structured, face-to-face interviews which were conducted in a quiet place. The interview guide developed by asking participants to describe their pain experience from 'the past but not a defined period'. It can be problematic for the study to report pain from a variant time period (current and past), because researchers found that reporting pain from the past and from current pain experiences would influence the accuracy of autobiographical memory (Meyer, Karl & Flor, 2015). However, the interview schedule was more flexible in enabling people to report the pain that hurt them most, which is a more pragmatic decision. Reporting pain from different periods may allow capturing the significant effects of their experiences later than those with current pain experiences who may have different experiences to share. Therefore, the interview guide was designed to capture a more broad set of experiences from the general population. Therefore, if I recruited a population who were undergoing same current pain experiences, such as post-operative pain, they might have similar experiences, whereas adapting the general population may provide variance and diversity in attitudes on pain relief approaches.

A thematic inductive analysis was used to identify potential patterns and themes from the transcribed interviews data. Members who were experts in the field of conducting reviews checked and reviewed the scripts and the results in order to assess the credibility of the findings.

All study procedures were reviewed and approved by the Plymouth University Ethics Committee, the Health Research Authority (HRA), the Research Ethics Committees (REC) and the National Health Services (NHS) in the UK. Approval was also obtained from the International Medical Centre in Saudi.

Conclusion

It was established in the previous chapter that post-operative pain management remains a challenge and that psychological intervention would be effective in this regard. Patients and HCPs' attitudes/views towards psychological techniques as pain management strategies required an investigation. This gap in the literature led to the development of the central research questions that were illustrated in the overview section: 'Are brief psychological techniques effective in the reduction of acute post-operative pain among adult patients?' and 'What are the potential barriers to the delivery of brief psychological techniques to reduce acute post-operative pain in primary care?'

Methodologies and data collection techniques have been reviewed in this chapter. An appropriate research methodology (qualitative and quantitative) has been selected and justified.

A systematic review procedure was planned as a starting point to gather sufficient information regarding the effectiveness of brief psychological intervention in managing acute post-operative pain. The semi-structured interview was selected as the most suitable technique in the data collection process of qualitative studies, and thematic analysis was selected to analyse and interpret the gathered information. In the quantitative study, an online survey was selected as the most appropriate technique of data collection to explore peoples' views on brief psychological intervention as pain management strategies. Procedures of all studies were developed and explained, and data analysis was planned and described. Finally, a summary of the issues which can influence the research validity and reliability was provided, and ethical approval was considered.

Chapter 3 – Methods and Results of the Systematic Review of the Effectiveness of Brief Psychological Interventions

As illustrated in Chapter 1, conducting the systematic review is important for number of reasons. Mostly to accumulate and gather the available evidence to evaluate the effectiveness of BPIs as methods to manage postoperative pain.

Objectives of the Systematic Review

The aim of the review is to answer one main question: Are brief psychological interventions effective for relieving acute postoperative pain? The review might seek answers to other related questions,

I. Can brief psychological interventions reduce acute postoperative pain?
II. Does the timing of the intervention's delivery (pre-, during, or post-surgery) have an effect on pain outcomes?
III. Do the methods of the intervention's delivery (audiotape, face-to-face, written materials, etc.) influence pain outcomes?
IV. Does the intervention have an overall effect on other related postoperative outcomes (i.e., anxiety levels, medication use, satisfaction, wellbeing, etc.)?

Methods

Systematic Review Procedures

Criteria for Considering Studies for this Review

Types of Studies

The review included randomised controlled trials (RCTs) of brief psychological interventions that treat acute postoperative pain. Blinded and non-blinded trials were included as in the nature of the interventions, patients may not be blinded.

Participants and Settings

Patients included those who were able to respond adequately to the primary outcomes and to perform any of the psychological self-help techniques. The search did not target the paediatric studies or adults participants at the start of the search; however, during the extraction of data, paediatric studies were excluded, only if included patients who aged five years and under. Because there are probably type of interventions and special techniques of distraction would fit more with their age category (less than 5 years old). Studies were included when the patients involved were undergoing/underwent surgical procedures; other medical procedures were excluded, e.g. burn care or dressing change because these medical procedures are not surgeries.

Types of Interventions

All included studies reported the effects of BPIs to reduce post-surgical pain. I define a brief intervention as one that does not exceed two hours of individual treatment in a session or one day of group training. These criteria were selected to discover interventions that could be applied in real-world in everyday bases by patients and consider the practical element and the acceptability of the intervention when designing intervention in the future. This could be assessed based on the description of the interventions that should be provided in the text report/published paper.

Additionally, this requirement indicates that the interventions can be delivered by health professionals with only brief training; interventions requiring master- or PhD-level

psychological training were excluded. I included interventions that could be delivered cost-effectively by the existing clinical teams or by the use of any self-help or self-administered materials. These criteria were applied to consider the nature of the workload healthcare professionals may experience during their work, also to consider the economic benefits these interventions may have on the healthcare system. Therefore, discovering interventions that could help patients relieving their pain and being costly effective at the same time would be required. To assess these criteria, the published report should mention the full procedure of the intervention delivery, how the intervention delivered, and which materials have been used to help patients practice the interventions.

The modes of delivery varied between studies and included audio recordings and printed self-help materials (transcript). Interventions combined multiple psychological techniques (e.g. relaxation plus positive suggestions). In studies that compared more than one active treatment with the control, we selected for comparison the arm designed to be maximally effective.

Studies were included when the psychological intervention was compared with any type of control, such as usual care or attention control, and when the effect of the brief psychological intervention was not measured in the control group and was clearly isolated to prevent any contamination or overlap in the findings.

Trials were considered when the intervention was delivered before, during or after the surgery, and a follow-up was made with the patients for at least six h or more after the surgery. These criteria were assessed by reviewing the description of the process of the intervention delivery and data provided in the analysis. Where data were missing, an attempt to contact the authors has been made to gain as much information as possible to be more accurate.

Types of Outcome Measures

Primary Outcomes

The primary outcome is patient-reported pain after surgery. Pain was measured on a continuous scale, such as numeric rating scales or VAS. When psychometric scales were used, I analysed total pain scores in preference to subscales, although data from

subscales (e.g. intensity vs. unpleasantness in the McGill short-form Pain questionnaire; Melzack, 1987), were included in my secondary analyses. When outcome data were collected on multiple occasions I selected measurements closest to 1 day, 1 week, 1 month and 3 months post-surgery, but the obtained follow-up data did not exceed 1 week post-surgery.

Secondary Outcomes

I extracted the following secondary outcome measures, where they were available:

- VAS Anxiety, or State-Trait Anxiety Inventory (STAI).
- Quality of life, mobility, fatigue.
- Medication (analgesic) consumption and related side effects.
- Satisfaction with treatment
- Adverse events (e.g. withdrawal, vomiting, or sleep problems).

Search Methods to Identify Studies

I identified relevant randomized clinical trials of acute postoperative pain in English or Arabic; other foreign language papers for which translations are not available will be excluded. The following databases were searched, Cochrane Central Register of Controlled Trails (CENTRAL), PubMed, Web of Science, EMBASE, PSYCINFO

I defined a series of search terms to identify relevant sets of studies:

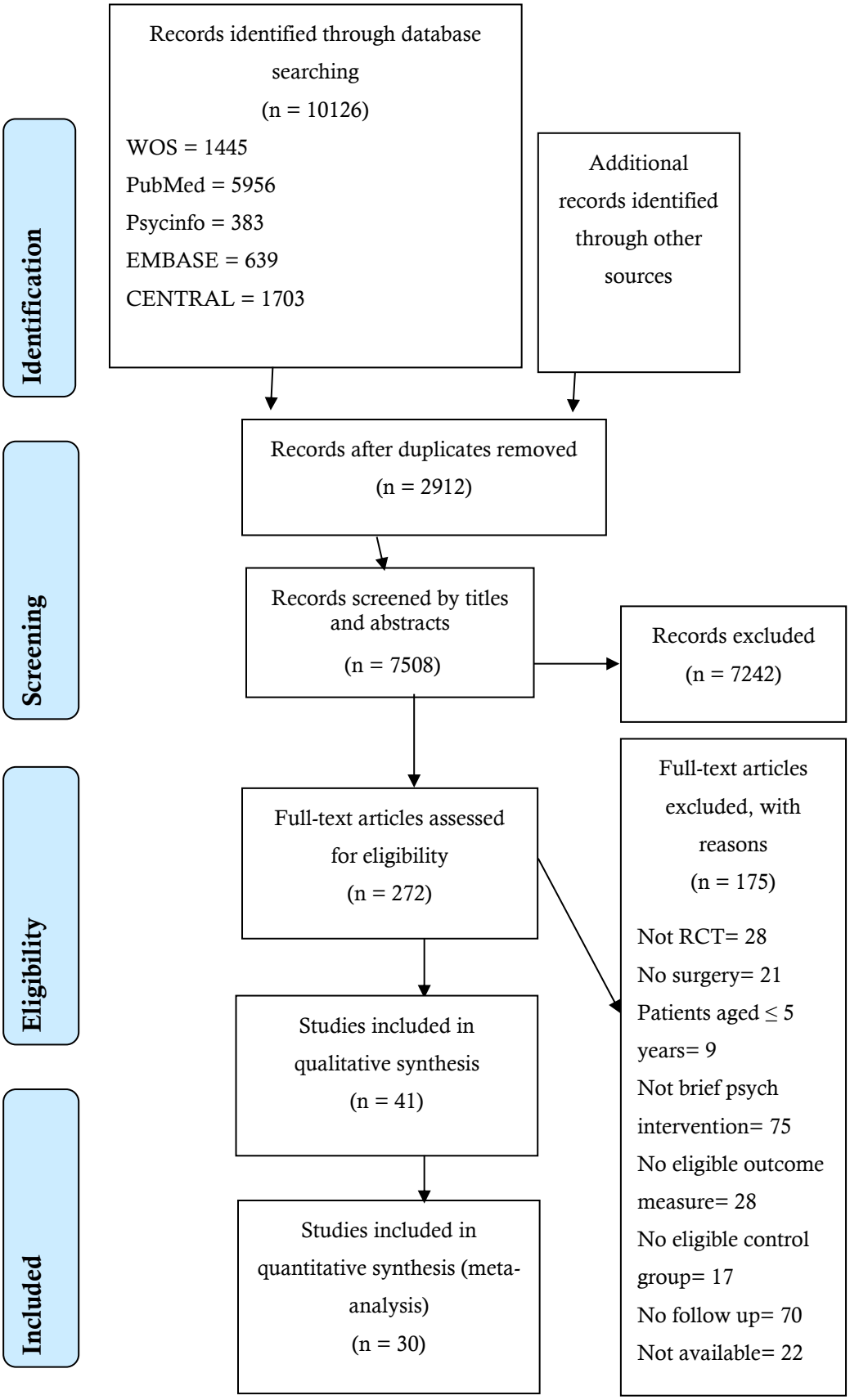
1. Postoperative pain, post-surgical pain,
2. Randomized controlled trial,
3. Behavioural intervention,
4. Mind-Body therapy,
5. Relax,
6. Hypnosis,
7. Distraction, or music,
8. Psychological intervention,

I then identified study reports matching searches #1 and 2, plus one of searches 3 to 8 and added them to my pool of potentially eligible studies (see Appendix A).

It should be noted that these search terms which are listed above are only a category of interventions I considered in this review, but the search terms are more specific. I did not consider including terms such as 'brief' in the search term, because at this stage of the search a full set of search terms is needed to be applied and avoiding filtering or narrow the search at the start.

In addition, during the search process (see figure 1) I identified some studies from other resources e.g. scan bibliographies of review articles for potentially relevant studies (see Appendix B).

Figure 1: PRISMA flow diagram of the search process



Data Collection and Extraction

Initially, one reviewer (TA) independently conducted the search for potentially eligible studies. Titles and abstracts of all studies returned from the searches were scanned first to determine their eligibility for including the review. The results recorded and discussed with the review team. Then full screening for possible inclusion of these studies was done and agreement for the inclusion of the studies in meta-analyses was discussed with BW.

Data was extracted by TA using a standardised data extraction worksheet, this form was created based on those used by Cochrane Library systematic reviews for RCTs with minor modifications made to fit my research criteria and objectives.

When data were extracted, they were coded as the follows. Age coded by using the mean of participant's age, and gender coded as % of female. The intervention characteristics coded based on the methods of intervention delivery (audiotape, face to face, written materials, videotape), and the time when the intervention was delivered (pre, during, post). Also, the duration of intervention for each session was coded by minutes, and the frequencies of the intervention were coded as the number of sessions. Initially, the follow up was coded as hours, days, weeks, but this has changed into time points closest to 12, 24, 84, hours because the studies did not have long-term follow up.

Dealing with Missing Data

In the first instance I attempted to communicate with the original study's authors if possible. Where data could not be obtained then I analysed only the available data and included these studies in a narrative description only, and excluded them from the quantitative analysis.

Quality Assessment of Studies

The Cochrane collaboration's tool for assessing risk of bias in randomised trials applied in the following domains: Sequence of generation, allocation concealment, blinding of outcomes, incomplete outcome data, selective reporting of outcomes, and other sources

of bias. The domains scored as low risk of bias, high risk of bias or unclear. These scores used for all included studies in a meta-analysis (see Figure 2 and Figure 3). I did not consider a lack of blinding in participant a flaw in the quality of the methodology as the nature of intervention cannot be blinded about the participants in most cases.

Figure 2: quality of methodology items for the included studies presented as percentage.

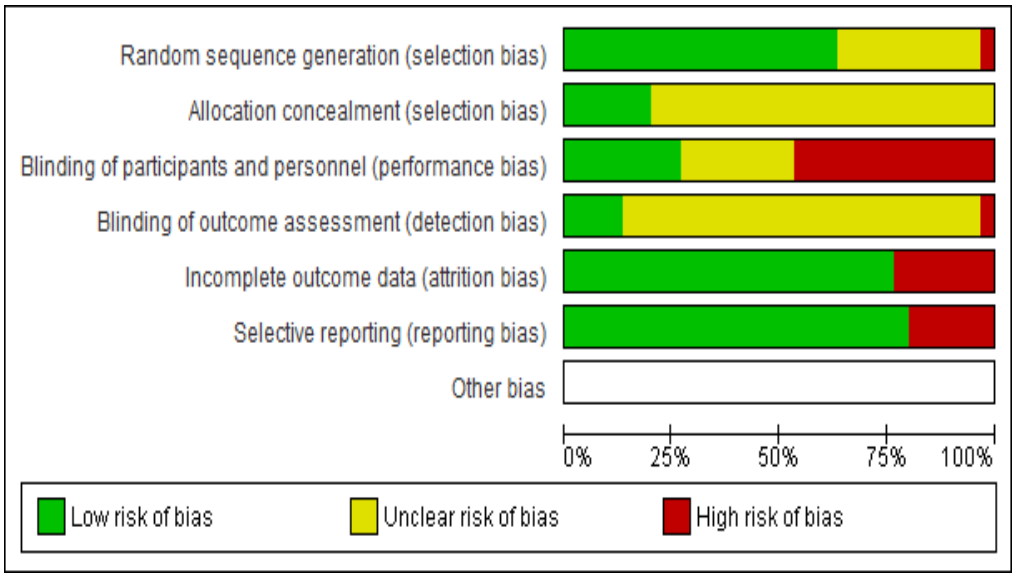
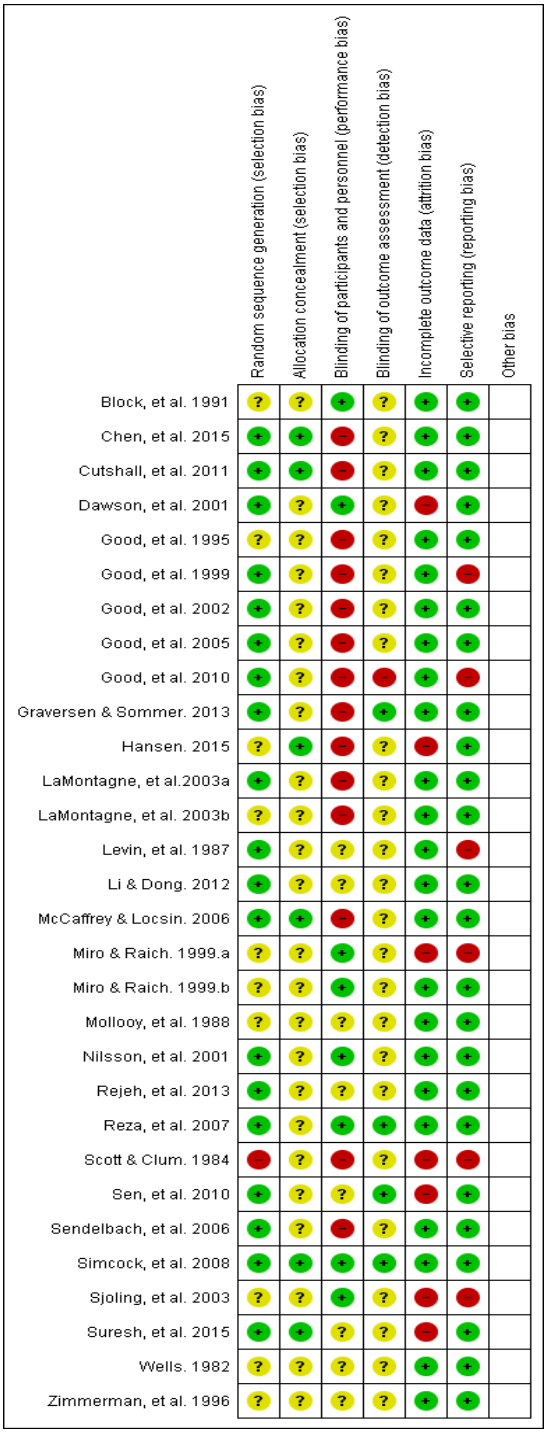


Figure 3: Summary of quality of methodology for each study included.



Quantitative Analysis in the Review

The outcomes I obtained were all continuous variables; therefore, I calculated the effect size by calculating the standard mean differences (SMD) from the included studies, whenever means and standard deviations were available. When standard error and interquartile ranges were provided, I calculated the standard deviations for these outcomes by using a standard equation (see Higgins & Green, 2011). I should note that this is an approximation assuming that the data are normally distributed, although this is likely not the case — belied by the choice to report the interquartile range (IQR) rather than the SD. Nonetheless, I decided that this was a reasonable compromise because the number of available studies was quite low. Also, I conducted a sensitivity analysis that excluded these studies to identify if the pattern of the results for the main findings on the pain scores would be the same or might change when such studies are excluded. Measurements (means, standard error or standard deviations) were also extracted from the scanned graphs with the use of an image manipulation software program.

I performed the meta-analysis (see studies included meta-analysis in Table 1) by using Review Manager (version 5.3, Cochrane Library). I used SMD because the variables had different scales of measures (pain measures). The data were pooled with the use of random effects models because of the likely clinical heterogeneity between the interventions. I used funnel plots and Egger test to assess the possibility of a small sample size bias in the pain outcomes included the analysis. When the data of the outcomes were insufficient for inclusion in the meta-analysis, I provided a qualitative description only (see Table 2).

Investigation of Heterogeneity

I conducted meta-regressions analysis (see Table 3) with Stata version 13 to investigate sources of heterogeneity and to investigate possible moderators for the effect of the interventions. The analysis included the following variables: methods of intervention delivery (audiotape vs face to face), timing of intervention (pre, during, post, pre and post), type of control (usual care vs other comparisons), pain outcomes (pain visual analogue scale (VAS) vs other pain outcomes).

Table 1: Study Characteristics for studies not included the quantitative analysis.

	Patients characteristics				Intervention characteristics			
ID	**M[a] age**	***% F**	***N**	**Surgery, type**	**Intervention**	**Timing/duration/frequency**	**Comparison**	**Outcomes**
Daltroy, et al. 1998	64	66%	222	TKR[a], THR, Major	combined audio tape information and face to face training relaxation with written script	30 min, once pre-surgery.	no intervention	STAI[a] , pain
Doering, et al. 2000	60	38%	100	THR, Major	videotape of education	12 min, once pre-surgery	usual care	VAS[a] pain, STAI-X1, intake of analgesics and sedatives
Good, et al. 2001	45	84%	468	abdominal, Major	audiotape with earphones of music and relaxation	once pre-surgery, 15 min 3 times post-surgery	no intervention	VAS pain and distress

Hattan, King & Griffiths. 2002	63	20%	25	cardiac surgery, Major	audiotape of music through personal stereo system	20 min, once post-surgery	care as usual	VAS pain and VAS anxiety
Lebovits, Twersky, McEwan. 1999	39	/	70	elective hernia repair	audiotape of relaxation and therapeutic suggestion	during surgery	comparison tape	*VRS pain, nausea and vomiting
Manyande & Salmon. 1998	42	51%	118	abdominal, Major	audiotape of relaxation with headphone	15 min once pre-surgery, 15 min post-surgery	no tape	VAS pain and distress, STAI

Mogan, Wells & Robertson. 1985	41.5	82%	72	elective abdominal, Major	face to face guided relaxation with written script	once pre-surgery	no intervention	VAS pain (sensation and distress), analgesic consumption.
Walworth, et al. 2008	46.5	56%	27	elective surgical procedures for brain, Major	live music therapy	30 min once pre, and 30 min once post.	no music	VAS pain, STAI
Hook, Songwathana, Petpichetchian. 2008	40	100%	102	elective surgeries, Major	CD of music	30 min once pre, 30 min 7 times post.	no music	VAS pain (sensation and distress), VAS anxiety, medication consumption

[a]age presented by mean, %F= female number presented as percentage, N= total sample size, STAI= state-t
analogue scales, VRS= visual rating scales, TKR= total knee replacement, THR= total hip replacement.

Table 2: Study Characteristics for included studies in the quantitative analysis.

ID	Patients characteristics	Surgery	Intervention characteristics

	Mª age	% Fª	Nª		Surgery type	Intervention	Timing/duration/frequency	Com
Block, et al. 1991	35	88%	209	fallopian tubes, total abdominal hysterectomy, vertical banding gastroplasty, cholecystectomy	major	audiotape with headphone of relaxation and theraputic suggestions	during surgery	blank
Chen, et al. 2015	68	67%	30	TKR	major	Music played on a CD player through broadcast speakers.	30 min, twice per, 60 min, once, post.	usua
Cutshall, et al. 2011	63	23%	100	cardiac surgery	major	CD of music and relaxation	20 min, 6 times, post.	usua
Dawson, et al. 2001	45	not stated	138	total abdominal hysterectomy	major	audiotape with earphones of positive suggestions	not stated	whit
Good, et al. 2002	46	not stated	199	gynaecologic surgery		audiotape with earphones of music and relaxation	30 min, once, pre and 60 min, 3 times, post.	no ta
Good, et al. 2005	43	60%	167	intestinal surgery		audiotape with earphones of music and relaxation	30 min, once, pre, 30 min, 6 times, post	usua

Good, et al. 1999	45.4	83%	500	abdominal	major	audiotape for jaw relaxation and music	30 min, once, pre, 60 min, 4 times, post.	usua
Good, et al. 2010	not stated	not stated	517	abdominal	major	audiotape for relaxation and music	20 min, once, pre, 60 min, 5 times, post.	usua
Good. 1995	46	70%	84	abdominal surgery	major	audiotape of relaxation and music	20 min, once, pre, 60 min, 3 times, post.	no ta
Graversen & Sommer. 2013	47	61%	88	laparoscopic	minor	pillow integrated with MP3 player of music	pre and post, no state of min	no m
Hansen. 2015	45.6	80%	105	abdominal and urinary track	major	iPod for relaxation	15 min, 8 times, pre, 15 min, 10 times, post.	usua
LaMontagne, Hepworth, Cohen, Salisbury. 2003a	14	81%	109	spinal fusion surgery	major	videotape and face to face training of coping skills including relaxation and guided imagery	10 min, once, pre.	stand infor n
LaMontagne, Hepworth, Salisbury, Cohen. 2003b	13	89%	66	spinal surgery	major	videotape and face to face training of coping skills including relaxation and guided imagery	10 min, once, pre.	
Levin, Malloy & Hyman. 1987	43	100%	40	Cholecystectomy		audiotape of rhythmic relaxation or Benson's	before and after, no min or frequency reported	usua no ta

						relaxation techniques		
Li & Dong. 2012	27.5	100 %	60	caesarean delivery		audiotape of music	30 min, once, pre.	no m
McCaffrey & Locsin. 2006	75.6	65%	124	hip or knee	major	audiotape for music	60 min, 4 times, post.	usua
Miro & Raich. 1999.a	55	not stated	92	hysterectomy with double oophorectomy		guided relaxation imagery face-to-face training with transcript for practising later	30 min, once, pre.	atten cont
Miro & Raich. 1999.b	44	53%	90	cholecistectomy	major	guided relaxation imagery face-to-face training with transcript for practising later	30 min, once, pre.	atten cont
Mollooy, Levin & Feldman. 1988	47	100 %	28	elective abdominal hysterectomy	major	music with headphone	10 min, twice, post.	usua
Nilsson, et al. 2001	51	100 %	89	elective abdominal hysterectomy	major	audiotape of music and therapeutic suggestion with headphones	during surgery	tape oper room soun
Rejeh, et al. 2013	73	74%	124	abdominal surgery	major	audiotape of relaxation with earphones	20 min, once, pre.	usua

Reza, et al. 2007	25	100 %	100	elective caesarean section		CD of music with headphone	during surgery	white music
Scott & Glum. 1984	43	86%	64	cholecystectomy, abdominal hysterectomy, vaginal hysterectomy	major	face to face intervention for information and practise relaxation with a written script for relaxation practise.	25 min, once, post, 10 min, 3 times, post.	standard information
Sen, et al. 2010	29.6	100 %	70	elective caesarean		music with headphone	60 min, once, post.	usual
Sendelbach, et al. 2006	63.3	30%	86	cardiac		audiotape with headphone for music and relaxation	20 min, 6 times, post.	usual
Simcock, et al. 2008	67	60%	30	total knee arthroplasty	Major	music with headphone	during surgery	MP3 white
Sjoling, et al. 2003	71	60%	60	total knee arthroplasty	Major	Information in face to face meeting with leaflet	40 min, once, pre.	standard information
Suresh, De Oliveira, Suresh. 2015	25	54%	56	elective orthopaedic, neurosurgical, urological, plastic or general surgeries.	Major	audiotape of music	30 min before	no ta
Wells. 1982	53.5	50%	12	Cholecystectomy		relaxation with face to face training	70 min, once, pre.	usual

Zimmerman, et al. 1996	67	32%	96	coronary artery bypass graft	CD of music with visual images of different scenes on videotape	30 min, twice, post.	usua

[a]M= mean age; %F= female; N= total sample size; NRS= numeric rating scale;
PRI-R =Pain Rating Index of the McGill Pain Questionnaire (MPQ); FPS-R= faces pain scale revised; questionnaire to measure pain intensity, sensory, affective.

Results

Description of Studies Characteristics

I identified 7,365 titles and abstracts from different databases and other resources, of which 272 articles were fully screened (see Figure 1). Forty-one RCTs met my inclusion criteria and were included the qualitative description of the studies' characteristics (see Tables 1 and 2). However, only 30 RCTs were included in the quantitative analysis because of missing data (means and standard deviations),

The 30 included studies involved a total of 3,630 participants whose age ranged from 12 to 76 years. They were undergoing a number of different surgeries, which varied from minor laparoscopic (Graversen & Sommer, 2013) to major operations, e.g. total knee or hip replacement or abdominal surgeries. The sizes of the study sample varied from 12 (Wells, 1982) to 517 (Good et al., 2010).

Sixteen of the included studies stated clearly which types of anaesthetics have been administered during the trial, which were local, general or epidural anaesthesia, and which sedations have been administered, which was mainly the morphine equivalent; the remaining studies did not state the medication/sedation status in detail. However, only 14 of the 30 studies reported medication consumption (mg morphine equivalent) among the patients. These 14 studies were included in the meta-analysis.

Description of the Trials

The intervention techniques included in the studies were mainly relaxation (25 studies) and music (21 studies). Of these, 10 studies combined both techniques. Four studies were on relaxation techniques combined with guided imagery, and three studies combined positive therapeutic suggestions. Seven studies included pre-educational techniques.

All interventions were conducted in private quiet rooms in hospitals or in the operating room. The majority of the interventions (23) were delivered via audiotapes or CDs with headphones or earphones; of these, only one intervention was delivered via broadcast speakers (Chen et al., 2015), and one was delivered via a pillow installed with an MP3 player (Graversen & Sommer, 2013). The second most common method of delivery in

eight studies was face-to-face brief training, which was conducted before surgery. Other modes of delivery were as supported to audiotape or face-to-face methods; these are written materials (transcript or leaflets of the intervention; five studies) and videotapes (three studies).

In terms of pain outcome measures, the majority of the included studies (22 of 30) assessed pain with the VAS, whereas the remaining studies used different measures of pain, i.e. Faces Pain Scales-Revised (Suithna Suresh, Gildasio, Oliveira, 2015) and the Pain Rating Index of the McGill Pain Questionnaire (Good, 1995). Anxiety outcomes were measured in 11 of the 30 studies by two types of measures, the STAI and VAS. Satisfaction with the treatment was measured in 4 of the 30 studies.

Additional outcomes were reported in some of the included studies, but an inadequate overlap existed to qualify such studies for inclusion in the meta-analysis. These outcomes were well-being (Nilsson et al., 2001), vomiting (Reza et al., 2007), nausea (Nilsson et al., 2001), sleep problems (Zimmerman et al., 1996), pain interference in daily activities (Miro & Raich, 1999a) and fatigue (Graversen & Sommer, 2013; Nilsson et al., 2001). None of the included studies reported cost-effectiveness analyses of the intervention.

Pain was measured at different points throughout the intervention. These follow-ups were closest to 12, 24, 48, 72 and 94 h. The intervention was delivered pre-operatively only (9 of the 30 studies), during operation (5 of the 30 studies), post-operatively only (7 of the 30 studies) or before and after the surgery (9 of the 30 studies).

Description of Intervention

The amount of time the patients spent in training during the intervention varied and was adequately reported in 23 studies. The duration of each treatment varied between the minimum of 10 min and the maximum of 320 min. The average number of minutes of training before surgery was 36 min, and that after surgery was about 133 min.

The frequency of practicing the technique (sessions) was varied from 1 to 2 sessions pre-operatively and 1 to 10 sessions post-operatively.

The majority of the treatment groups compared with the standard care groups (22 of the 30 studies) in the remaining studies included other attention comparison factors, such as

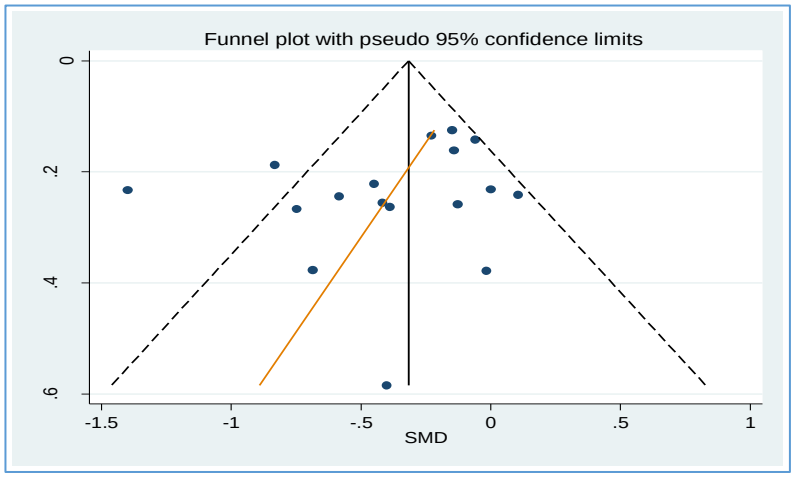
white noise or the sound of the operating room, blank tape and using a pillow as an intervention, similar to the case in the treatment group without music activation.

Risk of Bias in Included Studies

The quality of the included studies varied (see Figure 2-3). Generally, most of the included studies reported all the outcomes that they intended to measure (24 of the 30 studies); however, most studies did not provide sufficient details about both method blinding of the outcome assessment (24 of the 30 studies) and allocation concealment (24 of the 30 studies). Blinding of the participants was impossible because the patients will be aware of the music or relaxation techniques used during the intervention. However, five studies reported the blinding of participants; music intervention was activated after sedation prior to the operation. Only 8 of the 30 studies stated clearly the blinding of doctors or nurses to the intervention.

Funnel plots and Egger test indicated no bias (symmetric distribution of the plots, see Figure 4). For accuracy, I run the Egger test, which showed no evidence of small study bias (p=0.239).

Figure 4: Funnel plot with Egger test of pain outcomes at 24hrs



Moreover, I performed a sensitivity analysis excluding all studies that used imputed (approximate calculation) means or standard deviations in my meta-analysis to determine if the pattern of the pain score results will be changed by this imputation. The analysis shows no differences between the imputed and non-imputed studies in the

pattern of pain score findings, and the interventions in both groups remained effective in reducing pain scores (−0.40 (95% CI −0.74 to −0.06 p=0.02) and −0.32 (95% CI −0.50 to −0.15) p <0.000, respectively).

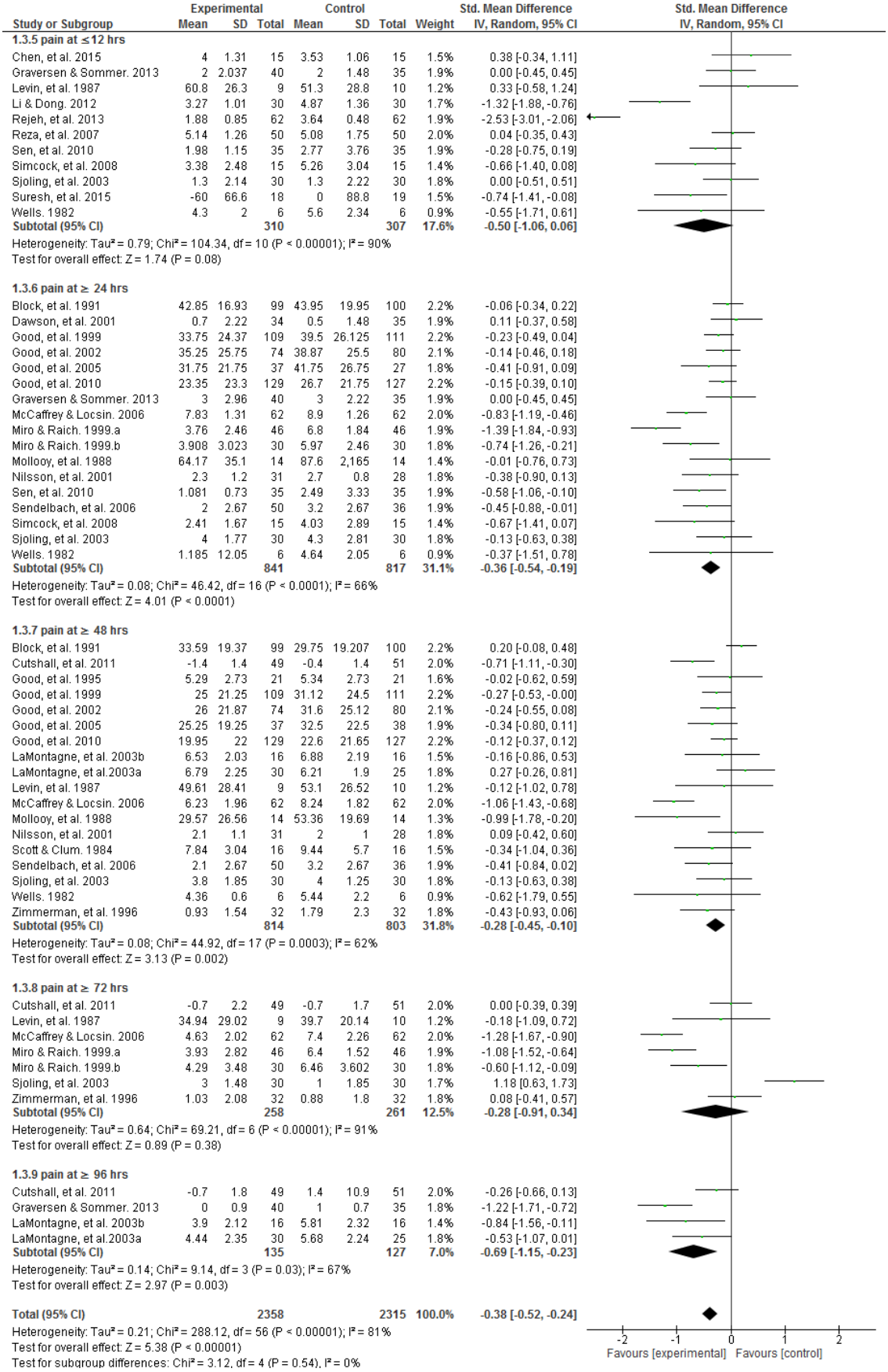
General Effect of the Interventions

The analysis of pain outcomes was organised according to the time of follow-up (closest to 12, 24, 48, 72 and 96h), in order to find out if brief psychological interventions reduced postoperative pain; see Table 3.

The analysis shows a reduction in pain scores at 24h (17 RCTs, SMD −0.36 [95% CI −0.54 to −0.19]) and at 48 h (18 RCTs, SMD −0.28 [95% CI −0.45 to −0.10]). Also, a trend of pain reduction is evident at the follow-ups closest to 12 h (10 RCTs, SMD −0.50 [95% CI−1.06 to 0.06]) and 72 h (7 RCTs, SMD −0.26 [95% CI −0.90 to 0.38]). The analysis likewise shows a reduction in pain scores at the time closest to 96 h (4 RCTs, SMD −0.69 [95% CI −1.15 to −0.23]), but the number of studies at this time was too small to confirm the findings.

The heterogeneity in all follow-up studies was substantial and varied from 62% to 90%. The heterogeneity at 12 h was (Chi^2=104.34, df=10 (p< 0.000); I^2=90%), that at 24 h was (Chi^2=46.42, df=16 (p<0.0001); I^2=66%) and that at 48 h was (Chi^2=44.92, df=17 (p=0.0003); I^2=62%); see Figure 5.

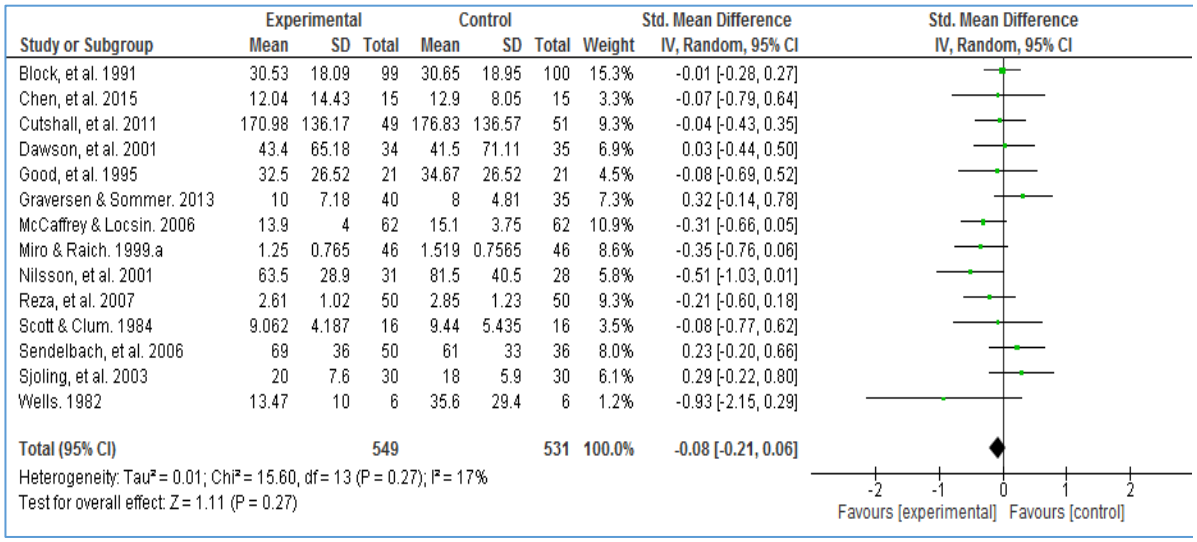
Figure 5: forest plot of the time points of pain outcomes



In addition, I run meta-analysis to analyse the effect of brief psychological intervention on other related surgical outcomes from the available data. Only anxiety and morphine-intake outcomes were analysed by calculation of the average of the scores because not all included studies measured these outcomes at different time points, similar to what was done for the pain outcomes.

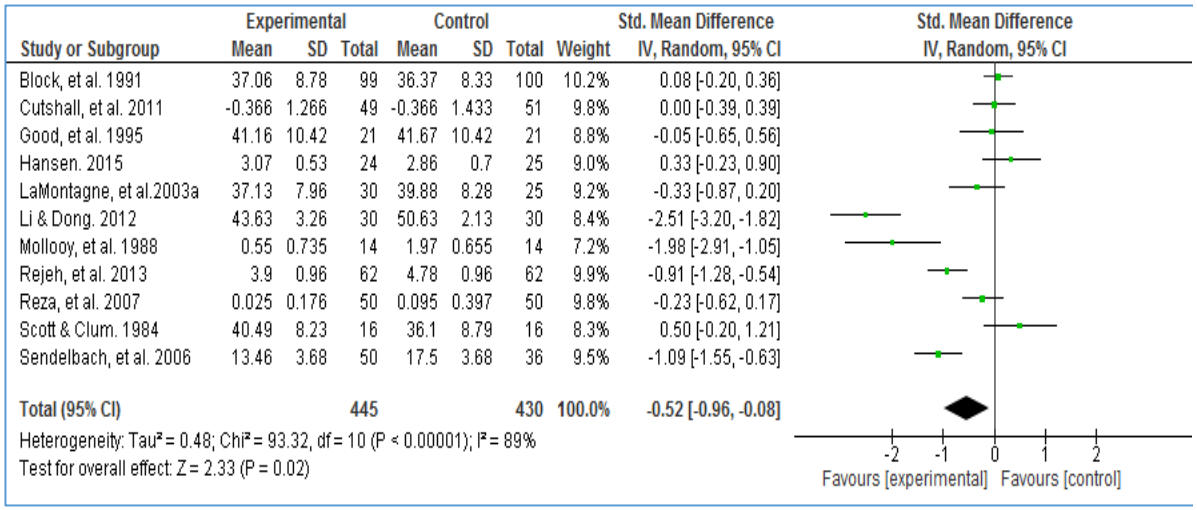
The analysis shows that the interventions did not have an effect on opioid intake among patients after their surgery (14 RCTs, SMD −0.0, 8 [95% CI −0.21, 0.06]; see Figure 6.

Figure 6: forest plots of the influence of psych interventions on morphine equivalent (mgs)



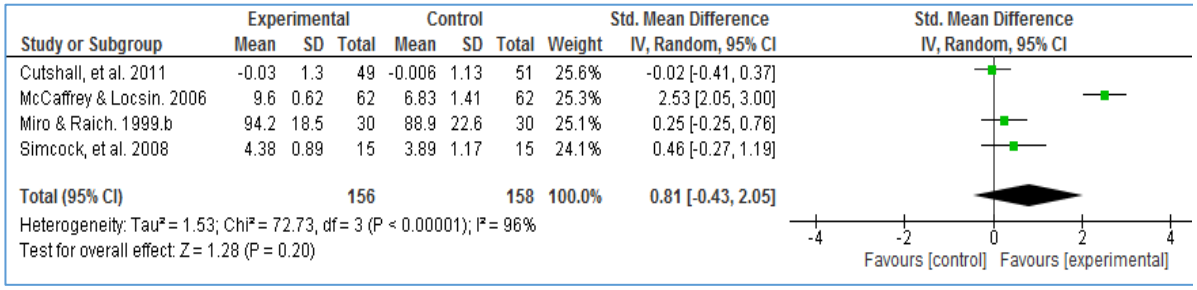
However, the analysis shows a significant negative small to medium effect on anxiety scores (11 RCTs, SMD −0.52 [95% CI −0.96, −0.08], with a substantial heterogeneity: (Chi^2=93.32, df=10 (p<0.00001); I^2=89%); see Figure 7.

Figure 7: forest plots of the influence of psych interventions on anxiety outcomes



Moreover, analysis of the satisfaction scores showed a medium to large effect, but this was statistically not significant (4 RCTs, SMD 0.81 [95% CI −0.43, 2.05]); see Figure 8.

Figure 8: forest plot of satisfaction outcomes



The Effect of Moderators of Brief Psychological Interventions on Pain Scores

To determine the heterogeneity in the data, I considered the effects of the following study characteristics (audiotape vs face to face), (pre, during post-surgical), (visual

analogue scale VAS vs not VAS), and (standard care control vs not standard care) on pain scores only. I considered pain scores that were measured at 24 h follow-up because they showed a small to medium effect of the interventions and were the closest to the time of surgery. To determine the heterogeneity in the data, I preformed sensitivity (subgroup) and meta-regression analyses (Table 3).

I conducted a joint test including the categories of study characteristics I specified above in meta-regression analysis; see table 3, to explain the estimated effect size of the psychological interventions on the pain scores at 24 hrs.

The analysis shows that the face-to-face method reduced pain scores significantly (β=−.46, t=−2.10, p=0.05), with I^2=57%, compared with the audiotape method.

Interventions did not use VAS to measure pain explained a significant reduction in pain scores (β=−.64, t=−5.30, p=0.000), with I^2=9%, compared with that used VAS.

The F test findings of the categories included the variable timing of intervention delivery, indicated a statistically significant effect on pain scores. Therefore, I run pairwise comparisons for these four categories (pre, during, post, pre and post) to determine which of these categories might have a major influence on the estimated effect on pain scores. The analysis shows that although post-surgical interventions had an effect on reducing pain scores, this effect was not significant. By contrast, pre-surgical interventions significantly reduced pain scores compared with the other categories.

Table 3: Meta-regression analyses of the moderators of the effects of brief psychological interventions on the pain scores

Variables, Categories	Effect Size (95% CI)	Regression Coefficient (95% CI)	*t* test	*p* value/ *F* test	I^2
Method of intervention delivery					
Category 1	Audiotape − .28 (− .48 to − .08)	.46 (− .005 to .92)	2.10	0.05	57.08%
Category 2	Face to face − .74 (− 1.16 to − .32)				
Timing of intervention delivery					
Category 1	Pre-op − .75 (− 1.16 to − .33)			7.24	46.54%
Category 2	During − .17 (− .53 to .18)				
Category 3	Post-op − .54 (− .91 to − .18)				
Category 4	Pre and post − .18 (− .45 to .098)				
Types of pain outcomes					
Category 1	[2] VAS pain − .15 (− .28 to − .03)	0.64 (0.38 to 0.93)	5.30	0.000	9.01%
Category 2	Other pain outcomes − .80 (− 1.03 to − .57)				
Types of control groups					
Category 1	Standard care − .33 (− .60 to − .06)	0.08 (− .34 to .51)	0.44	0.66	68.23%
Category 2	Attention care − .42 (− .75 to − .09)				

I^2=variation because of heterogeneity; *p* value=from the joint test for all covariates in each group (categories)

[2] VAS=Visual Analogue Scale

Discussion

Summary of Main Findings

My meta-analysis of the 30 studies (a total of 3,630 patients) showed evidence of the effectiveness of brief psychological interventions, including relaxation music, positive suggestions and providing information, in reducing postoperative pain and anxiety scores amongst surgical patients. The estimated effect of the intervention was small to moderate, but I did not find significant effects of these interventions on morphine equivalent consumption. Furthermore, the quality of the methodology was generally fair, which could affect the validity and accuracy of the estimated effects of my results. In terms of the secondary outcomes, these were inadequately reported in the majority of the studies.

There are no previous systematic reviews investigating the effects of brief psychological interventions, which I included in my review, in patients undergoing surgeries in one single/individual review. Therefore, I compared my findings with those of reviews summarising the evidence of one or two of these psychological interventions in patients undergoing surgical procedures.

A recent meta-analysis of Hole et al. (2015) investigated the effect of music as an aid for postoperative recovery. I included 12 studies from this review because they met the of the review inclusion criteria (Cutshall et al., 2011; Good, 1995; Good et al., 1999; Graversen and Sommer, 2013; McCaffrey and Locsin, 2006; Mullooly et al., 1988; Nilsson et al., 2001; Reza et al., 2007; Sen et al., 2010; Sendelbach et al., 2006; Simcock et al., 2008; Zimmerman et al., 1996). Hole's results confirmed that music achieved a large estimated effect on pain, anxiety and analgesic intake. My results are in line with those of Hole's review with respect to pain and anxiety outcomes, but not with respect to analgesic intake. The differences between my findings and those of Hole et al. are likely due to the number of studies included in the review; Hole et al. included a large number of studies (72), which could detect more differences, compared with the small number of my included studies (30); however, my finding appears more trustworthy because I consider stricter inclusion criteria for my review compared to Hole's review. I considered only studies that has at least 6 hrs or more in the length of the follow up not just

measuring pain at one point, which allow us detect more changes in pain scores and during the intervention.

In addition, the systematic review of Nelson et al. (2013) investigated the effectiveness of pre-surgical mind–body-based therapies on postoperative outcomes. Two of the five studies in this review included in my meta-analysis, and these were the Scott and Clum (1984) and Wells (1982) trials (these were included in the qualitative description of Daltroy et al., 1998; Manyande and Salmon, 1998; Mogan et al., 1985). Nelson's review concluded that relaxation had no beneficial effect on analgesic intake, whereas guided imagery had moderate benefits. The review also reported partial improvements of relaxation techniques and strong evidence of the effects of hypnosis and guided imagery on post-operative outcomes (length of hospital stay and self-report of psychological well-being) compared with the control group. The differences between my review and that of Nelson are likely due to the selection of primary outcomes and the data synthesis. I used self-report of pain, which measures the level of pain as a primary outcome, to determine the level of pain reduction after surgery which consider, whereas Nelson's review did not; instead, it used length of stay at the hospital and self-report of psychological well-being as the indicators of improvement after surgery. Both reviews have advantages that measuring the length of stay is economically important and wellbeing QoL is important from patients' perspective, but pain could be 'cleaner' and may be more predictive of later chronic pain. Thus I believe that my findings are more reliable in reflecting the effect of the intervention as I extracted pain scores from actual measures of pain. Furthermore, compared with my review that used a quantitative approach, Nelson's review synthesised data by using the qualitative approach because of the small number of included studies in each intervention group (eight for relaxation, eight for guided imagery and four for hypnosis).

Another systematic review that of Kwekkeboom and Gretarsdottir (2006), measured the effect of relaxation techniques on pain outcomes only in various medical conditions of pain. The review concluded that a significant effect of relaxation techniques on pain outcomes was found in 8 of 15 studies. Although this might be considered a positive conclusion, the review did not run meta-analysis, and it included studies with different conditions of pain compared with my review that focused on the effect of brief psychological interventions on postoperative pain and that used a quantitative approach to synthesise the data. Therefore, I should note that my review findings are more reliable

and precise in reflecting the effect of psychological interventions on postoperative pain scores.

Limitations

Several limitations of the present review should be acknowledged. The majority of the reviewed studies provided insufficient information to enable the accurate assessment of the randomisation methods used. Insufficient details on the blinding of outcome assessment and randomisation allocation/concealment limited my ability to assess the potential effects of these components on the estimated effects of brief psychological interventions.

In addition to the small number of studies included in my meta-analysis, I needed to include those studies that imputed the standard deviation based on statistical calculation; this might have affected the overall estimation of the treatment effect size. However, sensitivity analysis that excluded these imputed SD studies from the analysis showed no differences in the pattern of the main findings on pain outcomes.

Moreover, I can notice that although the VAS was not significant in reducing postoperative pain scores compared to other pain outcomes in the category of (VAS vs not VAS) measurement of pain, the level of heterogeneity nearly disappeared. I could assume that the change in heterogeneity in this category may be because the studies included this category had low risk of bias in the allocation of participants. In terms of the large differences between these categories, the reasons are not clear but I could assume that it could be due to different interpretation of pain scores. Therefore, this is worth further investigation.

Furthermore, self-hypnosis intervention was not identified in my review despite the effectiveness of this technique, as summarised in a number of previous reviews (e.g. see Montgomery et al., 2002 and Tefikow et al., 2013). I could justify this limitation by stating that it is mainly attributed to my inclusion criteria; the self-hypnosis studies I came across with did not meet the inclusion criteria because such studies included different medical procedures and did not have eligible follow-ups. I could also assume that this is likely due to the lack of self-hypnosis studies in the context of surgical

procedures compared with the large number of studies that have been conducted on other medical procedures with other pain conditions.

Moreover, the available data did not allow me to answer some of my raised questions for the review. For example, my data could not determine the differences between these psychological techniques (relaxation, or music) on pain scores, and which of these techniques would have the largest effect on postoperative pain scores. Also my data did not allow me to measure the effect of brief psychological interventions on other outcomes such as the effect of psychological treatment on the side effects of medications or on pain during other activities i.e. walking, standing, etc.

Related to the process of search and study selection, this review may be subject to language bias because the search strategy was limited to studies published in English and Arabic. As a result, some studies that reported the effect of these interventions in other languages might have been missed.

Implications and Conclusion

My results have several potential implications for practice and further research. I could not perform meta-analysis for the majority of my secondary outcomes because they were either not measured or were provided in one trial only. Therefore, future trials that investigate the effects of brief psychological interventions, such as sleep problems, vomiting, nausea and interference in daily activities, on the adverse events that might be experienced after surgeries are certainly required. In addition, future researchers could give more attention to ensuring the quality of the methodology used in terms of the randomisation of trials.

My results also suggested the effectiveness of brief psychological interventions in reducing pain after surgery in clinical trials. Therefore, I would explore the possibility of implementing brief psychological interventions in primary care as potential costly effective treatment. This suggested the research direction of the next step in the PhD research.

Chapter 4 – Methods and Findings of the Qualitative study on the Perspective on Pain Relief Conducted with Non-Clinical Participants.

As illustrated in Chapter 1, it is important to conduct this qualitative study with people from the public because that would help establishing the preliminary knowledge of peoples' perception and attitudes towards BPIs as pain coping strategies.

Objectives of this Qualitative Study with General Population

I. To establish the kinds of pain relief techniques individuals with any type of pain, either current or historic, have employed.
II. To investigate attitudes and beliefs which influenced their choices to use different kinds of pain relief particularly, psychological techniques to cope better.

To assess their acceptance of psychological techniques as an option to relieve their pain with a view to revealing any barriers preventing them from accepting and practicing these techniques as pain relief.

Methods

Study Design

The study utilised a thematic qualitative approach and semi-structured interviews to explore participants' views and attitudes towards pain and pain-relief. This semi-structured interview facilitated gathering different prospective about pain experiences and pain relief and exploring people's attitudes and beliefs on medical and non-medical pain reliefs.

Sampling and Procedure

A convenience sample of students and staff at Plymouth University were recruited via a paid-participation system. Participants met the following inclusion criteria: a) aged 18 and above, b) experienced a somatic or physical pain, currently or in the past, including surgery, injury, or chronic headache; however, other types of pain occurred because of emotional reasons such as depression or anxiety were excluded, and lastly c) they were able to communicate verbally with the researcher.

Semi-structured face-to-face interviews were conducted with a total of 21 participants. They were asked to provide written informed consent prior to their interviews. Interviews took place in a pre-booked room at the university between June and July 2016. The length of the interviews ranged between 15 to 45 minutes. All interviews were conducted in the English Language and each interview was audio-recorded with prior permission from the participant.

Interview Protocol

The interview guide developed by asking participants to describe their pain experience from 'the past not a defined period'.

The interview guide was used and included open-ended questions and probes to encourage participants to describe their experience. The interview was divided into three sections:

Firstly, participants were asked to describe their pain experience physically and emotionally, and were asked to recall the nature of pain intensity on a visual analogue scale (VAS) from 0-100 mm (VAS; 0mm no pain to 100mm the worst pain ever) at the time of their injury, or surgery, etc. Then they were asked to describe their approaches to deal with that experience and the impact of that pain on their life activities. In the last part of the interview, a description of psychological techniques for pain management was proposed as a possible way to relieve pain (See Box 1).

Box 1: script of brief psychological intervention.

(*...imagine you are listening to somebody on a tape taking you through, relaxing each part of your body starting with something like that close your eyes and take a deep breath in and out. Then the instruction will guide you through to picture one of your favourite place in your mind while you're listening to one of your favourite music or while you're listening to a calm music...*)

Participants were then asked about their opinions. There was flexibility to pursue other areas of interest that were raised during the interview. Interviews were audio recorded, and transcribed verbatim.

The type of pain was assessed by asking the participants to describe their pain experience, for how long that pain lasts, and the cause of that pain to determine whether the pain acute or chronic etc. For example, if participants describe their pain experience as sharp, lasted for short-term and the cause of the pain was clear, i.e. surgery or injury then it is an acute pain, and if they describe their pain experienced as aching, burning and lasted for a longer period; then it is a chronic pain. I followed the guidelines of British Medical Association (2017) and The Faculty of Pain Medicine of the Royal College of Anaesthetists (2015) which described acute and chronic pain to determine which participant has acute pain experience and which one has chronic pain.

Demographic information that describing population characteristics such as age, gender, marital status, employment, level of education, date of birth etc. was collected. These data were collected because they are known to be related to actual healthcare services, level of self-care and clinical or health outcome. For example, data on patients' race and ethnicity were found to influence the quality of care provided by healthcare services (Thorlby et al., 2011); in addition, socio-demographic information found to influence self-care maintenance, self-care confidence, self-care monitoring and self-care management among type 2 diabetes (Ausili et al., 2018); moreover, the quality of marital status was related the health outcomes (Robles et al., 2014)

The study procedures were reviewed and approved by the Plymouth University Ethics Committee.

Data Analysis

A thematic inductive analysis was used to identify potential patterns and themes from the transcribed interview data. NVivo software (version 10) was used to support the analysis of the data. The researcher (TA) created a preliminary list of noteworthy quotations from each transcript. Then a list of potential themes that appeared from the data was created. These themes were reviewed and discussed with the academic supervisory team until an agreement was reached upon the coding list that best reflected the data. Finally, the researcher (TA) summarised the data and grouped them into organised themes. In terms of the validity of this list of themes and to increase the trustworthiness of the findings, a final checking that compared the final list of themes with the actual interview scripts was conducted by (AN), she is an expert in qualitative research, then findings were presented by (TA) in a well-written report that followed the qualitative guidelines.

The analysis focused on individual's beliefs of perceived effectiveness of non-drug techniques in general, as well as psychological techniques, their acceptance of these psychological techniques to be methods of pain relief, and any potential barriers to using these techniques.

Results

Participants' Characteristics

Two out of 21 interviews were excluded from the analysis as their pain experience did not meet the definition of pain I meant to include in this study. The data included in my analysis was collected from a total of 19 participants (8 males, 11 females ages between 20 and 72, median = 54, IQR= 22-59). All participants were English speakers with different ethnicity (all demographics listed in table 4).

Participants' pain experiences were described in table 5. Each participant had different experiences of pain. The recall of the pain intensity ranged from severe and moderate pain to mild as measured with VAS (median = 75; IQR = 70-90), and the measure of their current pain ranged between 0 and 40 (median = 5, IQR=0-10). Pain was described

as “acute and sharp” in six participants, “chronic severe” in nine participants, and as “chronic but not severe” in three participants only.

Table 4: Characteristics of Participants from general population

Age, year, median (IQR)	54 (22-59)
Gender	***N (%)***
Male	8 (42)
Female	11 (58)
Marital status	
Married	6 (32)
Single	8 (42)
Not reported	5 (26)
Ethnicity	
White British	13 (68)
Other British background	5 (26)
Asian	1 (5)
Employment status	
Student	5 (26)
Working	7 (37)
Retired	7 (37)

Table 5: Description of pain experience from general population participants

Pain experience/location	**N**	**(%)**
Finger	3	(16)
Knee	3	(16)
low back i.e. removing a sebaceous, spondylolisthesis(spine/coccyx)	7	(37)
Neck and shoulder	1	(5)
Ankle	1	(5)
Coil operation	1	(5)
Migraine/headache	2	(11)
Broken bones	1	(5)
Cause of pain		
Injuries	3	(16)
Surgery	5	(26)

Arthritis	1	(5)
Active exercise	3	(16)
Unclear	7	(37)
Type of pain		
Acute and sharp	6	(31)
Chronic, severe	10	(53)
Chronic, not severe	3	(16)
Period since pain started		
3 months	2	(11)
9 months	2	(11)
Over 2 years	5	(26)
Over 10 years	8	(41)
Over 30 years	2	(11)
Recall of pain intensity (VAS)		
Severe pain 75 – 100	12	(63)
Moderate pain 45 – 74	7	(37)
Current pain		
Mild pain 5 – 44	10	(53)
No pain 0 – 4	9	(47)

Note: Some participants indicated more than one location of pain

Summary of the Themes

Analysis of the interviews identified four themes: 1) views related to living with pain, 2) concerns about pain medication, 3) views on non-medication/alternative treatments of pain relief, and 4) possible barriers encounter the practice of psychological techniques, (table 6).

Views Related to Living the Pain Experience

Fatalism vs Stoicism

Participants varied in their approaches to living with pain. A small number of participants considered pain as their fate, which they must accept. This was especially true of chronic pain participants in the sample.

> (P10 *"Say, any form of physical exercise which involves the shoulder and neck area is painful and then you can come back from whatever the activity is and then you can be, you know, worse than you were so it's not going to help me really is it? I think it's just something that I need to live with..."*).

However, most of the participants considered pain as part of normal life, but that belief did not stop them looking for a healthy body, thinking positively, or engaging with and enjoying their lives.

> (P14 *"…I know I have to have a form of exercise, but that doesn't necessarily help the pain. It just means that I'm exercising which is important for my bones. And so, very occasionally, I go out in the morning… I can't jog the whole, I'd only go out for about 20 minutes, but I'll jog, power walk, jog, power walk. So if I feel okay, I'll go out and do that and still haven't got the pain..."*)

> (P15 *"…it's like I've done all I can do to reduce it so I can't really do anything else to help it. So I'll just stop complaining and get on with life."*)

> (P13 *"…being injured whilst running…it's one of those things that women have got to go on with no matter happens in life. You know, if you're in pain, you're not…you can't feel sorry for yourself. Again, it's mind over matter. You try to build up resistance and do the things that you normally can do…. once I've actually put what I need to do in my feet and then I just get up and do whatever I need to do. There's no point in being a couch potato and just feeling sorry for yourself. We [means women] tend to be more stoic than anything else… I can't let pain ruin my life… ".).*

Other participants have described pain as a good sign in life.

> (P6 *"…You can't live without having aches and pains so you taught yourself how to enjoy them… These days, it's just a normal part of life. Yeah, I'm in my 60's. I do rock climbing. I teach aerial acrobatics. I do swimming, cycling. And I expect to get bruises and bashes maybe broken bone or cuts and gashes and aching muscles and pulled muscles and things like that… And to me having those is actually a good sign because it means I've been out enjoying myself. And that's what I said to all my friends and students "When you got the bruises, be glad of it because it means you've been doing something."*)

Another participant mentioned that despite the pain she felt much better than other people who suffer more, it might be an attempt to motivate herself.

> (P14 *"…I'm very lucky. There are so many people who have really bad pain that they live with every single day of their lives, so I'm lucky.)*

Impact of Pain (Emotionally, Physically and Socially)

Participants described various aspects in their life that were affected by their pain experience. Their emotional status, their life activities including fun and work, in addition to the impact of pain on their relationships with partners, friends or parents.

Participants who especially were in high intensity pain felt sad, upset, angry and frustrated as this pain restricted their movements, or stop them from working.

> (P17 *"…Awful, awful. And in the end I mean, I couldn't even try to get a job or work because I knew I was completely unreliable. So just undermines everything really… I feel I had no life at that time, because I just get better and then I was waiting until the next time it happened. So it was terrible really."*)

> (P18 *"..I was cross, because I wanted to get out in the garden. So I made myself a little platform on a bench and did some sort of raised gardening. So I felt irritated really that I couldn't do what I like doing."*)

A few participants (P7, P10, and P19) who suffer from chronic pain expressed their worries for the future, anticipating a time when they could not find a treatment to relieve their pain, a prospect which leaves them somewhat depressed

> (P10 *…Your system would eventually become; you know…that it wouldn't work. I don't know what quite the word is, but the, you know, perhaps… And I think that they're not able to inject you twice a year for years and years and years, you know, so there will come a time when they'll probably say they can't do any more for it and I don't know what the…you know, whether stronger painkillers or more painkillers or what would be the…what I would do then?*)

> (P7 *…I can't go to the gym. So, it's kind of depressing…it came back three times. So, the thought of it coming back the fourth time, it's kind of daunting that I'm going to go through all these things again for the next few months…. So, this pain makes me feel very tired. Like thinking of going under the knife again. It's not scary, but it's just tiring…*),

> (P19 *"…Quite a bit helpless really, especially when it was at its worst because I couldn't get up the stairs properly and I couldn't...I could hardly put my socks on, so I couldn't bend over… so I thought, yeah, it was not good… I'm a bit of a worrier so I began to think what would happen if it came on the other side, I'd be totally helpless... but…I think I dealt with it quite well actually because I still...I tried to carry on with most of my activities. But I knew I wouldn't be able to do my...delivering my papers, so I was getting worried will I be able to do the next slot when it's time to go out with the papers; that was a worry…"*)

In addition, P8 and P7 revealed that pain affected them financially, and others wished for a solution to get rid of pain.

Most participants mentioned at least one of the following aspects that was affected by their pain experience. For example, their daily activities, their fun activities such as sports and dancing and their work or study.

Some participants (i.e. P9, P15) reported that this pain affected their relationship with at least one of the following i.e. partner, friends or parents and they did not receive the social support from them.

Concerns about Pain Medication

Participants described their thoughts of medications. This can be divided into 3 main categories: 1- worries from the side effects of the medications, 2- worries to build tolerance, and 3- worries to be dependent to medications.

Worries about the Side Effects of Medications

> *(*P12 *"I can only take painkillers for maybe a couple of weeks. Because obviously they can have effects on your stomach and things… but obviously, I was trying not to take the painkillers because you're not meant to take them for a long period of time…")*

> *(*P13 *"I tend not to take medication. I'm not a lover of medication, I try and be resilient to medication and not take any medication… If the pain is too much then sometimes, I would have recourse to painkillers and things like that in order to manage my pain…. because if you take one medication it triggers something else")*

> *(*P17 *"I tried all sorts of things, but I didn't want to take strong drugs. So I tried all sorts of alternative things... some of the stronger drugs I know can destroy your liver or something like that. So I just didn't want to go down that road at all. But the doctor told me one time that I was silly that I should because…to get my life back. He probably didn't use that word but this is the impression he gave….")*

> *(*P6 *"I wouldn't take drugs unless they're absolutely necessary…all medicines are poisons. They caused problems…")*

*(*P8 *"I think it just sort of messes with your body's natural reactions to things possibly…")*

Worries about Building Tolerance

*(*P11 *"…I don't want to have like build up a tolerance to medication and stuff like that… so usually I'll go with non-medication but sometimes when it goes bad I will…")*

*(*P21*"…I use just, like, Ibuprofen, but I try not to, just like painkillers...I always feel like one day I'm really going to hurt myself. I always keep waiting to injure myself so badly that I'm, like, yes now I need painkillers… and I tend not to take too many because I know if you take too many painkillers it will just diminish the effects later if you have too many")*

Worries about Dependence

*(*P11 *"…So usually I'll not have medication because I don't want to become dependent on pills…")*

*(*P8 *"…sometimes my family have had some sort of prescription drug thing and… Yeah, so seeing people kind of hooked on it kind of makes you feel like it's not a good idea to sort of become dependent on stuff like that…")*

Views on Non-Pharmaceutical / Alternative Treatments

Participants seemed to be open-minded to most of the alternative therapies of pain relief and their positive approaches towards these type of techniques as pain relief clearly appeared in the content, which was including acceptance of non-psychological and psychological techniques.

Acceptance of Non-Psychological Methods

Acceptance of non-psychological treatments such as acupuncture, yoga, stretching exercise, massage, cold gel, was reported by 6 of the 19 participants. However, only a

few were willing to try any techniques of pain relief on the condition that the technique promised to get rid of the pain permanently.

> (P10 *"…it probably wouldn't work, but having said that, I mean I have been to physiotherapy and that does involve you being handed a set of instructions and you're sent home to do this so many times a day and I haven't really stuck with that. I think I'm looking more for an instant cure rather than… I know a lot of things, you know, probably can be helped by helping yourself, but I going to be expecting it to go out the room with a cure and you do it from physiotherapy or it does involve some effort on my part.")*

> (P17 *"…I was very willing, yes. And I was very happy that even if it was placebo effect only then it would've work on me because I've tried to believe in everything. I was confident somehow that I would found the answer eventually. I don't know why, but I sort of felt I would, the answer must be there and I would find it eventually. So I was ready to believe that everything would work, but it didn't.")*

Acceptance of Psychological Methods

Their acceptance of psychological techniques included two aspects; acceptance of distraction and relaxation techniques, which was reported by the majority of the participants, and the acceptance of self-hypnosis or hypnotherapy, which was reported by a few participants.

Some participants accepted distraction and relaxation techniques as "nice experiences" with which they had some previous experience using.

> (P19 *"I could see it would make me relaxed, yes. I have done something a bit like that maybe at the end of an exercise class where they get you out to relax at the end do some gentle stretching. Yes, it is nice...")*

> (P16 *"..I remember learning apart from when she gave me the tape as it was at that time of this kind of thing, was her saying that, "You need to keep yourself fit, blah-di-blah. And if you feel really stressed, put an elastic band around your wrists and ping it, and the pain will take your mind off anything else. And I came out of that after an hour thinking (Chuckles) I spent an hour for an elastic band, so they can't put me off, anything like that. But when I listened to the tape later I thought, no this is really good… So I do remember that really, really did help. So yes, if anyone suggested it again… I will try, yeah. Of course I would.")*

Participants who accepted hypnotherapy, did not have a clear reason but some were aware of the meaning of hypnosis…

> (P11 *"…I've heard of self-hypnosis but I've never heard it used in pain context. But I quite like stuff like Derren Brown TV shows. And I've seen him and people like him make people feel pain and then put them in a hypnotic state and they just don't feel it. So I know about stuff like that, but I've never actually thought of trying it on myself. I may do.")*
>
> *(*P12 *"…I haven't tried it. I've never had anybody sort of explain it to me or say anything about it. I mean I'd be happy to try it if someone did, I suppose. But I haven't any experience of it.")*
>
> (P14 …*"R: What do you think of self-hypnosis? Have you heard about it?*
>
> *P: I've heard about it, yes, but that's as far as it goes. I know nothing more than that.*
>
> *R: So from what you know about this technique, could you imagine yourself trying self-hypnosis I mean are you willing to do this kind of exercise to cope with your pain?*
>
> *P: Yes. It might work.")*

In addition, 7 out of the19 participants had not tried psychological methods of pain relief before.

Approaches to Pain Management

When participants were encouraged to describe their personal preferences to relieve pain, their views revealed that people would like to use both approaches; medication and other alternatives. It is clear that they were looking for safe options compared to the drugs side effects and they were wishing to have more information about their pain.

> (P11 *"So usually I'll not have medication because I don't want to become dependent on pills, I don't want to have like build up a tolerance to medication and stuff like that. So usually I'll go with non-medication but sometimes when it goes bad I will.")*
>
> (P14 *"I try to avoid…I have to take one tablet each morning for my blood pressure. I have to do that because if I don't, then I'm at risk of having a stroke or a heart attack, so I have to take that. But believe me, that was under sufferance*

and my doctor would tell you the same. I went on for a long time saying, no, no, no, no, I'm not taking them, no. And then eventually, I had to succumb to that. But I would rather have a sort of holistic way of getting to the bottom of what causes this, but I've been to Derriford Hospital and I've had physiotherapy and it doesn't, and I've also been to an osteopath as well, but it's there and as I say, it would be an operation to try and do something to the bones and that, I wouldn't do that. I think it's far too dangerous. I hate anything to do with backs, surgical")

The majority of the participants reported that they were aware of the risks of medications and some explicitly indicated that they would not take it until they really needed to. Only one participant explicitly chose to use the medical option of "injections" over the psychological techniques, as she believed that this was the only option that worked for her pain.

"… I am one for, you know, a bag of pills or an injection or, you know, some kind of action rather than something that seems to be dealing with your mind more…"

In addition, P9 believed that the use of alternative treatments might be appropriate for people who suffer from chronic pain, but acute pain was better managed by medication.

"I suspect that if I'd had a chronic pain which lasted months and months and months, then I probably would investigate everything and I'd consider that [psychological and non-psychological methods]."

Two participants (P4 and P3) wished to receive more support and information from healthcare professionals to deal properly with their pain.

*(*P4 *"Obviously, I would like a lot more... it would be a lot reassuring if he took like lots of x-rays and just lots of test just to see exactly where it is and why it's hurting and stuff. Because I still don't know exactly why it's hurting. He was just giving me the medication just for like pain management and strengthening or like strengthening…")*

*(*P3 *"I think perhaps they can tell me first that there's this technique that…so that I can prepare. Like if let's say really I can't handle it, I can use this to help me. But I wasn't aware...I will prefer that they can give me a leaflet like to bring home*

to say, okay, ways to…for relaxation. I mean, that would help because, after the surgery maybe I'm still a bit unconscious, I mean, not very aware of the surroundings. So, if they tell me after the surgery I may not be able to really capture it, maybe a leaflet will be good. Like at least when I'm home, I'm feeling a bit bored, I can take it out and have a read and then I can try it. Yeah, because if you tell me at the moment when I'm discharging, maybe I won't really pay attention to it...")

Barriers to the Use of Psychological Techniques

Multiple barriers, internal and external, were identified to using psychological techniques as pain relief. There were no observable differences between gender or age group. The most frequently reported barriers were labelling of the intervention, lack of confidence and self-efficacy, scepticism and finding a suitable time and place.

Labelling of Intervention

Some of the participants (i.e. P11, P15, P18, and P19) implied that they were spontaneously performing features of psychological techniques when they felt the pain such distracting their attention by watching TV or reading books, or relaxing by clearing their mind. When a brief description of psychological technique was presented to them and they were then asked about their opinion of it as method of pain relief, their responses explicitly and implicitly implied scepticism of the effectiveness of the techniques. Their replies suggested that there could be an issue with how the interventions are labelled.

*(*P18 *"…I suppose if people were sceptical, they might not want to even embark on that. I think some people turn immediately to medication and going to the GP and think it's a magic pill they can have.".)*

Another participant implied that this technique would work better than the technique she used but did not mentioned whether she would like to change the way of dealing with pain or not.

*(*P6 *"…I would say probably for some people that would work a lot better than my technique")*

Other ways of expressing their scepticism was by stating that the psychological techniques were good and might work for others but not for themselves.

"I don't think it would work very well with me. And I think I'm too much of a control freak for that to work"

"…I think some people can believe in that kind of thing more than me…".

One participant (P9) explicitly stated his scepticism about hypnosis techniques and he preferred to be in control over his pain rather somebody hypnotise him.

(P: "I don't think it would work very well with me. And I think I'm too much of a control freak for that to work".

R: Why is that? Could you explain more?

P: "It's hard to quantify, but I'm sort of very much in control of myself and I think I'd struggle to actually get to the stage where you could actually let go and relax and everything. And I think if you could do that then the pain could possibly go away. But as I say, I just don't think I'd be good at it."

R: Yeah.

P: "And I don't think anyone could ever hypnotise me.")

Lack of Confidence and Lack of Self-Efficacy

A number of participants claimed that they had active minds which could not easily be distracted, even when they were practicing these techniques. They also believed that pain was something that was not easy to be distracted from.

*(*P11 *"I have done breathing exercises before, and again they sometimes help, but because I've got a very active mind, it'll always get distracted and just think about something else and then it'll always went back to thinking about pain.")*

*(*P13 *"Well, I suppose it is, if you've nothing else to do, sit down and relax, but I can't relax, that's one of my problems. I've got to be on the go. And even with the pain I will be on the go. You know, I will not sit down in front of a television and watch a film. I'm always doing something, I'm always very active both craft-wise and whatever. I can't be a couch potato or sit down and imagine this…")*

*(*P14 *"I think because of the person that I am I tend to focus on things. So if I've got the pain, I don't want anything else; I've got the pain.")*

*(*P15 *"…I feel like it would probably make me focus more on it because like to have nothing externally to try and distract me from it…")*

*(*P16 *"…I've tried those and I used to use them to help me to sleep. And they're very hard work for me. It takes a long time for me to stop my mind wondering off. But there was a point when it did work and it has been on my mind to give it another go….")*

In addition, a few participants expressed their lack of knowledge in terms of how they could perform it and could not imagine doing it. One participant (P7) said: *"I'm not that good at imagining."*, and another (P9) said: *"I just don't think I'd be good at it…."* And one more said that (P21) *"…I don't know how confident I am in my own abilities. I could just imagine it going horrifically wrong and still ending up in a lot of pain…."*

Scepticism

This included participants' disbelief in brief psychological techniques. Some expressed clearly that they were not 'believers' in such techniques i.e. P10 stated that

"I think some people can believe in that kind of thing more than me… I am one for, you know, a bag of pills or an injection or, you know, some kind of action rather than something that seems to be dealing with your mind more…"

It also included doubts about the effectiveness of brief psychological techniques. Although most participants were willing to try these, this did not necessarily mean they believed in their effectiveness.

*(*P10 *"I think I could quite enjoy that experience, but I don't think it would…when I had finished with the experience, I don't know if it made any difference to my pain in my shoulder… I think it would seem like a nice experience, but not something that's going to help my problem in the long run…")*

*(*P9 *"I don't think it would work very well with me. And I think I'm too much of a control freak for that to work… if it had a chance of working, I would consider it, but I wouldn't…. No, I'm not saying that I wouldn't try it, I'm just saying that I just don't think it would work for me")*

There were other sets of barriers that were externally driven:

Finding a Suitable Place, and Time to Practise:

Some mentioned the need to choose a suitable place to do try it

(P12 *"…Depending on the circumstances… I mean, like where you are and things like that. Obviously, if you're just sitting on the stairs in your house, that's not...yeah, one could do that, obviously. Maybe you're outside and there's a lot of other things going on, it would maybe be more difficult....")*

*(*P19 *"...finding the right time and place really…")*

Two participants mentioned that the structure of the content might not fit the place where they could experience pain

*(*P5 *"I can't imagine just for example, if I was in a football match, just to go in a room and just start playing music and then sit down and…. It just seems very…not extreme, but it just seems very structured, like a proper structured way….")*

*(*P12 *"…I think certainly if you're thinking about something else, other things that are distracting. I think certainly that can help. I guess maybe not in a very structured kind of way….")*

One participant P19 mentioned that it would be better if they tried it in a class

"…finding the right time and place really… I always think it's not quite the same on your own. I like...I did like it in the class…"

Two participants emphasised the need of practising or training before start doing it alone

> *(*P21 *"…I could totally see how self-hypnosis, if you do manage to hypnotise yourself how it could totally work because you're not...I mean my understanding of self-hypnosis you imagine yourself somewhere else or something. If you're not there...sat at home with your painful teeth, then you're on the beach somewhere in your head, then I could imagine how it could totally work. I don't know how confident I am in my own abilities. I could just imagine it going horrifically wrong and still ending up in a lot of pain….")*

> *(*P16 *"Time and not setting aside time to learn that properly…")*

Additional Barrier

The analysis revealed one final issue that was discussed less frequently but might be considered a significant barrier when trying brief psychological techniques. This involved not having enough social support including family and friends, who might not understand pain and when rest or relaxation was needed, might interfere with his using the technique (Table 6).

Discussion

In this study, we identified general views and beliefs about pain management techniques. In addition, we identified a number of specific opinions about brief psychological techniques from a diverse population who had pain experience. The most frequently reported barriers to practising brief psychological techniques as pain relief methods were internal barriers such as scepticism, lack of confidence to practice and lack of knowledge or the stigma around psychological treatment. Moreover, the analysis indicated their acceptance of non-medication options/treatment of pain relief.

A considerable amount of research has addressed the issue regarding patients' beliefs and attitudes about medication and the impact of these on their adherence to medication (Phatak & Thomas, 2006; Unni, Shiyanbola, & Farris, 2016). Other studies have reported participants' beliefs on the effectiveness of self-management pain programmes (Bair et al., 2009). However, limited studies have investigated the public's attitudes and

beliefs towards simple self-help administered psychological techniques to relieve pain. This qualitative study added to understanding of people's views and beliefs about pain relief strategies by gathering different views from this population who had experienced various types of pain, and identified their attitudes towards self-administered psychological techniques.

Findings of this study suggested that people still have great concerns about medicine intake, which is reflected in the adherence literature for many chronic conditions such as asthma, cardiac, rental and oncology (Robert Horne & Weinman, 1999) and [OA] (Laba et al., 2013). For example, Laba et al. (2013) conducted a survey in 188 osteoarthritis patients to investigate the influence of some medical-related factors such as pain efficacy, mode of action, dose frequency, treatment schedule, side effects, and out-booklet costs, which might influence their decision to continue treatment. The study found that side effects were one of the main factors implicated in patients not continuing treatment. Apparently, patients are not taking medication as they are prescribed; thus, the World Health Organisation (De Geest & Sabaté, 2003) has recommended that this is should be a priority for healthcare professionals, policy makers and health managers, and health researcher to increase the effectiveness of health interventions that are attributed to low-cost interventions. This may have a greater impact on improving the adherence to treatment, as medications is essential, but insufficient in itself for the successful treatment of disease.

In addition, my findings suggested that people accepted other non-pharmacological treatment, which is in line with other research. For example, a survey included 256 patients with irritable bowel syndrome for Harris and Roberts (2008) reported that patients revealed their acceptance to most of the modality treatments that included tablets, diet change, yoga, stomach cream, heat pads, homeopathy, hypnotherapy, acupuncture, and suppositories. Although tablets were their most accepted method of treatment, some had reported their dislike of conventional medical treatment due to side effects. Austrian et al. (2005) reported that the majority of participants with chronic pain revealed their desire and willingness to explore other treatment options, such as trying exercise and willing to learn relaxation techniques.

Moreover, the findings have suggested some potential barriers in terms of practicing brief psychological intervention to relieve the pain. Findings from this study identified some

potential barriers in line with previous research. Bair et al. (2009) evaluated a self-management programme, which included relaxation and deep breathing exercise as one of the programme main components. The study concluded that one of the barriers to adherence was that patients saw some aspects of self-management practices as not tailored to their specific needs, and a perceived lack of social support from people around them. This has been identified in this current study. Other studies (Austrian et al., 2005; Park et al., 2013) conducted with older people to investigate barriers and acceptance to non-pharmacological treatment, concluded that people were willing to practice these types of treatment, but their lack of experience or faith in them left them with concerns regarding their efficacy.

Based on the findings from former research, it is clear that participants were willing to accept non-pharmacological therapies, and more specifically in this research, they are accepting of brief psychological techniques. However, they are still sceptical and might lack confidence to practice it. There are some possible explanations for this. One possible reason is the lack of knowledge or the misinformation about psychological treatment. For instance, techniques such as mindfulness meditation have been argued to have adverse side effects (Farias & Wikholm, 2016). These may include somatic, psychological and neurological problems. In addition, the authors argued that some people might react negatively to meditation because it could provoke inner emotional problems people tended to forget, and make people more aware of themselves, which might change how they perceived themselves (Farias & Wikholm, 2016). On the other hand, substantial research on meditation has reported its benefits in different fields (i.e. Glomb et al., 2011), with students' learning and cognitive performance (i.e. Ching et al., 2015) and with people with chronic pain (Morone et al., 2008). Beneficial effects of mindfulness meditation training on rating of painful electric stimulation have been examined in experimental research (Zeidan et al., 2010) where findings suggested that mindfulness training for 20 min for 3 days showed significant reductions in the sensitivity to pain. Furthermore, a qualitative study (Morone et al., 2008) included older people with chronic pain where beneficial effects of mindfulness included pain reduction, mood enhancement, and improvement in a sleep latency and quality of sleep, and achieving well-being.

Research has indicated that mindfulness meditation practice requires a set of skills that involve a particular way of paying attention and awareness, which can be developed

through meditation, in the present moment, and non-judgementally to a particular experience moment by moment (Kabat-Zinn, 2003), which means that people have to be fully engaged in this activity to gain the therapeutic effects from the training. Accordingly, as it is important to highlight that there may be negatives related to meditation, but we should consider the fact that these negatives are not likely to be harmful effects and in some cases will be simply ineffective if people cannot master it, or fully engaged in the training. In addition, research into the adverse effects of mindful meditation are still not conclusive and need further investigation.

Another explanation for the scepticism surrounding psychological intervention is that individuals could be affected by the misconceptions or prejudice associated with psychological treatment, which in fact led to some participants displaying negative attitudes towards psychological intervention, and more specifically to the word "hypnosis". This may be associated with somewhat negative media portrayal as a form of entertainment and lead to a view of it being unscientific (Upshaw, 2006). Such stigma attached to mental illness treatment could be a major obstacle and influence people's adherence to treatment. For example, a Sirey et al. (2001) study found that perceived stigma among 92 outpatients with major depression at the start of their treatment predicted their early discontinuation with the treatment, especially among elderly people. Moreover, a huge literature on stigma indicated that stigma could stop people from seeking help for their mental disorders (e.g. Schomerus & Angermeyer, 2008). Although there a huge volume of literature associated with stigma around mental disorders and seeking treatment, there is limited information on people's assumptions about psychological techniques for pain. However, we can assume, to some extent that people stop seeking help from psychological services or techniques in an attempt to avoid being a part of a stigmatized group. Also, some people may believe that psychological interventions or techniques are not tailored for their somatic or physical pain, and should only benefit people with mental disorders. Studies conducted with chronic pain patients indicated that patients may be resistant to taking up psychological therapies for physical conditions because they assume that means it is 'all in their mind' (Hyland et al., 2016; Jon Stone et al., 2002). Therefore, improving people's knowledge, educating them and consideration of how interventions are labelled would play an important role in the acceptance of the brief psychological intervention in the future.

Limitations

There were a number of limitations to the research. One potential limitation of the study is that the data from the transcripts did not allow investigation of the possible effects of gender or age in the acceptability of brief psychological techniques as pain reliefs. So further investigation might consider the role of gender and age as possible barriers in implemented these techniques.

This qualitative study included limited numbers of participants that do not necessarily reflect the views for the majority of people in the area where the research have been conducted. The study also collected views from different participants having different pain experiences. As a result, findings cannot be extrapolated and might not allow researchers to compare findings from this study to those of one particular pain experience. However, the descriptions of these views revealed the current thoughts of pain management preferences and the potential barriers that might be encountered in practising brief psychological interventions. Furthermore, findings of this study explained the reality for people on the ground, which reflected to some extent findings from previous research. Despite the various pain experiences included, this research has highlighted some considerable barriers might affect the delivery and the implementation of brief psychological techniques as a complementary method of pain relief. It is important to consider the labelling of the psychological intervention as that can be affected by the stigma surrounding the concept of psychological treatments. Changing the name of such interventions may make them more appealing and less stigmatising. In addition, it is important to consider the type of information and knowledge that should be provided to patients prior to the delivery of the intervention about the availability of different options, other than medications, that can be self-administered to relieve pain.

Conclusion

The study demonstrated that most participants are willing to trying other treatment options in order to reduce the risk of the side effects of pain medication. Some had practised psychological techniques such as distraction and breathing exercises spontaneously when they were in pain, but tended to be more sceptical or conservative when they were asked directly about their opinion on psychological pain relief. This

outlines some potential barriers in delivering the brief psychological intervention. People's knowledge surrounding pain should be addressed by applying evidence based information to overcome their misinformation and lack of confidence in practicing the psychological intervention of pain relief. This can be improved by working in conjunction with health professionals who are interested in improving pain management services to deliver a well-labelled intervention and well-organised and packaged.

Chapter 5 – Methods and Findings of the Online Survey on People's Views and Attitudes on Pain Relief

Introduction

The effectiveness of brief psychological interventions in the experimental and clinical settings have been summarised in chapters 1.

Although research has supported the fact that brief psychological techniques such as relaxation, distraction, or guided imagery could be effective as pain relief strategies (Kwekkeboom et al., 2008), investigation of participants' views and perceptions on the perceived effectiveness of these techniques were limited. A few qualitative studies have established the general positive views on some of these techniques. For example, Morone et al. (2008) study that investigated the effects of mindfulness meditation on 27 older adult with chronic low back pain, who were part from a clinical trial that conducted an eight-week mindfulness meditation programme (4 days a week, 30 minutes). Based on grounded theory and content analysis of diary entries, researchers were able to identify several beneficial aspects of the programme on pain, attention, sleep (latency and quality), and achieving well-being, which had a positive effect on their mood and on their quality of life. In addition, participants included Morone's et al. study benefit from using various methods of pain reduction that have been taught in the programme such as distraction, increased body awareness leading to behaviour change, better pain coping, and direct pain reduction through meditation.

Another descriptive qualitative study (Tse et al., 2005) that explored pain relief strategies used by older people with chronic pain (n= 44 participants) found that majority of participants used non-prescription interventions with different frequency including oral drugs, analgesia ointment/oil, massage, meditation, watching TV, listening to music, deep breathing, they also perceived that to be effective in pain relief. Although findings of this study reported that only 20% of participants took their prescribed medications, the reasons for the remaining participants why they did not take their medications were not revealed by patients in the study.

Research that combining the findings from qualitative studies on individuals' views towards non-drug interventions for pain relief, especially brief psychological

interventions, with quantitative data is limited. There has been little research carried out to quantify the acceptance and the perceived effectiveness of brief psychological techniques (hypnosis, relaxation and distraction techniques) in one single study. For example, a survey of Mitchell et al. (2007) explored music listening behaviour and related this to pain experience, and explored who considered music to be part of their pain management and investigated their perceptions of the benefits. Participants reported that besides the other benefits that they gained from listening to music such as helping them to cope with everyday life, enhancing their mood and feeling less lonely and relieve boredom; distraction and relaxation were the most frequently perceived benefits of music among participants. Furthermore, both frequent music listening and a perception of music as personally important were further found to relate to higher quality of life. Also, personal importance of music was significantly related to listening to help pain. These findings indicated beneficial effects of music listening to long-term pain.

With this in mind, and as my findings from chapter 4 showed that brief psychological techniques such as distraction and relaxation techniques were accepted by majority of participants who included my study, there was very limited research conducted to quantify the extent to which people are willing to practice brief psychological techniques as pain relief strategy. Therefore, the current survey was motivated by the findings from previous research and by findings from chapter 2 to provide data that could be comparable with previous findings from qualitative studies. Providing quantifying data could be significant in increase the level of evidence available.

Similar to chapter 2, this study aimed to provide an estimation from general population towards brief psychological interventions, regardless of the variability in participants' pain experiences. Therefore, this chapter planned to provide a quantifying data to qualitative studies.

Objectives of the online survey

This survey was designed to a) quantify the degree to which people use different techniques to deal with pain in daily life, and b) quantify their acceptance of psychological techniques to relieve pain. We additionally wished to c) identify common barriers to the acceptance and practice of these techniques for pain relief.

Methods

Survey Procedure

Participants completed single online questionnaire, designed to probe current practice, and views and attitudes towards pain and pain-relief techniques identified in my qualitative studies. Additional questions explored people's attitudes and beliefs towards medical and non-medical methods to relieve pain.

Sampling and Procedure

Respondents were recruited as volunteers employees or for payment mainly students of Plymouth University. Data from participants who were aged 18 and above, able to read and understand English, and had experienced a somatic or physical pain: either current or in the past such as surgery, injury, or chronic headache were included in the analysis. Participant whom their experience were less than a week were excluded.

One hundred-thirty participants joined the survey. They provided their consent online before proceeding to the survey questions. Survey data were collected between July and November 2017.

The study procedures were reviewed and approved by the Plymouth University Ethics Committee.

Materials

Participants completed a 32-item structured questionnaire. This included items from an existing measure of beliefs and attitudes on medication (BMQ) (Robert Horne & Weinman, 1999).

This questionnaire was selected to assess participants' beliefs about medicine, because it is the validated and reliable questionnaire that is well-designed and commonly applied in this regard with different languages (i.e. Gatt, et al., 2017; Jimenez, et al., 2017). Modifying this questionnaire may affect the validity and the reliability of the data analysis later; therefore, these questionnaires unmodified/unchanged and used in the English language.

Depression and anxiety are the most negative emotional states that commonly diagnosed among people with various pain experiences; therefore, it is important in this survey to assess participants' emotional state to determine their level of negative emotion which may linked to their pain conditions in the analysis later. These questionnaires were applied without modification, which did not change their reliability and validity. Questions are presented in Table 7.

Table 6: Survey questions

Section 1: Demographic questions
age, gender, level of education, marital status, employment status, ethnic
Section 2: Exploring the pain experience
- Think back to the times in your life when you have experienced something painful which has lasted more than 2 weeks. Please note where on the body this pain was. - What was the cause of this pain? - How long have you been suffering from pain, if you are not in pain any more, for how long this problem caused you a significant pain? - Emotional impact (depression and anxiety) measured by items adapted from PHQ (Kroenke & Spitzer, 2002) and GAD7 (Spitzer et al., 2006). - How satisfied are you with the overall treatment you have received from your doctor (hospital or any medical centre) to relieve your pain?
Section 3: Views on pain medication
- How often do you prefer to use painkillers when you are in pain? (always to never/ 5-point scale) - Have you taken any painkillers in the past month? (Yes/No) If yes, can you state how often have you been taking the painkillers in the past month? If the painkiller has side effects, are you willing to stop taking it even if it is effective in pain relief? (Yes/No/Other) - Beliefs on medication (concerns and necessity) measured by the items from Horne and Weinman (1999).
Section 4: Acceptance to alternative/complementary pain management treatment, including brief psychological techniques

- Have you ever used any of alternative/complementary treatments such as acupuncture, massage, cold or heat appliance, imagery or visualisation, herbal remedies, etc.? (Yes/No)

If yes, for what purpose have you used them?

- Have you ever used any alternative/complementary treatment to cope better with pain? (Yes/No)

If yes, can you describe what did you use?

- Have you ever used distraction techniques such as listening to music, reading books, watching TV or video, or playing computer games, etc. as a method to focus your attention on something other than pain? (Yes/No)
- Have you ever used relaxation techniques such as progressive body relaxation, counting, jaw relaxation, etc. to distraction your attention from the pain? (Yes/No)
- Do you consider practising any of the following techniques (hypnotherapy, relaxation and meditation, distraction techniques i.e. listening to an audio record, reading or watching) when you are in pain? (Yes/No)

If "No" Can you consider these techniques if your doctor or any health care professional recommended them as part of your usual medical care? (Yes/No)

- Can you rank the following options in order, based on what do normally prefer to do when you feel the pain? (You can drag and drop the options to put them in the right order, where no.1 is the most preferable option and order no.9 is the least preferable one)
- Can you think of any reason might put you off trying psychological techniques as pain relief? Please tick all that apply

The questions were divided into four sections comprising: i) general demographic questions; ii) questions about their pain experience (i.e. type of pain, cause of pain, how long they were suffering, level of pain, and pain interfering on their daily activities); iii) views on pain medication; and iv) the acceptability to alternative/complementary pain management treatment, including brief psychological interventions as pain relief and the barriers to practise these interventions as pain relief.

Participants were asked to respond to the questions based on their previous or current pain experience.

In assessing participants' satisfaction with the pain management treatment that they received or used to manage their pain, respondents indicated their degree of satisfaction on 7-point Likert scale, ranging from 1= extremely satisfied, to 7= extremely unsatisfied.

In measuring participants' acceptance to brief psychological interventions, firstly, they were asked if they had used any complementary/alternative treatment for pain relief, then they were asked if they used distraction or relaxation techniques for pain relief. The answer "YES" indicates their awareness of these techniques. Their willingness to practise these techniques as pain relief were measured by asking this question "Do you consider practising any of the following techniques (hypnotherapy, relaxation and meditation, distraction techniques i.e. listening to an audio record, reading or watching) when you are in pain?" The answer "YES" indicate their acceptance.

In the last section of the survey, number of pain management approaches were provided to the participants and were asked to rank these choices in order based on their preferences. The choice that marked as 1 indicates that it is the most preferable approach compared to the other approaches might mark other than 1.

Data Analysis

A descriptive analysis was employed to quantify participants' responses to pain management medical and non-medical approaches. The researcher (TA) conducted the preliminary analysis and created a summary of the initial significant findings. A report of these findings was created, then reviewed and discussed with the academic supervisory team and an agreement will be reached upon the best summary of these findings that reflect the survey aims and objectives.

Results

Description of Participants' Demographics

Data was collected through Survey Monkey. Out of 130 participants were taking part in the survey, ninety-two managed to finish the study, with response rate less than 30%.

The respondents who started the study and provided some data but did not complete the survey, their provided data were included.

The majority of participants were female (74.55%), students (77.27%), single (65.14%), had completed their high school, diploma or equivalent degree (58.18%), white/British (70.91%), Table 8. Participants experienced pain in different parts of their bodies, Table 8; however, the majority suffered from hip, knee or foot pain, followed by back pain and pain in the arms. The pains experienced were mainly caused by injuries, and a number of participants still suffered from chronic pain, sometimes of long duration. However, the majority experienced pain for less than a month (see Table 9).

Table 7 : Demographics of participants included the survey N= 110

Age, year (M , SD)	(26.45 , 9.54)
Gender	**N (%)**
Male	28 (25.45)
Female	82 (74.55)
Level of education	
< High school	1 (0.91)
High school graduated, diploma or the equivalent degree	64 (58.18)
Bachelor's degree	16 (14.55)
Master degree	17 (15.45)
Doctorate degree	5 (4.55)
Other	7 (6.36)
Employment status	
Student	85 (77.27)
Working	20 (18.18)
Retired	2 (1.82)
Other	3 (2.73)
Marital status	
Single	71 (65.14)
Married	29 (26.61)
Divorced	2 (1.83)

Other	7 (6.42)
Ethnicity group	
White/British	78 (70.91)
Mixed/Multiple ethnic groups, i.e. White and other backgrounds	6 (5.45)
Asian/Asian British, i.e. Indian, Pakistani, Bangladeshi, Chinese, etc.	5 (4.55)
Black/African/Caribbean/Black British	1 (0.91)
Arab	20 (18.18)

Table 8 : Description of pain experience of the survey participants, N= 98

Duration of pain reported	**N (%)**
≤ One months	36 (36.73)
2 - 6 months	19 (19.38)
7 – 12 months	8 (8.16)
13 – 24 months	6 (6.12)
25 – 36 months	3 (3.06)
37 – 48 months	4 (4.08)
49 – 60 months	2 (2.04)
≥ 61 months	9 (9.18)
Pain location	
Head	36 (36.7)
Neck	14 (14.2)
Shoulders	25 (25.5)
Arms (hand, elbow)	56 (57)
Legs (hip, knee, feet)	71 (72.44)
Back, low back	57 (58.16)
Chest, abdominal	34 (34.6)
Cause of pain	
Surgery	12 (12.24)

Injuries	43 (43.88)
Active exercise	12 (12.24)
Burn	2 (2.04)
Arthritis	2 (2.04)
Unclear	15 (15.31)
Others	12 (12.24)

Summary of the Main Findings

The Impact of Pain (Emotionally and Physically)

Measuring participants' emotional state (depression and anxiety) shows that in depression items that 'I have little interest or pleasure in doing things…' and 'Feeling down, depressed, or hopeless…' most of the participants experienced these feeling several days 42 (42.86%) and 35 (35.7%), respectively. Besides, measuring the participants level of anxiety shows that 27 participants (27.55%) reported that 'having trouble relaxing' nearly everyday; 19 participants (19.39%) had become easily irritated everyday; and 17 participants reported that 'worried about different things' nearly everyday.

Participants were asked to identify from choices that were provided to them, if they have experienced any of these problem during their pain experience i.e. sleep problem, driving problem, trouble having fun or enjoy some activities, problem during walking or standing, ability to work and impact on their relationships. The majority of participants reported that they had experienced lacking of fun activities 57 (58.16%) and having sleep problems 43 (43.88%).

Furthermore, the analysis indicates that almost the majority of the participants satisfied with the overall treatment that they have received for their pain. Most respondents 34 (34.69%) were somewhat satisfied and 18 of 98 (18.37%) were neutral. Only six and four participants were somewhat unsatisfied and extremely unsatisfied, respectively.

Views on Medications

Most participants reported using painkilling medications in the past month, 64 (65.98%) reported that they used painkillers to cope with pain in the past month. Additionally, the analysis illustrates parallel views regarding using painkilling medications to manage their pain. While 26 participants (26.80%) reported that 'Always' using painkillers to cope with pain, almost a similar number of participants 24 participants (24.74%) reported that they 'Rarely' used painkillers to cope with pain. Only three participants (3.09%) reported that they 'Never' when they are in pain.

Moreover, the analysis indicates that participants might stop taking painkillers, because of the side effects. Almost most respondents 56 (57.73%) answered 'Yes' on the question that 'If painkillers have side effects, are you willing to stop taking it even if it is effective in pain relief?', while a few participants 17 (17.53%) reported that it depends on the severity of the pain and the extremity of the side effects. In the analysis of the questions related to their beliefs about medicine (necessity and concerns), the majority of participants reported their disbelief in the necessity of their medications to maintain their health; however, a few participants reported some concerns about medicines i.e. 26.80% of participants agreed and 23.7% stayed neutral about 'having to take medication worried them'. Additionally, 28.8% of participants agreed and 23.7% stayed neutral about the worries related to the long-term effects of the medicine. Participants showed fewer concerns about the poisoning effects of medicines and the addictive aspects related to medicine intake. However, most participants (46.39%) showed neutral view in the point that 'Natural remedies are safer than medicines'.

The Acceptance of CAM

The analysis shows that most participants used different approaches to complementary treatment. Sixty-one (66.30%) reported that they used complementary treatment. The analysis of a free text shows that participants used different CAM such as massage, herbal remedies, oil, yoga, acupuncture, Chiropractor, physiotherapy, meditation and relaxation for various purposes such as relieve tension or obsessive-compulsive disorder (OCD), depression and health and well-being, including pain relief i.e. back pain,

recover from injuries, abdominal pain or knee pain. However, only a few participants 30 of 92 (32.61%) reported they used these CAM to cope better with pain.

The Acceptance of Brief Psychological Techniques

Participants' responses indicate an overall acceptance of brief psychological interventions for pain relief; also suggest that compared to relaxation techniques, distraction techniques were more commonly used by participants compared to relaxation techniques (figure 9 and 10). The majority of participants (66, 71.74%) reported using distraction techniques such as reading, listening to music, watching TV, or playing video games to help cope with pain. A substantial minority (29, 31.52%) had used specific relaxation techniques, for example, progressive muscle relaxation, jaw relaxation, or counting to cope with pain.

Figure 9 : Practising distraction techniques, survey data

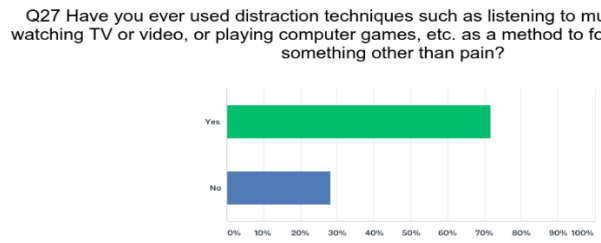
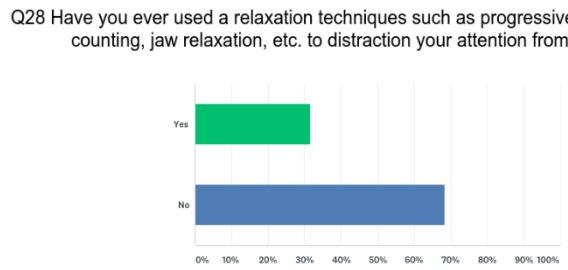


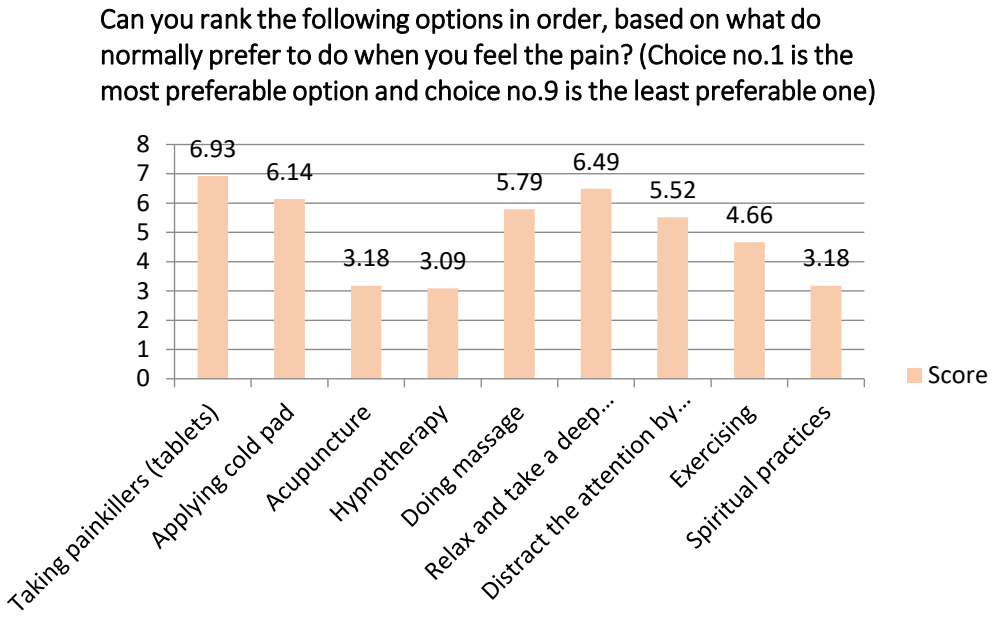
Figure 10 : Practising relaxation techniques (survey data)



Preferences for Pain Management

Asking participants to rank some approaches of pain management based on their preferences shows that the option ‘Taking tables' was the first preferable approach among participants to cope with pain, followed by relaxing and deep breathing exercises, then applying cold pad and doing massage and distraction. The least preferred techniques among participants were acupuncture, spiritual practices and hypnotherapy (figure 11).

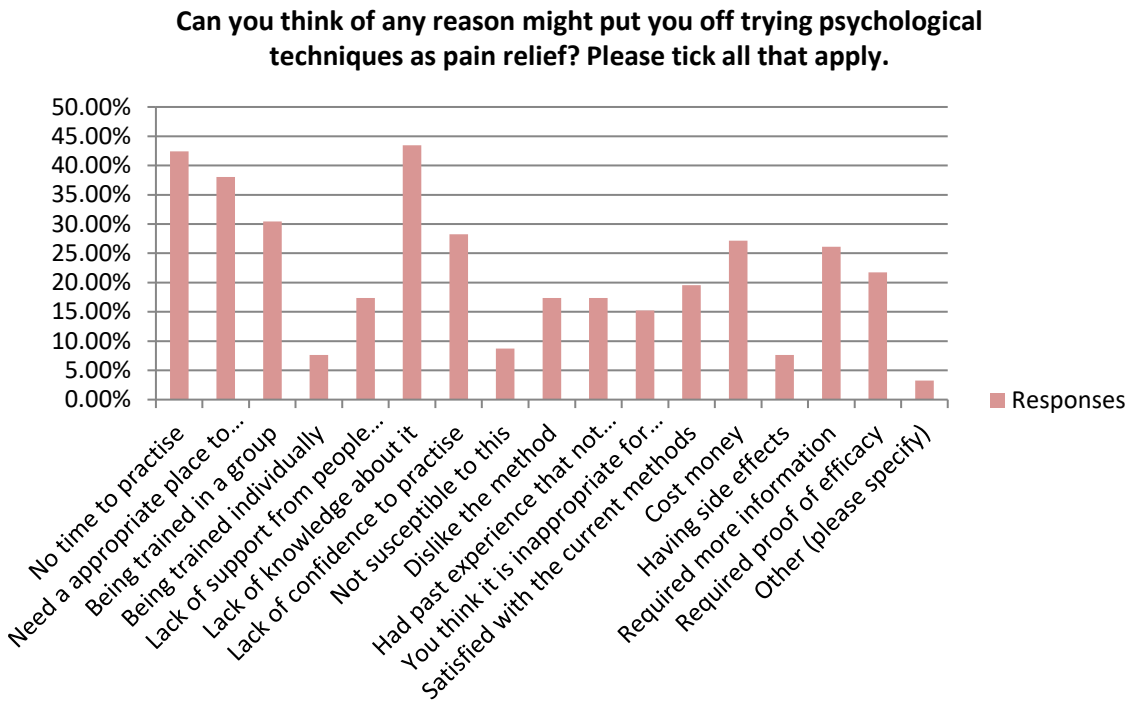
Figure 11 : Preferences for pain management (survey data)



The majority of participants 57 (61.96%) were willing to practise brief psychological techniques when they are in pain. Of those who would not consider brief psychological techniques to cope with pain when they asked ‘Can you consider these techniques if your doctor or any health care professional recommended them as part of your usual medical care?' The majority (31, 71.11%) answered ‘Yes', which indicated their willingness to change their mind if they were advised by their doctors to practise these techniques.

The most frequent barriers to practising these techniques were a lack of knowledge (40, 43.4%), no time to practice (39, 42.39%), and the need for an appropriate place to practice (35, 38.04 %). Other barriers included a belief that the participant would not be "susceptible" to the techniques (8, 8.7%), being trained individually not in-group (7, 7.6%) and having side effects 7 (7.6%) were considered the least barriers by participants (figure 12).

Figure 12: Barriers to practise psychological pain management (survey data)



Discussion

This descriptive study was conducted to quantify the degree to which participants use different techniques to deal with pain and to measure their acceptance to practise psychological methods to relieve their pain. Results identified that people were practising various approaches of non-drug interventions including CAM techniques and aspects of brief psychological interventions such as distraction and relaxation. In addition, it is identified that the majority of participants prefer to practise distraction techniques compared to other aspects of brief psychological methods such as hypnotherapy. Furthermore, 'taking tablets for pain relief' followed by 'relaxation and deep breathing exercise' were the top preferable ways among participants to cope with pain. 'Lacking of knowledge' and 'lacking of time to practise the techniques' came in the top of the potential barriers that may impact the delivery of brief psychological interventions as pain relief strategies.

This study could be considered the first to my knowledge that investigated the views of the non-clinical population who had various pain experiences on the acceptance of a

number of psychological interventions (i.e. distraction, relaxation, and hypnotherapy) all in one single study.

The majority of participants did not report the major impact of pain on their emotions or physical activities, which is not in line with other work that described patients' experiences who were living with pain and how that affect their work and their families (Tollefson, Usher, & Foster, 2011); as pain caused them to be isolated, and disabled to do their work making them more dependent on family members. A possible explanation for my findings is that most of my participants had pain experiences extended/lasting for a short period (a month or less) and it is likely that when they conducted the survey they were not in severe pain, compared to those reported in the other study where their pain was unceasing. However, sleep issues and lacking fun activities, the most frequent problem among my participants, were experienced.

The responses to pain medications in my survey seemed inconclusive because participants have parallel views towards taking painkillers. When participants asked if they were willing to trade off the painkillers because of the side effects, the vast majority responded ‘Yes'. However, quantifying their scores related to their beliefs and attitudes on medication (BMQ) revealed that they have fewer concerns about the poisoning effect of medications and the addictive aspects related to medicine, which indicate a contradiction in their views. There might be an explanation to their responses; it is possible that participants are not suffering from severe health conditions that force them to be medicated. This is reflected in their answers to the question about the necessity for medication as life dependent which may reflect their fewer concerns. Being in a long-term chronic condition such as a cardiovascular state may cause people to be worried or have concerns about the effects of a long-term medications intake (Gordon, Smith, & Dhillon, 2007). Researchers interviewed 98 cardiovascular patients to explore their perspectives on pain management medication-related problems (Gordon et al., 2007). Results revealed patients' concerns related to how to the side effect of medication and their lack of knowledge pertaining to how to use their medicine. Also, it is possible that because the survey did not focus on exploring views from participants who share the same pain experience, instead it collected opinions from participants from various pain experiences (back, leg, head, etc.), which may explain the variance in their responses related to their concerns.

Moreover, results from the survey revealed that participants were using different approaches of non-drug interventions that are CAM techniques such as massage, cold or heat appliance, herbal remedies and oil, etc. and psychological strategies such as distraction and relaxation techniques. My participants commonly use CAM techniques for different reasons such as tension relief and pain relief. Their responses replicated the findings from other previous works on the prevalence of CAM approaches among the general population (i.e. Breivik et al., 2006; Harris & Rees, 2000).

My findings also showed the acceptance of psychological interventions by participants, and they are using these techniques occasionally for various reasons, i.e. depression, tension relief and a few use it as pain relief. Their responses also indicated that they seemed to have some preferences for psychological techniques because the majority of them were aware of using distraction techniques for pain relief compared to those who were aware of relaxation techniques. Also, they ranked relaxation techniques over the hypnotherapy approach as their preferred way to practise when they feel the pain.

Part of my findings are in line with some previous research (Kwekkeboom et al., 2008; Morone et al., 2008; Tse et al., 2005), but there are some differences. For example, Tse et al. (2005) qualitative study conducted with 44 older people has confirmed that non-drug interventions are common among older people that participants practising non-prescribed interventions included some non-pharmacological interventions, i.e. massage, distraction techniques, and deep breathing. This is in line with my findings, but different regarding the population. Also, my results focused on views related to brief psychological interventions, but Tes et al.'s research investigated the views in non-prescribed interventions that include a substantial variety of pharmacological and non-pharmacological approaches.

Moreover, in Kwekkeboom et al. (2008), researchers conducted post-study interviews with 26 cancer patients who were participants in a trial of guided imagery and progressive muscle relaxation intervention to explore their perceptions of the intervention and factors that contribute in the effectiveness of the intervention. Their findings revealed that in most cases, participants' perceptions 'perceived the intervention to be effective' matched the changes in their pain scores (being better or improved). Additionally, participants revealed that their active involvement, clear guided instructions, providing a source of distraction, stimulating relaxation, individual abilities

and preferences and pain qualities (i.e. not severe pain). Although the study supported the effectiveness of brief psychological interventions, it is different from my study in some aspects. First, the methods of Kwekkeboom and colleagues' study that used to collect data from participants are different, which is clinical trial followed by qualitative interviews) and included specifically views from cancer patients on the intervention, unlike my study included views from general population having various pain experiences. Also, Kwekkeboom and colleagues' research investigated factors that supported the intervention effectiveness, in contrary, my study focused on exploring barriers that may hinder the delivery of the psychological interventions. However, findings from both studies indicated that the clarity of the intervention guided instructions might help elevate patients' knowledge about the intervention which may lead to an effective intervention.

Quantifying participants' response to their preference through a number of strategies that were offered to them revealed that 'taking tablets' and 'relaxation and breathing exercise' were near the top of the list. This may indicate that combining controversial treatment and psychological approach to pain management should be considered and this is acceptable by the general population.

Further, participants have ranked some barriers that seemed to have a significant impact on practising brief psychological interventions to relieve pain. Results indicated that people put avital weight on the barrier 'Lack of knowledge', which has been suggested in the previous chapter (chapter 2), to be a possible reason for people's lack of confidence to practise brief psychological techniques and for their sceptical views about the efficacy of these psychological interventions to be used as pain relief method. Information is a key factor that may support a successful delivering of any intervention in clinical settings. Research has highlighted the importance of patients' preoperative education to improve the surgical outcomes and increase patients' satisfaction (Kruzik, 2009; Waller et al., 2015). A systematic review by Waller et al. (2015) included 14 studies confirmed that face to face, audio-visual and multimedia interventions reported benefits of the intervention on patients' satisfaction and knowledge, and only face to face interventions on anxiety. However, another meta-analysis conducted by McDonald et al. (2014) included 18 randomised and quasi-randomised studies to explore the effectiveness of preoperative education interventions among people undergoing total knee or hip replacement. Findings of the review did not confirm the impact of the preoperative

education interventions on anxiety, pain or any other surgical outcomes, but the researcher suggested that these interventions may benefit people who have specific needs such as depressed or anxious or those who have unrealistic expectations and may respond well to these interventions.

Based on the findings from my research, it is clear that participants are accepting brief psychological interventions and they have their preferences amongst these techniques. Also, it could be acceptable to combine conventional treatment intervention, i.e. 'tablets' with brief psychological interventions 'relaxation or distraction'. However, their limited information about these techniques including how to use them and whether if they are effective or not would be an obstacle in delivering the psychological interventions.

This survey has several limitations. Although the study has revealed noteworthy acceptance to brief psychological interventions as pain relief methods, conducting this survey with larger sample size possibly would have shown more significant findings. Participants who have dropped off the survey (n = 37) may have contributed to the findings, if they have completed the survey. Another limitation is that the available data did not reveal any additional findings; for example, whether participants who were suffering from pain for long period would indicate less or more acceptable to brief psychological interventions. Relying on the descriptive analysis approach only may cause this limitation.

Conclusion

To conclude, brief psychological techniques appeared to be acceptable by the general population; however, their lack of knowledge would easily impact their beliefs to engage in these interventions; for example, being sceptical or being susceptible to any misinformation around psychological treatments, which also presented in details previous chapter (chapter 2). Thus, to ensure a successful delivery of these techniques as part of pain management strategies in the future, in addition to consider the intervention labelling (as suggested in chapter 2), an appropriate packaging of the intervention should consider a provision of sufficient information for patients to address their concerns and answer most of their quarries and to elevate their knowledge. The information should

include, for example, a full description of the technique, evidence for the effectiveness of the technique, how could be practised, etc. It is also possible to address misperceptions around psychological treatment, which may be contributed to their lack of knowledge.

Chapter 6 – Methods and Results of the Qualitative Study on Pain Relief Views with Patients Undergoing Knee and Hip Replacement Among UK and Saudi Patients

Objectives of this Qualitative Study

I. To investigate the perceived effectiveness of brief psychological techniques for the relief of post-surgical pain among SA and UK patients who undergoing knee or hip replacement.

II. To investigate barriers to implementing the brief psychological techniques in clinical practice, and whether patients' attitudes toward these techniques would be a challenge or flexible and HCPs recommendations would be able to change their negative views.

III. To find out if these techniques are accepted as an effective treatment and if patients expect these techniques to have less side effects.

IV. To explore if there are any differences between SA and UK patients in their views on pain relief preferences, and in their acceptance of psychological interventions as pain relief techniques.

Methods

Study Design

A qualitative thematic analysis that applied inductive approach was selected. This approach was picked up because patients beliefs and thoughts that related to using psychological interventions as pain relief strategies are unclear. Thus, using this approach would add to our knowledge by exploring and identifying views and attitudes related to patients' experiences with pain and pain relief.

Setting and Participants

The study took place at orthopaedic department in two different locations: Derriford Hospital in Plymouth, UK; and the International Medical Centre (IMC) in Jeddah, Saudi Arabia.

Public health services in Saudi are easily accessible particularly for Saudi population. In some cases, when the health insurance is available, people normally approach private sector to have TKR or THR. Participants were recruited from one of the largest private hospitals (IMC) and well known in preforming these types of surgeries. Patients who attended that medical centre were to some extend representative of the Saudi population, because the medical centre receive different groups of patients who came from different social, educational and economic status, not just restricted for specific type of patients.

A convenience sample of patients, who were visiting or admitted to the hospital from each setting, were approached by their doctor and asked to participate. The patients were recruited from the orthopaedic clinic between March 2017 and June 2017. Demographic and clinical characteristics of participants are shown in Table 10.

Patients were included in the study when they were at least 18 years old and undergoing primary joint knee or hip replacement. We included patients who had either undergone surgery within the past 9 weeks, or who were scheduled for surgery within the coming 2 weeks. Patients who had experienced minor or major complications after surgery such as wound infections or re-scheduled for other surgery were excluded. Patients who had difficulties in communicating verbally with the researcher were excluded.

Table 9: Demographic and clinical characteristics of UK & SA patients

	NHS (N= 27)	**SA (N=31)**
Age, year, median (IQR)	63 (55 – 78)	63 (55.5 – 74.5)
Gender N (%)		

Female	15 (55.5)	15 (48.3)
Marital status		
Single	3	3
Married	22	27
Divorced or widowed	2	1
Qualification		
Left school early	13	9
Secondary or diploma	7	12
Bachelor	3	10
Other degrees	3	-
Employment status		
Working	10	10
Retired	14	7
Not working or housewife	3	14
Type of surgery		
Knee	13	27
Hip	14	4
Other pain experiences		
Back pain	3	7
Neck or shoulder	1	2
Arthritis, rheumatoid, osteoarthritis	2	5
Other knee or hip	7	5
Other	3	6
Duration of condition		
≥5	17	7
6-10	7	9
≤11	-	4

Data Collection

Patients were identified and interviewed at three different points during their treatment: 1) the pre-operative assessment clinic; 2) the post-operative phase on the wards, between day one and day 4 after surgery; and 3) during the follow-up phase between 6 to 9 weeks after surgery, in which patients were recovering at home.

All patients were identified from the consultants' weekly lists by the consultants' assistant. Patients, who fit the study criteria, were approached first by their consultants, to ask them if they were interested in taking part in the study. Those who agreed to participate signed the expression of interest form, which allowed the principal investigator to contact them and arrange for the interview. Patients were interviewed at three phases, during their pre-op assessment, inpatient and at their follow-up assessment. For patients in the pre-op phase, they were asked to indicate, whether they consented to be contacted in the other two phases, whilst an inpatient or during their follow-up assessment.

Most patients joined a private one-on-one interview, but sometimes attended with a family member present (i.e. husband, wife, sister or daughter), conducted by the principle investigator which lasted between 8 and 27 minutes, and were audiotaped; the interview guide is presented in Table 11. Patients were asked to rate their pain in a numeric rating scale (0-10). English interviews were transcribed verbatim by a commercial transcription service. Arabic interviews were transcribed and translated by the principle investigator.

Every effort was made to ensure patients understood what was involved before written consent was obtained. In the UK the study was approved by the Health Research Authority (HRA), the Research Ethics Committees (REC), the University of Plymouth Ethics Committee, and the National Health Services (NHS). In addition, approval was obtained from the International Medical Centre in Saudi.

Table 10: Interview guide used to collect data from patients in both settings adapted to fit each phase (pre-op, post-op, and follow-up)

Exploring their pain experience

What did you do to cope better with that pain?
Can you describe your feelings?
How that affect you in your life, you relationship?
How much pain are you in when moving, resting or in general?

Exploring their approaches to deal with pain

What do you normally do when you feel the pain?
Do you have any reservations regarding pain relief or painkillers?
Can you think of any other ways that might be helpful, if you are experiencing a painful episode?

Exploring their views on psychological pain relief

Did you do anything to distract your focus away from the pain?
At this point a description of psychological technique was presented to participants (see box 1) and were asked some of the following questions:
Would it be hard trying something like this?
Can you think of some things that might put you off trying it?
Do you think this way might help you to cope better with your pain?
Would it change your view if doctors or nurses recommended that to you to try it as part of your treatment?
How do you feel about taking part in courses similar to what I have described to you to help you relieve pain?

Box 1: A script of psychological technique

"Imagine yourself in your bed after surgery… if you were listening to somebody on a tape or CD taking you through relaxing each part of your body… starting with something like… to close your eyes and breathe deeply, then the instructions will guide you through to imagine one of your favourite pictures in your mind while you are listening to one of your favourite pieces of music"

Data Analysis

The data was analysed according to the thematic approach (Braun & Clarke, 2006) using NVivo software (version 11) to help organise and classify the content of transcripts. To identify themes that could answer the research questions initially, the analysis involved reading of the whole scripts to gain an overall impression of the data. Then coding was performed and emerging codes from the data were categorised into groups. Each group was reviewed to check if themes were related to the codes, then the themes were refined and labelled. Findings of these data were recorded by the principle investigator and presented to the supervisory team for discussion.

The following step in the analysis was to conduct a separate analysis to each phase as a set to identify whether there would be any differences related to pain perceptions or behaviour, pain experiences or views on psychological pain relief between each phase (pre-op, post-op and follow-up). Where no differences was identified, general analysis was performed across both NHS and Saudi data. Finally, a report that summarised these findings was produced and reviewed by the supervisory team.

Results

Participant Characteristics

All patients' characteristics were presented in Table 10. In the UK setting, 12 participants were approached at post-op phase and 11 patients were approached at pre-op and follow-up phases. Three post-op patients asked to be withdrawn from the study after a written consent form was gained and the interview date was scheduled because personal reasons, or do not feel very well to talk. The other patients who were in pre-op and follow-up phases were agreed verbally but changed their mind later at the day of the interview because personal reasons or do not have time for the interview. At the end only nine patients from each phase provided data for analysis.

In Saudi setting, 12 participants were also approached in each phase to participate in the study. From post-op and pre-op phases, eleven patients agreed to take part in the study and provided data. Only nine patients were recruited from the follow-up phase.

Summary of the Themes

Four main themes were identified, which are 1) Living with pain experience; 2) Concerns related to pain relief; 3) acceptance to psychological interventions; and 4) Barriers in implementing psychological pain relief techniques, which involved internal and external aspects.

Theme 1: Living with Pain Experience

Participants from SA and the UK settings both described the impact of their pain experiences on their daily routine and on their emotional status. In addition, they described different approaches and attempts to cope better with this experience.

The Impact of Pain

The majority of pre-op patient in both settings agreed on the fact that pain had restricted their movements, e.g. walking, and reduced their normal activities such as daily exercise. Additionally, they were experiencing high levels of pain properly that the main motivation for them to take the risk of surgical pain.

> *"it depends on the activity I'm going to do, like when I'm sitting like this do not do any activity, I feel mild pain between 4 or 5, but when I start walking and moving or if I'm standing, the pain could reach a high level like 8 or 10"*
>
> SA pre-op P1, male

> *"the pain only reduced my amount of activities, but I carried on my life as normal"*
>
> SA pre-op P1, male

> *"…pain affecting more things in my life. I'm an active person I like walking and exercising a lot, I used to do different exercises, but because the pain has progressed the rate of my daily exercise dropped by 20% or 30%"*
>
> SA pre-op P2, male

"oh God… the pain is increasing when I walk, I can't walk .. I used to walk long distances because it's healthy and good for the body, but the pain won't allow me to do that anymore. I can't climb the stairs, I can't stand up to do my praying I have to do it while I'm sitting on a chair. The driving became annoying because of the pain, this why I have to do the surgery that is it"

SA pre-op P7, male

"P: The last few days has been horrendous, but normally, it's right above an 8 [on VAS 0-10]. It does not change even with medication… You know, you are restricted… in how far you can walk and you've got to use sticks and… I haven't drove for eight years… Because you don't know with the pain if it is that severe… You lose concentration. So...

R: And how about the sleep at night?

P: Oh, dreadful."

UK pre-op P5, male

"I feel the pain 10 [on VAS 0-10] most of the time… Well, it's not too bad when I sit down but as soon as I get up and move..."

UK pre-op P9, male

"...to do the gardening properly or bend over to do the gardening properly and... and I find that I have to hold on...of course, that may be age but I find that I have to hold on something if I am on the garden. I was...I feel unsafe… and I am not so sure of myself when I am like climbing around or walking around."

UK pre-op P8, male

Moreover, some SA patients stated that seeking a cure for their pain cost them much money without any benefits, before they have decided to do the surgery, however, this issue was not captured on the UK's patients' discussion.

In comparison to pre-op patients, follow-up patients seemed to be much satisfied with their joint replacement outcomes and had more steady or stable emotions. However, a number of SA follow-up patients reported that the pain still affected their daily routine, even after their joint had been replaced.

"…I'm an active person, I like going out and inviting people to my house. I also have a big house and I have to supervise my children and the housekeepers… all that I could not do it anymore because of the pain. The pain restricted my movements… I have pain in my hand and I became very tired when doing the daily routine like climbing and getting down the stairs"

SA follow-up P9, female

"oh God.. I can't sleep, that pain make me worried, I have to put a pillow between my legs to feel comfortable and to be able to sleep"

SA follow-up P6, female

"R: so you mean you cannot move it because you afraid that would hurt?

P: yes. And If I stand up for a while in the kitchen or walk only a short distance that will trigger the pain immediately"

SA follow-up P6, female

"I'm not at work at the moment, I'm off. I can't drive until you're off the crutches… I've cut down, I only take it [painkillers] at night now but maybe I need to take it during the day again in order to gain more movement in my leg without it being too painful."

UK follow-up P1, female

"Well I haven't drove since I got it done but I'm hoping to start driving again."

UK follow-up P3, male

"Um, nowadays, I mean we've had horses for many, many years but nowadays, it is my granddaughter and my daughter basically but I still sort of do and my husband helps me too—I might go at the stables and do that sort of thing but I don't ride anymore. And my husband looks after the chickens and the ducks."

UK follow-up P4, female

"….it's difficult to get in and out of the car, but that's only because I couldn't get to bend, but once I was sat in, I can drive."

UK follow-up P9, female

On the other hand, post-op patients in both settings indicted feelings like being uncomfortable in their movements, their sleeping, and whilst resting in bed. This was attributed to the wound after surgery and was seen as an obvious outcome of the surgery and hoped to be temporary.

> *"I took pain relief when I feel the pain. it takes time until start to work [he meant the medication]. After that about 30 minutes, the pain come back and the effect of the pain relief has gone, and then I go back and ask again… please hurry up I want my pain relief... sometimes won't allow me (meant the pain) to sleep and sometimes I was sleeping and the pain just wake me up"*
>
> SA post-op P9, male

> *"P: When I had to move it to bend it, that was quite painful, so I'd put that at about a nine,[or a] seven. But it's all settled once I stopped…*
>
> *R: So when you are resting in the bed, is there pain?*
>
> *P: Yeah it's like a nagging toothache like, you know… Four or five [on NRS 0-10]."*
>
> UK post-op P1, female

> *"it can be awkward sleeping at night definitely because, you know, it's not normal to lie on your back… I wouldn't feel confident lying on my side yet because it's still a bit too sore"*
>
> UK post-op P9, female

Furthermore, pain experience had an impact on patients or emotional state. Most patients highlighted some negative feelings such as anxiety, anger, and low moods, and some reported their fears from the surgery. These negative feelings emerged generally before the surgery and most of these feelings vanished after the surgery among post-op and follow-up patients from both settings.

> *"I felt worried and so emotional, but all that went after I had my surgery done and felt better now. Thanks God"*
>
> SA follow-up P1, female

"Before having my surgery maybe I was moody, angry and anxious, but after my surgery couple of months all those feelings gone because the pain disappeared and became quite normal person walking and… yeah. Thanks God"

SA follow-up P2, male

"… I was nervous because of fear of the unknown more than anything I think."

UK follow-up P5, female

"…I was definitely moody. Well, fed up really, because the pain limited what you can do and then that was the main thing was that I wasn't able to do an awful lot of the things that I could before. I mean one of the things is my young granddaughter, she can't wait for nana to be better so that she can dance again."

UK post-op P6, female

"… it made me feel physically exhausted. And to be honest because I was physically exhausted and I have a 3-year-old. It was starting to affect him how I felt and my mood. So, I was not as patient as I should—as I felt I should be."

UK post-op P9, female

"Anxious. Sometimes, we get fed up of it. Feeling anxious several days… You just get fed up because I can't do what I want to do. I'm restricted, because yeah, I like to do things. I'm always busy, I'm always active. And I found if I can't do anything, it frustrates me and then, I'll just get mad and I'll just you know."

UK pre-op P1, male

Although most patients at post-op and follow-up phases seemed satisfied with the outcomes of their joint replacements a few patients expressed negative feelings like being scared, worried, or sad:

"I'm feeling so sad. I don't know what happened to make the pain comeback, again. The doctor said it would take at least 10 or 15 years to get another one [surgery], but I feel worried, I did the surgery to get rid of that pain but now see how [she stopped talking because she got upset]"

SA follow-up P6, female

"Feeling the pain again that is scaring me, why did it come back? So I need the doctor to tell me there is nothing wrong here… I need him just to comfort me. What is the reason for that pain, is it because of my age the bones getting weaker

or lighter, I don't know. Thanks God [she start getting emotional and about to cry]"

SA follow-up P7, female

"I feel very relaxed [in fact the patient meant completely the opposite and laughed]. I really feel irritated because of that pain on my knee, I can't go out and change my mood. I'm sitting most of the time home. I thought when I did the surgery, I would be better, and get rid of all that pain. All people around me told me that [do it and you'll be better] but I feel the pain exactly the same nothing has changed. The knee has stiffened, although I was doing my exercises [she start getting emotional and about to cry]… I really hope to get my life back and fix this I'm really tired from waiting for this pain to go. The problem is the knee stiffened, thanks God what I can say"

SA follow-up P8, female

"I think quite concerned about my knee because it's very sore and I've been very tentative myself about sort of walking and doing my exercises. And I've just been told I'm being… that I'm not being forceful enough with what I'm doing. I think, well, I was afraid that if I was too forceful I would damage my knee, and that I've been assured it's not the case unless I was in an accident or something really badly. So I have to now push myself more, do more with it, make more of an effort"

UK follow-up P1, female

"…I feel hopeless, little interest or pleasure in doing things, most of the day… because I'm always been… No, because I'm generally used to be working all the time, being home all the time is just it's not me really."

UK follow-up P3, female

"I was quite down… Yeah because of the pain. People have said there is more benefit so, I have it done… it is wearing me down I think."

UK follow-up P5, female

A notable feature of many of the SA interviewees was that they were optimistic that their pain could be alleviated with the help of God, and with the support they received from their family. These feelings were not identified in this way among the UK patients, who in contrast expressed their hopes and wishes only to be better soon.

"R: how are feeling now after the surgery? Worried, anxious?

P: No never. I did feel everything good and with the help of God. I'm doing my exercise and feeling better. Thanks God. No worries nothing. My children and my grandchildren around me and love me and I love them and that is all Thanks God [she seemed very optimistic]

R: does the pain make you feel irritated sometimes or angry?

P: no. no. Thanks God. We are not impulsive young people, we are adult and we should tolerate and be able to deal with the situation. And I had my first knee replaced and that went well and I'm hoping this one would be the same as well with the help of God"

SA post-op P3, female

"I used to refuse to have my knee done. I was hoping for the knee to get better and I don't need to go through the process of the surgery. I know some people who did the same surgery in India, but I told my-self [no I need to be with me family and my children], you know the travel is not easy and they might get worried about me and I get worried about them. So I decided to be with them and do it here. Thanks God… I'm so optimistic that everything will be fine and the pain is getting down and down by the time, I mean the first day after surgery I felt like as I did not do any surgery, but today I feel good Thanks God and tomorrow will be better, with the help of God"

SA post-op P6, male

"…I'm very optimistic and I can feel the pain diminish very day… yeah. My family visits me every day and they advices me to do what the doctors' sked me to do, and doing my exercises, and yeah thanks God they are here to support me in this situation..."

SA post-op P5, male

Approaches to Coping with Pain

Generally, in both setting participants' responses indicated that although they reported that they have to take their medication because it is important, they also had positive attitudes toward CAM including herbal therapy, massage and local patches.

Both SA and UK postoperative patients reported that they coped with pain using medication and doing their physiotherapy. In addition, most of them cited similar methods to manage their pain better (before surgery) such as using, local patches, herbal therapy, gel and oil massage alongside with their medications.

".. I used lots of alternatives… I used herbal therapy, gels and something like olive oil and ginger and some other traditional things… I really cannot forget it… the horrible taste, but I did it because it is not dangerous [she meant it is not risky and don't have any side effects]"

SA follow-up P1, female

*".. I used sometimes like light or gentle massage, warm oil mixed with salt. At night, I'm using **Voltaire** the local gel not tablets and any other gel to relaxing the muscles before I go to bed, after that I feel quite relief. Thanks God"*

SA follow-up P7, female.

*"I've tried all sorts, I've tried **TENS** machines, using that, using massage… I went swimming anyway and tried to relax the muscles and things like that, I did all sorts of things but it's still there... I take tramadol. I take two tramadol at night time because even now my left hip still niggles because of the pain at night times, every day… I take twice a day of naproxen and I also take omeprazole"*

UK follow-up P2, female

"I have tried before... it became bad. Physiotherapy, coconut oil heated up and put it on the joint… yeah it eases up. I've tried other methods…"

UK pre-op P01 female

*"… It just the local patches like **Voltaire** [it includes **Diclofenac** is a nonsteroidal anti-inflammatory drug (NSAID)] and the other light pain relief like **Solpadine**…and sometimes using the traditional stuff like **Vicks** and warm olive oil.. Actually, my doctor [from another hospital] told me that [why have not you tried the traditional stuff like sesame or olive oil…"*

SA pre-op P10, female

"… for this pain, I had my pain relief over two months now continuously… I have tried applying warm and cold packs, and acupunctures. I also doing my physio. I have travelled to seek treatment for that, but it always came back…"

SA pre-op P4, female

A few patients tended to accept pain and live with it; however, this does not mean they surrendered to pain and allow it to make them feel down, their action was simply adapted themselves to take their medication and accept living with it. This point appeared clearly among a few patients in UK.

"I'll just live with it. You know, I'll get obviously ill. But anti-inflammatory painkillers. But apart from that, I just have to live with that. There is not much you can do. A lot of people will sort of let the pain get them down. But I've been living with it, as you can gather, for such a long time now. I just don't let it, it's a part and part of day's life. Don't let it get me down."

UK post-op P2, male

"I would just... to put up with it really. I think that you know, I had seen my mum with her knees and the injection she had and... Cortisone and, yeah... So, those injections and cortisone injections and... It put me right off of injections and pills really"

UK pre-op P9, male

"I just try and take what I can. I mean, they don't kill the pain totally. They only take the edge of it. That's all they do. And the rest of it, like I say, I've had to live with. So, I just do."

UK post-op P2, male

"R: how did you go over that pain before the surgery?

P: well, not for a lot really, you know, I just—I just had to put up with it…

R: did you use cold or heat packs..?

P: No, I didn't actually. No, I don't think of that but, yeah, perhaps I could have. I did do exercises.

R: So you would not do anything that to distract your attention from that pain?

P: Not really, no, you just have to sort of try to keep still and then it'll… Sort of it's—it hurts least… Get a bit frustrated actually."

UK post-op P8, female

"…getting stuck onto it, but before you just start to take Paracetamol and then just go on with it. It was such a useful. Because it was there all the time, you bought it. You might just get used to it. So…"

UK pre-op P01, female

On the other hand, SA patients beside their taking their medication, they intended to used religious approaches to distract themselves and to cope better with their pain, which was not common in UK's patient's discussion, except for one UK follow-up patient, who reported that he has to say his prayers and be thankful to God before going to his bed.

> *"…something like reading the Quran and saying my prayers… this is really make my pain reduced and really gave me a great motivation"*
>
> SA follow-up P4, male

> *"…me personally, I believe in our religion. So I depend on God and trust him. I believe the healing in God's hand; he is able to relieve my pain. Yeah I think this is the best"*
>
> SA post-op P7, male

> *"…I have nothing on my hand all on God's hand. I came here to seek help and I'll continue my treatment with them, if I did not get better that's it I'll be with God and depend on him. If God wants to heal me he will. But I have to do something and seek treatment …"*
>
> SA pre-op P2, male

Sleeping, resting or reducing their normal activities i.e. walking, or exercising and ignore the pain sometimes were captured in their conversations as the most common ways to help ease the pain

> *"It's resting really, yeah nothing else..."*
>
> UK follow-up P3

> *"…I just ignore it, basically, that's what I do. I just ignore it…"*
>
> UK post-op P2, male

> *"I tried to tolerate the pain as much as I can… I tried to avoid climbing the stairs and any things would trigger that pain, once I had it [the pain] I took painkillers and had a rest. Also I used warm and cold packs that helped …"*
>
> SA follow-up P2, male

"I'm trying to rest and not move it much until the pain go away. Or I'm trying to get myself busy like watching TV or doing something in the iPhone, but when the pain accelerated. I ask them [nurses] for pain relief"

SA post-op P2 male

"…they prescribed me sleeping pills, because when I woke up the pain probably gone… but would not allow me to sleep… then I play on my iPhone like I'm trying to ignore it…"

SA post-op P5, male

"the pain got worse about 6 month ago, it was there before but I was trying to ignore it and carry on with my life until it get bad. I could not wait any more I have to do the surgery…"

SA post-op P6, male

"…I was trying to ignore the existence of the pain and get busy with something else like reading or watching TV"

SA pre-op P2 pre-op, male

Some patients cited in their discussion that they were using some kind of distraction technique. UK patients were tending to use gardening, knitting, colouring, while most SA patients were tending to watching TV, playing on mobiles, listening to verses from the Quran or saying their prayers.

"…I like reading. I tried to keep my mind occupied."

UK follow-up P5, female

"I spend most of time, like I say, doing gardening and stuff like that. Anything to keep me busy."

UK post-op P2, male

"R: if you feel the pain what would you do to distract your attention on that?

P: I will look at the window or… I do colouring at home, yeah. That's help. It relaxes you a lot."

UK post-op P4, female

"I have children, I do knitting… put at in the back of your mind… I have got very high strong pain… it does not normally affect me… I can cope..."

UK pre-op P01, female

"When I felt the pain I used to watching TV and watching movies, yeah, and reading"

SA follow-up P5, female

"… I was trying to ignore the existence of the pain and get busy with something else like reading or watching TV"

SA pre-op P2 pre-op, male

"I'm trying to get my-self busy with something else like watching TV"

SA post-op P2, male

"…they gave me sleeping pills, because when I woke up the pain probably gone… and I play on the iPhone like I'm trying to ignore it…"

SA post-op P5, male

Theme 2: Concerns Related to Pain Relief

Most patients in Saudi and UK raised different concerns related to taking painkillers or medical pain relief. They were in addition trying to limit their consumption of the painkillers as much as they could.

"I don't like taking too many pills if I could help it"

UK pre-op P9, male

"Hopefully, once my knee is done. All the medication would be gone"

UK pre-op P5, male

"I try to use like obviously all the ones [medicine]. But if the pain eases off by taking one pill, then, I'll take one pill."

UK post-op P2, male

"…I'm just trying to limit taking pills that's all."

UK post-op P4, female

"I'm hoping not to have to take them. (Laughs) I'm hoping that this will work and I won't need them anymore. So, we'll wait and see. I would rather not take it if I didn't have to if you know what I mean yeah. I tried to... I do try to limit what I take"

UK post-op P6, male

"I only take the one I've absolutely got to, but night times at the moment I just have to take them because I have got no choice. Night times my bones sort of ache… they're just anti-inflammatory to help with the arthritis, so no…"

UK follow-up P2, female

"…I try to take some painkillers, but taking much painkillers that I don't like. I have tried to stop it once the pain was relieved, after two or 3 weeks…"

SA follow-up P4, male

"…I'll take anything [meant pain relief] would help me manage the pain, but personally I don't like at all. I'll show you my bag of meds only I take what it is really necessary… "

SA post-op P3, female

Although most patients noted the painkillers were the most common method and considered to be the first option to control their pain, they also raised their concerns related to the risk of side effects, addiction and tolerance to pain relief through their conversations.

Side effects was the most frequent concern appearing in their discussion in both SA and the UK.

"No. No. I don't. I don't like taking them [painkillers]. I'm trying to avoid them. As much as I can. I don't like them. You know, it is all chemical substances after all and will harm or affect the body more than gaining any benefit"

SA pre-op P2, male

"I'm trying to avoid it [painkillers] because I know it has side effects. It is true that it could relieve the pain, but it could also destroy the kidney or other vital organs in the body. So I try not to take it, unless it's really necessary."

SA pre-op P1, male

"… I'm trying to take it once a day, because of my stomach. I cannot take much and I take it only if I was really in pain. Sometimes I take ***Paracetamol*** *and sometime replace it with something… I had a colonoscopy and the doctor there advised me to watch carefully what I'm eating and drinking… I mean I have had enough meds that I should take"*

SA follow-up P6, female

"I only used some gel like ***Voltaire,*** *I cannot take more pain relief, I'm afraid that would affect my kidney or my stomach… or something else"*

SA follow-up P9, female

"…I knew that I do have certain side effects with certain pain management and stuff, particularly sickness. It does make me a bit quite ill as it did on this case and, it always does."

UK post-op P5, male

"I think they're necessary [pain relief] depending on the levels of pain but I'm always one of these if I can get away without taking it, I will do until I have to. So, in some respects that's good but in other respects, it's your worst enemy. I've been lucky in that I, with the ***Oramorph*** *and the Codeine, I've never found it addictive but I know those can be very addictive substances for some people… So, I'm lucky I have not, never have that. But of course they have their own other side effects like the* ***Oramorph*** *it makes me a bit itchy."*

UK post-op P9, female

"…Yeah. My mum used to take them [he meant medicine]. She had arthritis where it was bad but it didn't do her a lot of good really in her stomach"

UK pre P9, male

"Yeah, I just don't like taking medications. I think it – it causes a lot of other problems, all the side effects. Touch wood. I haven't had any other side effects with any medication"

UK pre-op P5, female

Worries to be addicted or develop drug tolerance were further concerns emerged through the discussion of some patients.

"..I used to take painkillers daily, but I tried to bear the pain to avoid the painkillers as much as I could…"

SA follow-up P2, male

"… I don't prefer it [pain relief], because of the addiction and I don't like getting used to it"

SA follow-up P4, male

"I have to take it as soon as I get this knee done and it's normal and I should stop, hopefully. I don't like to think I'm dependent on it which I think I am at the moment. Especially the Tramadol, I can't bear if I don't take it [her meds]. I have added the Tramadol at least at least three years and before that, we tried all different things, and I've got a Morphine patch as well, but that is because I will not be able to work without that. So, once this knee has been done and it's – you know back to normal then hopefully I will be able to stop. I am gonna stop it. That's the plan. The doctors gonna wean me off to help me out"

UK follow-up P5, female

"…I have heard that tramadol can be addictive, but also, I also get concerns in regards to how much is it damaging my kidneys or my liver…"

UK follow-up P2, female

"If the painkiller's more… because you just become a little bit… Dependent on them. And I take enough medication on a day to day basis that I have to take. I don't need to walk down the road and rattle, you know, with all the different bits and pieces I'm on at the moment"

UK pre-op P1, male

"I don't want to get addicted to painkillers…"

UK pre-op P8, male

"I've been lucky in that I, with the Oramorph and the Codeine, I've never found it addictive but I know those can be very addictive substances for some people."

UK post-op P9 female

Theme 3: Acceptance of Psychological Techniques

Despite the agreement among the majority of patients on the difficulty of being distracted by anything while in severe pain, a few patients clearly cited their acceptance to practise these techniques, because it could be helpful and effective to relieve their pain. Many stated that is was a new approach for them and they had not heard of it being used as pain relief; however, only a few cited clearly their willingness to try it. Those who expressed their readiness to practise it, they would like to try it on the basis that even if it was not effective, it would not be harmful. While a few patients seemed to be polite and accept to try it.

"R: after describing this technique, would it be hard for you to do that?

P: No. No, because when I have bereavement after losing my son, they actually went through relaxation techniques. And it was a group therapy of about eight of us, brilliant, and I went through that. And each time we went, the lady there would get us to do that while we were there so we could do it again when we were at home. But I have never… I haven't thought about doing it with this. (Laughs)

R: So, are you willing to take some courses to teach you how to use it with pain?

P: Yeah, of course"

UK Follow-up P1, female

"…Actually, pain is a physical thing, not on the mental thing… but I'm happy to try [psychological intervention] and be convinced…"

UK pre-op P7, male

"I expect so, yeah, I'm open to different methods, and alternatives."

UK Pre-op P1, female

"…nothing would stop me from trying it except I don't know anything about it [the psychological pain relief]…"

SA pre-op P6, female

"R: So, if you are still at the hospital and the doctor or the nurse gave you a suggestion to try listening to the tape, which included the technique I've just explained to you [psychological technique] in order to relief your pain, are you going to try it for that reason?

P: Yes, of course. Why not.

R: So, can you think of any reason may put you off from the trying, other than what you have mentioned 'You have not tried it before and do not know much about its effectiveness'?

P: No. I don't have any problem with that I can try it to find out if it's working or not.

R: For example, would the time be a problem?

P: No, it is not. I would have plenty of time during the day."

Follow-up P6, female

"R: Can you think of anything may put you off from practicing this technique?

P: No. I have no problem with that. I can try it, it could be effective"

Follow-up P7, female

"I have no problem with that [attending training course for psychological intervention], especially this won't hurt at all… I cannot think of any reason that could stop me from doing it [attending training course]. It could be helpful and effective; it also would open my mind to much more knowledge"

Pre-op P2, male

"I would do anything would help me relieve my pain and don't have any threats to my health"

Pre-op P1, female

On the other hand, psychological techniques were unacceptable as postoperative pain relief for a number of reasons that are explained in the following theme.

Theme 4: Barriers in Implementing Psychological Pain Relief Techniques, which Involved Internal and External Aspects

The variability of patients' understandings to brief psychological interventions have revealed various type of barriers, which are internal and external barriers. These factors are likely to affect the delivery of these techniques in the clinical context.

Scepticism, lack of knowledge, the severity of the pain, lack of self-efficacy, personal preferences, stigma and patient's character, personality and background were the most frequent internal factors appearing in both SA and UK patients' discussion.

Scepticism + Unfamiliarity

Patients from both settings expressed their scepticism and dis-belief of psychological techniques to relief their pain:

> *"R: have you heard of hypnosis?*
>
> *P: yeah, but I think it's not real and not effective…"*
>
> SA follow-up P1 female

> *"I don't think it [psychological techniques] would be able to distract my attention from the pain… this is what I believe to be honest…"*
>
> SA follow-up P3 male

> *"I think the alternative treatments are good with certain types of pain, I don't think it has anything to do with the surgical pain… and I think the alternative therapy would reduce the pain, but not make it go away…"*
>
> SA post-op P5 male

> *"P: I was only reading recently in a paper about a lady who had problems and with severe headaches and when she saw a hypnotherapist and it helped… She then had the confidence in it, but she took notes of what he said and she applied whatever instructions he had given her in the coming months and she said it helped. This lady has severe headaches. It was important to look at it…*
>
> *R: So are you interesting to try something like that in the future?*

P: no. no. no… Because I don't think it will work for me. I don't think it will work for me."

UK follow-up P8 male

"R: Have you heard about self-hypnosis? Do you believe in this?

P: No.

His wife: Where you can hypnotise your pain away yourself…

P: No, that isn't going to work. Sorry. I do apologise.

His wife: he's not a believer. I worked with psychologists for 30 years. I know that you can mind over matter.

P: But my mind it does matter. My knees have to perform a certain job, whether they're in pain or… they have to work. So, if it's painful, they work harder. I know it sounds stupid but I need them to work."

UK pre-op P1, male

Lack of Knowledge

When psychological techniques such relaxation exercises or positive suggestions were suggested through the discussion as a potential practice to support patients coping with pain before or after surgery, their responses indicated a clear limited knowledge how these techniques could be used with pain and stated they might try it, if they have given a proper explanation.

"Nothing would stop me from trying it except I don't know anything about it [the psychological pain relief]…"

SA pre-op P6, female

"…if it was an alternative and I'd have to…I'd want to know more about it and I'd like to speak to somebody that's already been through it."

UK post-op P1, female

"Well, I presume if I was given an adequate explanation of what I should try and do. I will undertake that. You know and to just see if that was effective…"

UK pre-op P7, male

"Why I wouldn't have it done? Sceptical, I suppose. I've never heard of it being done. I've never heard of anybody else having it done…"

UK pre-op P1, male

Patients' perceptions about pain, which is that pain is a physical matter rather than mental matter; thus, their model of pain seemed to be a cause of their lack of knowledge or interest.

*"Actually, pain is a physical thing, not **a** mental thing… I'm happy to try [psychological interventions] and be convinced…"*

UK pre-op P7, male

"I have not thought of that really [relaxing] when I felt the pain, I only get some rest and that is it. But I don't think the pain in the joint would be relieved with some breathing, I think that [breathing] not related to that pain, I don't know this is my opinion"

SA pre-op P2, male

It is possible that participants' scepticism is driven by their lack of knowledge. For example, one SA female patient she believed that this approach may contradict with her religious beliefs and she quoted that view when she was asked about hypnosis or if she tried it before

"…No did not try it, just I feel that it is not true. I mean I feel it's better for us to hold on what God said in his Holy Quran, and say the prayers and that might help us more and get relaxed psychologically…"

SA follow-up P1, female.

Another SA male patient stated that this type of treatment [psychological technique] is superstition when was asked about his preferred way of practicing the intervention:

"R: so how about if you saw a clip on the YouTube trying to guide you through the relaxation… ask you to close your eyes and take deep breath, and guide you through to picture one of your favourite place in your mind, can you do that to cope with the pain?

P: no. no. I think this is kind of superstition…It won't work."

SA post-op P7, male

Moreover, patients' lack of knowledge combined with their preferences or combined with misinformation sometimes led to their scepticism. This was apparent among SA patients in the following statements:

"…from my experience and knowledge, that stuff [psych tech] might affect individual's thoughts and change it in a bad way, so I have not tried to listen to it and tried to avoid it… "

SA follow-up P2, male

"…I can't do that, I feel like it is an escape from reality… I feel it is not going to work, I don't like it"

SA follow-up P5, female

"… I think if I'm in a really bad pain I would do it [self-hypnosis] no problem, but what I saw on the TV about it would make me scared from trying it…"

SA follow-up P7, female.

"I do agree to some extend [accept psych tech]. I mean people should be confident and have a strong faith in God. So I think this way [psych tech] would help weak individuals or having personality issues, but people who have a strong faith might don't need this… "

SA pre-op P1, male

"P: I can do that [listening to a tape with relaxation tech] I have no problem... it could be helpful and doesn't have any harm.

R: so have you heard of hypnosis?

P: yeah, I do, but personally I feel it's kind of superstition…

R: have you tried it before?

P: no. but I feel it's kind of distortion of the reality, it's kind of changing the fact to something not true or not real…"

SA pre-op P2, male

The Severity of the Pain

The majority of patients in both settings reported that if they experienced high level of pain, they would not be able to distract their attention away from that pain and these are quotes from their statements.

"…it depends on the level of the pain I have and the state that I would be in. if the pain was severe of course that would not be effective, but if the pain was moderate it might have an effect as it involved something that we might like [meant the training might have something interesting to practise]…"

SA follow-up P4, male

"…no I cannot do it… when the pain start, is very bad, he won't let you think of anything else until you take the pain relief. Once I took the pain relief, all what I need to do is just wait… and do whatever the doctor would tell me to do… so I might try it if the doctor advise me to do that, otherwise I'm not going to do it by myself... I don't think it would be effective with the pain, but the doctor knows what is best for me…"

SA post-op P3, female

"P: do it and forget about the pain, no I cannot do it. Believe me the pain won't allow you to think of anything else.

R: okay. How about when you try to distract you attention and talking to your family here, would that help you to forget about it?

P: no never. Believe me, the pain is there I can't focus of anything else… I might get mad or angry if one on my family here trying to talk to me, while I'm in pain…"

SA post-op P6, male

"…it would be very hard [to try psych tech] because it seems to overtake you [the pain] no matter what you think about. In the end, like I say, you sit there and say, "go away, go away, come on, hurry up go away" but you know it's there and suddenly it seems to start easing off and you think, "oh, that's lovely and come on, don't come back... I think it is because of the pain. It really I mean the pain…"

UK follow-up P7, female

"…my threshold is very, very low, right? So, I make sure I'm taking the painkillers all the time and if they slowly bringing them, I remind that I'm due my painkillers…"

UK post-op P3, male

"…Just did it myself. Just breathing and just trying to relax and... I tried that for ages but when the pain kicks in it's just, "Ugh!" it just overtakes it so it does…"

UK pre-op P6, female

Lack of Self-Efficacy:

A few patients talked about their ability to perform the intervention, which may stop them from trying it, and sometimes mixed their lack of efficacy with ignorance about the intervention.

"…me personally, I can't do it [trying psych tech]. All my attention and focus would be on the pain area only…"

SA follow-up P3, male

"…SI don't think that would relieve my pain… let me tell you a story, once I was sitting with my little granddaughter, she was watching a TV, it has some pictures and stuff like that. The TV was not loud, but I could not hear anymore. So I shouted at her to close the TV I needed the room to be quiet I could not take any more from that…so if the pain became severe I could not be distracted by anything I would close everything and make it very quiet…"

SA post-op P1, female

"…I might try it, but honestly I don't know if it would work or not, I haven't tried something like this before to know whether is going to work or not…"

SA pre-op P6, female

"It wouldn't be hard to do it. I don't think it will help a lot… Because it doesn't give me any relief and if the pain is severe, I don't think it would give you any really."

UK follow-up P8, male

"…obviously, if you're in that much discomfort that you think it's not going to work. But it doesn't always work, you see."

UK post-op P2, male

"… I went to the show once where there was a hypnotist. And that's very interesting, but it did not seem to work on me…"

UK pre-op P8, male

"I'll give it a try how effective it could be, I'm not sure… Actually, pain is a physical thing, not on the mental thing… I'm happy to try and be convinced…"

UK pre-op P7, male

Personal Preferences

In Saudi setting, patients' preferences for pain relief strongly associated with their religious beliefs, while UK patients' preferences associated with what they like and dislike.

"…listen to me… any Muslim when she or he gets his prayers done and washed him-self and do his actual prayer and asked the God… you know the doctor and the healer is the God… so I prefer rise my hand asking for his help… so this is my philosophy in the life, and all what I have been through, it is just a matter of time and will end…"

SA follow-up P9, female.

"…honestly, people might practise something like that [psych tech], but people should always ask the God to help them and this is the best really from my personal experience…"

SA pre-op P1, male

"P: I do prefer something written, I like to read and apply what is written on that paper, but I don't like listening… give me paper read I'll try to read it, understand

it, then practise it… so if the tape have some instructions related to the surgery so I would prefer a written paper…

R: so you don't like the idea of listening to a tape would help you to relax?

P: no. no. I do but I prefer that if it something from YouTube or so, then I might listen it could be helpful... [He meant he cannot trust an audiotape]"

SA post-op P7, male

"…you do get that advice you know, about what you do on managing your pain. But each and every person manages his pain in different ways, don't they? Some go to like classes and stuff like that. Even I was asked, do I want to go with these classes. And I went, "Well, no. because it will like depress me." But anyway, I was told that I had to go. And I went there. By the time I finished having the interview with the guy, he said, "It's a waste of time you coming to this class." So, I said, "Yeah, that's what I thought." So, like I say, where some people suffer, get very depressed with their conditions and all that, I just don't let it get to me like that. I try and keep busy. Yes. And work to my capabilities what I can do…"

UK post-op P2, male

"Probably… I would be listening to it [tape with psych intervention] and then something else would catch me and I would be ignoring what was being said. So, what I was trying to say, it was like soothing music. Soothing music is not me… Quite heavy rock band music type thing. So, yeah, it's something that I probably end up ignoring more than listening to it."

UK post-op P5, male

"… I would do it [relaxation] on my own preferably… I'm not into that…"

UK post-op P8, female

Stigma

A few patients implied that they did not prefer psychological techniques especially hypnotherapy or self-hypnosis, but possibly would try them; however, only one SA patients stated her view clearly in the conversation

"R: if the doctor or the psychologist asked you to try this, from whom would you accept and do it?

P: from my doctor I think better.

R: can you tell me if there any reason would let you think of that?

I think I do trust the doctor more, because he is aware of my situation more and have been treating me for a while, so. But the psychologist might don't know me, or maybe it's only my feelings that won't allow me to accept anything from a psychologist, I don't know…"

SA follow-up P1, female

Patient's Character, Personality and Background

Some patients' responses indicated that their personality could be an actual barrier to try psychological techniques as postoperative pain relief. For example, one patient did not like to be committed to any long-term treatment plan or she will get bored, while a few stated that their personality does not fit with the setting or the requirement to practise these techniques; for example this techniques may need a quiet atmosphere and they prefer to be active not on that position.

"…I would try it no problem. I've never tried something like this before. Just to be honest with you I might try it once or twice, but then getting bored and discontinue … it could be helpful, but you can say… it is me [her character or personality] feeling bored or lazy to continue doing the same thing"

SA post-op P4, female

"personally, that's…probably, I'm not one of those people who will listen to those sorts of things. It's not my, should we say cup of tea… it's like almost like reading or listening to an audio book... After a while, it's just something as I was saying and I tend to ignore it because it's a voice in the background like listening to the radio… You know it's there, but you're not listening to it unless something catches you and quite honestly that would…that would be the same for other audio tape, you're trying to listen and concentrate on that."

UK post-op P5, male

"No, I think if you're just sort of going down the… go around and you're going around to meditation or like… no, it's not him [his wife talking]… I don't know it's just not me [he is talking]…"

UK follow-up P3, male

"…some people, obviously need those classes. But I find that I can actually slightly cope without it, because I can just adapt different things… Because obviously I'm ex-Army six, ex forces. So, largely, when I was in the army, damaged myself. But I know enough methods to sort of get around to try and ease the situation, try and relax my body."

UK post-op P2, male

"… I do that, and it doesn't work because I usually do more damage to myself. Because I'm frustrated, because I like to do everything. And if I can't do it, it's just… it does make me angry…"

UK pre-op P1, male

"…He's not patient enough to do breathing exercises. I think when it comes down to, he wants results and he wants them now…[his wife talking]… Yeah. Not 10 minutes later or anything. That's why it's in the state it's in at the moment, because it just…yeah, to be honest…[he is talking]"

UK pre-op P1, male

"…She has no patience for that [her relative replied].

No, not really... kinda sit long enough to… and concentrate to listening to music or… I'm not even a TV person [patient replied]"

UK pre-op P6, female

A few patients stated that they would prefer not to engage in a practice like this because they prefer to be 'in control'.

"…I've heard of it [hypnosis and hypnotherapy] but I've never gone down that road. I never have done. Again, it's something I've not really thought about… I don't know what it is… I've always been happier when it's—oh, I'm in control not somebody, if you know what I mean… That is something I don't particularly like the idea of, somebody else being in control. That's why I didn't want the operation because they'll be just in control than I'm not…"

UK post-op P6, female

"…me personally, I don't like these stuff [psychological techniques]. Because I prefer practical, physical things, but anything related to the imaginations or so, not that I don't like it, but I don't believe that would have any effect. I think the relaxation should come from me from inside and surrender to reality. I think this way would make me more relaxed as it is coming from me, I motivated myself. But the way that people tell me to do this and to do that … I do not like it. I like the practical ways that to guide me to do some exercises… yeah. I prefer the something has some movements, yeah that might I believe in and like it…"

SA follow-up P2, male

Patient's background was reported only by one of SA patient as a factor, but was not captured through the other UK patients

"…why not, I can do it [listening to the tape]. Look… nowadays people's thoughts and education have changed, not like how it used to be years ago. Also, the fact that people's background might affect his or her acceptance to these techniques. Me for example, I grew up in a family that open-minded to listening to music for example, but there are families don't believe on something like that…"

SA pre-op P5 male

On the other hand, a few external factors were identified through their conversations such as the time, the place and the content of the intervention.
Time and place were not reported as an obstacle among SA patients; however, two of the UK patients mentioned it.

"About the only reason is like obviously time…if you've got time to do it because it does take time doing…if you do it correctly. And time consuming…"

UK post-op P2, male

"…if you are in this environment, if you're in a walled environment and then it was, you know, you're going to listen to this tape, and, there's not an awful lot of any distractions going on— the TV's are not ...I haven't got those, you know what I'm saying? … it's quite a lot of this...it's like a physiotherapist that come out and say – you need to do these exercises. Hand on my heart how I have been doing them, probably as regularly as I should do or I was trying to achieve the aim at that end of the day…"

UK post-op P5, male

The content of the intervention such as having an attractive content and having the right accent were mentioned by a few of SA and UK patients

> *"I might listen to the first 5 minutes, if that was attractive and have something useful, I would continue, but if it have general information or boring, I would discontinue…"*
>
> SA post-op P7, male

> *"… I would try to listen to it [the tape], and if I liked it, I would continue listening, but if I didn't like it I would leave it…"*
>
> SA pre-op P7, male

> *"…My husband had it once when he had like a breakdown. And he had some deep breathing exercises and he did them at night time and meditation. And he was listening to it and I was trying to be really supportive trying to listen to it. But I think it was just a combination that it was very unfortunate they had a very slow but Americanised accent. So, I was seriously trying to control my laughter."*
>
> UK follow-up P2, female

> *"…I relax listening to David Attenborough… His voice, I mean you've got to watch the TV. He has got such a nice voice…"*
>
> UK pre-op P5, female

Patient Preferences or Autonomy vs. Medical Practice or Authority

It was reported frequently among the majority of the patients in both cultures that they were willing to reconsider their views and try the brief psychological techniques, if one of HCPs especially doctors has advised them to practise these techniques, because they trust their medical expertise and knowledge. Nevertheless, a few patients also from both cultures stated clearly that their views are not going to be changed even with the doctors' recommendations for these techniques.

The following quotes indicated patients' readiness to consider practicing brief psychological interventions and trust on doctors' recommendations.

"If the doctor advise me to do it, I'll do it I absolutely have no problem with that…"

SA follow-up P4, male

"I don't know. If the doctor asked me to do it I can't say no, because he knows what's best for me. But I don't know if I would try it or not. I might give it a go…"

SA post-op P1, female

"…I don't think it would be effective with the pain, but the doctor knows what is best for me…"

SA post-op P3, female

"… You should trust your doctor, doctors are reliable… and we should follow their advice…"

SA post-op P6, male

"I might listen to the first 5 minutes, if that was attractive and have something useful, I would continue, but if it have general information or boring, I would discontinue…"

"R: would you accept this technique, if the doctor or the nurse recommended it for you to try it?

P: yes of course. I would listen to it [the tape], and if I liked it, I would continue listening, but if I didn't like it, I would leave it…"

SA pre-op P7, male

"R: if the doctor would advise you to try it to relieve your pain, would that change your mind?

P: maybe, if it would not take much time, but if it's required long time no I won't accept it."

SA follow-up P5, female

"Well, I suppose if they [staff at the hospital] said to try and see, well I would do it, yeah"

UK follow-up P3, male

"R: would it change your mind if the doctor had discussed with you...

P: No."

UK post-op P3, male

"… I'll do what they say or tell me."

UK post-op P4, female

"…if the doctor says to me or the surgeons say to me, you must take this or take that then he knows more better than I do and I will…and I'll follow his advice, you know…"

UK pre-op P8, male

The following quotes indicated the views of a few patients from both cultures.

"R: would the doctor change your mind to try it?

P: he has to convince me first, why I should do it…"

SA follow-up P3, male

"R: so would you accept to attend a course teach you how to do it?

P: no. I don't think that even if the doctor tried to convince me, because I know it would not work…"

SA follow-up P5, female

"…no I cannot do it… when the pain start, is very bad, he won't let you think of anything else until you take the pain relief. Once I took the pain relief, all what I need to do is just wait… and do whatever the doctor would tell me to do… so I might try it if the doctor advise me to do that, otherwise I'm not going to do it by myself... I don't think it would be effective with the pain, but the doctor knows what is best for me…"

SA post-op P3, female

"No. I don't think it would change my mind [the doctor's recommendation to this tech]… because I think the pain was so excruciating. It was literally bone grating on bone and there's virtually not hardly there, so yeah. "

UK follow-up P2, female

Discussion

The data collected from patients undergoing total knee or total hip replacement revealed general views about pain management techniques and a number of specific beliefs and attitudes toward brief psychological methods. Broadly, patients indicated their acceptance of non-pharmacological treatment choices of pain relief and these data show that many patients practice psychological techniques spontaneously to relieve pain, including various methods for distraction and relaxation. No significant variations were distinguished between the UK and Saudi patients' in patients' views on brief psychological techniques for postoperative pain, although a greater role was found for religious practice among SA patients, both in directing practice and setting expectations. The most frequently reported barriers to practising brief psychological techniques as postoperative pain relief were internal barriers such as scepticism, which often corresponded to a lack of knowledge either of contemporary scientific perspectives on pain, i.e. "pain is physical not mental" or on the nature of the techniques themselves. Severity of pain, lack of self-efficacy, and stigma or misconceptions related to psychological treatment were also issues for some patients. Respondents also indicated a role for healthcare professionals' in recommended and aiding the implementation of brief psychological techniques.

Although the barriers that the ‘lack of awareness’ and ‘stigma’ might seem contradictory, the ‘lack of awareness’ is merely meant the lack of understanding of the benefits of psychological interventions and the possible contributions of these psychological treatments on the context of pain relief. Their lack of knowledge of the benefits of psychological interventions resulted in negative views such as the ‘stigma’ or misconceptions surrounding the psychological treatments, which explicitly expressed by few numbers of included patients. This is point was discussed in details in chapter 4. A semi-interviews conducted in an outpatient pain clinic in Singapore that included chronic patients to explore their views on seeking psychological treatments to coping with pain (S.-Y. Yang, et al., 2015). Patients felt that the HCPs lack of knowledge about appropriate treatment caused their frustration. Besides, although patients lacked of knowledge of how psychological treatment was related to pain management and asking why they were ‘paying just to talk’, their experience were quite positive when they participated in the treatment and found these treatments helpful. Additional, key

findings revealed from S.-Y. Yang et al.s' study (2015) as barriers to participating in psychological treatment that psychological treatments (CBT) appeared high in cost and time required to attend, which is in line with the findings of this study with postoperative patients.

A considerable amount of research has been invested in exploring barriers or facilitators to self-management or pain self-management among various chronic sufferers (Bair et al., 2009; Bayliss, Ellis, & Steiner, 2007; Mann, LeFort, & VanDenKerkhof, 2013). For example, a qualitative study by Bair et al. (2009) conducted to identify barriers and facilitators to self-management of chronic musculoskeletal pain among patients with comorbid pain and depression. Eighteen patients, who were part of self-management trial versus usual care, joined the interview. Findings revealed a number of barriers related to using self-management programme, these were some of the obstacles: lack of support from families or friends; limited resources, i.e. transportations or financial; depression; time constraints and other life priorities; avoiding activities because of fear of pain; lack of tailoring strategies to meet personal needs; ineffectiveness of self-management strategies; difficult patient-physician interactions. Additionally, the study revealed some facilitators to improve the programme; these facilitators included encouragement from nurse care management; improving depression with treatment; support from family and friends; and providing a list of different self-management strategies to use. Findings of my study revealed other types of barriers such as lack of knowledge; lower or lack of self-efficacy; severity of pain and stigma around psychological treatment, only shared one theme that revealed by Bair et al. (2009) study that patients were sceptical and do not believe psychological intervention would help them cope with pain. Other cross-sectional survey by Bayliss et al. (2007) conducted to identify barriers to self-management that were associated with lower perceived health status and lower reported physical functioning for 352 senior adult with multi-morbidities. Findings reported that 50% of patients suffer from fair or poor health, and analysis shows that there was association between perceived health status and factors such as higher level of morbidity, lower level of physical functioning, less knowledge about medical conditions, less social activity, persistent depressive symptoms, greater financial constraints, and being a male. It also reported potential barriers to self-management, which significantly associated with lower levels of physical functioning,

higher level of morbidity, greater financial constraints, greater number of compound effects of conditions, persistent depressive symptoms, higher level of patient-clinician communication, and lower income, which are not in line with the findings of my the study. Moreover, a study by Kwekkeboom et al. (2008) conducted post-study interviews with 26 cancer patients who were participants in a trial of guided imagery and progressive muscle relaxation intervention explored patients perceptions of the intervention effectiveness and factors may contribute in the effectiveness of this intervention. The findings revealed that in most cases, participants' perceptions 'perceived the intervention to be effective' matched the changes in their pain scores (better pain relief). Additionally, participants revealed that their active involvement, clear guided instructions, providing a source of distraction, stimulating relaxation, individual abilities and preferences and pain qualities (i.e. not severe pain). Although the study supported the effectiveness of brief psychological interventions, it is unlike my study because researchers investigated factors that supported the intervention effectiveness. This study focused on exploring barriers that may hinder the delivery of the psychological interventions in clinical settings. However, findings from both studies in line to an extent on that the severity of the pain and the clarity of the intervention guided instructions might help elevate patients' knowledge about the intervention to be practised correctly, which may lead to an effective intervention in the future.

Although there was lack of research that investigated patients' views on, and barriers to, brief psychological techniques for postoperative pain relief. My qualitative study improved the understanding of patients' attitudes toward brief psychological strategies of postoperative pain relief by gathering views from two different cultures who undergoing same pain experiences (TKR and THR), and supported an effective implementation of these intervention by identifying similarities and differences in response to brief psychological techniques among patients from SA and UK cultures. The influence of culture on pain perceptions and management has been highlighted in the literature (Briggs, 2008). Patients may respond to pain with 'Stoic' approach, where individuals are less likely to express their feeling of pain and tend to bear it, or they may respond to pain with 'emotive' way where people more likely to express or verbalise their pain experience and their feelings (Davidhizar & Giger, 2004). However, results of my study did not identify significant differences between patients from both cultures in the description of their pain experience, but SA patients were slightly emotional and almost

cried, especially among those their surgery failed and start to feel the same preoperative pain again. An additional difference seemed to have an impact on approaches to pain management among SA patients is the religious beliefs, which is that their assumption that seeking aspects of psychological therapies may conflict with their religious beliefs.

These findings suggest that patients still have significant concerns about medicine intake, which confirmed results from previous work in studies with chronic sufferers (Alami et al., 2011; Sale et al., 2006). Apparently, patients are aware of the risk of pain medication; thus, their preference and adherence to medicine may have been affected. For example, a survey of Fraenkel and Fried (2008) conducted with knee osteoarthritis patients to investigate their preferences between medical treatments (a cream, oral medications, or injections) and exercise. The findings suggested that patients preferred to exercise over the other treatment options, even when oral medicines and injection were described as 20% or 50% more effective than the other options. Patients were willing to trade off the benefits of treatment because of the side effects (Fraenkel & Fried, 2008). Therefore, in view of these findings, it could be noted that the demand for implementing psychological interventions to make patients feel more satisfied with the treatment and feel less exposed to the risk of treatment is required.

Moreover, findings from this qualitative study suggested that patients accepted non-pharmacological approaches as pain relief including distraction. My findings identified that patients dealt with their pain by applying different non-pharmacological strategies such as using simple massage, distraction methods by reading or watching TV or by the support they had from their family, which is in line with findings from Gélinas et al. (2013) qualitative study. Gélinas et al. study collected responses from patients and ICU nurses about the non-pharmacological interventions that can be useful and feasible for pain management in the ICU unit. Findings presented 33 non-pharmacological interventions found to be useful, relevant and feasible and the top four non-pharmacological interventions were music therapy and distraction from the cognitive-behavioural category, simple massage from the physical category, and family presence facilitation from emotional support category. In addition, patients' acceptance of non-pharmacological treatment in my study is reflecting most of the findings from other literature in complementary or alternative therapy among chronic patients (e.g. Barnes, Bloom, & Nahin, 2008) and cancer patients (e.g. Molassiotis et al., 2005). This indicates that complementary or alternative treatments are widespread among patients undergoing

various types of pain, which could make it acceptable by patients undergoing surgical procedures. Thus, postoperative patients might be willing to practise more than just medical treatment for postoperative pain. However, a number of potential barriers to practising simple psychological interventions for postoperative pain relief were identified in my study.

Generally, findings from this study confirmed findings from my previous chapters that patients are willing to practise brief psychological techniques. However, their huge lack of knowledge about the beneficial effects of psychological treatment in pain relief, and how these interventions could be practised led them to be more sceptical and lack of confidence to try it (lack of self-efficacy). Patients' limited knowledge of the availability of other complementary or non-pharmacological treatment for postoperative pain relief could be due to a number of reasons. One possible reason could be the patients' misperception about who should seek psychological support. Patients may assume that only people with mental health problems could benefit from psychological services. Although evidence to support this assumption maybe limited, a few studies included patients with chronic pain indicated that patients may show some resistance in taking up psychological treatments for their physical conditions because they assume that means it is ‘all in their heads’.

Additionally, Saudi patients’ perceptions of pain and psychological treatment were influenced by religious beliefs, and my data noted that their scepticism may be driven by their assumption that seeking some aspects of psychological treatment such as hypnosis would cause a conflict with their religious beliefs.

Findings of my study revealed a difference between SA and UK patients in the way they are dealing with pain. Amongst SA patients, they repetitively used the expression that "Thank God" through their conversations, even when they were in a high level of pain (measured on NRS 0-10) or describing their dreadful experience with pain. Using this expression could not be described as a common phrase; it seemed to be used as a type of coping strategy with pain. A qualitative study by Lagman et al. (2014) conducted with 10 Filipino breast cancer survivors identified that prayer was considered the most common religious practice among those patients, followed by prayers by others and spiritual support from the Catholic Church. Therefore, delivering psychological treatment in Saudi setting should consider extra attention in explaining and presenting these

interventions, for example, providing evidence that indicates religion (Islam) and psychological treatment are not conflicted.

Furthermore, patients in both cultures expressed their real need for surgery to get rid of the pain. They implied that they could tolerate surgical pain, which may take some time, but could not bear their current pain. This is could be an area of investigation, where patients are able to distinguish between their pain and surgical pain.

Unexpectedly, analysis of my data revealed no differences across the multiple time-points that were set and aimed to explore more variations in patients' views. However, this lack of variance among these phases could be the reflection of their actual thoughts regardless of being before or after surgery. In addition, although the questions were clearly prepared prior to the beginning of the study, and each phase have a different set of questions, the lack of variance in their views could be explained by the fact that patients may become confused about what time period the investigator was discussing. Also, a few patients have reported that even after having their surgery done weeks ago prior to the interview, they were still experienced a high level of pain; thus, this could be a reason why I could not detect any changes in patients' views and attitudes toward brief psychological interventions.

Additional reasons that may contribute to patients' scepticism in brief psychological intervention as postoperative pain relief is the lack of healthcare providers' support or contributions. Their support should include enhanced patients' information on the postoperative pain management strategies including medical and nonmedical treatment. My data clearly noted that patients in both settings had trust in their doctors' expertise, which makes the involvement of healthcare professionals required to deliver brief psychological interventions successfully in practice. Evidence showed that patients' trust on their physicians has linked with more satisfaction with medical care, and the low level of patients' trust in their physicians the less they have followed their advice (Thom, Kravitz, Bell, Krupat, & Azari, 2002). An observational study carried out in care setting by Thom et al. (2002) to investigate 732 adult patients' trust in their physicians (N= 45, who were family physicians, general internists and cardiologists) and link between their high trust and the requested or needed for more services. Findings of the study revealed that although patient trust in the physician was not associated with the likelihood that service was requested or provided during the visit, patients with low trust prior to the

visit consistently were more likely to report that a needed or requested service was not provided. Also, patients with a low level of trust were less satisfied with their care, less likely to intend to follow the doctor's advice and less likely to report symptom improvement at two weeks. This would lead to the concern that how healthcare providers may perceive brief psychological intervention to relieve postoperative pain, which may have the influence over patients' decision. This is what is going to be presented in the next chapter.

Study limitation

The findings of this study should have some limitations. First, qualitative methods helped in developing our understanding of patients' different views toward brief psychological interventions. Further work may be needed to investigate the possibility of transferring these findings with other surgical procedures.

Additionally, collecting data at three different time point (pre-operative, postoperative in ward, and after discharge) allowed us to identify any differences among patients on their pain experience and pain management approaches; however, the analysis did not show great variation among phases on patients' responses. It is likely that as patients sampled at each phase were different, there were difficulties in tracking any changes on patients' views on brief psychological interventions. Therefore, a further longitudinal study may be needed to allow tracking any changes on patients' responses, and views on pain experience and management approach, more specifically to follow any changes in their acceptance to brief psychological interventions, i.e. are they going to be more acceptable or reluctant to these techniques.

Finally, a further limitation is that the difficulty in explaining and forming shared understanding from the patients' data to be able to discuss it. Explaining patients' answers in the way that presented in this report make the analysis and the detection of patients' views more manageable to be followed and understood and allow the connection of the findings from the study to the primary objectives of the PhD project. Although the focus on the analysis was on discovering positive views on their responses, this is because the intention was to find out support to implement these techniques in practising brief psychological interventions. Additionally, although patients expressed a

few positive views on brief psychological interventions; it is difficult to detect whether they were really engaged and focusing on the description of the intervention or possibly their minds were occupied with their preconceptions; thus, further work may be needed to explore this point of view.

Conclusion

The study demonstrated that most patients in both cultures (SA and UK) are already using different approaches to deal with their pain, and implied their willingness to practice brief psychological treatment as a method of pain relief. Although some had performed psychological techniques such as distraction and breathing exercises spontaneously when they were in pain, they acknowledged their unfamiliarity with psychological interventions to be used as postoperative pain relief strategy. This has highlighted some emerging potential barriers among both cultures in delivering the brief psychological intervention, such as being sceptical, lack of knowledge or lacking self-efficacy. Additionally, among SA patients an extra barrier has emerged which is that the belief that psychological treatment might contradict with their religious beliefs. Patients' knowledge related to pain management should be addressed by applying evidence-based information to help enhance patients' misinformation and build up their confidence in their skills to practice psychological interventions as pain relief strategies. This could be achieved by working as a team with healthcare professionals especially those who are interested in pain management to deliver a well-designed and packed intervention.

Chapter 7 – Methods and Results of Healthcare Professionals' study

Objectives of this Qualitative Study

To investigate attitudes towards brief psychological techniques for post-surgical pain among HCPs, and gauge the perceived effectiveness of these techniques.

To identify and explore barriers to implementing psychological techniques in contemporary practice.

To identify and explore any differences between Saudi Arabian and UK HCPs in attitudes towards these psychological techniques.

Methods

Study Design

A qualitative thematic analysis that applied an inductive approach was chosen because I did not have a prior knowledge of what participants might believe about psychological interventions. Thus I choose this approach to explore and identify views and attitudes related to the participants' work experiences in the postoperative care especially postoperative pain management.

Settings and Participants

The study took place at orthopaedic departments in two different locations: Derriford Hospital in Plymouth UK and the International Medical Centre (IMC) in Jeddah, Saudi Arabia (SA).

Twelve healthcare professionals including nurses and consultants employed in the orthopaedic department at these two different hospitals, were invited to participate. The participants were recruited from the department between March 2017 and June 2017. HCPs working at the orthopaedic ward, including consultants, senior and junior doctors, nurses, pain specialists were invited to the study; other HCPs from other departments were not invited to the study. The characteristics of participants are shown in Table 12.

Table 11 : Sociodemographic characteristics of HCPs UK & SA	**NHS (N=9)**	**SA (N=10)**
Gender N (%)		
Male	5 (56)	6 (60)
Female	4 (44)	4 (40)
Profession		
Consultant	5	3
Consultant assistant	0	2
Anaesthetist	0	1
Nurse	4	4
Years' experience in postoperative care		
≤5	1	1
6-10	0	4
11-15	5	2
≥16	3	3

General description of orthopaedic (joint replacement) postoperative pain management protocol as implemented in both settings with most of their patients are presented in Table 13.

Table 12: Postoperative pain management protocol for joint replacement patients

UK	**Saudi Arabia**

Pre-operative (surgery preparation)	Patients attend educational workshop called "Joint school".	Patients attend educational workshop called "Family education"
Aesthetic for surgery	Spinal anaesthesia or Femoral block lasting for 12h after surgery.	Spinal anaesthesia lasting for 12 to 24 h after surgery.
Postoperative days	PCA* for 48h (p.r.n*) For moderate to severe pain strong painkillers are used on a regular basis i.e. Oxycodone for 48h or Morphine equivalent i.e. Oramorph, Paracetamol	PCA for 48h (p.r.n) Some patients continue with epidural catheter lasting for 24 after surgery + Oral intra-macular For moderate to severe pain strong painkillers can be used on a regular basis i.e. Tramadol* 100 ml, Paracetamol 1000ml or Morphine equivalent i.e. Zefo or Pethidine 8ml.
Discharge	Patients could be discharged from day 4. Patient go home with prescription included i.e. Tramadol, Paracetamol, and Oramorph NSAIDs* i.e. Naproxen	Patients could discharged from day 5. Patient go home with prescription included i.e. Tramadol Paracetamol, NSAIDs

*PCA = Patient control analgesia; Abbreviation meaning "when necessary" (from the Latin "**pro re nata**", for an occasion that has arisen, as circumstances require, as needed); NSAIDs = Nonsteroidal-antiflammatory (should be stopped at 3rd postoperative week); Tramadol = is in a class of medication called "Narcotic analgesia".

Procedure

A semi-structured interview guide (Table 14) was developed by the research team. A pilot interview was performed with an orthopaedic surgeon and the guide was found to work well. This pilot interview was excluded from the analysis, as it contains general discussion not all related to the interview questions. Healthcare professionals were identified and approached first by a member from the clinic in each setting. Study invitation was sent via email, and then approached directly and the date of the interview date booked up at their convenience. The main author (TA) conducted all the interviews. All interviews were performed in private one to one at the participants' workplace. Due to the demanding work in the both clinics, the interviews lasted between 8 and 20 minutes, and were audiotaped. English interviews were transcribed verbatim by a by a commercial transcription service. Arabic interviews were transcribed by the main author and were translated and reviewed to check the validity of the findings. A written consent form was obtained from all the participants and a copy was made for them.

The study was approved by the Health Research Authority (HRA), the Research Ethics Committees (REC), and the National Health Services (NHS) in the UK. In addition, the approval obtained from the International Medical Centre in Saudi.

Table 13: Interview guide used to collect data from healthcare professionals

Exploring the variability in the current protocol of postoperative pain
What is the current protocol that is usually applied with all patients undergoing joint replacement of knee or hip, in terms of managing their pain before and after surgery?
Do you think this current protocol is always implemented?
If not, could you explain why?
How do you find patients usually react with this path of treatment?
Is there any variation in the application of the protocol between doctors and nurses?
Do you think some patients are given the right amount of pain relief dosage (prescription) as recommended?
Can you think of any issue that might concern you when prescribing opioids to patients?
Exploring different ways for pain management
How do you normally prepare your patients for their surgeries in order to help them control their pain?
What do you normally advise your patients if they still in pain even with their adherence to their treatment?
Exploring their views on psych tech.
Do you think psychological techniques have a role to play in postoperative pain management?
What do you think of the way that would distract the patient's focus away from their pain by for example, listening to a tape/CD for music, or for breathing exercises, or for guiding the patients to picture a favourite place in their mind, all to help them cope with/relieve their pain?
Would you be likely to recommend some of these techniques to your patients?
Can you think of any factors that might affect the delivery of these techniques here at the hospital?

Data Analysis

The data was analysed according to the thematic approach (Braun, Clarke, & Terry, 2012), using NVivo software (version 11) to help in the analysis.

The first step of the analysis involved familiarisation with the transcripts to create a general impression. Each transcript was then searched for content related to postoperative pain management protocol and then coded. Other codes were identified relating to the variation in applying the protocol and medication prescription, patients' experiences with medication, and their views on other methods of pain relief including psychological techniques was performed by the main researcher. The initial findings

were recorded and discussed with the team. The next step in the analysis was creating a meaningful list of themes by combing codes into superordinate constructs. Each theme identified, included subcategory all summarised in a report to be presented to the team. Finally, all data was checked and reviewed for validation of the findings by another team member.

Results

Participants' Characteristics

Participants' age and ethnicity data were presented in Table 15. Twelve HCPs were approached initially from each hospital. The workload prevented three from the UK hospital and two from the Saudi medical centre from participating in the study. These potential participants declined to take part after being invited, but before consent was obtained.

Table 14: HCP's age and ethnicity group

	NHS (N=9)	**SA (N=10)**
Age, year, median (IQR)	48 (43 – 53.5)	40.5 (35 – 57.5)
Ethnicity		
White British	8	0
Arab	1	7
Asian	-	3

I identified four main themes: 1) postoperative pain protocol and 2) acceptance to psychological techniques as pain relief, 3) potential barriers to implement psychological pain relief techniques. 4) Potential facilitators of psychological intervention implementation.

Theme 1: Postoperative Pain Protocol

Participants from both groups commented on the way that the protocol was implemented to manage the postoperative pain and how that can vary between patients for a number of reasons, mainly the patients' health status and medical history.

Adherence to the protocol, variability in prescribing pain relief and their pain management approaches were identified, with UK and Saudi (SA) HCPs commenting on the current protocol of postoperative pain management for TKR and THR patients.

Adherence no Deviation

The majority of the UK HCPs reported that they are following a standardised protocol as planned and seemed reasonable, for example,

> *"I think they have written up for the protocol routinely and I think that is pretty standard. There may be a slight variation of the analgesic choice from some of the anaesthetists but I don't think it's very much and there is protocol saying what they should do."*
>
> UK HCP9

Only one HCP raised an issue that was not mentioned in other discussions with the rest of the HCPs in that setting. HCP3 was hoping to improve the protocol by implementing a routine protocol, which can be applied for all patients to assure some clarity for the nurses when patients come out of the surgery and allow them to control the patients' pain much better rather than waiting for what fits for each patient.

Likewise, most Saudi HCPs, reported that they are following a standardised protocol and they could not deviate from that protocol; for example,

> *"it is a written policy and the decision has been authorised by the clinic [meant hospital], so all healthcare providers nurses or doctors should follow this policy,*

unless as I told you there are some exceptional cases required the doctor to be fully aware of the patients' medical status and what is needed"

SA HCP1

They reported that patient's medical history may change the strategy of treatment, but there is a protocol for that and should be followed. Only two of the HCPs (2 and 3) wished to administer a femoral nerve block preoperatively to assure better control of the postoperative pain.

In addition, HCPs in both settings reported the availability of the medication for patients. Patients can request pain relief any time when their pain is increasing, which called in the protocol (p.r.n). This means that pain relief is available for patients, but patients should decide when they need to take it. However, some Saudi and UK HCPs noted that although it is the patients' decision to request more pain relief, they strongly encouraged their patients to ask for more pain relief before the pain hit them and could not tolerate that pain.

Prescribing Variability

Prescription might vary among patients based on their medical history or health status; according to the following views

"...all patients almost are having the same treatment... except in some cases, some patients got specific reaction like allergy.. "

SA HCP1

"No, obviously there's something medically different with the patient. So the patient has got a past history of Opioid toxicity or intolerance to NSAID because of an ulcer. So obviously they will not put the same medication. But they should get some medication".. "you alter the dose depending on with a frail 80-year-old lady, you wouldn't give the same doses of 16 stone strong man. You would vary that, you know, depending on their weight and how old they are."

UK HCP 3

Pain Management Approaches

Participants of both groups cited that patients took part in preoperative education programme that was designed to prepare patients for their surgery: i.e. managing their expectations, and dealing with their questions, despite the label or the term that was used to address this service. In the UK hospital this programme was called "Joint school", while in Saudi medical centre it was called "Family education".

Saudi and UK HCPs both endorsed the value of alternative and safe treatment approaches to manage or cope with pain. Side effects such as nausea, vomiting and constipation were often mentioned as reasons to sometimes change the dosage, the type of pain relief, or to limit the opioid therapy. HCPs were also trying to withdraw opioids as quickly as possible to minimise the risk of addiction and other adverse postoperative outcomes.

> *"I don't like narcotic and stuff like* ***Tramadol*** *because it has nasty side effects and patients tend to be addicted to it. I prefer to give them [patients] NSAIDs and* ***Paracetamol*** *as it has fewer side effects, and do not affect the liver or the kidney functions that much..."*

SA HCP3

> *"we don't want them on opioids for very long afterwards. We don't want them going home on that for all sorts of reasons. You'd want them to try them to go off opioid analgesia. And they need to have enough analgesia certainly for their knees when they're doing their physio. So, that's in the consideration."*

UK HCP9

Another SA HCP9 pointed out that he is advising his patients to stop taking strong pain relief on the 10th postoperative day, as there is no urgent need for that and for their own safety

> *"in the 10th postoperative day, I try as much as I could to stop* ***Tramadol****, instead I prescribe them* ***Paracetamol*** *or* ***Panadol.*** *If they still have a severe pain, I'll*

advise them to use something else like local patches to help them relief the pain. This is happening with me and this is my way even with patients with chronic osteoarthritis. If they spend much period of time on ***Voltaire****, I would convince them to use natural treatment like* ***anti-inflammatory*** *and* ***Piascledine*** *such avocado, and using local patches or applying gel, just to let them reduce the amount of painkillers."*

Some of SA HCPs noted that they personally avoid taking meds when feel any pain unless it is urgent and the pain was unbearable.

HCP7 shared her view "*…I don't really like to take any medicine, I don't like them, sometimes it's not good having too much chemicals in your body…",*

"me personally I had a surgery on my knee. I took my pain relief once after two hours after I've been admitted, then I stopped taking any pain relief and tended to use physiotherapy, massage and local patches, if it's really painful I got Panadol only".

HCP9

HCP 9 justified his avoidance of pain killers because, besides the toxic effect of using more pain relief on the body, he was able to tolerate more pain. However, UK HCPs did not raise the issue of personal preferences in using medication for their pain. Probably, because of the limited time of the interview, there was no much time to extract more information and they did not volunteer much information.

Theme 2: Acceptance of Psychological Techniques for Pain Relief

The majority of Saudi and UK HCPs both implied that they are accepting of psychological approaches to support postoperative pain care when they were asked about their views in the role of psychological techniques on pain relief. SA HCPs stated that

*"I think this way would help patients. Most patients have fears from the hospital, from the post-surgical pain and from the surgery and I think that would help…*HCP4", and HCP2 cited that

"I think if that happened [meant implementing the psychological techniques in the medical centre] and there is research confirmed the effectiveness of these techniques, I hope I could see that here to help our patients, really"

Likewise, some of UK's HCPs emphasised that distraction could be helpful for patients:

> *"I just think it would be good to have that alternative and I think you know if any, any aids really from, from thinking about how to maybe distract the patients away from pain or just think maybe in person just think more positively I think It would probably help...".*
>
> HCP7

Additionally, HCP2 emphasised this view distraction is helpful because most patients in that ward sharing pain experience, but there is nothing could help distract their focus on pain:

> *"I think distraction therapy is vital and that is the problem in, not so ward areas that we haven't got anything to take away, you're here, you've had your operation. You've got a pain in your hip because you've had the operation, everybody else in that bay has had operations, they all have their own experiences and pain, so there's lots of things, so you're not actually distracting their focus on pain discomfort, suffering post-surgery and what we put them through so…"*

Another UK HCP pointed this positive attitude that expressed these psychological techniques could be additive and low risk treatment:

> *"I think that potentially it could make quite a difference and I think the patients do have pain problems after joint replacements and despite—because we have to balance enough making them numb for a week because we've got get and going and if you ever need, you got to balance blocking their nerves and still getting to function. Then, I think anything that we can do even if it's only got a 15% of improvement or 10% improvement; it is really valuable, so I think it really good Thing."*
>
> HCP9

Theme 3: Potential Barriers to Implementation of Psychological Pain Relief Techniques

HCPs on the other hand reported similar factors that might prevent delivering this type of intervention in the clinical setting. Some of these factors were barriers related to patients, and other barriers related to HCPs' scientific endeavour.

Barriers Related to Patients

The main issues which were frequently mentioned on the participants' discussion were patients' characteristics, preferences and their level of knowledge. UK HCPs suggested that it could be patients' choice/preferences not to use any psychological way to help relieving the pain. This is according to the shared views of the following UK HCPs.

> *"I think it's just depends with the patients who will accept it because sometimes they just don't want to engage with it [a psychological intervention]"*
>
> HCP6

> *"...For some people, yeah definitely. Just listening to some music or just to stop thinking about that [meant the pain], isn't it?"*
>
> HCP2

> *"I think some would think and some wouldn't. I think it depends on the individual but I think it also depend on us as nurses about how we solve that as such to the patient and how we promoted it and how we, we definitely—yeah. And some nurses I could think perhaps we more keen on. Yeah, and others would be so much just give us some pain relief but actually"*
>
> HCP7.

> *I think more importantly, I think what's more often more interesting is certain personality traits and types, different psychological groupings of patients can be very useful in predicting how well people do. How many of these people about in the past and as surgeons, we can often try and predict well, "I think this patient can find it really difficult and difficult to get over". I think the patient tells you they've got high pain threshold, you know they're going to do badly. So, you can sort of predict, not always right and some patients prove their role and do better than you think but also you can predict who is going to do badly because we see so*

many patients and we do so many. And I know work has been done to categorise the patients to see if you could predict that and therefore make that to focus on the group that going to do badly. And, you know, make sure, you know, they have maybe due of having preoperative pain relief and are psychologically ready for the operation that prepared slightly better than the normal patient to or many patients who will fly for a hip replacement would need any psychological intervention as well."

HCP4

Similarly, SA HCPs emphasised that patients' level of knowledge about these techniques and the patients preferences would be the main obstacle to implement or deliver this technique in clinical setting. This is according to following opinions of the SA HCPs.

"I think it is good idea, but depends on patient's education and knowledge, some patients especially old ones, who might have severe pain in the 3 or 4 postoperative days, I mean he could not do it, but I think they need awareness and education and family education who would help the patient"

HCP9

"It vary from patient to the other. Sometimes patients here do not like to listen to CD or something that could not actually see it or physically use it (like taking meds). They normally prefer to see and hear directly from the doctor... to comfort them"

HCP1

"It can be accepted if there is research confirm this technique is effective and shows some results, then would be clinically accepted by healthcare providers. Then it depends on the patient how to be convinced, I think it needs a psychologist"

HCP3

"it depends on the patient... if this is acceptable and especially emphasised with the family educator, why not? Because after all this is would support the safety of patient and early recovery..."

HCP5

Stigma was an additional barrier related to patients characteristics that was captured by one of SA healthcare professional statement. This was not noted in any UK's HCPs discussion.

> *"..maybe most patients seeking for something physical like medicine, and when you tell them try to imagine... this way in our Arabic region might be not acceptable. Because they do not rely on something psychological and psychotherapy always linked to people with mental complications."*
>
> HCP3

Barriers Related to their Lack of Knowledge or their Scientific Endeavour

Saudi and UK HCPs both agreed on their discussion that evidence for effectiveness and reasonable level of knowledge is required. They mentioned that their knowledge about such techniques are limited to their area of expertise (orthopaedic and medical pain relief) and could not recommend or approve these techniques to their patients until it is proven to be really effective in postoperative pain management. These are their statements, for example, UK's HCPs noted these views

> *"I personally don't know of any technique so I can't advise people on techniques I don't know about…. I think we'd have to have a bit of evidence to suggest that it works first"*
>
> HCP3

Another HCP noted this *"I think you need a properly monitor and that's the hard thing because you need to do a lot of patience to see whether or not it make a significant difference."*

HCP4

Additional HCP reported this *"I don't think it would be harmful. I think first of all you need to examine whether it's clinically affective and then examine whether it's affordable."*

HCP6

In the SA's HCPs discussion also cited the similar opinions. For example:

"It can be accepted if there is research confirm that this technique [relaxation or positive suggestions] is effective and shows some results, then would be clinically accepted by healthcare providers…"

HCP3

Moreover, the limited knowledge about the beneficial effects of psychological interventions in pain relief could be a barrier to recommend these techniques to their patients. For example, One of UK's HCPs believed that psychological intervention could be more helpful if tailored for specific group of patients only i.e. those who are identified as high risk patients or those expected to have poor outcomes from surgery, but not for pain relief:

"I think high-risk patients, patients that are flagged up as high risk. Having a poor result in terms of pain relief, it probably could be seen by psychologist before. I don't know whether it's cost-effective…Think about resources and the need even of some sort of psychotherapy for every single patient. I don't think that is needed."... "Because the discussion might answer a lot of patient's questions"… "it might help specific group of patients who have some sort of, you know, depression, psychological backgrounds"… chronic kind of pain, neuropathic pain"… "patients with fibromyalgia."… "the frequent flyers with the pain clinic."… "but we cannot standardise that for every single patient"

This point of view was not captured by any of SA discussion.

Scepticism

Additionally, there was only one negative opinion captured by one of the SA HCP when asked about the possibility of implementing psychological techniques as pain relief. He seemed to reflect his own belief and claimed that *"No, never. It's difficult to be accepted by patients, they will not accept this way [meant psychological techniques]"*. Additionally, one more UK HCP noted that when asked about his views in applying psychological techniques in hospital *"…I think, as an adjunct to what we are already doing, I think it would be unreasonable to try...",* when he was asked about why and if there is any reason would put this off he claimed that *"… Probably many reason, probably many bad things about it…*",

but he did not provide any reason, which indicated they opposed the acceptance of psychological techniques as pain relief probably because they were sceptical.

Work Overload

Additional barriers not frequently mentioned such as professionals' lack of time or overload of work were captured here. It was reported by UK HCP4 that they have more work to do and doctors or nurses are not able to deal with psychological interventions or cannot follow up with patients on this issue.

> *"...have to be somebody on top of what we already have."… "have to be psychologist, psychotherapist"…"You couldn't ask for more staff to do it."… "It would have to be, somehow, another member of the team, you do it."… "I don't think doctors, I don't think consultant and I don't think nursing staff, physio or OT, so it have to be another one team member that come in to give that sort of treatment. This is time consuming. We don't have enough much time"*
>
> UK HCP4

In SA setting, HCPs mentioned this is a job for a pain clinic department to deal with, because they do not have the knowledge and the time to deal with these interventions.

Family Support

An additional barrier that was not frequently discussed among participants from both groups was the presence of family. Family presence with patients during their admission to hospital could be helpful and supportive to some patients, or could be an obstacle for HCPs when they are trying to do their job. A HCP from UK reported that family could influence patient's behaviour with their negative emotions:

> *"Well yeah, and that's sounds not a good thing to say, but some people do that, they can be absolutely fine and then the family come in and then they display all*

this, oh I've been in agony or it's been awful, even though before that they were absolutely fine."

UK HCP2.

Another example from SA HCP, she emphasised that family could be a bad influence on patients' behaviour and feelings:

"I think family might have a role on this. For instance, sometimes when they have a patient who had a surgery they might tend to get rid of all moaning and complaining about pain and give him the painkillers just like that. while there are some families who are encouraging their patients and tell him that you are good , try to move a little , try to forget, you are strong… try to do your exercise … you know just to motivate their patients"

SA HCP 9

It means that if patients trying to engage in psychological interventions, families who have negative attitudes towards these interventions could be a barrier or not supportive.

Themes 4: Potential Facilitators of Psychological Intervention

UK and SA HCPs shared similar views on some factors related to the practicality of delivering the intervention. These factors frequently emerged in part of their discussion and can facilitate the process of implementing psychological intervention such as availability of resources, training matters (for patients and the person who will lead the delivery of the intervention) and the procedure of the delivery.

The UK's HCPs emphasised through their conversation that the financial or the economic issue would be the major factor that would affect the delivery of the intervention, so intervention should be cost-effective.

"I think, obviously things cost is a big thing, isn't it, with everything"

UK HCP8

"if there was some kind of psychological intervention, you could get the patient to do that would help with their pain, that would be an additional thing that we are

not doing at the moment but would be relatively cheap and preferably cost effective, but there is nothing I'm aware of that's got any evidence behind it. If it were to be introduced, then it would have to be some of those simple to administer and the patient-led really because I don't think there are the resources to have a lot of it extra equipment"

UK HCP9

Additionally, cost and patients' safety were important factors to accept psychological intervention as pain relief.

"I don't think it would be harmful. I think first of all you need to examine whether it's clinically effective and then examine whether it's affordable."

UK HCP6

"well, it's cost and it's another thing for the nurses to do, like if that thing cost of developing it, cost of improving it made a difference, that would be another thing. But I don't think there would be any clinical reasons why you couldn't do it, you know? I don't think there would be many patients that would be a safe issue [he meant there will not be a concern about the safety or there will not be a problem when using psych tech] for them or it wouldn't be a thing that they will be in danger too, so I can't see any clear reason why they couldn't do. They've got enough time to do it"

UK HCP9

Furthermore, the cost issue was frequently mentioned besides other fundamental factors such as the availability of the resources i.e. who will deliver it and training required.

"I guess if you're expecting the doctors to deliver it then they need a bit of training. Because they can't just say go and breathe and it will settle down. I don't see a reason, if it is proven to show a benefit, I don't see a reason why the nurses on the ward or the ***HCA's*** *could not be trained in these techniques because they, to be fair if I'm honest, they have more contact with the patients than we have. We, like a consultant, I will see a patient once a day if I'm lucky. But the nurses will be*

seeing them day in, day out. So if that is something that the, that maybe the nurses can be trained in, if indeed it does show a benefit then yeah, I'm all for it."

UK HCP3

"If where you wanted a physical person to come and actually do that as a specific role, then yes, you got the resources here with me to actually support that as to employ something at that role"

UK HCP1

Another factor related to the availability of the resources is that the availability of the equipment required for practicing these interventions.

"Yeah, everyone's got their bedside services on here so they can have access to music through the radio and obviously we encourage people to bring things in to the hospital as well. I don't know whether that's something, they actually suggest that the joint school bringing our... there was iPhones now, if they're going back... can use tapes. (Chuckles)"

UK HCP1

In addition, only one of the UK's HCPs cited that patients might be interested in a group training. The other HCPs in UK and SA did not raise this issue.

"The results obviously, research maybe. They probably want some research. We want to know what the cost would be. They'd want to know how it's going to be done. You probably couldn't do it individually and you could do it in a group. It's difficult because obviously our patients were unable to get around quite so much"

HCP8

In contrast, SA's HCPs did not consider the financial issue to be an obstacle in delivering the intervention, but they reported factors like the availability of evidence of the psychological intervention effectiveness, and the training issues.

> *"I don't think it will be any other reasons, but they have to get the evidence, these are could help the patient, then will be decide how to be added it to the protocol. Also, they should study the idea of how to be implemented/delivered in the way patient would accepted. This would take time to explain the details of the delivery, regarding the financial matters it should not be a big deal here in this medical centre as it is a big and might have the equipment"*
>
> HCP1

> *"..No. no. the hospital here is very interested and care about subjects like these and it might seek to provide all the equipment that required"*
>
> HCP2

Moreover, they mentioned that the cost would not be an obstacle, if the procedure and the targets of the intervention were clear

> *"..see, in terms of the hospital, there will be no problem. This hospital is big and well-equipped, it would have the resources. It is open-minded to all that but it required to put what you need to do in a specific protocol, what are you going to do, what are going to provide, who are the targeted age, everything. Other than that the hospital have no problem with that"*
>
> HCP4

> *"..it can be done (delivered), by the clinic pain department. It is part from our procedure that after the patient finish his or her meeting with the anaesthetist; they should meet the pain educator to explain everything to them before the operation. So, at that point, patient could be told what to do exactly (he meant delivering the intervention the same time while meeting with the pain education). So the pain educator should be prepared by attending courses or workshops to be able to deliver it to patients"*
>
> HCP3

Discussion

I found that the majority of HCPs in both settings held favourable attitudes towards brief psychological interventions for postoperative pain relief, and in the main accepted these techniques as part of mainstream medical treatment. However, my interviews revealed a number of potential barriers for the widespread adoption of these techniques. Specifically, HCPs believe that it is the patients' personal preference to practise psychological treatment at present because insufficient evidence relates to the effectiveness of these techniques to be formally recommended as part of the main protocol.

I did not find substantial differences in attitudes or barriers between the UK and SA. In both countries HCPs were consistent in their support for the need for additional evidence for the effectiveness of these techniques in postoperative pain management.

Minor differences emerged in relation to how these interventions could be supported in clinical practice and achieve wider adoption. In the UK HCPs emphasised that interventions must be cost-effective, and highlighted the need to provide equipment to patients. In SA HCPs emphasised problems relating to training practitioners correctly, and that interventions should be clearly described and made accessible to patients by pain management specialists. There is a possible explanation for SA views that HCPs put greater role for medical authority to determine and approve all type of treatment that might be uptake or consumed by patients in SA.

The majority of HCPs in this study claimed that they were totally compliant with the protocol of postoperative pain management that employed in their clinical settings. They described their compliance to indicate their pain medication prescriptions, but did not mention or imply their pain assessment. Postoperative pain assessment was problematic as highlighted in the introduction of this chapter that nurses relied on patients' behavioural expression rather than using validated tools to measure pain intensity (McCaffery et al., 2000), also recent evidence showed the low compliance of postoperative pain assessment (Hoogervorst-Schilp et al., 2016).

Some of HCPs expressed their concerns that patients would be at risk of side effects of some medications and expressed their concerns relevant to long-term prescription to narcotic drugs. Previous studies that investigated HCPs' attitudes and beliefs in

prescribing opioids for chronic pain revealed different concerns related to drug therapy reported additional concerns, and the side effects were part of their concerns (i.e. Bhamb et al., 2006). For example, a survey by Bhamb et al. (2006) examined 248 primary care physicians to discover the most commonly prescribed opioid type, the most common opioid prescription concerns, and other related questions regarding opioid therapy. Findings revealed that physician concerns regarding opioid therapy included prescription drug abuse (84.2%), addiction (74.9%), adverse effects (68%), tolerance (60.7%), and medication interaction (32%), which indicate high rate of concerns regarding opioid therapy in this group of physicians. Another by Wilson et al. (2013) survey indicated physician's awareness of the negative effects of opioids and their awareness has associated with the decrease in their prescribing to medication, also has associated with their level of experience and training to treat chronic pain. Because HCPs viewed side effects of medication as a concern, this potential motivations for them to adapt brief psychological interventions.

In both cultures, HCPs expressed a need for treatments that could help reducing the risks of usual treatment, often implying acceptance of brief psychological interventions. However, almost all expressed a desire for more scientific evidence to support the efficacy of brief psychological interventions for postoperative pain because they are currently not aware of the scientific benefits of these interventions in the context of postoperative pain relief. Their attitudes seemed positive; however, their emphasis for more evidence to prove the efficacy of psychological intervention to relieve postoperative pain indicated their unawareness of that these techniques have been found to be effective, as emphasised in the first chapter (systematic review). HCPs perceptions toward brief psychological interventions in this chapter have supported the assumptions that were made earlier in the systematic review chapter that the lack of HCPs' knowledge of brief psychological interventions as postoperative pain strategies are one of the barriers that may be encountered in delivering these techniques in the future. This barrier could be overcome and HCPs may change their minds once the evidence for the effectiveness are presented to them and approved by clinical settings.

The need for more scientific evidence is another factor associated with HCPs attitudes toward brief psychological interventions in this study. Research that investigates the views of HCPs on brief psychological techniques is lacking; however, other studies investigated physicians' attitudes toward CAM from different countries confirm that

HCPs are needed for reliable information and scientific evidence for these type of approaches (Maha & Shaw, 2007; Milden & Stokols, 2004; and Olchowska-Kotala & Barański, 2016). For example, investigating NHS HCPs views on CAM revealed that a minority of HCPs were 'enthusiasts', but the majority of them were either sceptic or undecided and asked for evidence base of CAM (Maha & Shaw, 2007). This study also highlighted the importance of doctor-patients communication. Further, other HCPs from Poland were generally sceptic about the benefits of these techniques and they expressed their intention to learn more about it, but confirm the need for evidence-based practice (Olchowska-Kotala & Barański, 2016).

As suggested in the introduction of this chapter, personal preferences of HCPs in pain management could be a barrier to implementing brief psychological techniques in general practice. However, the findings of this qualitative study confirmed their overall acceptance of these psychological interventions as potential safe options (low risk of side effects) for pain relief, especially if the scientific evidence would demonstrate the effectiveness of these techniques. Furthermore, a few of SA HCPs voluntarily admitted their negative attitudes towards medications and they personally prefer to limit their use of painkillers unless they really needed to when dealing with their own pain, but UK HCPs did not discuss their personal preferences when dealing with their pain. This is probably because of the limited time of the interview, which did not allow for the extraction of further information.

Few HCPs revealed sceptical and negative attitudes toward brief psychological technique to be used as postoperative pain relief and did not justify their views. Their responses may reflect their personal experience or maybe they are not interested in treatment out of the mainstream; however, the majority of HCPs implied positive views.

In addition, findings in this study revealed some of practical issues such as cost, training and clarity of the intervention procedures, which are essential elements that should be considered when planning to deliver any health intervention to general practice.

Limitations

This study has a number of limitations. The duration of the interviews included the study were slightly shorter than originally planned, ranging between 7 to 27 min. This made it hard to fully explore all of the items in the interview schedule, and may have affected participants responses. Despite the fact that some HCPs in both settings seemed to be distracted by their work and intent to finish early to catch up with their patients, most interviews managed to capture the essential points of view that this study aimed for. In addition, participants may change their responses in situations where they were busy or distracted, and using the thematic approach may not allow capturing these changes.

Furthermore, conducting face-to-face interview may cause biases in participants' responses i.e. being polite in their answers and a bias come from the researcher interest in the positive expressions about psychological interventions. Participants included in the study were straightforward in their opinion and the researcher tried to avoid leading questions; however, to avoid these type of biases prior to the interview, participants were reminded with that there are no right or wrong answer and they are free to express their views, which what I am more interest in to answer the research questions. Additionally, conducting qualitative analysis make the findings more likely to be exposed to self-bias. To avoid this pitfall, findings were discussed and reviewed with the supervisory team and final report was reviewed until the agreement was reached.

Moreover, orthopaedic clinic is a part from other departments in hospitals, and the sample included this study may provide partial understanding that may not necessary reflect other views from other departments. Thus further research may consider investigate different views of HCPs from different clinics.

Conclusion

HCPs from UK and SA cultures emphasised the need for scientific evidence relevant to the effectiveness of brief psychological interventions to relieve postoperative pain to be able to recommend them to their patients. Thus, educational workshops that aimed to enhance HCPs knowledge and attitudes toward psychological interventions may be an

important step prior to deliver the brief psychological intervention in acute postoperative pain context to support or ensure a successful implementation of the intervention.

Chapter 8 - Participants' Views on the Proposed Design of Brief Psychological Intervention

Introduction

Previous chapters have emphasised the effectiveness of brief psychological interventions in relieving acute postoperative pain and pain-related anxiety (Chapter 3). However, views collected from the general population, patients, and HCPs (Chapters 4 - 7) on the use of brief psychological techniques as potential methods of pain relief have revealed several barriers to the acceptance of these techniques that might hinder their delivery in practice. Most of the barriers relate to constructs from social cognitive theories, such as self-efficacy (see the Social Cognitive Theory (SCT) developed by Bandura, 1986; the Theory of Planned Behaviour (TPB) developed by Ajzen, 1985; and the Health Belief Model (HBM) developed by Rosenstock, 1974). Perceived barriers to treatment include a lack of knowledge about psychological interventions for pain relief (in the HBM), and attitudes and beliefs about treatment such as scepticism (in the TPB) and the preconceptions or the negative thoughts surrounding psychological interventions. These constructs may influence participants' intentions to practise psychological interventions.

It is therefore important to understand the beliefs that underpin patients' behaviour to explain why, for example, some patients adhere to their treatment programme while others do not, which may result in different outcomes in terms of pain management.

This will thus enhance the delivery of health behaviour change interventions in primary care. Earlier research has suggested that primary care professionals need to know how to help patients cope with their symptoms and adhere to treatment plans, as well as knowing how to persuade patients to engage in behaviours that may help prevent illness. They can achieve this by understanding and implementing theories of health behaviour change in primary care (Elder, Ayala, & Harris, 1999). Researchers have highlighted several theoretical components in health belief models that might be useful in understanding behaviour change and in predicting the maintenance of health behaviour in clinical settings, for example by explaining adherence to treatment. Researchers have

argued that behaviour modification may employ both negative and positive reinforcement to modify performance; for example, HBM emphasises the reduction of environmental barriers to behaviour while Social Learning Theory suggests that the perception of skills and reinforcement are more important in determining behaviour. Self-management models may therefore benefit from converting these theories into forms of self-action. Theories of social support highlight the importance of reinforcement delivered through social networks, while the Theory of Reasoned Action highlights the role played by perceptions of social processes (Elder et al., 1999). Some researchers have shown, for example, that patients suffering from chronic pain may form beliefs that help them to cope with their pain or motivate them to engage in certain types of treatment. For example, a prospective study by Bishop et al. (2008) hypothesised that patients' beliefs about treatment, their perceptions of illness, and treatment appraisals would predict their adherence to CAM. Self-report questionnaires were used to collect data from 240 patients attending 3 CAM clinics to measure patients' beliefs, illness perceptions, and treatment appraisals. Three months later, self-report questionnaires were then used to collect data measuring patients' adherence to therapists' recommendations, treatment use, and lifestyle changes. The findings revealed that illness perceptions, treatment appraisals, and beliefs explained a modest proportion of the variance in adherence to CAM. Babadağ et al. (2015), on the other hand, measured the correlation between pain beliefs and coping with pain in201 patients. Pain beliefs comprise 'organic pain beliefs' where patients believe pain is triggered by natural causes i.e. tissue damage, and 'psychological beliefs' where patients believe pain is triggered by psychological factors i.e. being anxious or the belief that thinking about pain makes it worse. The highest possible score for the scale used was 6 and the minimum score was 1. The findings revealed that patients' mean score for organic beliefs was 3.97, while the mean score for psychological beliefs was 5.01. Furthermore, there was a significant negative correlation between patients' organic beliefs, self-management and conscious cognitive interventions, and a positive correlation between organic beliefs and helplessness. There was also a positive correlation between patients' psychological beliefs and self-management. Researchers also found significant differences between organic beliefs among patients who use opioid analgesics where patients who believed their pain was caused by organic factors could not cope and were more likely to feel helpless. However, although patients' decisions to use pain management strategies for pain relief

are dependent upon many factors, including their beliefs, evidence has yet to be provided that explains the role of beliefs in predicting patients' intentions to participate in brief psychological interventions to obtain postoperative pain relief. Nevertheless, the research presented above gives several indications as to the factors that should be considered when planning the delivery of self-help interventions (such as my own brief psychological intervention).

Health behaviours refer to any behaviours that impact on people's physical and mental health and quality of life (Tombor and S. Michie, 2017). Based on NICE guidelines (2014) 'behaviour change' could be described as a set of principles and activities that aimed to help people to adapt a healthier lifestyle (e.g. be more physically active or be in a healthy diet). Tombor and Michie (2017) noted that there are three types of behaviour related to population health: behaviours that contribute to the prevention of disease (e.g. tobacco smoking); behaviours that involve care-seeking and adherence to treatment (e.g. participating in screening programme); and behaviours that relate to the delivery of healthcare (e.g. participating in hand hygiene practice). Based on the researcher's description of the types of health behaviours, the intervention described in this chapter is fit within the definition of Tombor and Michie. The proposed intervention was designed to reduce surgical pain by changing patients' negative perceptions and attitudes that have been linked with the efficacy of BPIs as pain relief strategy. Also, participating in BPI would encourage patients to be more active in managing their pain condition, which may increase their self-efficacy and support the self-management interventions

Highlighting the influence of patients' beliefs underpins the importance of using psychological theories to support the design and implementation of health behaviour interventions in primary care settings. Several studies have suggested that understanding the theoretical basis of health behaviour interventions may be useful when transforming research evidence into practice (French et al., 2012; S1 Michie et al., 2005). For example, Michie et al. (2005) used a consensus approach to develop a consensus among three groups of multidisciplinary experts (health psychology theorists, health services researchers, and health psychologists) regarding a theoretical framework that could be used to transform research into practice. Researchers identified 12 domains that could explain behaviour change. These were: knowledge, skills, social/professional role and

identity, beliefs about capabilities, beliefs about consequences, motivation and goals, memory, attention and decision processes, environmental context and resources, social influences, emotion regulation, behavioural regulation, and the nature of the behaviour. Michie and Prestwich (2010) have also suggested that theoretically-informed interventions could lead to better outcomes in practice.

It is possible to argue that using theories of health behaviour change may not always inform interventions; however, many research studies have shown that health belief models have succeeded in informing health behaviour change. For example, a recent meta-analysis by Steinmetz et al. (2016) investigated the effectiveness of the TPB in predicting and explaining behaviour change in several behavioural interventions. Eighty-two studies were identified in total comprising 123 interventions conducted in different disciplines. These confirmed the effectiveness of TPB-based interventions with a mean effect size of 0.50 for behaviour change. Additionally, the analysis also identified gender, education, and behavioural domain as moderating the effectiveness of interventions. Another review by Holmes, Hughes and Morrison (2014) investigated evidence for the successful application of health psychology theories such as socio-cognitive theory, self-regulation theory, and social support theory in predicting patients' adherence to medications. Sixty-seven studies involving randomised controlled trials as well as several other methodologies were included in a narrative synthesis of the data. The findings revealed that adherence was measured by self-report in most studies (50 of 67), and the significance of self-efficacy was highlighted in 17 of 19 studies, perceived barriers in 11 of 19, perceived susceptibility in 3 of 6, necessity beliefs in 8 of 9, and medication concerns in 7 of 8. This review therefore demonstrated the usefulness of theory-based interventions in predicting patients' adherence to medication. Theories of health behaviour are therefore important and could contribute to the design of health behaviour change interventions in several ways (Armitage & Conner, 2000; Michie & Abraham, 2004; Redding, Rossi, Rossi, Velicer, & Prochaska, 2000; and NIHCE, 2014). For example, they could help identify the determinants of any given health behaviour, which is an essential step in the development of a successful intervention and in predicting behavioural change. Theories also can guide research and facilitate the application of health interventions (Campbell et al., 2007).

Ensuring the successful delivery of a brief psychological intervention as a pain management strategy therefore requires an understanding of the determinants of

patients' behaviour to explain or predict their acceptance and/or adherence to interventions after surgery. In this respect, several health behaviour theories have been applied, such as the Health Belief Model (Rosenstock, 1974), Social Cognitive Theory (Bandura, 1986), the Transtheoretical Model of Behaviour (Prochaska & Velicer, 1997) the Theory of Planned Behaviour (Ajzen, 1985), and the Theory of Reasoned Action (Ajzen & Fishbein, 1980). These theories all aim to explain how and why individuals participate in a certain behaviour and several of these theories share similar constructs (e.g. self-efficacy). However, our data provided evidence for the health belief constructs appeared in the TPB and for self-efficacy theory; thus, the current chapter explores the potential application of brief psychological interventions based on the TPB and Self-efficacy theory.

The TPB is a model that explains why individuals make decisions about whether to perform a specific behaviour (Ajzen, 1985). The model proposes that a person's intention to perform a certain behaviour is determined by three separate components: individuals; attitudes towards the behaviour; the perceptions of social opinions regarding the behaviour, known as subjective norms; and the degree of perceived behavioural control (PBC). PBC has been described as a 'person's perceptions of the ease or difficulty of performing the behaviour of interest and is useful for predicting behaviour that is not under an individual's volitional control (Ajzen, 1991, p.183).

A large of ongoing evidence applying the TPB to different behaviours has shown this theory to be useful in explaining patients' intentions and behaviour to exercise (Pastor et al., 2015), adhere to treatment (Rich et al., 2015), and donate blood (Giles et al., 2004). Furthermore, a health intervention based on the TPB that was conducted with cardiac patients (n = 87) increased their level of attendance on a cardiac rehabilitation programme (Wyer et al., 2001). Pastor et al. (2015) also aimed to identify belief models related to performing an exercise pattern (walking) in 46 women with fibromyalgia and to explore the relationship between belief constructs and behaviour. The findings showed there were more positive consequences related to the guidelines of performing exercise than negative ones (behavioural beliefs) and the families/friends were an important influence on engaging in exercise (normative beliefs). The researchers also identified pain, fatigue, and emotional state as factors that could facilitate or inhibit the performance of exercise (control beliefs). Additionally, the relationship between the constructs is coherent with the theory and supports its application it to selected

behaviours and populations (Pastor et al., 2015). Although Pastor et al.'s research is an elicitation study and is the first stage of a formative research study, their findings supported the application of TPB and the efficacy of the theory in predicting and explaining health behaviour. A meta-analysis of twenty-seven studies conducted by Rich et al. (2015) aimed to explore the efficacy of TPB in predicting adherence to treatment behaviour among patients with chronic illness. The results showed that the theory explained 33% of the variance in intention and 9% of the variance in adherence, and there were consistent patterns of effects (small to medium effect sizes) among attitudes, subjective norms, perceived behavioural control, and intentions. Even with small effect sizes this result indicates that the theory is still able to predict patients' adherence to treatment regardless of the type of illness. This indicates its potential suitability in terms of predicting patients' adherence to a brief psychological intervention for pain relief. This is important because applications of the TPB to psychological techniques such as postoperative pain relief have yet to be conducted.

Another cognitive element that appears to have a strong influence on chronic patients' behaviour and the beliefs that support or hinder their adherence to treatment is self-efficacy (Thompson, Broadbent, Bertino, & Staiger, 2016). Self-efficacy theory consists of two components: self-efficacy expectancies and outcome expectancies (Bandura, 1997). Self-efficacy expectancies are the beliefs that one can perform the necessary behaviour to produce a specific outcome; outcome expectancies are beliefs that certain types of behaviour will produce a specific outcome. For example, Marszalek et al. (2017) examined the effect of outcome expectations on exercise by investigating demographic, physical, and psychological outcomes among 262 people with knee osteoarthritis (OA). The findings showed that higher outcome expectations for exercise were associated with greater self-efficacy and fewer depressive symptoms but were not associated with any other variables (gender, age, education, social support, pain, anxiety, or radiographic severity).

Research has also suggested that treatment adherence is determined by a combination of pain-related beliefs that either support or inhibit the ability of patients suffering from chronic pain to adhere to treatment recommendations over time. Several studies have shown that self-efficacy can be a valuable predictor of different health behaviour. For example, Martos-Méndez (2015) assessed the mediating effect of the role of perceived social support in the relationship between self-efficacy and adherence to treatment in a

random stratified sample of 202 patients suffering from chronic pain. The results showed that self-efficacy was associated both directly and indirectly (through social support and satisfaction with support) with adherence to treatment regarding diet and exercise. Waldrop et al. (2001) also investigated whether self-efficacy in 105 older orthopaedic patients in relation to orthopaedic rehabilitation tasks among explains the variance in rehabilitation outcomes and then assessed whether health value could moderate the outcome expectancy relationship. After controlling other variables, including physical functioning, they found that self-efficacy predicted the significant variance in rehabilitation outcomes among patients; however, health value did not moderate the outcome expectancy relationships (Waldrop et al., 2001). Moreover, Porter et al. (2008) found that lower self-efficacy for managing pain was associated with reports of higher pain and a decrease in patients' well-being. Porter et al.'s study examined self-efficacy in relation to managing pain, symptoms, and functioning among 152 patients with early stage lung cancer and their caregivers. They also measured the association between self-efficacy and adjustment among both patients and caregivers. The findings indicated a low level of overall self-efficacy among patients and caregivers in relation to managing pain, symptoms, and functioning, and there were significant associations between self-efficacy and adjustment. Patients low in self-efficacy reported significantly higher levels of pain, fatigue, lung cancer symptoms, depression, and anxiety, and significantly worse physical and functional wellbeing. Additionally, when patients and caregivers both had low self-efficacy, patients reported higher levels of anxiety and poorer quality of life compared to when they were both high in self-efficacy.

These findings regarding self-efficacy beliefs has highlighted the significant influence this construct has on patients' subsequent behaviour. Therefore, to ensure successful delivery of the brief psychological intervention for pain relief and ensure greater adherence to the intervention, it will be important to improve patients' beliefs in their ability and confidence to practise a brief psychological intervention. This should therefore be targeted in my intervention plan.

Expectations are another important construct in many health belief models and have a significant impact on health-related outcomes. *Treatment expectations* refer to the improvements patients believe are likely to occur when adhering to a treatment (Reid, 2016). Several studies have reported that patients' initial beliefs about the effectiveness of treatment affects their final treatment outcomes (e.g. Goossens, Vlaeyen, Hidding, Kole-

Snijders, & Evers, 2005; Linde et al., 2007; Myers et al., 2008; Peerdeman et al., 2016). For example, Goossens et al.'s (2005) research with 171 adult patients investigated the influence of expectations in predicting both long- and short-term treatment outcomes. Expectations were measured before and after receiving CBT for chronic pain. Patients who believed that treatment would help them cope better with their pain reported enhanced coping skills and efficacy in controlling pain at a 12-month follow-up when treatment was completed. Similar findings have been reported by Myers et al., (2008) in research conducted with 444 patients with acute lower back pain. They investigated the impact of patients' expectations on their functional recovery and found a significant association between patients' expectations and improvements on recovery. Moreover, such expectations were found to reduce levels of pain. A meta-analysis conducted by Peerdeman et al. (2016) investigated the influence of patients' expectations, through verbal suggestions, conditioning, and mental imagery, on pain relief. Thirty studies were included in the review, of which 27 were quantitative in nature. Overall, the analyses showed that these interventions exerted a medium size effect. However, there were different size effects for each type of expectation and a subset analysis revealed medium to large effect sizes for these interventions with experimental and acute procedural pain, but small effects with chronic pain. The findings indicate that expectations-based interventions, especially verbal suggestions for acute procedural pain, could be effective in relieving pain.

Patients' expectations were also found to influence the treatment outcome when compared to patients' preferences. A recent randomised study by Beasley et al. (2017) measured the effects of participants' preferences and expectations on health outcomes among 442 participants experiencing widespread chronic pain. Participants were randomly allocated to one of four treatment groups (CBT, exercise, CBT and exercise, and a control group). At a 6-month evaluation, it was found that patients' preferences regarding expectations had a strong effect on treatment outcomes whereas preferences regarding treatment did not have a strong effect. Additionally, Stewart et al. (2017) investigated the predictive value of initial psychotherapy motivation on the outcomes of multimodal interdisciplinary treatment (medical interventions, psychotherapy, physical therapy, pharmacotherapy, and relaxation) for chronic somatoform pain in 403 inpatients. When compared to tests prior to treatment, post-test results showed a significant decrease in the level of pain intensity, depressive symptoms, and other clinical

improvements. Furthermore, measuring the predictive value of initial psychotherapy motivation on outcomes revealed that a greater level of pre-treatment psychotherapy predicted lower levels of post-treatment mean pain intensity, depressive symptoms, and global psychological distress (Stewart et al., 2017). Both Beasley et al.'s (2017) and Stewart et al.'s (2017) findings support the strong recommendation that psychological interventions should be considered part of a pain treatment protocol.

Overall, these findings indicate the significant influence that patients' beliefs, attitudes and expectations have on the efficacy of treatment. Therefore, I will measure the credibility and expectancy pertaining to the intervention in my research, which may add value to this intervention for pain relief. For example, Smeets et al. (2008) found an association between treatment credibility and expectancy and subsequent rehabilitation outcomes for patients suffering from chronic lower back pain. Researchers have also found that patients with lower credibility and expectancy scores were more likely to express higher levels of pain-related fear and had lower internal control of pain.

Aim of Study

In this chapter, I have described the development of a brief psychological intervention for postoperative pain management. I aimed to develop a practical and feasible intervention for patients waiting to have surgery to help them cope better with postoperative pain. This will be achieved by using their feedback and opinions to help refine the design of the intervention and make it more practical and acceptable to patients.

Additionally, I aimed to measure the extent to which this intervention may engender credibility and positive expectancies among patients who have experienced postoperative pain and might consider using the intervention.

By completing this phase of the research, I will be able to clarify the design of an intervention that utilises self- administered materials i.e. audio-tapes or smart devices, to support the self-management of postoperative pain.

Methods

Development of the Intervention

The description of the intervention that now follows was based on evidence collected through the systematic review (Chapter 3), and from data obtained from qualitative studies (Chapters 4, 5 and 6). In addition, I conducted semi-structured interviews with a small group of participants to explore their opinions towards a proposed psychological intervention designed to help patients cope with postoperative pain alongside pharmacological treatment. This semi-structured interview helped improve aspects of the intervention such as the practicality and feasibility of the design.

The steps taken in the development of the intervention are briefly described in Table 16. The process was guided by the 'Intervention Mapping' approach (Eldredge et al., 2016) which combines one or multiple theories, practical evidence, and research to create behaviour change interventions. This approach follows the guidelines recommended by the Medical Council on how to develop and evaluate complex interventions to help explain and resolve a problem (Craig et al., 2008).

Table 15: Brief description of intervention development

Steps	**Brief description of each step**	**Details**
Step 1: Conducting an assessment	Developing an understanding of the problem and investigating why we need to make this change among the target population and how.	Conducting a systematic review to investigate postoperative pain management and accumulate evidence for the effectiveness of brief psychological interventions as a pain relief strategy (Chapter 3). Besides, systematic review findings helped in the decisions that were made later in the process of designing the intervention, e.g. the mode of delivery, the duration and the frequency of the

		intervention and the content of the intervention.
Step 2: Identifying determinants of the behaviour	Develop an understanding of what causes and influences the behaviour by identifying the reasons and factors that may explain it.	Conducting qualitative studies to investigate views, beliefs, and attitudes toward psychological interventions and explore the barriers that may facilitate or hinder the delivery of these interventions in practice (Chapters 4-7).
Step 3: Selecting appropriate behaviour change techniques (theories) and setting goals for the intervention plan	Selecting behaviour change techniques that could be employed to ensure the successful delivery of the intervention.	Several health belief constructs emerged through a discussion with both the general population and patients regarding the process of assessment. These helped identify the determinants of patients' behaviour towards psychological interventions. These are the main models and constructs of health belief that emerged during the process of assessment and data collection, which helped in designing the intervention: - Beliefs about psychological intervention; - Knowledge and information about psychological interventions; - Perceived of behavioural control and Self-efficacy. - Motivations to practice the intervention. In details, participants have negative beliefs about psychological intervention. Examples of their beliefs are that psychological intervention is not relevant to pain, these interventions are not effective, and

Participants revealed scepticism beliefs about these interventions such as these intervention supposed to be for people who are weak.
Some participants revealed a stoic approach dealing with their pain. These are mainly attributable to a lack of knowledge.
Positive and negative attitudes towards psychological interventions were expressed (e.g. like them, dislike them, accept them, do not accept them, psychological techniques perceived as not harmful…and so on)
Motivations and intentions to practise psychological techniques (negative attitudes towards medication for pain relief or previous bad experience with medication, good previous experience with psychological techniques for purposes other than pain, psychological techniques perceived as not harmful and so on
Perceptions of psychological techniques (effective or not effective, perceived stigma about psychological treatment…and so on)
Perceived behavioural control (some expressed the view that they like to be in control of their behaviour rather than being controlled by someone or something)
Self-efficacy (most participants expressed low confidence in their ability to practise psychological techniques, i.e. low self-efficacy).
All these beliefs have been targeted in the intervention by providing more information about the contribution of psychological

		interventions in acute postoperative pain, and how this should work in an introductory session and allow them to practice the intervention with the presence of the instructor in practical session to increase their self-efficacy.
Step 4: Drawing up the intervention plan	Sketching the outlines of the intervention based on the selected health behaviour theories/models	Description of the proposed intervention proposed plan in Table 17.
Step 5: Developing a practical plan for the intervention	Deciding upon intervention materials, methods of delivery, timelines, and evaluation of effectiveness.	Identifying the health belief constructs underpinning the behaviour of targeted patients, and in relation to a suitable health belief theory or model. Outlining the timelines, mode of delivery, and methods of evaluation. Taking into consideration resources and demands in healthcare setting.
Step 6: Evaluation	Communicate the intervention plan to relevant others. Views from patients with surgical experience were important in this respect.	Feedback on the initial design was obtained through a small qualitative investigation. Patients commented on several issues (see the results section in this chapter for further details) and the design was then updated. There comments helped ensure the plan was practical and feasible.

Intervention Materials

The proposed intervention was entitled "Pain relief exercise" (see Table 17). A summary of the intervention was written in a table and provided to participants so that they could read and comment on different aspects of the intervention.

Table 16: Proposed intervention for postoperative pain "Pain relief exercise"

Period of programme	Activities	Intervention	Delivered by	Where	Materials	Estimated frequency	Estimated duration	Notes
Day 1: (before surgery during the pre-assessment)	> Part one, is a one introductory, group session with the specialist to explain the components of the intervention in details. > Part two, is one group session to practise the intervention first with the specialist. And	Including three components: **1-** Pain education **2-** Progressive muscle relaxation exercises with musical background. **3-** Positive suggestion to relieve pain. In part two, an audiotape or CD of relaxation and positive suggestions for	A specialist in pain management	A suitable room at the hospital/ medical centre will be arranged for the presentation of the intervention material and the training. A copy of the intervention material will	An audiotape/CD of the intervention with or without headphones + A leaflet including some information about other ways of pain relief.	One session	Part one: 30 min Part two: 20-30 min	> This session designed to be a group session, as there is no evidence appeared from my data to consider this a barrier on the delivery of the intervention. > Musical background is optional depend on patient's preferences. > Leaflet could be presented as a poster if patient prefer this option.

	answer any related questions.	pain relief will be used.		be handed to patients to be taken home.				> The CD will be taken home to practise it as much as they could e.g. once a day. > Patients will be encouraged to bring their own device that they like to listen to the intervention content through…
Day 2: On Day of surgery)	A nurse will remind the patients to practise the intervention individually. Any time on the day before their surgery.	Self-administered audiotape/CD of relaxation and positive suggestions.	The patient	At a hospital or a medical centre. On the waiting room for the surgery.	CD with or without headphone (as patients prefer)	One session	20-30 min	> This session is important because it could be a long gap between the introductory session and the day of the surgery, to make sure they master the technique.

								> Patients will be reminded to bring their own device that will listen to the intervention through… If their copy not available (lost or forgotten at home), a spare copy machine too will be available for them.
Day 3: 1st post-surgical day.	A nurse will remind patients to practise on their own whenever they need to, at least once a day at any time.	Self-administered audiotape/CD of relaxation and positive suggestions.	The patient	In hospital on their bed.	CD with headphones.	One session minimum	20-30 min	

Day 4 2nd post-surgical day)	Doing the same activity as day 3 of the intervention.

Quotes relating to self-hypnosis, relaxation, and guided imagery were adapted from previous research (Lang et al., 2006) and provided to participants as examples to show what the intervention might look like (see Box 1).

Box 1: Quotes relating to self-hypnosis, relaxation and guided imagery.

Suggestion helps you concentrate on coping more comfortably. It is a way to help your body become more comfortable and of dealing with any discomfort or pain that may arise. It is simply another form of concentration, like getting so caught up in a movie or reading a good book that you forget this is what you are doing.
Here are some suggestions for relieving any discomfort or pain….
"…Now what I want to do is to show you how you can use your imagination to enter a state of focused attention and physical relaxation. If you hear sounds or noises in the room, just use these to deepen your experience. And use only the suggestions that are helpful for you. There are a lot of ways to relax but here is one simple way: On one, I want you to do one thing - look up. On two, do two things - slowly close your eyes and take a deep breath. On three, do three things - breath out, relax your eyes, and let your body float. One… two… three... That's right… just imagine your whole body floating… floating… each breath deeper and easier.... Soon you can imagine that you are floating somewhere safe and comfortable… in a bath… a lake… a hot tub… or just floating comfortably in space, each breath coming deeper and easier… You can notice how with each breath you let a little more tension out of your body… as you let your whole body float, safe and comfortable…"

"…now with your eyes closed and remaining in a state of concentration, you notice how your body is feeling right now. You can imagine where you would like to be… You can see what is around you… You can see the colours, the textures, the shapes, the patterns of light and shadow… You can smell the air… You can feel the temperature of the air… That's right… this is your safe and pleasant place to be… and you can use your imagination to help yourself now and in future moments…Your body has to be in the hospital… but you don't. So, you can just spend your time being somewhere you would rather be…"

"…If there is some discomfort in the body… you can admit this… and then you will discover that you can transform that sensation… If you feel some discomfort, you might find it helpful to imagine that part of the body feeling warmer… as if you were soaking in a warm bath, or as if you could feel the warmth of the sun on the skin... Imagine that you can spread warmth into that part of the body…"

"…If you feel some discomfort, you might find it helpful to imagine that part of the body becoming cooler… if it is more comfortable, as if you had ice or snow on that part of the body… or as if you can feel the coolness of the breeze on the skin. Imagine that you can spread coolness into that part of the body…. "

"…if you feel some discomfort, you might imagine another pleasant sensation spreading into the body, perhaps a sensation of energy or tingling... You can imagine that this warmth or coolness or other comfortable sensation can become a protective filter between you and any discomfort… These comfortable sensations can increase, more and more, with each passing breath and each passing moment… you can filter the discomfort out of the body… To feel comfortable…"

A credibility and expectancy questionnaire (CEQ) (Devilly & Borkovec, 2000), it is a quick and easy-to-administer scale for measuring treatment expectancy and rationale credibility for use in clinical outcome studies, the questionnaire consist of and measuring two components only, which are cognitively based credibility and relatively more affectively based expectancy. This questionnaire was completed by each participant included this study at the end of the interview to measure their expectations regarding the potential effectiveness of the intervention.

Sampling and Procedure for Qualitative Methods

Developing a health intervention to be delivered in primary care means considering patient's needs to ensure that the intervention is in their best interests. I therefore invited participants from the public (non-clinical sample) who had undergone a joint

replacement (hip, knee, or similar surgeries) to act as advisors to help ensure delivering a suitable, acceptable, and practical psychological intervention.

Participants were recruited from the general population in Plymouth, UK. The study was advertised in public places (café shops, public libraries, local gym, and so on.); additionally, participants were invited to take part through social media. Participation was voluntary, and each participant needed to a) be aged 18 and above, b) have experienced a joint replacement surgery or similar surgery, or are planning to have joint surgery, and c) be able to communicate verbally with the researcher and have no health complications.

Semi-structured face-to-face interviews were conducted with a total of 6 participants. Each participant was asked to provide written consent prior to the interview. The interviews then took place in a pre-arranged venue, which was either at their workplace or a public location (Plymouth Central Library) between March and November 2017. The duration of the interviews ranged from 20 to 52 minutes. All interviews were conducted in the English language and each interview was audio-recorded with prior permission from the participant.

Before commencing, the procedures used in the study were reviewed and approved by the Plymouth University Ethics Committee.

Interview Protocol

An interview guide was used that included open-ended questions and probes to encourage participants to describe their own opinions regarding the design of the intervention. Prior to the interview, participants were given a copy of the intervention design that they were then asked to read. They were reminded that they are only needed to provide their opinions and comments on the design and answer related questions (rather than practice the intervention). The interview was divided into different sections to simplify the process of analysis (see Table 18).

During the interview, participants were asked to describe their experience of pain and how they dealt with that experience. They were then asked to comment on the acceptability of the content and the different components of the intervention. In the final

part of the interview, questions concerning the practicality of the intervention were explored.

Participants were also encouraged to provide any suggestions they felt would improve the proposed design. All interviews were audio recorded and transcribed verbatim.

Table 17: Interview questions for the proposed intervention design.

Questions exploring the experience of pain.	Where is your pain? Have you had your surgery? What do you do when you are/were in pain?
Questions related to the acceptability of the intervention	What do you think of this intervention design and structure? e.g. practical, complicated, confused, easy to follow, clear, etc. Which part of the intervention (if any) do you think we need to improve? And why? Do you think practicing the intervention in a group session would be ok for most people? Can you think of any ways to make our intervention more acceptable for patients who may have some resistance towards psychological intervention? Is it the label of the intervention, is it the person who will introduce it to them, is it the level of evidence for the effectiveness of the intervention, etc.
Questions related to the components included in the intervention	What do you think of the structure or sequence of the components we have in place? Do you have any suggestions? In the 'Pain education' part, what sort of information should we focus upon? In the 'Relaxation' part, relaxation may include different techniques like progressive muscle relaxation, counting, or jaw relaxation, etc. Can you think what sort of relaxation techniques you or most people might prefer to try? Can you think of any examples/sentences or words, etc. that might encourage positive thoughts to relieve pain?
Questions related to the practicality/feasibility of the intervention	Which type of material or devices you do think most people would use to practise listening to the intervention content? (written script, audiotape, CD, smartphones, iPod, etc.)

	Would you be able/happy to download the content of the intervention on the devices you like e.g. smart phones? We suggest practising the intervention before and after the surgery. What do you think of this? What do you think of the time we have allocated to the introductory session? And the other training sessions in the intervention? In general, for what length of time do you think patients would accept practising the sessions before surgery? e.g. hours, days, weeks. After surgery, for how long do you think patients would carry on practising? How many times do you think patients would be able to repeat the intervention sessions per day without becoming bored? How long should each session last in minutes or hours to be acceptable/reasonable? Where do you think most patients would prefer to initially practise the intervention? At home, at hospital, etc. Whom do you think the most appropriate person would be to introduce the intervention to the patients? Is it comfortable to use headphones/earphones when practising?

Data Analysis

A thematic deductive approach was used to identify potential patterns and themes related to the intervention contents, design materials, etc. this approach was used because the aim of this qualitative study is to find support to specific themes and labels, which were identified from the qualitative studies presented in previous chapters in this project. An inductive approach also was used in the way that can help to identify more new patterns or themes may appear from the transcribed interview data. NVivo software (version 11) was used to support the analysis. The researcher (TA) created a preliminary list of noteworthy quotations from each transcript. A list of potential themes that emerged from the data was then created. These themes were reviewed and discussed with the academic supervisor until an agreement was reached on the coding list that best reflected the data.

The analysis focused on participant's views and opinions regarding the acceptability of the intervention content, the practicality of the delivery, and the feasibility of the proposed design.

In the analysis of CEQ, descriptive statistics (median and IQR) were obtained to summarise participants' responses to each item. Participants' highest score in response to the CEQs or items 1, 2, 3 and 5 was nine, and the lowest score was 1. Participants responded to CEQs or items 4 and 6 by indicating, as a percentage, the extent to which they agree with the questions (100% was therefore the highest score and 0% the lowest).

Findings

Demographic Characteristics

A total of 12 participants were contacted, but only 6 agreed and consented to take part in the study (Table 19). Participants were aged between 30 and 68 years old, all were White British, and most were unemployed. Most participants experienced pain in both knees, with one person experiencing pain in one knee only. Three participants were waiting for a knee replacement; of these, one was also waiting for an ankle replacement. Those who had had surgery (one amputation and two knee replacement surgeries) were no longer in severe pain.

Table 18: Characteristics of patients participated in the discussion of the intervention's design
(N= 6)

Age in years (median, IQR)	(62.5, 49.25 – 65.25)
Gender (female %)	3 (50%)
Marital status	N
Married	5
Single	1
Level of education	
< High school	4
≥ High school	2
Employment status	

Employed	2
Unemployed	4
Had surgery	3
Waiting for surgery	3
Currently in pain	3
Location of pain	
Knee	4
Amputation	1
Ankle	1

Summary of the General Themes

Initial analysis of the data revealed several distinct themes. These were categorised according to the following sequence.

Intervention Structure

Participants expressed positive views on the structure of the intervention. They described it as simple, clear, and easy to follow.

> *"…I think it's actually a good idea... it's easy to follow…"*
>
> P3 female

> *"…it's clear. Very clear."* P5 male and P6 female

> *"… I think this is really good."* P4 female

> *"… Well you're structuring it… I think the relaxation bit would come in- that could be quite early on couldn't it, because if you put people at ease and they can relax, they're probably more open to other suggestions and if they're relaxed, if they've just come in, they're quite tense and they're uptight and they're you know, they're a bit agitated, that would be difficult to get anything other than that, so the relaxation would probably be the first step. And then it was positive thoughts…"*

P2 male

"…you could do two hand in glove [his way of expressing and explaining that the intervention structure and the components are acceptable and manageable] in there, don't they, because you can do the relaxation bit, you can be sat down or laid on a bed or whatever, you could have headset on and then the positive thoughts could be coming through there as could the music as well, so you're getting two things at the same time, at least two things…"

P2 male

Intervention Components/Content

Pain Education

Participants clearly emphasised the importance of pain education. They implied this should include evidence of its effectiveness and examples of how they can practise.

"…Definitely more information on how it [hypnosis/positive suggestions] works and what it's mainly trying to achieve, that'd be helpful…Not even having it done before… First time for them, and it's also a little bit frightening" P5 and his wife expressed that "Yeah. I'm a bit much the same as Johnny [her husband's name] really, but it's not knowing, that's what you need, so if you got like a bit of information insight to it."

P6.

"…I don't really know about that [intervention components and structure]. Because people are different. Some people will accept it and some people won't… I do think that seminars would be logical because then it would bring people from different walks of life together and they can…they could discuss what their pains are. You know, and that type of thing [their preferences]"

P1 male.

"So if these people are you know, they going to have the operation, they've been told there's no other option like me, I've been told to go away all the time, so I think, I don't know, I feel like could've been told a little bit early I've had to manage it, but for the day one before that, if somebody's going in to surgery, they're not aware of, well, and mindfulness and stuff like that, it might be, "Oh,

what's all that about?" That's the thing. I think if you're educated in like mindfulness and relaxation, then this would come- make sense to me, it does."

P4 female

One participant, although initially sceptical, stated that he might change his mind about these techniques when presented with evidence or proof of their effectiveness.

"…I don't know how you go down or how you'd actually finally convince someone apart from showing them examples if you had you know, if you've had people that come in to you and got video tapes of them having a relaxation session, and you get sort of a feel for how much pain they're in at the beginning of the session, and then you'll feed back at the end, came back and they said, "Well actually, it does feel better. I do feel better for it." That kind of thing might encourage people. They need to see examples don't they, I'm a sceptic like that with hypnosis, I don't think- I don't believe anyone could hypnotise me, never had it tried, but I don't think they could because they pick certain people that they got to be really- either be really into it, and I'm sceptic about all of these kind of things"

P2 male

"Proof that this kind of things do work. Everyone likes to think that if- what it is, these people that they do like, ghost hunting and things like that, and they think they've seen things, I need to have that proof myself, these people that sort of say they can talk to dead people and things like that. I'd have to be there and they will have to give me the exact information about someone that I know very, very well, that no one could possibly know and then I will believe. So, it's the convincing thing, it's how you convince."

P2 male

Relaxation Techniques

When asked to comment on the most popular or preferred techniques of relaxation, all participants stated that people's choices differ and a few of them gave examples of the techniques they prefer to engage in or practise.

"Well in my own…myself, when I was in London I used to do…we used to sit in a chair and just relax and think nice thoughts, you know? And like I say, I used to have this dolphin tape that I used to listen to…"

P1 male

"*Probably, music of some sort actually... Unlike the body relaxation, I think that would be good actually, the full body one...*"

P3 female

"…I don't really know about that [intervention components and structure]. Because people are different. Some people will accept it and some people won't… I do think that seminars would be logical because then it would bring people from different walks of life together and they can…they could discuss what their pains are. You know, and that type of thing [their preferences]"

P1 male.

When asked about the relaxation techniques that would be acceptable to most patients, one participant suggested making this the patient's choice.

"I think you have to put it out there what they could possibly have, what method might suit, and then they could suggest or select, "I'd like to try this way." So that way they're included from the start and it's their judgement as well rather than being told. This is the best way… Some people don't like that do they?" "They like to think, "Right. Okay. Now those are the options, can I try to do this?" And make it their own choice…."

P2 male

Positive Suggestions

Participants expressed their interest in the positive suggestions that were presented to them as examples.

"…That sounds good…" P5 male

"…It's all like switch yourself off…" P6 female

"I think it's amazing and I tell you something, I'd love to go and take some of these and try them on my husband for his neck pain…"

P4 female

However, one participant expressed his fears about hypnotic techniques; he explained that this was due to what he had seen presented on TV.

> *"…I've got reservations about how it worked. I don't know. I think just because I've seen programmes with hypnotics, it frightens me a little bit so… I don't think I would like the hypnotic… I've always been a little bit… I mean, when we watch these programmes … and the man then gets me to do things, I've always been a bit sceptical of that. (Laughter)"*
>
> P5 male

Additionally, when asked to suggest any positive thoughts that might be helpful, no one could think of any helpful suggestions.

> *"…I can't think of anything at the present moment, I'm sorry. Only with my own experience, I listened to tapes. I listened to soft music. You know, and relaxing deep breathing type of thing…"*
>
> P1 male

Intervention Labelling

Only a few participants commented on the labelling of intervention when asked to provide their suggestions.

> *"…Anything with that type of heading [psychological], that would put me…"Oh, psychology. What do they want…" either they've spotted something that I've said or done or I don't know what you could use, and it's the intervention isn't it… use something cuddly. I really don't know, but that's a difficult one because anything to do with medical things tend to become slightly technical aren't they, and it's a giveaway in the name then, it's something a little bit more involved, I think simplify it really… I have to get up on some thought."*
>
> P2 male

> *"Probably just pain* management*. I would've thought would have been… yeah, I think."*

P6 female

Intervention Practicality

Intervention Materials:

A few participants expressed their preferences about the type of materials they would like to use in conjunction with their training, such as tapes, smartphones and headphones.

> *"…think you'd need like headphones and it needs to be really quiet because if you're in a ward obviously. (chuckles)… I think that would be good."*

P3 female

> *"…you could have head set on and then the positive thoughts could be coming through there as could the music as well …"*

P2 male

Participants were asked if it would be helpful to have a script of the intervention or whether they would prefer to just listen to the instructions on a CD. Some felt it would be helpful to have a script while others said that it depends on the individual's personal circumstances. Overall, they preferred to hear the instructions from a professional or CD rather than just reading them.

> *"…actually, maybe somebody actually talking to them like a professional, you know, explaining because I think it's always better when it comes from a person, it's human, you know, it's got a bit more of a… I don't know, like a special touch to it."*

P3 female

> *"…It depends. I think audio would be a better message. Some people do struggle with reading don't they, some people have a problem… So, there could be an issue. But if it's being told to you, it's easier to take on-board and you just can sit back and relax."*

P2 male

Participants were also asked to comment on the material that would be used in the intervention, consisting of either traditional means e.g. tapes and CDs, or more contemporary means e.g. smartphones (downloading an app). Participants expressed different views regarding this point. Some said that it depends on the generation the patient belongs to (older or younger).

> *"…I think younger patients are probably more accepting of things like that and I think possibly older people are very closed-minded and they don't want to know that…"*
>
> P3 female

> *"I don't know. I mean, majority of people that go for these operations are older anyway, I mean, a lot of them are- we look at it now, you know, if it was like, when a parent going for it, who's in her 60s, maybe 70, she wouldn't understand like when you put- download on your phone, I mean, my mum's got a phone that's ancient, they won't get that, so with tape or CD to them would be a lot easier to me. I wouldn't have anything to learn, unless if you get the stuff to go with it. I won't have anything, so I think for me, if you could, I don't know, CD would be all right I suppose you could do that."*
>
> P4 female

Other participants reported that they prefer traditional methods using tapes and CDs because they are not good at memorising details.

> *"…Audio tape, if you'll ask me… I'm an audio tape person myself, CD… Hopeless with phones. Hopeless with computers. … I can't keep things in my head. I don't know any of my grandchildren's dates of birth or birthdays. I don't know the boys' birthday, I just- I've got a problem I just can't keep anything in my head…"*
>
> P5 male

> *"…I just think CD would be right. CDs, yeah…"*
>
> P6 female

Intervention Times and Session Frequency

Participants commented on the time allocated to each session and the frequency with which each intervention was to be practised. All participants agreed that 20 – 30 minutes was a reasonable amount of time for each session, except for one participant who stated that:

> "…the five minutes is quite a long time, if you sit down and do something for about five minutes, perhaps that might be enough to get you started, the relaxation bit, that sounds really good… so I will be totally relaxed, so I wouldn't be open to any other suggestion then would I, because I would be unconscious", *P2 male.*

However, only one participant suggested that patients who had not practised this type of technique before might need more time to focus and learn how to carry out the technique properly.

> *"I think that will be enough [20 -30 min]. What I keep thinking of I've got to think of people that wouldn't- you've never done this sort of thing before, so for a minute, they're not going to be thinking and concentrating because they're probably going to be thinking, "what the… am I doing?" As they would feel, "Well this is not going to work." So, it's how they get that out of their head and practice it and actually relax, and realise what's going on, that could take a good 10, 15 minutes to actually…"*
>
> P4 female.

In terms of frequency, most agreed that practicing the intervention at least twice a day (once in the morning and once in the afternoon or the evening) would be sufficient.

> *"Possibly two or three times. You could do it first thing in the morning, then you can go in after lunch and do it, and then you can do it before you go to bed. You know, that type of thing. Perhaps help you get a better sleep. Because, you know, if you lie down and even listen to the music you can always do it while you're in bed, you know, and do the breathing and think of good thoughts and have some quiet music on, you know? Because it will only take about 15 or 20 minutes, say half an hour at the most…"*
>
> P1 male

"…I think morning is the worst time, I think that's when you should do it. Pain is a lot worse sometimes more in psychological pain and physical pain. Whenever you feel that you could really, if you got the time, if you're off because you've had this operation, I could do it all day, but again, in the afternoon, and definitely in the evening I think. Two or three times a day, two definitely at the times of day to go to sleep, and also if you wake up at the night with pain, why not do it then as well."

P4 female

"...not once, maybe twice a day… At the moment, we are not doing nothing… Definitely once or twice…"

P5 male

One participant suggested that people should prepare a plan so that they are more committed to practising and do not get confused.

"…I suppose you'd have to try and get some kind of pattern to it to make sure that you did follow it, so whether it be you know, I'm going to do an hour in the morning, at 9:00 or 10 minutes in the morning at 9:00, and I'll do it again at 1:00, and I'll do it again at 5:00, and you can plan out- you'd have to have some kind of plan, otherwise, they will just drift wouldn't they?"

P2 male

Only one participant commented on the length of the introductory session. She thought that having just one session before surgery would be insufficient to prepare patients to practise this technique properly.

"I personally think it could be a bit longer, I just think that maybe an hour before the surgery is not long enough. I think people are going to be quite anxious and I think possibly it could be a span of a few weeks of sessions, if you know what I mean. To prepare them, basically…"

P3 female

Another participant implied that patients needed more than one session so that they could become familiar with other pain relief approaches they may wish to practise.

"so if these people are you know, they going to have the operation, they've been told there's no other option like me, I've been told to go away all the time, so I think, I don't know, I feel like could've been told a little bit early I've had to manage it, but for the day one before that, if somebody's going in to surgery, they're not aware of, well, and mindfulness and stuff like that, it might be, "Oh, what's all that about?" That's the thing. I think if you're educated in like mindfulness and relaxation, then this would come- make sense to me, it does."

P4 female

It is apparent that participants have discussed the proper time in which to practise the intervention and the frequency of the sessions per day regardless of whether this would be before or after the operation.

Who Should Help in the Delivery of the Intervention?

Most participants expressed different views on who should help deliver the intervention. While a few suggested that their doctor should explain the different types of pain management approach, others felt that a nurse, psychologist, or occupational therapist might also help in this regard.

"…I think it should be the consultant first and he should be able to tell them exactly what's happening and not tell them a load of rubbish. You know. And it can come down to the doctors or the nurses and they could say we've got a session of such and such this particular day, would you like to attend? You know, that type of thing…" then he continues "…I think it should be… is it a psychologist that would look at that type of thing"

P1 male

"… for me would be helpful, if it was the surgeon who like I said, I have trusted my life to this man, if he's saying, Look, this might be very good for you, I would take his word and his judgement on that…"

P2 male

"I think a professional, a health professional of some sort, maybe even like an occupational therapist because, you know, they're quite in touch actually, more than the doctors are with the patients."

P3 female

Credibility and Expectancy Questionnaire (CEQ)

Analysis of the CEQ (Table 20) shows that participants reported higher credibility and expectancy regarding brief psychological interventions designed to reduce pain. Participants reported the credibility of the intervention as being above the midpoint. For item 1, 'how logical the intervention is', the median score was 7, (IQR range 7 - 8.5). For item 2, 'how successfully the intervention will be', the median score was (7, IQR range 7 - 75). For Item 3, which measured how confident they were in recommending the intervention to someone suffering the same experience, the median score was 7 (IQR range 6.25 – 7.75).

Participants' expectations about the potential outcomes of the intervention exceeded the midpoint of the scale (50%). For item 4, 'how much improvement will occur after the intervention', the median score was 60% (IQR range 50% - 77.5%). For Item 5, which asked whether the intervention would be helpful in reducing their pain, the participants' median score was 7.5 (IQR range 7 – 8.75).

Table 19: Participants' credibility and expectancy scores

Items	**Participants (Gender)**							
	P1 (M)	P2 (M)	P3 (F)	P4 (F)	P 5 (M)	P6 (F)	Median (IQR)	CEQ Highest-lowest scores
1- Logical intervention	9	7	7	9	6	7	7 (7 – 8.5)	9 - 1
2- Successful in reducing pain	8	7	7	8	5	7	7 (7-7.75)	9 - 1
3- Confident in recommending it to someone else	8	7	6	7	5	8	7 (6.25-7.75)	9 – 1
4- Improvement will occur after the programme	90	50	50	70	40	80	60 (50-77.5)	0% - 100%

5-	How much do you feel it would help you to reduce your pain	9	7	7	9	4	8	7.5 (7-8.75)	1 – 9
6-	How much improvement do you feel would really occur	90	50	50	70	40	80	60 (50-77.5)	0% - 100%

Discussion

In this chapter, the development of a brief psychological intervention to improve postoperative pain management was described in detail. The design was partially guided by the intervention mapping approach for health promotion (Eldredge et al., 2016). The intervention was developed using evidence from previous research and from two distinct perspectives; the non-clinical population's views and clinical population's views, the latter being the target population for this intervention. Combining different approaches (theories and patients' perspectives) to develop my intervention may help provide effective support to patients who suffer from acute postoperative pain. Most of the barriers to delivering a brief psychological intervention were internal factors (health belief-related barriers). These beliefs could be better understood and changed through an application of one or more health belief theories/models. Additionally, gathering information from patients to refine the design helped ensure the practicality and feasibility of the intervention in addressing patients' needs, which was one of the main strengths of this research.

The interviews with patients raised an issue that may be considered a barrier to delivering the intervention in a clinical setting. This is that patients believe the intervention needs to be explained or recommended by their HCPs, especially their doctors. However, HCPs (see chapter 7) feel that they do not have time to spend discussing this approach (a psychological technique) with patients, as this is someone else's responsibility, i.e. psychologists, and they are already overloaded with work. It is possible to overcome this problem by designing a brief educational workshop, supported by scientific evidence, which can be delivered prior to introducing this technique to

patients. This educational workshop should be designed for HCPs to enhance their knowledge of the efficacy of non-drug interventions, including brief psychological interventions used as part of postoperative pain management.

This proposed intervention was designed to be delivered in the context of primary care, where patients normally receive treatments for acute surgical pain. This means that the intervention design is not suitable to be delivered in GPs. The data from HCPs' study revealed that the current practices of the UK and SA to manage surgical pain seemed similar in terms of pharmacological treatments. Both settings are following strict protocol and normally follow this protocol without deviation as specified in HCPs' study. The application of other non-pharmacological treatments such as physical treatments is part of the pain management protocol of surgical pain, compared to psychological treatment, which is an uncommon treatment to be included in surgical pain management. Educational sessions which are a form of psychological interventions that normally provided to patients prior to their surgeries; however, these sessions are not popular among patients, because of a number of reasons either patient believe that these sessions are not important or these sessions not recommended by their doctors. This creates one of the challenges for delivering the proposed interventions to surgical patients. Another challenge is the limited knowledge of HCPs in the effectiveness of psychological treatments in the context of postoperative pain management. In addition, resource allocations and time could be a challenge to implement any healthcare intervention; however, this is not an issue with my proposed intervention because it is designed to be cost-effective and accessible any time as needed.

However, there are some issues or limitations that need to be addressed before delivering the intervention. Firstly, the number of participants who participated in the interviews to help refine the proposed intervention plan was small. Although participants responded positively to the plan and helped to clarify several details related to the introductory session and mode of delivery, this intervention should ideally be evaluated with a larger group of patients or with a focus group to facilitate the exchange of a greater range of ideas and to enhance the overall discussion. This will then provide an in-depth evaluation of the intervention that one-to-one interview sessions may not provide. Moreover, my evaluation did not include piloting the intervention with patients in a

clinical setting; however, this research is only an attempt to provide a tool that may help in understanding patients' behaviour towards psychological interventions. Understanding their beliefs and attitudes towards interventions is simply the first step in the implementation of brief psychological techniques in primary care. Another limitation is that the evaluation of the intervention plan was provided exclusively by patients; although this was valuable, additional perspectives from HCPs might lead to further improvements in the design. For example, by refining the timelines of the intervention.

In conclusion, I have developed an initial plan for a brief psychological intervention targeting acute postoperative pain relief that incorporates evidence from previous research and from my own data. The main outline of the intervention is as follows; the intervention, known as a 'pain relief exercise', will be introduced to patients in a pre-op assessment during an introductory session to familiarise patients with the technique. The introductory session should last for an hour and include both theoretical and practical parts. The theoretical part will be at the start of the session where all patients in attendance will be educated to increase their awareness of psychological interventions as potential complementary treatment for pain relief. The practical part will be delivered in the second half of the introductory session and will involve hands-on practise of the technique where patients will be provided with suitable materials to conduct the exercise. When evaluating the practical aspects, patients expressed their need to rehearse more than once before the day of admission so that they could master the technique by themselves and ask any questions they may have. The main components of the intervention are pain-education, relaxation, and positive suggestions. Chapter 2 highlighted the importance of labelling the intervention; therefore, when evaluating this issue, participants expressed their acceptance and comfort with the suggested label for my intervention, also, for the positive attitudes towards the components included the intervention plan.

Although patients did not propose any additional thoughts related to the positive suggestions, they generally provided positive feedback on the main components of the intervention and on the script that was presented to them. Patients revealed different preferences regarding the use of materials such as 'audio-tape, CD, or smart devices such as iPhone or iPod, etc.' during the delivery of the intervention. Most agreed that using

smart devices would be more practical and convenient, although a few expressed a preference for using audio-tape (mostly older patients). Thus, the mode of delivery should be adapted to patients' personal needs or preferences.

Re-evaluating the intervention by including other additional perspectives will enhance the proposed design of the intervention. Furthermore, piloting the intervention will be an important step in ensuring the feasibility and the practicality of this intervention prior to its implementation in clinical practice.

Chapter 9 - General Conclusion and Recommendations

The initial aim of the thesis was to examine the effectiveness of brief psychological interventions in postoperative pain among adult patients underwent different surgeries. This was achieved, firstly, by conducting a systematic review including clinical randomised controlled studies only. From the findings of the systematic review, it was identified that brief psychological interventions were effective in reducing the intensity of postoperative pain on the 24 hours. Furthermore, it was found that these interventions were effective to reduce the level of anxiety after surgery. However, results did not confirm the effectiveness of brief psychological interventions in the consumption of morphine equivalent among patients. There was also no enough data to compare the effectiveness of different techniques of brief psychological interventions, i.e. relaxation or positive suggestions is useful for postoperative pain relief. Also, insufficient evidence was available to confirm a number of practical issues related to the intervention design such as the ideal time duration (duration of each session by minutes or hours) to practise the technique, and the practical frequency (number of times a patient should practice techniques) to exercise the strategy to gain better outcomes from the intervention.

Following the findings of the systematic review, the second aim was to explore the potential barriers to implementing brief psychological interventions in clinical settings from different perspectives, including patients and HCPs. At this stage, the acceptance of brief psychological strategies was explored among the general population who had various pain experiences to gain a better understanding and draw expectations of general population's views and attitudes toward these interventions. The participants at this stage added valuable insight to the project and established some barriers towards these interventions. They expressed their general acceptance to non-pharmacological techniques including brief psychological interventions as pain relief strategy. Findings also indicated their spontaneous practice of these strategies such as distraction and relaxation techniques as pain relief methods. Additionally, they reported the risk of drug treatment and their intention to reduce the amount of their consumption of these drugs

as much as they could. However, the common main barriers that mentioned by participants which could pose a challenge in delivering these interventions into clinical settings were ‘Scepticism’, ‘Lack of confidence/self-efficacy’, and ‘Prejudice related to psychological treatment’.

Outcomes from the patients’ study confirmed the general population’s views’ and the potential barriers to delivering these interventions that have been revealed by general population responses. The most frequent barriers to practising brief psychological techniques as postoperative pain relief revealed by patients were internal barriers such as scepticism, which often corresponded with a lack of knowledge either of current scientific perspectives on pain, i.e. "pain is physical not mental" or on the nature of the techniques themselves. The severity of pain, lack of self-efficacy, and stigma related to psychological treatment were also internal issues revealed by for some patients. Patients also emphasised the importance of the role of healthcare professionals’ in recommending and aiding the implementation of brief psychological techniques. Furthermore, exploring the cultural influence among UK and SA patients’ towards brief psychological pain relief strategy did not detect significant variations between both cultures, although a more significant role was found for religious practice among SA patients, which could direct their preparation and expectations.

Results of HCPs’ views on brief psychological interventions revealed the significant role of scientific research to support the effectiveness of brief psychological interventions as pain relief techniques, which indicates their endorsement to scientific research. It also may imply their lack of knowledge regarding the current evidence related to the effectiveness of a brief psychological intervention to be part of postoperative pain management strategy. Furthermore, there were no significant variations in the practices of postoperative pain management between UK and SA HCPs; also no substantial differences in their views and attitudes toward brief psychological interventions as postoperative pain relief methods.

Findings from previous chapters of this project have contributed to developing outlines of a plan for designing an intervention for postoperative pain relief. The intervention outlines were shaped by previous research findings from my analysis (systematic review and qualitative studies with general population, patients and HCPs) and by conducting qualitative one-to-one interviews with a small group of patients to evaluate the proposed design with regards to the acceptability, practicality and feasibility of the intervention (structure, components, materials and mode of delivery, etc.). The overall views regarding the evaluation from participants were positive and acceptable by patients. Although participants clarify some aspects of the intervention such as mode of delivery and the content of the intervention, more discussion with a large group of patients in a focus group might enhance other aspects of the intervention plan design such as the way of measuring the intervention and their preferences and expectations.

Critical Appraisal of the Project

Despite the large contribution of this project to our knowledge and understanding of the attitudes and beliefs on psychological interventions for pain relief, there are several limitations of the project that should be acknowledged.

Findings of the systematic and meta-analysis reviews managed to confirm the positive effects of brief psychological interventions on postoperative pain and anxiety. However, the review suggested that conducting further research that investigating the effectiveness of brief psychological interventions should provide sufficient information to enable the accurate assessment of the quality of the randomisation methods in the studies, which will affect the judgement and the quality of the studies' findings. Further, self-hypnosis intervention was not identified in the review, this is possibly attributed to the inclusion criteria which specified that eligible self-hypnosis intervention should be in the context of surgical procedures and have at least 6 hours follow-up, but available studies did not meet these criteria. Moreover, the available data from the review did not answer some of the raised questions. For example, available data could not determine the differences between these psychological techniques (relaxation, or music) on pain scores, and which of these techniques would have the largest effect on postoperative pain scores. Also, the

available data did not allow measuring the impact of brief psychological interventions on other outcomes such as the effect of psychological treatment on the side effects of medications or pain during other activities, i.e. walking, standing, etc.

Despite the various pain experiences included in the study of general population's views on pain relief, this research has explained the reality for people on the ground and highlighted some considerable barriers might affect the delivery and the implementation of brief psychological techniques as a complementary method of pain relief such as labelling and lacking knowledge. Labelling of the psychological intervention is an important issue that emerged from these data, which may consider a barrier to deliver these interventions as part of pain management protocol. This is because of the stigma surrounding the concept of psychological treatments and their lack of knowledge about these approaches to pain relief. Therefore, it is suggested that using more appealing or acceptable name for the intervention with providing informative intervention to patients are important before the implementation would ensure a successful delivery in clinical practice for example in the UK clinical setting. Moreover, despite the relying on descriptive analysis to explain data of the survey study, findings highlighted the acceptance of combining approaches of pharmacological and psychological pain management as pain relief.

Exploring patients' views on psychological interventions at three different time points (pre-op, post-op and follow-up after discharge) did not explain many variances in their beliefs and views on pain management among these phases. This is likely because patients sampled at each phase were different, which make it difficult to track any changes in their responses. However, data revealed from this qualitative study allowed identification of cultural factors and more health beliefs constructs, i.e. self-efficacy as additional barriers to delivering these interventions as part of pain relief strategies in the clinical setting. Therefore, the plan of delivering brief psychological intervention should be tailored to patients' beliefs, preferences and their cultural/religious backgrounds.

Beck et al., (2010) define tailored interventions as 'targeted interventions as those designed to address a single characteristic of a group such as age, gender, diagnosis, or

ethnicity, or multiple group characteristics such as cognitive impairment in the elderly'. In this PhD project, the intervention designed or tailored to target patients undergoing surgeries (the targeted group), with respect to their beliefs and preconceptions on psychological interventions and ethnicity diversity. Targeting this population would help in supporting the protocol of postoperative pain management, and could benefit various population worldwide

Furthermore, despite the limitations of the qualitative study included the HCPs such as the short period of the interview time due to their workload schedule, which may distract them while conducting the interview, the study addressed an essential issue which seems to influence the delivery of the intervention. It is that their lack of knowledge about brief psychological interventions to be used as pain relief strategies and they required more scientific evidence for the effectiveness of these interventions. This also should be considered in delivering my intervention, because patients put much weight on brief psychological intervention, if their HCP recommends it. Delivering specific intervention plan that targeting HCPs' knowledge and attitudes towards brief psychological interventions may be required to be delivered prior to my intervention plan to elevate HCPs' understanding of psychological interventions for pain relief approaches and ensure that patients would be able to explore more pain relief methods.

General Recommendation / Implications

There are several recommendations, which could assist in the improvement of postoperative pain management protocol and practice. Here a summary will be presented to address some recommendations for possible further research and practice.

Recommendation for Research

In line with the limitations that were revealed from my research, further research might be considered.

- Conducting longitudinal research that to explore the influence of patients' beliefs and attitudes towards brief psychological interventions through the three different phases (pre-op, post-op and follow-up) might contribute to understanding the impact of patients' emotions, the role of their expectations or the level of pain to their views toward these interventions. Also, it might contribute to their acceptance of these interventions.
- The available data from participants did not allow investigating the possible effects of gender or age in the acceptability of brief psychological techniques as pain reliefs.

Researchers have noted the great influence of age and gender characteristics on health related behaviours (Deeks et al., 2009). Moreover, these characteristics were found to play a significant role in pain perceptions (Pickering et al., 2002) and pain expectations (Wandner et al., 2012).

Therefore, further investigation might consider examining the role of gender and age as possible barriers or facilitator to implementing these techniques.

- Evaluating the intervention plan with a large group of patients and with focus groups may allow gaining more insights and depth exploring and clarifying other aspects of the intervention through discussion between group members rather than discuss it in a one-to-one session.
- Consider piloting the proposed intervention design may provide practical implications for the intervention and might provide support to the findings that revealed by my meta-analyses.

Recommendations for Practice

This project has outlined the different approaches that adult patients may use to reduce the intensity of pain experience, included using aspects of brief psychological techniques spontaneously such as distraction and relaxation. Additionally, it has outlined potential barriers, which may influence the implementation of these techniques as postoperative

pain relief method. Therefore, to facilitate an intervention for this group of patients, the following issues are highlighted:

1) Intervention packaging consideration. This research found that stigma related to psychological treatment was one of the leading barriers, which may impact the delivery of brief psychological pain relief interventions; therefore, labelling the intervention should be considered to make patients more accepted to the intervention.
2) Awareness sessions and intervention practising. Findings of this research indicated the lack of patients' knowledge of the meaning of pain might influence their acceptance to other pain relief approach including psychological intervention, which affects their self-efficacy to practising these strategies. Therefore, attending sessions that aim to raise their knowledge and enhance their experience and practice are essential to be added to the protocol of pain management.
3) Enhance healthcare professional knowledge on pain management. This research found that HCPs endeavour scientific research that supports the effectiveness of brief psychological interventions, also patients consider doctors their most reliable source of information to follow any medical treatment or advice, which indicate the significant to increase HCPs' awareness with the benefits of brief psychological approaches on pain relief and potential enhancement to other surgical outcomes.

Reference

Reference of included studies of the systematic review (*studies not included meta-analysis):

Block, R. I., Ghoneim, M. M., Sum, S. T. P., & Ali, M. A. (1991). Efficacy of therapeutic suggestions for improved postoperative recovery presented during general anesthesia. *Anesthesiology*, *75*(5), 746–755.

Chen, H., Chen, T., Huang, C., Hsieh, Y., & Lai, H. (2015). Effects of music on psychophysiological responses and opioid dosage in patients undergoing total knee replacement surgery. *Japan Journal of Nursing Science*, *12*(4), 309–319.

Cutshall, S. M., Anderson, P. G., Prinsen, S. K., Wentworth, L. J., Brekke, K. M., Li, Z., … Bauer, B. A. (2011). Effect of the combination of music and nature sounds on pain and anxiety in cardiac surgical patients: a randomized study. *Alternative Therapies in Health and Medicine*, *17*(4), 16.

*Daltroy, L. H., Morlino, C. I., Eaton, H. M., Poss, R., & Liang, M. H. (1998). Preoperative education for total hip and knee replacement patients. *Arthritis & Rheumatology*, *11*(6), 469–478.

Dawson, P. R., Van Hamel, C., Wilkinson, D., Warwick, P., & O'connor, M. (2001). Patient- controlled analgesia and intra- operative suggestion. *Anaesthesia*, *56*(1), 65–69.

*Doering, S., Katzlberger, F., Rumpold, G., Roessler, S., Hofstoetter, B., Schatz, D. S., … Innerhofer, P. (2000). Videotape preparation of patients before hip replacement surgery reduces stress. *Psychosomatic Medicine*, *62*(3), 365–373.

Good, M. (1995). A comparison of the effects of jaw relaxation and music on postoperative pain. *Nursing Research*.

Good, M., Anderson, G. C., Ahn, S., Cong, X., & Stanton- Hicks, M. (2005). Relaxation and music reduce pain following intestinal surgery. *Research in Nursing & Health*, *28*(3), 240–251.

Good, M., Anderson, G. C., Stanton-Hicks, M., Grass, J. A., & Makii, M. (2002). Relaxation and music reduce pain after gynecologic surgery. *Pain Management Nursing*, *3*(2), 61–70.

Good, M., Stanton-Hicks, M., Grass, J. A., Anderson, G. C., Choi, C., Schoolmeesters, L. J., & Salman, A. (1999). Relief of postoperative pain with jaw relaxation, music and their combination. *Pain*, *81*(1–2), 163–172.

*Good, M., Stanton- Hicks, M., Grass, J. A., Anderson, G. C., Lai, H., Roykulcharoen, V., & Adler, P. A. (2001). Relaxation and music to reduce postsurgical pain. *Journal of Advanced Nursing*, *33*(2), 208–215.

Graversen, M., & Sommer, T. (2013). Perioperative music may reduce pain and fatigue in patients undergoing laparoscopic cholecystectomy. *Acta Anaesthesiologica*

Scandinavica, *57*(8), 1010–1016.

Hansen, M. M. (2015). A feasibility pilot study on the use of complementary therapies delivered via mobile technologies on Icelandic surgical patients' reports of anxiety, pain, and self-efficacy in healing. *BMC Complementary and Alternative Medicine*, *15*(1), 92.

*Hattan, J., King, L., & Griffiths, P. (2002). The impact of foot massage and guided relaxation following cardiac surgery: a randomized controlled trial. *Journal of Advanced Nursing*, *37*(2), 199–207.

*Hook, L., Songwathana, P., & Petpichetchian, W. (2008). Music therapy with female surgical patients: effect on anxiety and pain. *Pacific Rim International Journal of Nursing Research*, *12*(4), 259–271.

LaMontagne, L., Hepworth, J. T., Salisbury, M. H., & Cohen, F. (2003). Effects of coping instruction in reducing young adolescents' pain after major spinal surgery. *Orthopaedic Nursing*, *22*(6), 398–403.

LaMontagne, L. L., Hepworth, J. T., Cohen, F., & Salisbury, M. H. (2003). Cognitive-behavioral intervention effects on adolescents' anxiety and pain following spinal fusion surgery. *Nursing Research*, *52*(3), 183–190.

*Lebovits, A. H., Twersky, R., & McEwan, B. (1999). Intraoperative therapeutic suggestions in day-case surgery: are there benefits for postoperative outcome? *British Journal of Anaesthesia*, *82*(6), 861–866.

Levin, R. F., Malloy, G. B., & Hyman, R. B. (1987). Nursing management of postoperative pain: use of relaxation techniques with female cholecystectomy patients. *Journal of Advanced Nursing*, *12*(4), 463–472.

Li, Y., & Dong, Y. (2012). Preoperative music intervention for patients undergoing cesarean delivery. *International Journal of Gynecology & Obstetrics*, *119*(1), 81–83.

*Manyande, A., & Salmon, P. (1998). Effects of pre-operative relaxation on post-operative analgesia: Immediate increase and delayed reduction. *British Journal of Health Psychology*, *3*(3), 215–224.

McCaffrey, R., & Locsin, R. (2006). The effect of music on pain and acute confusion in older adults undergoing hip and knee surgery. *Holistic Nursing Practice*, *20*(5), 218–224.

Miró, J., & Raich, R. M. (1999a). Effects of a brief and economical intervention in preparing patients for surgery: does coping style matter? *PAIN®*, *83*(3), 471–475.

Miró, J., & Raich, R. M. (1999b). Preoperative preparation for surgery: An analysis of the effects of relaxation and information provision. *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice*, *6*(3), 202–209.

*Mogan, J., Wells, N., & Robertson, E. (1985). Effects of preoperative teaching on postoperative pain: a replication and expansion. *International Journal of Nursing Studies*, *22*(3), 267–280.

Mullooly, V. M., Levin, R. F., & Feldman, H. R. (1988). Music for postoperative pain and anxiety. *The Journal of the New York State Nurses" Association*, *19*(3), 4–7.

Nilsson, U., Rawal, N., Uneståhl, L. E., Zetterberg, C., & Unosson, M. (2001). Improved recovery after music and therapeutic suggestions during general anaesthesia: a double-blind randomised controlled trial. *Acta Anaesthesiologica Scandinavica*, *45*(7), 812–817.

Rejeh, N., Heravi-Karimooi, M., Vaismoradi, M., & Jasper, M. (2013). Effect of systematic relaxation techniques on anxiety and pain in older patients undergoing abdominal surgery. *International Journal of Nursing Practice*, *19*(5), 462–470.

Reza, N., Ali, S. M., Saeed, K., Abul-Qasim, A., & Reza, T. H. (2007). The impact of music on postoperative pain and anxiety following cesarean section. *Middle East J Anesthesiol*, *19*(3), 573–586.

Scott, L. E., & Clum, G. A. (1984). Examining the interaction effects of coping style and brief interventions in the treatment of postsurgical pain. *Pain*, *20*(3), 279–291.

Sen, H., Yanarateş, O., Sızlan, A., Kılıç, E., Ozkan, S., & Dağlı, G. (2010). The efficiency and duration of the analgesic effects of musical therapy on postoperative pain. *Agri: Agri (Algoloji) Dernegi'nin Yayin Organidir= The Journal of the Turkish Society of Algology*, *22*(4), 145–150.

Sendelbach, S. E., Halm, M. A., Doran, K. A., Miller, E. H., & Gaillard, P. (2006). Effects of music therapy on physiological and psychological outcomes for patients undergoing cardiac surgery. *Journal of Cardiovascular Nursing*, *21*(3), 194–200.

Simcock, X. C., Yoon, R. S., Chalmers, P., Geller, J. A., Kiernan, H. A., & Macaulay, W. (2008). Intraoperative Music Reduces Perceived Pain After Total Knee Arthroplasty–A Blinded, Prospective, Randomized, Placebo-Controlled Clinical Trial. *The Journal of Knee Surgery*, *21*(04), 275–278.

Sjöling, M., Nordahl, G., Olofsson, N., & Asplund, K. (2003). The impact of preoperative information on state anxiety, postoperative pain and satisfaction with pain management. *Patient Education and Counseling*, *51*(2), 169–176.

Suresh, B. S. S., De Oliveira, G. S., & Suresh, S. (2015). The effect of audio therapy to treat postoperative pain in children undergoing major surgery: a randomized controlled trial. *Pediatric Surgery International*, *31*(2), 197–201.

*Walworth, D., Rumana, C. S., Nguyen, J., & Jarred, J. (2008). Effects of live music therapy sessions on quality of life indicators, medications administered and hospital length of stay for patients undergoing elective surgical procedures for brain. *Journal of Music Therapy*, *45*(3), 349–359.

Wells, N. (1982). The effect of relaxation on postoperative muscle tension and pain. *Nursing Research*, *31*(4), 236–238.

Zimmerman, L., Nieveen, J., Barnason, S., & Schmaderer, M. (1996). The effects of music interventions on postoperative pain and sleep in coronary artery bypass graft (CABG) patients. *Research and Theory for Nursing Practice*, *10*(2), 153-170.

References included the thesis

(AHCPR), A. for H. C. P. and R. (1992). Acute pain management in adults: Operative procedures. Quick reference guide for clinicians. (AHCPR).

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In *Action control* (pp. 11–39). Springer.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211.

Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behaviour.

Al-Ghazal, S. K., Fallowfield, L., & Blamey, R. W. (2000). Comparison of psychological aspects and patient satisfaction following breast conserving surgery, simple mastectomy and breast reconstruction. *European Journal of Cancer*, *36*(15), 1938–1943.

Al-Shaer, D., Hill, P. D., & Anderson, M. A. (2011). Nurses' knowledge and attitudes regarding pain assessment and intervention. *Medsurg Nursing : Official Journal of the Academy of Medical-Surgical Nurses*, *20*(1), 7–11. https://doi.org/10.2478/s13382-013-0122-2

Al Qadire, M., & Al Khalaileh, M. (2014). Jordanian nurses knowledge and attitude regarding pain management. *Pain Management Nursing*, *15*(1), 220–228.

Alami, S., Boutron, I., Desjeux, D., Hirschhorn, M., Meric, G., Rannou, F., & Poiraudeau, S. (2011). Patients' and practitioners' views of knee osteoarthritis and its management: a qualitative interview study. *PLoS One*, *6*(5), e19634.

Albaqawi, H., Maude, P., & Shawhan-Akl, L. (2016). Saudi Arabian Nurses ' Knowledge and Attitudes Regarding Pain Management : Survey Results Using the KASRP. *International Journal of Health Sciences & Research*, *6*(12), 150–164.

AlBedah, A. M., El-Olemy, A. T., & Khalil, M. K. M. (2012). Knowledge and attitude of health professionals in the Riyadh region, Saudi Arabia, toward complementary and alternative medicine. *Journal of Family & Community Medicine*, *19*(2), 93.

Albert, M., Paradis, E., & Kuper, A. (2015). Interdisciplinary promises versus practices

in medicine: The decoupled experiences of social sciences and humanities scholars. *Social Science and Medicine*, *126*, 17–25. https://doi.org/10.1016/j.socscimed.2014.12.004

Alrowais, N. A., & Alyousefi, N. A. (2017). The prevalence extent of Complementary and Alternative Medicine (CAM) use among Saudis. *Saudi Pharmaceutical Journal*, *25*(3), 306–318.

Anaesthetists, the F. of P. M. of the R. C. of. (2015). *Core standards for pain management services in the UK*.

Antonius, R. (2003). *Interpreting quantitative data with SPSS*. Sage.

Apfelbaum, J. L., Chen, C., Mehta, S. S., & Gan, T. J. (2003). Postoperative pain experience: results from a national survey suggest postoperative pain continues to be undermanaged. *Anesthesia & Analgesia*, *97*(2), 534–540.

Argoff, C. E. (2014). Recent management advances in acute postoperative pain. *Pain Practice*, *14*(5), 477–487.

Argyra, E., Siafaka, I., Vadalouca, A., & Care, P. (2015). How does an undergraduate pain course influence future physicians' awareness of chronic pain concepts? A comparative study. *Pain Medicine (Malden, Mass.)*, *16*(2), 301–311. https://doi.org/10.1111/pme.12568

Armitage, C. J., & Conner, M. (2000). Social cognition models and health behaviour: A structured review. *Psychology and Health*, *15*(2), 173–189.

Aronson, J. K. (2007). Compliance, concordance, adherence. *British Journal of Clinical Pharmacology*, *63*(4), 383–384.

Ausili, D., Rossi, E., Rebora, P., Luciani, M., Tonoli, L., Ballerini, E., … & Di Mauro, S. (2018). Ausili, D., Rossi, E., Rebora, P., Luciani, M., Tonoli, L., Ballerini, E., … & Di Mauro, S. (2018). Socio-demographic and clinical determinants of self-care in adults with type 2 diabetes: a multicentre observational study. *Acta Diabetologica*, *55*(7), 691–702.

Austrian, J. S., Kerns, R. D., & Carrington Reid, M. (2005). Perceived barriers to trying self-management approaches for chronic pain in older persons. *Journal of the*

American Geriatrics Society, *53*(5), 856–861.

Ayad, A. E., Ghaly, N., Ragab, R., Majeed, S., Nassar, H., Al Jalabi, A., … Costandi, J. (2011). Expert panel consensus recommendations for the pharmacological treatment of acute pain in the Middle East region. *Journal of International Medical Research*, *39*(4), 1123–1141.

B. Collett and M. Rockett. (2015). 5.1 DEFINITION, MEMBERSHIP AND INTERACTION OF THE MULTIDISCIPLINARY AND MULTISPECIALTY TEAM. In *CSPAM: Core Standards for Pain Management Services in the UKCore Standards for Pain Management Services in the UK* (1st ed.). Faculty of Pain Medicine of the Royal Collage of Aanaesthetists. Retrieved from https://www.rcoa.ac.uk/system/files/FPM-CSPMS-UK2015.pdf

Babadağ, B., Alparslan, G. B., & Güleç, S. (2015). The relationship between pain beliefs and coping with pain of algology patients'. *Pain Management Nursing*, *16*(6), 910–919.

Babbie, E. R. (2013). *The basics of social research*. Cengage learning.

Bair, M. J., Matthias, M. S., Nyland, K. A., Huffman, M. A., Stubbs, D. L., Kroenke, K., & Damush, T. M. (2009). Barriers and facilitators to chronic pain self-management: A qualitative study of primary care patients with comorbid musculoskeletal pain and depression. *Pain Medicine*, *10*(7), 1280–1290.

Baldini, A., Von Korff, M., & Lin, E. H. B. (2012). A review of potential adverse effects of long-term opioid therapy: a practitioner's guide. *The Primary Care Companion to CNS Disorders*, *14*(3).

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ, US: Prentice-Hall, Inc.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. Macmillan.

Barnes, P. M., Bloom, B., & Nahin, R. L. (2008). Complementary and alternative medicine use among adults and children; United States, 2007.

Barry, K. L. (1999). *TIP 34: Brief Interventions and Brief Therapies for Substance Abuse: Treatment Improvement Protocol (TIP) Series 34*. Rockville, MD: Center for Substance

Abuse Treatment.

Bayliss, E. A., Ellis, J. L., & Steiner, J. F. (2007). Barriers to self-management and quality-of-life outcomes in seniors with multimorbidities. *Annals of Family Medicine*, *5*(5), 395–402. https://doi.org/10.1370/afm.722

Beasley, M. J., Ferguson-Jones, E. A., & Macfarlane, G. J. (2017). Treatment expectations but not preference affect outcome in a trial of CBT and exercise for pain. *Canadian Journal of Pain*, *1*(1), 161–170.

Beck, C., McSweeney, J. C., Richards, K. C., Roberson, P. K., Tsai, P.-F., & Souder, E. (2010). Challenges in tailored intervention research. *Nursing Outlook*, *58*(2), 104–110. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3136169/pdf/nihms152371.pdf

Benedetti, F., Maggi, G., Lopiano, L., Lanotte, M., Rainero, I., Vighetti, S., & Pollo, A. (2003). Open versus hidden medical treatments: The patient's knowledge about a therapy affects the therapy outcome. *Prevention & Treatment*, *6*(1), 1a.

Berry, D., Bradlow, A., & Bersellini, E. (2004). Perceptions of the risks and benefits of medicines in patients with rheumatoid arthritis and other painful musculoskeletal conditions. *Rheumatology*, *43*(7), 901–905.

Bhamb, B., Brown, D., Hariharan, J., Anderson, J., Balousek, S., & Fleming, M. F. (2006). Survey of select practice behaviors by primary care physicians on the use of opioids for chronic pain. *Current Medical Research and Opinion*, *22*(9), 1859–1865. https://doi.org/10.1185/030079906X132398

Bicket, M. C., Long, J. J., Pronovost, P. J., Alexander, G. C., & Wu, C. L. (2017). Prescription opioid analgesics commonly unused after surgery: a systematic review. *JAMA Surgery*, *152*(11), 1066–1071.

Biggerstaff, D. (2012). Qualitative research methods in psychology. In *Psychology-Selected Papers*. InTech.

Bingel, U., Wanigasekera, V., Wiech, K., Mhuircheartaigh, R. N., Lee, M. C., Ploner, M., & Tracey, I. (2011). The effect of treatment expectation on drug efficacy: imaging the analgesic benefit of the opioid remifentanil. *Science Translational Medicine*, *3*(70), 70ra14-70ra14.

Bishop, F. L., Yardley, L., & Lewith, G. T. (2008). Treatment appraisals and beliefs predict adherence to complementary therapies: A prospective study using a dynamic extended self-regulation model. *British Journal of Health Psychology*, *13*(4), 701–718.

Bolderston, A. (2012). Conducting a research interview. *Journal of Medical Imaging and Radiation Sciences*, *43*(1), 66–76. Retrieved from https://www.jmirs.org/article/S1939-8654(11)00132-9/pdf

Bond, C., & Hannaford, P. (2003). Issues related to monitoring the safety of over-the-counter (OTC) medicines. *Drug Safety*, *26*(15), 1065–1074. Retrieved from https://s3.amazonaws.com/academia.edu.documents/37208325/N0194399104.pdf?response-content-disposition=inline%3B filename%3DThe_Strengths_and_Weaknesses_of_Research.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190826%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20190826T081730Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=ff91778d67f4eb142244b80d6f766683b37d020f26b0b866c062fe74279e4504

Boudreau, J. D., & Fuks, A. (2015). The Humanities in Medical Education: Ways of Knowing, Doing and Being. *Journal of Medical Humanities*, *36*(4), 321–336. https://doi.org/10.1007/s10912-014-9285-5

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Taylor & Francis*, *3*(2), 77–101.

Braun, V., Clarke, V., & Terry, G. (2012). Thematic analysis. *APA Handbook of Research Methods in Psychology*, *2*, 57–71.

Breivik, H., Collett, B., Ventafridda, V., Cohen, R., & Gallacher, D. (2006). Survey of chronic pain in Europe: Prevalence, impact on daily life, and treatment. *European Journal of Pain*, *10*(4), 287–333. https://doi.org/10.1016/j.ejpain.2005.06.009

Briggs, E. (2008). Cultural perspectives on pain management. *Journal of Perioperative Practice*, *18*(11), 468–471.

British Medical, A. (2017). *Chronic pain: supporting safer prescribing of analgesics*. Retrieved

from file:///C:/Users/talsanaani/Downloads/Analgesics-chronic-pain.pdf

Bryman, A. (2007). Barriers to integrating quantitative and qualitative research. *Journal of Mixed Methods Research*, *1*(1), 8–22.

Buenaver, L. F., McGuire, L., & Haythornthwaite, J. A. (2006). Cognitive-Behavioral self-help for chronic pain. *Journal of Clinical Psychology*, *62*(11), 1389–1396.

Buvanendran, A., & Kroin, J. S. (2009). Multimodal analgesia for controlling acute postoperative pain. *Current Opinion in Anesthesiology*, *22*(5), 588–593.

Cagle, J., & Bunting, M. (2017). Patient Reluctance to Discuss Pain: Understanding Stoicism, Stigma, and Other Contributing Factors. *Journal of Social Work in End-of-Life & Palliative Care*, *13*(1), 27–43.

Campbell, N. C., Murray, E., Darbyshire, J., Emery, J., Farmer, A., Griffiths, F., … Kinmonth, A. L. (2007). Designing and evaluating complex interventions to improve health care. *BMJ: British Medical Journal*, *334*(7591), 455.

Caracciolo, B., & Giaquinto, S. (2005). Self-perceived distress and self-perceived functional recovery after recent total hip and knee arthroplasty. *Archives of Gerontology and Geriatrics*, *41*(2), 177–181.

Carr, L. T. (1994). The strengths and weaknesses of quantitative and qualitative research: what method for nursing? *Journal of Advanced Nursing*, *20*(4), 716–721.

Català, E., Reig, E., Artés, M., Aliaga, L., López, J. S., & Segú, J. L. (2002). Prevalence of pain in the Spanish population: Telephone survey in 5000 homes. *European Journal of Pain*, *6*(2), 133–140. https://doi.org/10.1053/eujp.2001.0310

Cathcart, S., Galatis, N., Immink, M., Proeve, M., & Petkov, J. (2014). Brief mindfulness-based therapy for chronic tension-type headache: a randomized controlled pilot study. *Behavioural and Cognitive Psychotherapy*, *42*(1), 1–15.

Chan, E. Y., Blyth, F. M., Nairn, L., & Fransen, M. (2013). Acute postoperative pain following hospital discharge after total knee arthroplasty. *Osteoarthritis and Cartilage*, *21*(9), 1257–1263.

Chiesa, A., Serretti, A., & Jakobsen, J. C. (2013). Mindfulness: Top–down or bottom–up emotion regulation strategy? *Clinical Psychology Review*, *33*(1), 82–96.

Chiles, J. A., Lambert, M. J., & Hatch, A. L. (1999). The impact of psychological interventions on medical cost offset: A meta-analytic review. *Clinical Psychology: Science and Practice*, *6*(2), 204–220.

Ching, H.-H., Koo, M., Tsai, T.-H., & Chen, C.-Y. (2015). Effects of a mindfulness meditation course on learning and cognitive performance among university students in Taiwan. *Evidence-Based Complementary and Alternative Medicine*, *2015*.

Chou, R., Gordon, D. B., De Leon-Casasola, O. A., Rosenberg, J. M., Bickler, S., Brennan, T., … Wu, C. L. (2016). Management of postoperative pain: A clinical practice guideline from the American pain society, the American society of regional anesthesia and pain medicine, and the American society of anesthesiologists' committee on regional anesthesia, executive commi. *Journal of Pain*, *17*(2), 131–157. https://doi.org/10.1016/j.jpain.2015.12.008

Chou, R., Turner, J. A., Devine, E. B., Hansen, R. N., Sullivan, S. D., Blazina, I., … Deyo, R. A. (2015). The effectiveness and risks of long-term opioid therapy for chronic pain: a systematic review for a National Institutes of Health Pathways to Prevention Workshop. *Annals of Internal Medicine*, *162*(4), 276–286.

Choy, L. T. (2014). The strengths and weaknesses of research methodology: Comparison and complimentary between qualitative and quantitative approaches. *IOSR Journal of Humanities and Social Science*, *19*(4), 99–104. Retrieved from https://s3.amazonaws.com/academia.edu.documents/37208325/N0194399104.pdf?response-content-disposition=inline%3B filename%3DThe_Strengths_and_Weaknesses_of_Research.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190826%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20190826T081730Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=ff91778d67f4eb142244b80d6f766683b37d020f26b0b866c062fe74279e4504

Chumbley, G. M., Hall, G. M., & Salmon, P. (2002). Patient-controlled analgesia: what information does the patient want? *Journal of Advanced Nursing*, *39*(5), 459–471.

Chung, J. W. Y., & Wong, T. K. S. (2007). Prevalence of Pain in a Community

Population. *Pain Medicine*, *8*(3), 235–242. https://doi.org/10.1111/j.1526-4637.2006.00205.x

Clarke, T. C., Black, L. I., Stussman, B. J., Barnes, P. M., & Nahin, R. L. (2015). Trends in the use of complementary health approaches among adults: United States, 2002-2012. *National Health Statistics Reports*, (79), 1–16. https://doi.org/10.1161/STROKEAHA.113.002813.Oxidative

Clement, S., Schauman, O., Graham, T., Maggioni, F., Evans-Lacko, S., Bezborodovs, N., … Thornicroft, G. (2015). What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psychological Medicine*, *45*(1), 11–27.

Cogan, J., Ouimette, M.-F., Vargas-Schaffer, G., Yegin, Z., Deschamps, A., & Denault, A. (2014). Patient attitudes and beliefs regarding pain medication after cardiac surgery: barriers to adequate pain management. *Pain Management Nursing*, *15*(3), 574–579.

Coley, K. C., Williams, B. A., DaPos, S. V, Chen, C., & Smith, R. B. (2002). Retrospective evaluation of unanticipated admissions and readmissions after same day surgery and associated costs. *Journal of Clinical Anesthesia*, *14*(5), 349–353.

Colloca, L., Lopiano, L., Lanotte, M., & Benedetti, F. (2004). Overt versus covert treatment for pain, anxiety, and Parkinson's disease. *The Lancet Neurology*, *3*(11), 679–684.

Conner, M., & Norman, P. (2005). *Predicting health behaviour*. McGraw-Hill Education (UK).

Corlett, P. R., Frith, C. D., & Fletcher, P. C. (2009). From drugs to deprivation: a Bayesian framework for understanding models of psychosis. *Psychopharmacology*, *206*(4), 515–530.

Correll, D. J., Vlassakov, K. V, & Kissin, I. (2014). No evidence of real progress in treatment of acute pain, 1993–2012: scientometric analysis. *Journal of Pain Research*, *7*, 199.

Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., & Petticrew, M. (2008). Developing and evaluating complex interventions: the new Medical Research

Council guidance. *Bmj*, *337*, a1655.

Creswell, J. W. (1997). *Research Design Qualitative & Quantitative Approaches. Thousand Oaks-London-New*. New Delhi: Sage Publications.

Croskerry, P. (2002). Achieving quality in clinical decision making: cognitive strategies and detection of bias. *Acad Emerg Med*, *9*(11), 1184–1204. https://doi.org/10.1111/j.1553-2712.2002.tb01574.x

Cypress, B. S. (2017). Rigor or reliability and validity in qualitative research: Perspectives, strategies, reconceptualization, and recommendations. *Dimensions of Critical Care Nursing*, *36*(4), 253–263. Retrieved from https://journals.lww.com/dccnjournal/Fulltext/2017/07000/Rigor_or_Reliability_and_Validity_in_Qualitative.6.aspx

Dalton, J. A., Carlson, J., Lindley, C., Blau, W., Youngblood, R., & Greer, S. M. (2000). Clinical economics: Calculating the cost of acute postoperative pain medication. *Journal of Pain and Symptom Management*, *19*(4), 295–308.

Damush, T. M., Kroenke, K., Bair, M. J., Wu, J., Tu, W., Krebs, E. E., & Poleshuck, E. (2016). Pain self-management training increases self-efficacy, self-management behaviours and pain and depression outcomes. *European Journal of Pain*, *20*(7), 1070–1078.

Dao, T. K., Youssef, N. A., Armsworth, M., Wear, E., Papathopoulos, K. N., & Gopaldas, R. (2011). Randomized controlled trial of brief cognitive behavioral intervention for depression and anxiety symptoms preoperatively in patients undergoing coronary artery bypass graft surgery. *The Journal of Thoracic and Cardiovascular Surgery*, *142*(3), e109–e115.

Davidhizar, R., & Giger, J. N. (2004). A review of the literature on care of clients in pain who are culturally diverse. *International Nursing Review*, *51*(1), 47–55.

De Geest, S., & Sabaté, E. (2003). Adherence to long-term therapies: Evidence for action. *European Journal of Cardiovascular Nursing*, *2*(4), 323. https://doi.org/10.1016/S1474-5151(03)00091-4

Deeks, A., Lombard, C., Michelmore, J., & Teede, H. (2009). The effects of gender and age on health related behaviors. *BMC Public Health*, *9*(1), 213.

Denzin, N. K. (2007). Triangulation. In *The Blackwell Encyclopedia of Sociology*.

Devilly, G. J., & Borkovec, T. D. (2000). Psychometric properties of the credibility/expectancy questionnaire. *Journal of Behavior Therapy and Experimental Psychiatry*, *31*(2), 73–86.

Dhanoa, A., Yong, T. L., Yeap, S. J. L., Lee, I. S. Z., & Singh, V. A. (2014). Complementary and alternative medicine use amongst Malaysian orthopaedic oncology patients. *BMC Complementary and Alternative Medicine*, *14*(1), 404.

DiMatteo, M. R. (2004). Variations in patients' adherence to medical recommendations: a quantitative review of 50 years of research. *Medical Care*, *42*(3), 200–209.

DiMatteo, M. R., Giordani, P. J., Lepper, H. S., & Croghan, T. W. (2002). Patient adherence and medical treatment outcomes: a meta-analysis. *Med Care*, *40*(9), 794–811. https://doi.org/10.1097/01.MLR.0000024612.61915.2D

DiMatteo, M. R., Haskard, K. B., & Williams, S. L. (2007). Health beliefs, disease severity, and patient adherence: a meta-analysis. *Medical Care*, *45*(6), 521–528.

Doorenbos, A. Z. (2014). Mixed methods in nursing research: an overview and practical examples. *Kango Kenkyu. The Japanese Journal of Nursing Research*, *47*(3), 207. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4287271/

Dovidio, J. F., & Fiske, S. T. (2012). Under the radar: How unexamined biases in decision-making processes in clinical interactions can contribute to health care disparities. *American Journal of Public Health*, *102*(5), 945–952. https://doi.org/10.2105/AJPH.2011.300601

Driessen, E., Van Der Vleuten, C., Schuwirth, L., Van Tartwijk, J., & Vermunt, J. (2005). The use of qualitative research criteria for portfolio assessment as an alternative to reliability evaluation: a case study. *Medical Education*, *39*(2), 214–220. Retrieved from file:///C:/Users/talsanaani/Downloads/articledriessenetal2005mededuca.pdf

Drost, E. A. (2011). Validity and reliability in social science research. *Education Research and Perspectives*, *38*(1), 105.

Dualé, C., Sibaud, F., Guastella, V., Vallet, L., Gimbert, Y., Taheri, H., … Dubray, C.

(2009). Perioperative ketamine does not prevent chronic pain after thoracotomy. *European Journal of Pain*, *13*(5), 497–505.

Duivenvoorden, T., Vissers, M. M., Verhaar, J. A. N., Busschbach, J. J. V., Gosens, T., Bloem, R. M., … Reijman, M. (2013). Anxiety and depressive symptoms before and after total hip and knee arthroplasty: a prospective multicentre study. *Osteoarthritis and Cartilage*, *21*(12), 1834–1840.

Dusek, J. A., Griffin, K. H., Finch, M. D., Rivard, R. L., & Watson, D. (2018). Cost savings from reducing pain through the delivery of integrative medicine program to hospitalized patients. *The Journal of Alternative and Complementary Medicine*, *24*(6), 557–563.

Eid, T., Manias, E., Bucknall, T., & Almazrooa, A. (2014). Nurses' knowledge and attitudes regarding pain in Saudi Arabia. *Pain Management Nursing*, *15*(4), e25–e36. https://doi.org/10.1016/j.pmn.2014.05.014

Elder, J. P., Ayala, G. X., & Harris, S. (1999). Theories and intervention approaches to health-behavior change in primary care. *American Journal of Preventive Medicine*, *17*(4), 275–284.

Eldredge, L. K. B., Markham, C. M., Ruiter, R. A. C., Kok, G., & Parcel, G. S. (2016). *Planning health promotion programs: an intervention mapping approach*. John Wiley & Sons.

Elkins, G. R., Barabasz, A. F., Council, J. R., & Spiegel, D. (2015). Advancing research and practice: The revised APA Division 30 definition of hypnosis. *International Journal of Clinical and Experimental Hypnosis*, *63*(1), 1–9.

Eriksen, J., Sjøgren, P., Bruera, E., Ekholm, O., & Rasmussen, N. K. (2006). Critical issues on opioids in chronic non-cancer pain:: An epidemiological study. *Pain*, *125*(1–2), 172–179.

Eriksson, K., Wikström, L., Fridlund, B., Årestedt, K., & Broström, A. (2016). Patients' experiences and actions when describing pain after surgery–A critical incident technique analysis. *International Journal of Nursing Studies*, *56*, 27–36.

Evans, J. R., & Mathur, A. (2005). The value of online surveys. *Internet Research*, *15*(2), 195–219.

Farias, M., & Wikholm, C. (2016). Has the science of mindfulness lost its mind? *BJPsych Bulletin*, *40*(6), 329–332. https://doi.org/10.1192/pb.bp.116.053686

Fauerbach, J. A., Lawrence, J. W., Haythornthwaite, J. A., & Richter, L. (2002). Coping with the stress of a painful medical procedure. *Behaviour Research and Therapy*, *40*(9), 1003–1015.

Fields, H. L. (2000). Pain modulation: expectation, opioid analgesia and virtual pain. In C. B. Mayer, E. A., & Saper (Ed.), *The Biological Basis for Mind Body Interactions* (pp. 245–253). Progress in Brain Research.

Fincham, J. E. (2008). Response rates and responsiveness for surveys, standards, and the Journal. *American Journal of Pharmaceutical Education*, *72*(2), 43. Retrieved from https://www.ajpe.org/doi/pdf/10.5688/aj720243

Finlay, K. A., & Rogers, J. (2015). Maximizing self-care through familiarity: The role of practice effects in enhancing music listening and progressive muscle relaxation for pain management. *Psychology of Music*, *43*(4), 511–529. https://doi.org/10.1177/0305735613513311

Finlayson, K., Downe, S., Hinder, S., Carr, H., Spiby, H., & Whorwell, P. (2015). Unexpected consequences: Women's experiences of a self-hypnosis intervention to help with pain relief during labour. *BMC Pregnancy and Childbirth*, *15*(1), 1–9. https://doi.org/10.1186/s12884-015-0659-0

Fischer, F. H., Lewith, G., Witt, C. M., Linde, K., von Ammon, K., Cardini, F., … Brinkhaus, B. (2014). High prevalence but limited evidence in complementary and alternative medicine: guidelines for future research. *BMC Complement Altern Med*, *14*, 46. https://doi.org/10.1186/1472-6882-14-46

Flor, H. (2014). Psychological pain interventions and neurophysiology: Implications for a mechanism-based approach. *American Psychologist*, *69*(2), 188.

Fraenkel, L., Bogardus, S., Concato, J., & Felson, D. (2002). Unwillingness of rheumatoid arthritis patients to risk adverse effects. *Rheumatology*, *41*(3), 253–261.

Fraenkel, L., Bogardus, S. T., Concato, J., & Wittink, D. R. (2004). Treatment options in knee osteoarthritis: the patient's perspective. *Archives of Internal Medicine*, *164*(12), 1299–1304.

Fraenkel, L., & Fried, T. (2008). If you want patients with knee osteoarthritis to exercise, tell them about NSAIDs. *The Patient: Patient-Centered Outcomes Research*, *1*(1), 21–26.

Francis, L., & Fitzpatrick, J. J. (2013). Postoperative pain: Nurses' knowledge and patients' experiences. *Pain Management Nursing*, *14*(4), 351–357.

Freedland, K. E., Skala, J. A., Carney, R. M., Rubin, E. H., Lustman, P. J., Dávila-Román, V. G., … Hogue, C. W. (2009). Treatment of depression after coronary artery bypass surgery: a randomized controlled trial. *Archives of General Psychiatry*, *66*(4), 387–396.

French, S. D., Green, S. E., O'Connor, D. A., McKenzie, J. E., Francis, J. J., Michie, S., … Grimshaw, J. M. (2012). Developing theory-informed behaviour change interventions to implement evidence into practice: a systematic approach using the Theoretical Domains Framework. *Implementation Science*, *7*(1), 38.

Friedman, D. A. (2012). 10 How to Collect and Analyze Qualitative Data. *Research Methods in Second Language Acquisition*, 180.

Gan, T. J., Habib, A. S., Miller, T. E., White, W., & Apfelbaum, J. L. (2014). Incidence, patient satisfaction, and perceptions of post-surgical pain: results from a US national survey. *Current Medical Research and Opinion*, *30*(1), 149–160.

Gandhi, B., & Oakley, D. A. (2005). Does 'hypnosis' by any other name smell as sweet? The efficacy of 'hypnotic'inductions depends on the label 'hypnosis.' *Consciousness and Cognition*, *14*(2), 304–315.

Gaskin, D. J., & Richard, P. (2012). The economic costs of pain in the United States. *The Journal of Pain*, *13*(8), 715–724.

Gatt, I., West, L. M., Calleja, N., Briffa, C., & Cordina, M. (2017). Psychometric properties of the Belief about Medicines Questionnaire (BMQ) in the Maltese language. *Pharmacy Practice (Granada)*, *15*(1).

Gélinas, C., Arbour, C., Michaud, C., Robar, L., & Côté, J. (2013). Patients and ICU nurses' perspectives of non-pharmacological interventions for pain management. *Nursing in Critical Care*, *18*(6), 307–318. https://doi.org/10.1111/j.1478-5153.2012.00531.x

Gelo, O., Braakmann, D., & Benetka, G. (2008). Quantitative and qualitative research: Beyond the debate. *Integrative Psychological and Behavioral Science*, *42*(3), 266–290. Retrieved from https://doi.org/10.1007/s12124-008-9078-3

Giles, M., Mcclenahan, C., Cairns, E., & Mallet, J. (2004). An application of the theory of planned behaviour to blood donation: the importance of self-efficacy. *Health Education Research*, *19*(4), 380–391.

Glomb, T. M., Duffy, M. K., Bono, J. E., & Yang, T. (2011). Mindfulness at work. In *Research in personnel and human resources management* (pp. 115–157). Emerald Group Publishing Limited.

Glowacki, D. (2015). Effective pain management and improvements in patients' outcomes and satisfaction. *Critical Care Nurse*, *35*(3), 33–41.

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, *8*(4), 597–606.

Goldberg, D. S., & McGee, S. J. (2011). Pain as a global public health priority. *BMC Public Health*, *11*. https://doi.org/10.1186/1471-2458-11-770

Golden, B. A. (2002). A multidisciplinary approach to nonpharmacologic pain management. *Journal of the American Osteopathic Association*, *102*(9 supplement), 1S.

Good, M., Anderson, G. C., Ahn, S., Cong, X., & Stanton-Hicks, M. (2005). Relaxation and music reduce pain following intestinal surgery. *Research in Nursing & Health*, *28*(3), 240–251.

Good, M., Stanton-Hicks, M., Grass, J. A., Anderson, G. C., Lai, H., Roykulcharoen, V., & Adler, P. A. (2001). Relaxation and music to reduce postsurgical pain. *Journal of Advanced Nursing*, *33*(2), 208–215.

Goossens, M. E. J. B., Vlaeyen, J. W. S., Hidding, A., Kole-Snijders, A., & Evers, S. M. A. A. (2005). Treatment expectancy affects the outcome of cognitive-behavioral interventions in chronic pain. *The Clinical Journal of Pain*, *21*(1), 18–26.

Gordon, D., Dahl, J., Miaskowski, C., McCarberg, B., Todd, K., Paice, J., … Turk, D. (2005). American pain society recommendations for improving the quality of acute and cancer pain management: American Pain Society Quality of Care Task Force.

Archives of Internal Medicine. https://doi.org/10.1001/archinte.165.14.1574

Gordon, K., Smith, F., & Dhillon, S. (2007). Effective chronic disease management: patients' perspectives on medication-related problems. *Patient Education and Counseling*, *65*(3), 407–415.

Gorji, M. A. H., Nesami, M. B., Ayyasi, M., Ghafari, R., & Yazdani, J. (2014). Comparison of ice packs application and relaxation therapy in pain reduction during chest tube removal following cardiac surgery. *North American Journal of Medical Sciences*, *6*(1), 19.

Grbich, C. (2012). *Qualitative data analysis: An introduction*. Sage.

Green, C. R., & Wheeler, J. R. (2003). Physician variability in the management of acute postoperative and cancer pain: a quantitative analysis of the Michigan experience.[see comment]. *Pain Medicine*, *4*(1), 8–20.

Gunnarsdottir, S., Ward, S. E., & Serlin, R. C. (2010). A population based study of the prevalence of pain in Iceland. *Scandinavian Journal of Pain*, *1*(3), 151–157. https://doi.org/10.1016/j.sjpain.2010.05.028

Gupta, A., Kaur, K., Sharma, S., Goyal, S., Arora, S., & Murthy, R. S. R. (2010). Clinical aspects of acute post-operative pain management & its assessment. *Journal of Advanced Pharmaceutical Technology & Research*, *1*(2), 97.

Gustafsson, U. O., Oppelstrup, H., Thorell, A., Nygren, J., & Ljungqvist, O. (2016). Adherence to the ERAS protocol is associated with 5-year survival after colorectal cancer surgery: a retrospective cohort study. *World Journal of Surgery*, *40*(7), 1741–1747.

Hammarberg, K., Kirkman, M., & de Lacey, S. (2016). Qualitative research methods: when to use them and how to judge them. *Human Reproduction*, *31*(3), 498–501.

Harris, L. R., & Roberts, L. (2008). Treatments for irritable bowel syndrome: patients' attitudes and acceptability. *BMC Complementary and Alternative Medicine*, *8*(1), 65.

Harris, P., & Rees, R. (2000). The prevalence of complementary and alternative medicine use among the general population: a systematic review of the literature. *Complementary Therapies in Medicine*, *8*(2), 88–96.

Haythornthwaite, J. A., Lawrence, J. W., & Fauerbach, J. A. (2001). Brief cognitive interventions for burn pain. *Annals of Behavioral Medicine*, *23*(1), 42–49.

Higgins, J. P. T., & Green, S. (2011). *Cochrane handbook for systematic reviews of interventions* (Vol. 4). John Wiley & Sons.

Højsted, J., Ekholm, O., Kurita, G. P., Juel, K., & Sjøgren, P. (2013). Addictive behaviors related to opioid use for chronic pain: a population-based study. *PAIN®*, *154*(12), 2677–2683.

Holden-lund, C. (1988). Effects of relaxation with guided imagery on surgical stress and wound healing. *Research in Nursing & Health*, *11*(4), 235–244.

Hole, J., Hirsch, M., Ball, E., & Meads, C. (2015). Music as an aid for postoperative recovery in adults: A systematic review and meta-analysis. *The Lancet*, *386*(10004), 1659–1671. https://doi.org/10.1016/S0140-6736(15)60169-6

Holmes, E. A. F., Hughes, D. A., & Morrison, V. L. (2014). Predicting adherence to medications using health psychology theories: a systematic review of 20 years of empirical research. *Value in Health*, *17*(8), 863–876.

Hoogervorst-Schilp, J., van Boekel, R. L. M., de Blok, C., Steegers, M. A. H., Spreeuwenberg, P., & Wagner, C. (2016). Postoperative pain assessment in hospitalised patients: National survey and secondary data analysis. *International Journal of Nursing Studies*, *63*, 124–131. https://doi.org/10.1016/j.ijnurstu.2016.09.001

Horne, R., Chapman, S. C. E., Parham, R., Freemantle, N., Forbes, A., & Cooper, V. (2013). Understanding patients' adherence-related beliefs about medicines prescribed for long-term conditions: a meta-analytic review of the Necessity-Concerns Framework. *PloS One*, *8*(12), e80633.

Horne, R., & Weinman, J. (1999). Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. *Journal of Psychosomatic Research*, *47*(6), 555–567. https://doi.org/10.1016/S0022-3999(99)00057-4

Hutchison, R. W. (2007). Challenges in acute post-operative pain management. *American Journal of Health-System Pharmacy*, *64*(6 Supplement 4), S2–S5.

Hwang, B., Eastwood, J.-A., McGuire, A., Chen, B., Cross-Bodán, R., & Doering, L. V. (2015). Cognitive behavioral therapy in depressed cardiac surgery patients: Role of ejection fraction. *The Journal of Cardiovascular Nursing*, *30*(4), 319.

Hwang, C. S., Turner, L. W., Kruszewski, S. P., Kolodny, A., & Alexander, G. C. (2015). Prescription drug abuse: a national survey of primary care physicians. *JAMA Internal Medicine*, *175*(2), 302–304.

Hyland, M. E., Hinton, C., Hill, C., Whalley, B., Jones, R. C. M., & Davies, A. F. (2016). Explaining unexplained pain to fibromyalgia patients: finding a narrative that is acceptable to patients and provides a rationale for evidence based interventions. *British Journal of Pain*, *10*(3), 156–161. https://doi.org/10.1177/2049463716642601

Hylands-White, N., & Derbyshire, S. W. G. (2007). Modifying pain perception: is it better to be hypnotizable or feel that you are hypnotized? *Contemporary Hypnosis*, *24*(4), 143–153.

I. Tombor and S. Michie. (2017). Methods of health behaviour change. *In Oxford Research Encyclopedia of Psychology. Ed. Oliver Braddick. New York: Oxford University*. Retrieved from https://oxfordre.com/psychology/view/10.1093/acrefore/9780190236557.001.0001/acrefore-9780190236557-e-125?print=pdf

Jensen, M. P., Chen, C., & Brugger, A. M. (2003). Interpretation of visual analog scale ratings and change scores: a reanalysis of two clinical trials of postoperative pain. *The Journal of Pain*, *4*(7), 407–414.

Jimenez, K., Vargas, C., Garcia, K., Guzman, H., Angulo, M., & Billimek, J. (2017). Evaluating the validity and reliability of the beliefs about medicines questionnaire in low-income, Spanish-speaking patients with diabetes in the United States. *The Diabetes Educator, 43*(1), 114–124.

Jin, J., Sklar, G. E., Oh, V. M. Sen, & Li, S. C. (2008). Factors affecting therapeutic compliance: A review from the patient's perspective. *Therapeutics and Clinical Risk Management*, *4*(1), 269.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research

paradigm whose time has come. *Educational Researcher*, *33*(7), 14–26.

Joshi, G. P., & Ogunnaike, B. O. (2005). Consequences of inadequate postoperative pain relief and chronic persistent postoperative pain. *Anesthesiology Clinics of North America*, *23*(1), 21–36.

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: past, present, and future. *Clinical Psychology: Science and Practice*, *10*(2), 144–156.

Kairaluoma, P., Bachmann, M., Rosenberg, P., & Pere, P. (2006). Paravertebral block reduces the prevalence of chronic pain symptoms after surgery for breast cancer: A-482. *European Journal of Anaesthesiology (EJA)*, *23*, 125–126.

Kastanias, P., Denny, K., Robinson, S., Sabo, K., & Snaith, K. (2009). What do adult surgical patients really want to know about pain and pain management? *Pain Management Nursing*, *10*(1), 22–31.

Khan, K. S., Kunz, R., Kleijnen, J., & Antes, G. (2003). Five steps to conducting a systematic review. *Journal of the Royal Society of Medicine*, *96*(3), 118–121. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC539417/

Khan, R. S., Ahmed, K., Blakeway, E., Skapinakis, P., Nihoyannopoulos, L., Macleod, K., … Darzi, A. (2011). Catastrophizing: a predictive factor for postoperative pain. *The American Journal of Surgery*, *201*(1), 122–131.

Khatib, Y., Madan, A., Naylor, J. M., & Harris, I. A. (2015). Do psychological factors predict poor outcome in patients undergoing TKA? A systematic review. *Clinical Orthopaedics and Related Research®*, *473*(8), 2630–2638.

Kheshti, R., Namazi, S., Mehrabi, M., & Firouzabadi, D. (2016). Health Care Workers ' Knowledge , Attitude , and Practice About Chronic Pain Management , Shiraz , Iran, *6*(4). https://doi.org/10.5812/aapm.37270.Research

Kiekkas, P., Gardeli, P., Bakalis, N., Stefanopoulos, N., Adamopoulou, K., Avdulla, C., … Konstantinou, E. (2015). Predictors of Nurses' Knowledge and Attitudes Toward Postoperative Pain in Greece. *Pain Management Nursing*, *16*(1), 2–10. https://doi.org/10.1016/j.pmn.2014.02.002

King, R., Robinson, V., Ryan, C. G., & Martin, D. J. (2016). An exploration of the

extent and nature of reconceptualisation of pain following pain neurophysiology education: A qualitative study of experiences of people with chronic musculoskeletal pain. *Patient Education and Counseling*, *99*(8), 1389–1393.

Kirk, P., Kirk, I., & Kristjanson, L. J. (2004). What do patients receiving palliative care for cancer and their families want to be told? A Canadian and Australian qualitative study. *Bmj*, *328*(7452), 1343.

Kissin, I. (2013). Long-term opioid treatment of chronic nonmalignant pain: unproven efficacy and neglected safety? *Journal of Pain Research*, *6*, 513.

Kroenke, K., & Spitzer, R. L. (2002). The PHQ-9: a new depression diagnostic and severity measure. *Psychiatric Annals*, *32*(9), 509–515.

Kshettry, V. R., Carole, L. F., Henly, S. J., Sendelbach, S., & Kummer, B. (2006). Complementary alternative medical therapies for heart surgery patients: feasibility, safety, and impact. *The Annals of Thoracic Surgery*, *81*(1), 201–205.

Kühlmann, A. Y. R., De Rooij, A., Kroese, L. F., van Dijk, M., Hunink, M. G. M., & Jeekel, J. (2018). Meta-analysis evaluating music interventions for anxiety and pain in surgery. *British Journal of Surgery*, *105*(7), 773–783.

Kumagai, A. K., & Wear, D. (2014). "Making strange": A role for the humanities in medical education. *Academic Medicine*, *89*(7), 973–977. https://doi.org/10.1097/ACM.0000000000000269

Kwekkeboom, K. L. (2001). Pain management strategies used by patients with breast and gynecologic cancer with postoperative pain. *Cancer Nursing*, *24*(5), 378–386.

Kwekkeboom, K. L., & Gretarsdottir, E. (2006). Systematic review of relaxation interventions for pain. *Journal of Nursing Scholarship*, *38*(3), 269–277.

Kwekkeboom, K. L., Hau, H., Wanta, B., & Bumpus, M. (2008). Patients' perceptions of the effectiveness of guided imagery and progressive muscle relaxation interventions used for cancer pain. *Complementary Therapies in Clinical Practice*, *14*(3), 185–194.

Laba, T. L., Brien, J. A., Fransen, M., & Jan, S. (2013). Patient preferences for adherence to treatment for osteoarthritis: The MEdication Decisions in

Osteoarthritis Study (MEDOS). *BMC Musculoskeletal Disorders*, *14*. https://doi.org/10.1186/1471-2474-14-160

Lagman, R. A., Yoo, G. J., Levine, E. G., Donnell, K. A., & Lim, H. R. (2014). "Leaving it to God" religion and spirituality among Filipina immigrant breast cancer survivors. *Journal of Religion and Health*, *53*(2), 449–460.

Lai, Y.-H., Keefe, F. J., Sun, W.-Z., Tsai, L.-Y., Cheng, P.-L., Chiou, J.-F., & Wei, L.-L. (2002). Relationship between pain-specific beliefs and adherence to analgesic regimens in Taiwanese cancer patients: a preliminary study. *Journal of Pain and Symptom Management*, *24*(4), 415–423.

Lang, E. V, Berbaum, K. S., Faintuch, S., Hatsiopoulou, O., Halsey, N., Li, X., … Baum, J. (2006). Adjunctive self-hypnotic relaxation for outpatient medical procedures: a prospective randomized trial with women undergoing large core breast biopsy. *Pain*, *126*(1–3), 155–164.

Lang, E. V, & Rosen, M. P. (2002). Cost analysis of adjunct hypnosis with sedation during outpatient interventional radiologic procedures. *Radiology*, *222*(2), 375–382.

Latina, R., Mauro, L., Mitello, L., D'angelo, D., Caputo, L., De Marinis, M. G., … Baglio, G. (2015). Attitude and knowledge of pain management among Italian nurses in hospital settings. *Pain Management Nursing*, *16*(6), 959–967.

Lebovits, A. H., Florence, I., Bathina, R., Hunko, V., Fox, M. T., & Bramble, C. Y. (1997). Pain knowledge and attitudes of healthcare providers: practice characteristic differences. *The Clinical Journal of Pain*, *13*(3), 237–243.

Lewis, E. T., Combs, A., & Trafton, J. A. (2010). Reasons for under-use of prescribed opioid medications by patients in pain. *Pain Medicine*, *11*(6), 861–871.

Lewthwaite, B. J., Jabusch, K. M., Wheeler, B. J., Schnell-Hoehn, K. N., Mills, J., Estrella-Holder, E., & Fedorowicz, A. (2011). Nurses' knowledge and attitudes regarding pain management in hospitalized adults. *The Journal of Continuing Education in Nursing*, *42*(6), 251–257.

Linde, K., Witt, C. M., Streng, A., Weidenhammer, W., Wagenpfeil, S., Brinkhaus, B., … Melchart, D. (2007). The impact of patient expectations on outcomes in four randomized controlled trials of acupuncture in patients with chronic pain. *Pain*,

128(3), 264–271.

Linton, S. J. (2013). Information and psychoeducation in the early management of persistent pain. *Encyclopedia of Pain*, 1632–1636.

Liu, X., Wang, S., Chang, S., Chen, W., & Si, M. (2013). Effect of brief mindfulness intervention on tolerance and distress of pain induced by cold-pressor task. *Stress and Health*, *29*(3), 199–204. https://doi.org/10.1002/smi.2446

Lobe, T. E. (2006). Perioperative hypnosis reduces hospitalization in patients undergoing the Nuss procedure for pectus excavatum. *Journal of Laparoendoscopic and Advanced Surgical Techniques*, *16*(6), 639–642.

Loewenstein, G. (2005). Hot-cold empathy gaps and medical decision making. *Health Psychology*, *24*(4S), S49.

Luciano, J. V., D'Amico, F., Feliu-Soler, A., McCracken, L. M., Aguado, J., Peñarrubia-María, M. T., … García-Campayo, J. (2017). Cost-utility of group acceptance and commitment therapy for fibromyalgia versus recommended drugs: an economic analysis alongside a 6-month randomized controlled trial conducted in Spain (EFFIGACT Study). *The Journal of Pain*, *18*(7), 868–880.

Luebbert, K., Dahme, B., & Hasenbring, M. (2001). The effectiveness of relaxation training in reducing treatment-related symptoms and improving emotional adjustment in acute non-surgical cancer treatment: a meta-analytical review. *Psycho-oncology*, *10*(6), 490–502.

Lune, H., & Berg, B. L. (2016). *Qualitative research methods for the social sciences*. Pearson Higher Ed.

Maha, N., & Shaw, A. (2007). Academic doctors' views of complementary and alternative medicine (CAM) and its role within the NHS: An exploratory qualitative study. *BMC Complementary and Alternative Medicine*, *7*, 1–11. https://doi.org/10.1186/1472-6882-7-17

Main, C. J., Foster, N., & Buchbinder, R. (2010). How important are back pain beliefs and expectations for satisfactory recovery from back pain? *Best Practice and Research: Clinical Rheumatology*, *24*(2), 205–217. https://doi.org/10.1016/j.berh.2009.12.012

Mann, E. G., LeFort, S., & VanDenKerkhof, E. G. (2013). Self-management interventions for chronic pain. *Pain Management*, *3*(3), 211–222.

Mansell, G., Storheim, K., Løchting, I., Werner, E. L., & Grotle, M. (2017). Identification of indirect effects in a Cognitive Patient Education (COPE) intervention for low back pain. *Physical Therapy*, *97*(12), 1138–1146.

Marc, I., Rainville, P., Masse, B., Dufresne, A., Verreault, R., Vaillancourt, L., & Dodin, S. (2009). Women's views regarding hypnosis for the control of surgical pain in the context of a randomized clinical trial. *Journal of Women's Health*, *18*(9), 1441–1447.

Marszalek, J., Price, L. L., Harvey, W. F., Driban, J. B., & Wang, C. (2017). Outcome Expectations and Osteoarthritis: Association of Perceived Benefits of Exercise With Self-Efficacy and Depression. *Arthritis Care & Research*, *69*(4), 491–498.

Martin, L. R., Williams, S. L., Haskard, K. B., & DiMatteo, M. R. (2005). The challenge of patient adherence. *Therapeutics and Clinical Risk Management*, *1*(3), 189.

Martos-Méndez, M. J. (2015). Self-efficacy and adherence to treatment: the mediating effects of social support. *Journal of Behavior, Health & Social Issues*, *7*(2), 19–29.

Mavros, M. N., Athanasiou, S., Gkegkes, I. D., Polyzos, K. A., Peppas, G., & Falagas, M. E. (2011). Do psychological variables affect early surgical recovery? *PloS One*, *6*(5), e20306.

May, A. (2008). Chronic pain may change the structure of the brain. *PAIN®*, *137*(1), 7–15.

McCaffery, M., Ferrell, B. R., & Pasero, C. (2000). Nurses' personal opinions about patients' pain and their effect on recorded assessments and titration of opioid doses. *Pain Management Nursing*, *1*(3), 79–87.

McDonald, S., Page, M. J., Beringer, K., Wasiak, J., & Sprowson, A. (2014). Preoperative education for hip or knee replacement. *The Cochrane Library*.

Melzack, R. (1987). The short-form McGill pain questionnaire. *Pain*, *30*(2), 191–197.

Meterko, M., Restuccia, J. D., Stolzmann, K., Mohr, D., Brennan, C., Glasgow, J., & Kaboli, P. (2015). Response rates, nonresponse bias, and data quality: Results from

a national survey of senior healthcare leaders. *Public Opinion Quarterly*, *79*(1), 130–144. Retrieved from https://www.researchgate.net/profile/Justin_Glasgow/publication/274253773_Response_Rates_Nonresponse_Bias_and_Data_Quality_Results_From_a_National_Survey_of_Senior_Healthcare_Leaders/links/562d795b08aef25a244319bd/Response-Rates-Nonresponse-Bias-and-Data-Quality-Results-From-a-National-Survey-of-Senior-Healthcare-Leaders.pdf

Meyer, P., Karl, A., & Flor, H. (2015). Pain can produce systematic distortions of autobiographical memory. *Pain Medicine*, *16*(5), 905–910.

Mezei, L., & Murinson, B. B. (2011). Pain education in North American Medical Schools. *Journal of Pain*, *12*(12), 1199–1208. https://doi.org/10.1016/j.jpain.2011.06.006

Michie, S., & Abraham, C. (2004). Interventions to change health behaviours: evidence-based or evidence-inspired? *Psychology & Health*, *19*(1), 29–49.

Michie, S., Johnston, M., Abraham, C., Lawton, R., Parker, D., & Walker, A. (2005). Making psychological theory useful for implementing evidence based practice: a consensus approach. *BMJ Quality & Safety*, *14*(1), 26–33.

Michie, S., & Prestwich, A. (2010). Are interventions theory-based? Development of a theory coding scheme. *Health Psychology*, *29*(1), 1.

Milden, S. P., & Stokols, D. (2004). Physicians' attitudes and practices regarding complementary and alternative medicine. *Behavioral Medicine*, *30*(2), 73–84.

Milder, T. Y., Williams, K. M., Ritchie, J. E., Lipworth, W. L., & Day, R. O. (2010). Use of NSAIDs for osteoarthritis amongst older-aged primary care patients: engagement with information and perceptions of risk. *Age and Ageing*, *40*(2), 254–259.

Mitchell, L. A., MacDonald, R. A. R., Knussen, C., & Serpell, M. G. (2007). A survey investigation of the effects of music listening on chronic pain. *Psychology of Music*, *35*(1), 37–57.

Molassiotis, A., Fernadez-Ortega, P., Pud, D., Ozden, G., Scott, J. A., Panteli, V., … Selvekerova, S. (2005). Use of complementary and alternative medicine in cancer

patients: a European survey. *Annals of Oncology*, *16*(4), 655–663.

Montgomery, G. H., Weltz, C. R., Seltz, M., & Bovbjerg, D. H. (2002). Brief presurgery hypnosis reduces distress and pain in excisional breast biopsy patients. *International Journal of Clinical and Experimental Hypnosis*, *50*(1), 17–32. https://doi.org/10.1080/00207140208410088

Moore, R. A., Derry, S., Aldington, D., & Wiffen, P. J. (2015). Single dose oral analgesics for acute postoperative pain in adults-an overview of Cochrane reviews. *Cochrane Database of Systematic Reviews*, (9).

Moore, R. A., Wiffen, P. J., Derry, S., Maguire, T., Roy, Y. M., & Tyrrell, L. (2015). Non-prescription (OTC) oral analgesics for acute pain-an overview of Cochrane reviews. *Cochrane Database of Systematic Reviews*, (11). Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6485506/pdf/CD010794.pdf

Morgan, D. L. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research*, *1*(1), 48–76.

Morone, N. E., Lynch, C. S., Greco, C. M., Tindle, H. A., & Weiner, D. K. (2008). "I felt like a new person." The effects of mindfulness meditation on older adults with chronic pain: qualitative narrative analysis of diary entries. *The Journal of Pain*, *9*(9), 841–848.

Morrison, R. S., Flanagan, S., Fischberg, D., Cintron, A., & Siu, A. L. (2009). A novel interdisciplinary analgesic program reduces pain and improves function in older adults after orthopedic surgery. *Journal of the American Geriatrics Society*, *57*(1), 1–10.

Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2002). Verification strategies for establishing reliability and validity in qualitative research. *International Journal of Qualitative Methods*, *1*(2), 13–22. Retrieved from https://journals.sagepub.com/doi/pdf/10.1177/160940690200100202

Morton, S. M. B., Bandara, D. K., Robinson, E. M., & Carr, P. E. A. (2012). In the 21st Century, what is an acceptable response rate? *Australian and New Zealand Journal of Public Health*, *36*(2), 106–108. Retrieved from https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1753-6405.2012.00854.x

Moseley, G. L., & Butler, D. S. (2015). Fifteen years of explaining pain: the past, present, and future. *The Journal of Pain*, *16*(9), 807–813.

Murgic, L., Hébert, P. C., Sovic, S., & Pavlekovic, G. (2015). Paternalism and autonomy: views of patients and providers in a transitional (post-communist) country. *BMC Medical Ethics*, *16*(1), 65.

Myers, S. S., Phillips, R. S., Davis, R. B., Cherkin, D. C., Legedza, A., Kaptchuk, T. J., … Connelly, M. T. (2008). Patient expectations as predictors of outcome in patients with acute low back pain. *Journal of General Internal Medicine*, *23*(2), 148–153.

National Institute for Health and Care Excellence NIHCE. (2014). *Behaviour Change: Individual Approaches*. *NICE Public Health Guidelines.*

National Institute for Health and Clinical Excellence (NICE) guidelines. (n.d.). *No*.

Neame, R., & Hammond, A. (2005). Beliefs about medications: a questionnaire survey of people with rheumatoid arthritis. *Rheumatology*, *44*(6), 762–767.

Nelson, E. A., Dowsey, M. M., Knowles, S. R., Castle, D. J., Salzberg, M. R., Monshat, K., … Choong, P. F. M. (2013). Systematic review of the efficacy of pre-surgical mind-body based therapies on post-operative outcome measures. *Complementary Therapies in Medicine*, *21*(6), 697–711.

Neumann, M. (2017). Knowledge and Attitudes of Orthopedic Nurses Regarding Pain Management.

Nicholls, J. L., Azam, M. A., Burns, L. C., Englesakis, M., Sutherland, A. M., Weinrib, A. Z., … Clarke, H. (2018). Psychological treatments for the management of postsurgical pain: a systematic review of randomized controlled trials. *Patient Related Outcome Measures*, *9*, 49.

Nilsson, U., Unosson, M., & Rawal, N. (2005). Stress reduction and analgesia in patients exposed to calming music postoperatively: a randomized controlled trial. *European Journal of Anaesthesiology*, *22*(2), 96–102.

Noble, H., & Smith, J. (2015). Issues of validity and reliability in qualitative research. *Evidence-Based Nursing*, *18*(2), 34–35. Retrieved from https://ebn.bmj.com/content/ebnurs/18/2/34.full.pdf

Nordgren, L. F., Banas, K., & MacDonald, G. (2011). Empathy gaps for social pain: Why people underestimate the pain of social suffering. *Journal of Personality and Social Psychology*, *100*(1), 120.

Nordgren, L. F., van der Pligt, J., & van Harreveld, F. (2007). Evaluating Eve: visceral states influence the evaluation of impulsive behavior. *Journal of Personality and Social Psychology*, *93*(1), 75.

Nuseir, K., Kassab, M., & Almomani, B. (2016). Healthcare providers' knowledge and current practice of pain assessment and management: How much progress have we made? *Pain Research and Management*, *2016*, 18–23. https://doi.org/10.1155/2016/8432973

O'Callaghan, C. C. (1996). Pain, music creativity and music therapy in palliative care. *American Journal of Hospice and Palliative Medicine®*, *13*(2), 43–49.

O'Cathain, A., Murphy, E., & Nicholl, J. (2007). Why, and how, mixed methods research is undertaken in health services research in England: a mixed methods study. *BMC Health Services Research*, *7*(1), 85.

O'Connell, N. E., Cook, C. E., Wand, B. M., & Ward, S. P. (2016). Clinical guidelines for low back pain: A critical review of consensus and inconsistencies across three major guidelines. *Best Practice and Research: Clinical Rheumatology*, *30*(6), 968–980. https://doi.org/10.1016/j.berh.2017.05.001

Olchowska-Kotala, A., & Barański, J. (2016). Polish physicians' attitudes to complementary and alternative medicine. *Complementary Therapies in Medicine*, *27*, 51–57. https://doi.org/10.1016/j.ctim.2016.05.004

Ossipov, M. H., Dussor, G. O., & Porreca, F. (2010). Central modulation of pain. *The Journal of Clinical Investigation*, *120*(11), 3779–3787.

Özer, N., Özlü, Z. K., Arslan, S., & Günes, N. (2013). Effect of music on postoperative pain and physiologic parameters of patients after open heart surgery. *Pain Management Nursing*, *14*(1), 20–28.

Pandey, S. C., & Patnaik, S. (2014). Establishing reliability and validity in qualitative inquiry: A critical examination. *Jharkhand Journal of Development and Management Studies*, *12*(1), 5743–5753.

Park, J., Hirz, C. E., Manotas, K., & Hooyman, N. (2013). Nonpharmacological Pain Management by Ethnically Diverse Older Adults With Chronic Pain: Barriers and Facilitators. *Journal of Gerontological Social Work*, *56*(6), 487–508. https://doi.org/10.1080/01634372.2013.808725

Pastor, M.-Á., López-Roig, S., Sanz, Y., Peñacoba, C., Cigarán, M., Lledó, A., … Écija, C. (2015). Walking as physical exercise in Fibromyalgia: An elicitation study from the Theory of Planned Behavior. *Anales de Psicología / Annals of Psychology*, *31*(2), 433–446.

Patton, M. Q. (1987). *How to use qualitative methods in evaluation*. Sage.

Peerdeman, K. J., van Laarhoven, A. I. M., Keij, S. M., Vase, L., Rovers, M. M., Peters, M. L., & Evers, A. W. M. (2016). Relieving patients' pain with expectation interventions: a meta-analysis. *Pain*, *157*(6), 1179–1191.

Pellino, T. A., Gordon, D. B., Engelke, Z. K., Busse, K. L., Collins, M. A., Silver, C. E., & Norcross, N. J. (2005). Use of nonpharmacologic interventions for pain and anxiety after total hip and total knee arthroplasty. *Orthopaedic Nursing*, *24*(3), 182–190.

Phatak, H. M., & Thomas, J. (2006). Relationship between beliefs about medications and nonadherence to prescribed chronic medications. *Annals of Pharmacotherapy*, *40*(10), 1737–1742. https://doi.org/10.1345/aph.1H153

Phillips, C. J. (2009). The cost and burden of chronic pain. *Reviews in Pain*, *3*(1), 2–5.

Pickering, G., Jourdan, D., Eschalier, A., & Dubray, C. (2002). Impact of age, gender and cognitive functioning on pain perception. *Gerontology*, *48*(2), 112–118.

Pietkiewicz, I., & Smith, J. A. (2014). A practical guide to using interpretative phenomenological analysis in qualitative research psychology. *Psychological Journal*, *20*(1), 7–14.

Pike, A., Hearn, L., & de C Williams, A. C. (2016). Effectiveness of psychological interventions for chronic pain on health care use and work absence: systematic review and meta-analysis. *Pain*, *157*(4), 777–785.

Porter, L. S., Keefe, F. J., Garst, J., McBride, C. M., & Baucom, D. (2008). Self-efficacy

for managing pain, symptoms, and function in patients with lung cancer and their informal caregivers: associations with symptoms and distress. *PAIN®*, *137*(2), 306–315.

Posadzki, P., Watson, L. K., Alotaibi, A., & Ernst, E. (2013). Prevalence of use of complementary and alternative medicine (CAM) by patients/consumers in the UK: systematic review of surveys. *Clinical Medicine*, *13*(2), 126–131.

Prochaska, J. O., & Velicer, W. F. (1997). The transtheoretical model of health behavior change. *American Journal of Health Promotion*, *12*(1), 38–48.

Rahman, M. S. (2017). The Advantages and Disadvantages of Using Qualitative and Quantitative Approaches and Methods in Language" Testing and Assessment" Research: A Literature Review. *Journal of Education and Learning*, *6*(1), 102–112.

Ramsey, C. A., & Hewitt, A. D. (2005). A Methodology for Assessing Sample Representativeness. *Environmental Forensics*, *6*(1), 71–75. Retrieved from http://hawaiidoh.com/references/Ramsey and Hewitt 2005.pdf

Rawal, N. (2016). Current issues in postoperative pain management. *European Journal of Anaesthesiology (EJA)*, *33*(3), 160–171.

Redding, C. A., Rossi, J. S., Rossi, S. R., Velicer, W. F., & Prochaska, J. O. (2000). Health behavior models. In *International Electronic Journal of Health Education*. Citeseer.

Reid, M. C. (2016). Expanding Targets for Intervention in Later Life Pain: What Role Can Patient Beliefs, Expectations and Pleasant Activities Play? *Clinics in Geriatric Medicine*, *32*(4), 797.

Ricardo Buenaventura, M., Rajive Adlaka, M., & Nalini Sehgal, M. (2008). Opioid complications and side effects. *Pain Physician*, *11*, S105–S120.

Rich, A., Brandes, K., Mullan, B., & Hagger, M. S. (2015). Theory of planned behavior and adherence in chronic illness: a meta-analysis. *Journal of Behavioral Medicine*, *38*(4), 673–688.

Robles, T. F., Slatcher, R. B., Trombello, J. M., & McGinn, M. M. (2014). Marital quality and health: A meta-analytic review. *Psychological Bulletin*, *140*(1), 140.

Rosendahl, J., Koranyi, S., Jacob, D., Zech, N., & Hansen, E. (2016). Efficacy of therapeutic suggestions under general anesthesia: a systematic review and meta-analysis of randomized controlled trials. *BMC Anesthesiology*, *16*(1), 125.

Rosenstock, I. M. (1974). Historical origins of the health belief model. *Health Education Monographs*, *2*(4), 328–335.

Rosero, E. B., & Joshi, G. P. (2014). Preemptive, preventive, multimodal analgesia: what do they really mean? *Plastic and Reconstructive Surgery*, *134*(4S–2), 85S–93S.

Sabaté, E. (2003). *Adherence to long-term therapies: evidence for action*. World Health Organization.

Sale, J. E. M., Gignac, M., & Hawker, G. (2006). How "bad" does the pain have to be? A qualitative study examining adherence to pain medication in older adults with osteoarthritis. *Arthritis Care & Research*, *55*(2), 272–278.

Salti, A., Alabady, A., Al-Falaki, M. M., Ibrahim, T. A., Scott, N. B., Sherllalah, S. T., & Schug, S. A. (2016). Expert panel consensus recommendations for postoperative pain management in the Gulf region. *Pain Management*, *6*(6), 569–579.

Sanders, S., Herr, K. A., Fine, P. G., Fiala, C., Tang, X., & Forcucci, C. (2013). An examination of adherence to pain medication plans in older cancer patients in hospice care. *Journal of Pain and Symptom Management*, *45*(1), 43–55.

Saposnik, G., Redelmeier, D., Ruff, C. C., & Tobler, P. N. (2016). Cognitive biases associated with medical decisions: a systematic review. *BMC Medical Informatics and Decision Making*, *16*(1), 1–14. https://doi.org/10.1186/s12911-016-0377-1

Sayette, M. A., Loewenstein, G., Griffin, K. M., & Black, J. J. (2008). Exploring the cold-to-hot empathy gap in smokers. *Psychological Science*, *19*(9), 926–932.

Schomerus, G., & Angermeyer, M. C. (2008). Stigma and its impact on help-seeking for mental disorders: What do we know? *Epidemiologia e Psichiatria Sociale*, *17*(1), 31–37. https://doi.org/10.1017/S1121189X00002669

Schreckenberger, M., Amberg, R., Scheurich, A., Lochmann, M., Tichy, W., Klega, A., … Landvogt, C. (2004). Acute alcohol effects on neuronal and attentional processing: striatal reward system and inhibitory sensory interactions under acute

ethanol challenge. *Neuropsychopharmacology*, *29*(8), 1527.

Schwarzer, R. (2008). Modeling health behavior change: How to predict and modify the adoption and maintenance of health behaviors. *Applied Psychology*, *57*(1), 1–29.

Scotland, N. Q. I. (2004). Post-operative pain management. Best Practice Statement. *Challenges*, *48*(June), 406–414. https://doi.org/10.1002/14651858.ED000033

Seers, K., & Carroll, D. (1998). Relaxation techniques for acute pain management: a systematic review. *Journal of Advanced Nursing*, *27*(3), 466–475.

Shang, A. B., & Gan, T. J. (2003). Optimising postoperative pain management in the ambulatory patient. *Drugs*, *63*(9), 855–867.

Sheikh, A. A., & Kunzendorf, R. G. (1984). Imagery, physiology, and psychosomatic illness. *International Review of Mental Imagery*, *1*, 95–138.

Sinatra, R. (2010). Causes and consequences of inadequate management of acute pain. *Pain Medicine*, *11*(12), 1859–1871.

Sirey, J. A., Bruce, M. L., Alexopoulos, G. S., Perlick, D. A., Raue, P., Friedman, S. J., & Meyers, B. S. (2001). Perceived stigma as a predictor of treatment discontinuation in young and older outpatients with depression. *American Journal of Psychiatry*, *158*(3), 479–481. https://doi.org/10.1176/appi.ajp.158.3.479

Skinner, H. B. (2004). Multimodal acute pain management. *American Journal of Orthopedics (Belle Mead, NJ)*, *33*(5 Suppl), 5–9.

Sloman, R., Rosen, G., Rom, M., & Shir, Y. (2005). Nurses' assessment of pain in surgical patients. *Journal of Advanced Nursing*, *52*(2), 125–132. https://doi.org/10.1111/j.1365-2648.2005.03573.x

Smeets, R. J. E. M., Beelen, S., Goossens, M. E. J. B., Schouten, E. G. W., Knottnerus, J. A., & Vlaeyen, J. W. S. (2008). Treatment expectancy and credibility are associated with the outcome of both physical and cognitive-behavioral treatment in chronic low back pain. *The Clinical Journal of Pain*, *24*(4), 305–315.

Smith, J. C. (2007). The psychology of relaxation. *Principles and Practice of Stress Management*, *3*, 38–52.

Smith, J., & Noble, H. (2014). Bias in research. *Evidence-Based Nursing*, *17*(4), 100–101.

Retrieved from https://ebn.bmj.com/content/ebnurs/17/4/100.full.pdf

Smith, M. Y., DuHamel, K. N., Egert, J., & Winkel, G. (2010). Impact of a brief intervention on patient communication and barriers to pain management: results from a randomized controlled trial. *Patient Education and Counseling*, *81*(1), 79–86.

Sommer, M., de Rijke, J. M., van Kleef, M., Kessels, A. G. H., Peters, M. L., Geurts, J. W., … Marcus, M. A. E. (2010). Predictors of acute postoperative pain after elective surgery. *The Clinical Journal of Pain*, *26*(2), 87–94.

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. *Archives of Internal Medicine*, *166*(10), 1092–1097.

Stefano, G. B., Fricchione, G. L., & Esch, T. (2006). Relaxation: Molecular and physiological significance. *Medical Science Monitor*, *12*(9), HY21-HY31.

Steinmetz, H., Knappstein, M., Ajzen, I., Schmidt, P., & Kabst, R. (2016). How effective are behavior change interventions based on the theory of planned behavior? A three-level meta-analysis. *Zeitschrift Für Psychologie*, *224*(3), 216.

Stevensen, C. (1995). Nonpharmacological aspects of acute pain management. *Complementary Therapies in Nursing and Midwifery*, *1*(3), 77–84. https://doi.org/10.1016/S1353-6117(05)80081-2

Stewart, J. A., Egloff, N., von Känel, R., Grolimund, J., Studer, M., & Grosse Holtforth, M. (2017). Motivation for Psychological treatment predicts favorable outcomes in multimodal interdisciplinary treatment for chronic somatoform pain. *Psychotherapy and Psychosomatics*, *86*(1), 60–61.

Stone, J., & Moskowitz, G. B. (2011). Non-conscious bias in medical decision making: What can be done to reduce it? *Medical Education*, *45*(8), 768–776. https://doi.org/10.1111/j.1365-2923.2011.04026.x

Stone, J., Wojcik, W., Durrance, D., Carson, A., Lewis, S., MacKenzie, L., … Sharpe, M. (2002). What should we say to patients with symptoms unexplained by disease? The "number needed to offend." *BMJ: British Medical Journal*, *325*(7378), 1449.

Strassels, S. A., McNicol, E., Wagner, A. K., Rogers, W. H., Gouveia, W. A., & Carr,

D. B. (2004). Persistent postoperative pain, health-related quality of life, and functioning 1 month after hospital discharge. *Acute Pain*, *6*(3), 95–104.

Tan, G., Craine, M. H., Bair, M. J., & Garcia, M. K. (2007). Efficacy of selected complementary and alternative medicine interventions for chronic pain. *Journal of Rehabilitation Research and Development*, *44*(2), 195.

Tan, G., Dao, T. K., Smith, D. L., Robinson, A., & Jensen, M. P. (2010). Incorporating complementary and alternative medicine (CAM) therapies to expand psychological services to veterans suffering from chronic pain. *Psychological Services*, *7*(3), 148.

Tariq, S., & Woodman, J. (2013). Using mixed methods in health research. *JRSM Short Reports*, *4*(6), 2042533313479197.

Tauben, D. J., & Loeser, J. D. (2013). Pain education at the university of Washington school of medicine. *Journal of Pain*, *14*(5), 431–437. https://doi.org/10.1016/j.jpain.2013.01.005

Tefikow, S., Barth, J., Maichrowitz, S., Beelmann, A., Strauss, B., & Rosendahl, J. (2013). Efficacy of hypnosis in adults undergoing surgery or medical procedures: a meta-analysis of randomized controlled trials. *Clinical Psychology Review*, *33*(5), 623–636.

Thom, D. H., Kravitz, R. L., Bell, R. a, Krupat, E., & Azari, R. (2002). Patient trust in the physician: relationship to patient requests. *Family Practice*, *19*(5), 476–483. https://doi.org/10.1046/j.1369-6513.2000.00091.x

Thompson, E. L., Broadbent, J., Bertino, M. D., & Staiger, P. K. (2016). Do Pain-related Beliefs Influence Adherence to Multidisciplinary Rehabilitation? *The Clinical Journal of Pain*, *32*(2), 164–178.

Thorlby, R., Jorgensen, S., Siegel, B., & Ayanian, J. Z. (2011). How health care organizations are using data on patients' race and ethnicity to improve quality of care. *The Milbank Quarterly*, *89*(2), 226–255.

Timmerman, L., Stronks, D. L., Groeneweg, J. G., & Huygen, F. J. (2016). Prevalence and determinants of medication non-adherence in chronic pain patients: a systematic review. *Acta Anaesthesiologica Scandinavica*, *60*(4), 416–431.

Tollefson, J., Usher, K., & Foster, K. (2011). Relationships in pain: the experience of relationships to people living with chronic pain in rural areas. *International Journal of Nursing Practice*, *17*(5), 478–485.

Tse, M. M. Y., Chan, M. F., & Benzie, I. F. F. (2005). The effect of music therapy on postoperative pain, heart rate, systolic blood pressure and analgesic use following nasal surgery. *Journal of Pain & Palliative Care Pharmacotherapy*, *19*(3), 21–29.

Tuli, F. (2010). The basis of distinction between qualitative and quantitative research in social science: Reflection on ontological, epistemological and methodological perspectives. *Ethiopian Journal of Education and Sciences*, *6*(1).

Ubel, P. A., Angott, A. M., & Zikmund-Fisher, B. J. (2011). Physicians recommend different treatments for patients than they would choose for themselves. *Archives of Internal Medicine*, *171*(7), 630–634. https://doi.org/10.1001/archinternmed.2011.91

Unni, E. J., Shiyanbola, O. O., & Farris, K. B. (2016). Change in medication adherence and beliefs in medicines over time in older adults. *Global Journal of Health Science*, *8*(5), 39.

Upshaw, W. N. (2006). Hypnosis: Medicine's dirty word. *American Journal of Clinical Hypnosis*, *49*(2), 113–122.

Urquhart, C. (2012). *Grounded theory for qualitative research: A practical guide*. Sage.

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & Health Sciences*, *15*(3), 398–405.

Velleman, S., Stallard, P., & Richardson, T. (2010). A review and meta-analysis of computerized cognitive behaviour therapy for the treatment of pain in children and adolescents. *Child: Care, Health and Development*, *36*(4), 465–472.

Verbeek, J., Sengers, M.-J., Riemens, L., & Haafkens, J. (2004). Patient expectations of treatment for back pain: a systematic review of qualitative and quantitative studies. *Spine*, *29*(20), 2309–2318.

Vermeire, E., Hearnshaw, H., Van Royen, P., & Denekens, J. (2002). Patient adherence to treatment: three decades of research. A comprehensive review. *J Clin Pharm Ther*,

26. https://doi.org/10.1046/j.1365-2710.2001.00363.x

Visser, E. J. (2006). Chronic post-surgical pain: epidemiology and clinical implications for acute pain management. *Acute Pain*, *8*(2), 73–81.

Vogel, D. L., Wester, S. R., Wei, M., & Boysen, G. A. (2005). The Role of Outcome Expectations and Attitudes on Decisions to Seek Professional Help. *Journal of Counseling Psychology*, *52*(4), 459.

Vranceanu, A.-M., Jupiter, J. B., Mudgal, C. S., & Ring, D. (2010). Predictors of pain intensity and disability after minor hand surgery. *The Journal of Hand Surgery*, *35*(6), 956–960.

Vrijens, B., De Geest, S., Hughes, D. A., Przemyslaw, K., Demonceau, J., Ruppar, T., … Lewek, P. (2012). A new taxonomy for describing and defining adherence to medications. *British Journal of Clinical Pharmacology*, *73*(5), 691–705.

Waldrop, D., Lightsey Jr, O. R., Ethington, C. A., Woemmel, C. A., & Coke, A. L. (2001). Self-efficacy, optimism, health competence, and recovery from orthopedic surgery. *Journal of Counseling Psychology*, *48*(2), 233.

Waller, A., Forshaw, K., Bryant, J., Carey, M., Boyes, A., & Sanson-Fisher, R. (2015). Preparatory education for cancer patients undergoing surgery: a systematic review of volume and quality of research output over time. *Patient Education and Counseling*, *98*(12), 1540–1549.

Wandner, L. D., Scipio, C. D., Hirsh, A. T., Torres, C. A., & Robinson, M. E. (2012). The perception of pain in others: how gender, race, and age influence pain expectations. *The Journal of Pain*, *13*(3), 220–227.

Ward, S. E., Carlson-Dakes, K., Hughes, S. H., Kwekkeboom, K. L., & Donovan, H. S. (1998). The impact on quality of life of patient-related barriers to pain management. *Research in Nursing & Health*, *21*(5), 405–413.

Watt-Watson, J., Stevens, B., Garfinkel, P. E., Streiner, D., & Gallop, R. (2002). Relationship between pain knowledge and pain management outcomes for postoperative cardiac patients, (January), 535–545. https://doi.org/10.1046/j.1365-2648.2001.02006.x

Westbrook, D., Sedgwick-Taylor, A., Bennett-Levy, J., Butler, G., & McManus, F. (2008). A pilot evaluation of a brief CBT training course: Impact on trainees' satisfaction, clinical skills and patient outcomes. *Behavioural and Cognitive Psychotherapy*, *36*(5), 569–579.

Williams, A. R., Hind, M., & Sweeney, B. P. (1994). The incidence and severity of postoperative nausea and vomiting in patients exposed to positive intra-operative suggestions. *Anaesthesia*, *49*(4), 340–342.

Wilson, H. D., Dansie, E. J., Kim, M. S., Moskovitz, B. L., Chow, W., & Turk, D. C. (2013). Clinicians' attitudes and beliefs about opioids survey (CAOS): Instrument development and results of a national physician survey. *The Journal of Pain*, *14*(6), 613–627.

Wisdom, J., & Creswell, J. W. (2013). Mixed methods: integrating quantitative and qualitative data collection and analysis while studying patient-centered medical home models. *Rockville: Agency for Healthcare Research and Quality*. Retrieved from https://pcmh.ahrq.gov/sites/default/files/attachments/MixedMethods_032513comp.pdf

Wolfert, M. Z., Gilson, A. M., Dahl, J. L., & Cleary, J. F. (2010). Opioid analgesics for pain control: wisconsin physicians' knowledge, beliefs, attitudes, and prescribing practices. *Pain Medicine (Malden, Mass.)*, *11*(3), 425–434. https://doi.org/10.1111/j.1526-4637.2009.00761.x

Wu, C. L., Naqibuddin, M., Rowlingson, A. J., Lietman, S. A., Jermyn, R. M., & Fleisher, L. A. (2003). The effect of pain on health-related quality of life in the immediate postoperative period. *Anesthesia & Analgesia*, *97*(4), 1078–1085.

Wyer, S. J., Earll, L., Joseph, S., Harrison, J., Giles, M., & Johnston, M. (2001). Increasing attendance at a cardiac rehabilitation programme: an intervention study using the Theory of Planned Behaviour. *Coronary Health Care*, *5*(3), 154–159.

Yang, H., Carmon, Z., Kahn, B., Malani, A., Schwartz, J., Volpp, K., & Wansink, B. (2012). The Hot–Cold Decision Triangle: A framework for healthier choices. *Marketing Letters*, *23*(2), 457–472.

Yang, S.-Y., Bogosian, A., Moss-Morris, R., & McCracken, L. M. (2015). Mixed

experiences and perceptions of psychological treatment for chronic pain in singapore: skepticism, ambivalence, satisfaction, and potential. *Pain Medicine*, *16*(7), 1290–1300. Retrieved from https://academic.oup.com/painmedicine/article/16/7/1290/1917399

Yuxiang, L., Lingjun, Z., Lu, T., Mengjie, L., Xing, M., Fengping, S., … Jijun, Z. (2012). Burn patients' experience of pain management: a qualitative study. *Burns*, *38*(2), 180–186.

Zeidan, F., Gordon, N. S., Merchant, J., & Goolkasian, P. (2010). The Effects of Brief Mindfulness Meditation Training on Experimentally Induced Pain. *Journal of Pain*, *11*(3), 199–209. https://doi.org/10.1016/j.jpain.2009.07.015

Appendixes

Appendix A: an example of the search strategy used within PubMed

((acute pain OR operative pain OR surgical pain OR postoperative pain OR post surgical pain OR pain after procedure OR acute postoperative pain OR acute post surgical pain)) AND (randomized controlled trial OR RCT OR randomly OR random OR clinical trial OR controlled clinical trial)

((((acute pain OR operative pain OR surgical pain OR postoperative pain OR post surgical pain OR pain after procedure OR acute postoperative pain OR acute post surgical pain)) AND (randomized controlled trial OR RCT OR randomly OR random OR clinical trial OR controlled clinical trial))) AND ((relax OR relaxation OR breathing training OR breathing exercise))

((((acute pain OR operative pain OR surgical pain OR postoperative pain OR post surgical pain OR pain after procedure OR acute postoperative pain OR acute post surgical pain)) AND (randomized controlled trial OR RCT OR randomly OR random OR clinical trial OR controlled clinical trial))) AND (((((distract) OR distraction) OR music) OR music therapy) OR attention)

((((acute pain OR operative pain OR surgical pain OR postoperative pain OR post surgical pain OR pain after procedure OR acute postoperative pain OR acute post surgical pain)) AND (randomized controlled trial OR RCT OR randomly OR random OR clinical trial OR controlled clinical trial))) AND ((guided imagery OR mental visualization))

((((acute pain OR operative pain OR surgical pain OR postoperative pain OR post surgical pain OR pain after procedure OR acute postoperative pain OR acute post surgical pain)) AND (randomized controlled trial OR RCT OR randomly OR random OR clinical trial OR controlled clinical trial))) AND ((hypnosis OR hypnotherapy OR hypnotic induction OR self-hypnosis OR hypnotic suggestion OR hypnotic treatment OR autohypnosis OR hypnotically OR hypnotism OR hypnotist OR hypnotized OR hypnosis dental OR hypnosis anesthetic OR hypnotherapeutic))

((((acute pain OR operative pain OR surgical pain OR postoperative pain OR post surgical pain OR pain after procedure OR acute postoperative pain OR acute post surgical pain)) AND (randomized controlled trial OR RCT OR randomly OR random OR clinical trial OR controlled clinical trial))) AND psychological intervention

((((acute pain OR operative pain OR surgical pain OR postoperative pain OR post surgical pain OR pain after procedure OR acute postoperative pain OR acute post surgical pain)) AND (randomized controlled trial OR RCT OR randomly OR random OR clinical trial OR controlled clinical trial))) AND ((behavioural intervention OR behavioral intervention))

((((acute pain OR operative pain OR surgical pain OR postoperative pain OR post surgical pain OR pain after procedure OR acute postoperative pain OR acute post surgical pain)) AND (randomized controlled trial OR RCT OR randomly OR random OR clinical trial OR controlled clinical trial))) AND ((mind-body therapy OR mind body treatment))

Appendix B: The form of Study eligibility:

Study ID: (it will be captured from Bibtex)

Study Characteristics	Eligibility criteria
Study design	Randomised Controlled Trial
Participants	Males or females. Included different ages, excluded ≤ 5 years old. Undergoing any form of surgical procedure.
Types of intervention	Delivered by audiotape OR by a script made by a trained psychologist in these techniques. Delivered by any self-help materials e.g. brief training in workshop or online, but not exceeded 2 hours of individuals or a day of group training. The effect of psychological intervention should be evaluated independently from the control group. Assessed either a single or combination of psychological interventions with separated measures. and compared them with other control group not including any aspects brief psychological interventions. A brief psych intervention included: ✓ Relaxation techniques ✓ Hypnosis ✓ Guided imagery ✓ Distraction e.g. music ✓ Psychoeducational interventions. <u>BUT excluded:</u> × Interventions should be conducted by psychological specialists or trained nurses. (e.g. live hypnosis or cognitive behavioural intervention). × Psych interventions that require patients' involvement in long training programmes for treatment (e.g. relaxation exercise as part from cognitive behavioural therapy; however, it could be included if each technique was measured or evaluated independently from other component of the intervention and the training lasting ≤ 2h). Control comparator: No type of control group is pre-specified, and can include treatment as usual or any other type of comparisons as long as the effects of brief psychological interventions are isolated and not included in the control group. Length of follow-up: At least 6h or more follow-up of the intervention.
Outcome measures	Primary outcome:

	At least one measurement of self-reported pain after surgery included: • Numerical Rating Scale (NRS) • Visual Analogue Scale (VAS) • McGill Pain short form questionnaire Secondary outcome: If it is available included: • Anxiety • Quality of life, mobility, fatigue, well-being. • Medication (analgesic) consumption and related side effects. • Satisfaction with treatment. • Adverse events (e.g. withdrawal, vomiting, or sleep problems).
Coding	By reviewing studies (titles & abstracts) they will be assigned into one of the following categories: 1 = eligible to review the full article. 2 = excluded. 3 = unclear or needed to be discussed.