

**Investigation of instruments measuring healthcare
practitioners' attitudes and beliefs toward low back pain:
Psychometric properties and survey of New Zealand
osteopaths and manipulative physiotherapists**

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Declaration

Name of candidate: Wendy Rushworth

This thesis entitled: *'Investigation of instruments measuring healthcare practitioners' attitudes and beliefs toward low back pain: Psychometric properties and survey of New Zealand osteopaths and manipulative physiotherapists'* is submitted in partial fulfilment for the requirements for the Unitec degree of Master of Osteopathy.

Candidates Declaration:

I confirm that:

- This thesis represents my own work;
- Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee.

Research Ethics Committee Approval Number: 2013-1056

Candidate Signature:

Date: 02/03/2015

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Section 1: Literature Review

Thesis Introduction

The prevalence of low back pain (LBP) in western society is high and costly not only for society, but also for the individual experiencing LBP (Copeland, Taylor, & Dean, 2008; Waddell, 2004). There have been a substantial number of studies exploring the relationship between LBP, psychosocial aspects including attitudes and beliefs, and associated disabilities (Coudeyre et al., 2006; Keefe, Rumble, Scipio, Giordano, & Perri, 2004; Leeuw, Goossens, Linton, et al., 2007a; Rainville et al., 2011). This research has been conducted mainly from the patient's perspective. Only recently has attention been directed toward health care practitioners and the possible influence they may have on patients' beliefs and the impact on recovery. It is thought that practitioners' attitudes and beliefs may have a considerable influence in exacerbating or modulating patients' fears and anxieties about pain and symptoms they may be experiencing. If the practitioner harbours negative beliefs about LBP and the management of LBP, this may inadvertently influence advice they give to patients. This advice may not be in line with current best practice guidelines and could negatively influence patients' recovery.

It is well established that patients' beliefs and expectations impact their health outcomes (Demmelmaier, Asenlof, Lindberg, & Denison, 2009; Ruud M. A. Houben et al., 2005; S. Linton, J. Vlaeyen, & R. Ostelo, 2002; Pincus et al., 2007). With regard to LBP, it is recognised that fear-avoidance beliefs are detrimental to recovery and strongly correlate to rising disability, particularly in the acute phase (Leeuw, Goossens, van Breukelen, Boersma, & Vlaeyen, 2007; Leeuw, Goossens, Linton, et al., 2007a; I. Swinkels-Meewisse, Roelofs, Verbeek, Oostendorp, & Vlaeyen, 2006). Practitioners can influence patients' perception of symptoms (particularly pain) and expectations of recovery (Rainville et al., 2011), whether this influence is positive or negative seems to be at least partly dependent on the practitioner's own beliefs around the management of LBP. As a consequence, in recent years there has been growing interest in the development of simple measures to assess practitioner attitudes and beliefs to examine if they may harbour beliefs which may influence management not in line with best practice evidence. Available measurement tools that aim to quantify attitudes and beliefs of practitioners in regards to LBP lack evidence in some psychometric properties (Bishop, Thomas, & Foster, 2007), although some of these

tools have already been utilized in studies exploring practitioners' beliefs around LBP and what influence that has on their advice and management for patients (Ruud M. A. Houben et al., 2005; S. Linton et al., 2002). Further research is required to explore the reliability and validity of these tools before further investigations around practitioners' beliefs toward LBP are conducted.

This thesis investigated the psychometric properties of instruments that measure practitioners' attitudes and beliefs about LBP. Secondly it explored the respondents' attitudes and beliefs toward LBP. Section 1 presents a literature review introducing the topic of LBP, the influence practitioners' attitudes and beliefs may have on their patients' LBP and an overview of available instruments to measure practitioners' attitudes and beliefs. The review concludes with a rationale for further investigation that leads to Section 2. Section 2, is a report of an investigation into the psychometric properties of the Fear Avoidance Beliefs Tool (FABT), Tampa Scale of Kinesiophobia for Health Care Practitioners (TSK-HC), Back Pain Attitudes Questionnaire (Back-PAQ) and the Health Care Providers Pain and Impairment Relationship Scale (HC-PAIRS). Exploration of the attitudes and beliefs of New Zealand (NZ) osteopath and manipulative physiotherapy respondents was also undertaken. Additional data not reported in the manuscript (response rate calculations) are presented in the thesis Appendices (Section 3) along with ethics documentation.

Definitions related to Low Back Pain

Low back pain has been defined in simple topographical terms as “pain and discomfort, localised below the costal margin and above the inferior gluteal folds, with or without leg pain” (Tulder et al., 2006). For the majority of people experiencing LBP, a precise pathological cause is often not detected and therefore is referred to as ‘non-specific low back pain’ (NSLBP). The diagnosis of NSLBP indicates a musculoskeletal origin (Tulder et al., 2006). The timeframe of LBP have been defined by Koes and Tulder (2006) as: ‘acute LBP’ – LBP persisting less than six weeks, ‘sub-acute LBP’ – lasting between six weeks and three months; and ‘chronic LBP’ as lasting longer than three months.

The Prevalence and Impact of Low Back Pain

Most people experience LBP at some stage in their lives. In Europe, it has been estimated that 84% of the population will experience back pain, with approximately 23% entering into a chronic back pain cycle and 11-12% experiencing disability due to LBP (Airaksinen et al., 2006). The World Health Organisation estimate the prevalence of LBP to be 60-70% in industrialised countries and report from the Global Burden of Disease Study report that LBP is one of the top 10 diseases and injuries that account for the highest number of ‘disability adjusted life years’ worldwide (World Health Organisation, 2010). In New Zealand, as many as 67% of all New Zealanders aged between 45 and 64 years were predicted to have experienced some form of LBP (McBride, Begg, Herbison, & Buckingham, 2004). A more recent study that surveyed 602 New Zealanders revealed the lifetime prevalence of back pain was 87% (Darlow et al., 2014a). In addition to this, the Ministry of Health report LBP to be one of the leading causes of health loss in NZ (Ministry of Health & Accident Compensation Corporation, 2013).

Not only is LBP costly for society with regard to health resources it can also be detrimental to many aspects of an individuals’ health and their financial status. The costs associated with LBP are directly dependent on recovery time of the individual and health treatments utilised. Whilst the majority of people with acute/sub-acute LBP recover within two months approximately 3-10% will continue to suffer from LBP beyond this period and may develop an array of disabilities associated with the LBP they are experiencing such as an inability to complete activities of daily living (Klenerman et al., 1995; Waddell, 2004). It is this small proportion of people with persistent LBP that consume approximately 75-80% of health resources allocated to NSLBP (Andersson, 2001; Frymoyer & Cats-Baril, 1991; Loisel et al., 2001; McBride et al., 2004; Waddell, 2004). This amounts to the use of substantial financial resources to cover compensation payments, reduced productivity, and treatment costs. The Accident Compensation Corporation (ACC) in NZ, a Government owned insurance scheme that covers personal injury, spends approximately \$280 million per year on LBP claims (Copeland et al., 2008).

From the perspective of the individual the cost of LBP and the associated disability can be financially, socially and mentally debilitating. Inactivity due to pain can lead to loss of work and income, social isolation, anxiety and feelings of helplessness. According to Waddell (2004) work loss is the most important single measure of low back disability due not only to loss of income but also to a persons' sense of worth, often leading to depression or negative affect (Bogduk, 2006; Waddell, 2004). This scenario presents a risk of a person with LBP entering a negative cycle of activity restriction due to perceived pain which can create further negative impacts on general health and well-being (Waddell, 2004).

Pain and Disability

Pain is defined by the International Association for the Study of Pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage” (Pain, 2010). The perception of ‘potential tissue damage’ is subjective and there is considerable variation for different individuals in their experience of pain, their response to their experience of pain and the impact this may have on their lives. This experience of the perception of pain depends mostly on past encounters with pain, the expectation of pain and the individuals' beliefs around pain (Bogduk, 2006; Loeser & Melzack, 1999).

For many years pain was considered a signal of tissue damage, however investigations have shown that pain is a highly complex phenomenon and does not solely rely on physiological input into the nervous system (Waddell, 2004). The plasticity of the nervous system means that nociceptive messages can be modified at every level of transduction and transmission (Waddell, 2004). This can lead to central or peripheral sensitisation inducing the perception of pain through even innocuous, normal sensory stimulation in an individual (Latremoliere & Woolf, 2010). Even though it is commonly accepted in science and healthcare that pain does not always equal tissue damage, there remains a common public perception that this is the case. Importantly, this common public perception appears to be reflected in the management of LBP patients by some practitioners (Coudeyre et al., 2006; Leeuw,

Goossens, van Breukelen, et al., 2007; Leeuw, Goossens, Linton, et al., 2007a; Leeuw, Goossens, Linton, et al., 2007b).

Pain Behaviours

The ‘perception of pain’ typically results in the demonstration of various ‘pain behaviours’. These pain behaviours are a way of communicating pain to other people and can include facial expressions, limping, taking analgesics, taking time off work and seeking health care (Waddell, 2004). These behaviours are partly dependent on the person’s culture and what they deem to be socially acceptable (Waddell, 2004). A state in which a person experiences a fear of pain, as it is thought to represent increasing tissue damage, can lead to limitation of activity and this in turn can drive disability. The World Health Organisation defines disability as “the outcome or result of a complex relationship between an individual’s health condition and personal factors, and of the external factors that represent the circumstances in which the individual lives” (WHO, 2010). A more succinct definition from Bogduk (2006) is: a combination of physical disorder, distress, and illness behaviours producing disability.

Health care tends to focus on reducing the patients’ pain rather than how well they are functioning in their life (Waddell, 2004). It is conventional that people in western society will seek professional help to reduce their pain and associated symptoms. Pain is most often seen in today’s society as something that should be avoidable and not tolerated. With this view, people experiencing pain may expect an external influence to ‘fix’ them creating greater vulnerability to influences such as practitioners’ attitudes and beliefs.

Transition from Acute to Chronic Pain

The transitional point between acute and chronic pain is a ‘grey’ area in the literature. Chronic pain has been defined for research as lasting longer than three months (Koes et al., 2006) but perhaps a more useful guideline for clinicians is when pain remains longer than the ‘normal’ expected recovery time of the acute injury (Waddell, 2004).

Acute pain initially serves a biological purpose to keep us safe, to pull our hand from a hot object or avoid walking on a fractured leg. Chronic pain however, is devoid of this biological meaning (Waddell, 2004). When acute pain is seen as non-threatening, normal activities are resumed and functional recovery is promoted; conversely if acute pain is misinterpreted and perceived as a threat, a cycle of disuse and avoidance ensues that may exacerbate the problem and create disability (Leeuw, Goossens, van Breukelen, et al., 2007). The ‘threat value’ of pain, meaning how much risk the individual will interpret into a situation in terms of pain generation, often determines pain behaviours (Moseley, 2003). The anticipation of pain may result in the individual avoiding activities; this is referred to as ‘fear avoidance’ behaviour (Keefe et al., 2004).

Barriers to Recovery

There are many aspects of the pain experience that have been recognised as barriers to recovery from LBP in the acute and sub-acute phase. Psychosocial factors are widely considered to be stronger predictors of a transition into chronicity and disability than physical limitations (Burton, Waddell, & Main, 2006). Some of these psychosocial factors are pain catastrophising, helplessness, pain related anxiety and fear of pain (Keefe et al., 2004). Other factors include older age, pain intensity and functional disability, job dissatisfaction, duration of sickness absence, and expectations about recovery (Burton et al., 2006). Almost all of these recovery obstacles are products of a person’s belief and value systems. These are in turn influenced by the patients’ environment and exposure to varying life experiences (Aschenbrenner & Venable, 2009). Therefore, the individuals’ social support network, which most often includes a practitioner, are all likely to influence a person’s beliefs about their LBP.

Beliefs, Attitudes and Expectations

In general terms, a person’s beliefs and attitudes are formed from life experience, and shape interpretation and experience of current and future events in their life. Patient beliefs and expectations have been shown to influence their health outcomes (Demmelmaier et al., 2009; Ruud M. A. Houben et al., 2005; S. Linton et al., 2002; Pincus et al., 2007). In a trial that explored the role of patients’ expectations on health outcome it was found that greater outcome expectations significantly improved the

result of the treatment (Linde et al., 2007). This study provided participants, who had a variety of conditions (including chronic LBP, migraine headache, knee osteoarthritis), with either twelve acupuncture, or 'sham' treatments. Information was then gathered on the patients' beliefs about the treatments they received. The authors of a review of prognostic studies report strong evidence about 'recovery expectations' being predictive of the patients' work outcome (Iles, Davidson, & Taylor, 2008) especially if they were measured within three weeks of onset of the episode of NSLBP. A cross-sectional descriptive study had comparable findings and also established an association between the patients' fear of movement and their practitioners' high fear avoidance beliefs (Poiraudreau, Rannou, Baron, et al., 2006).

Fear Avoidance Beliefs and Behaviour

The fear-avoidance model (Vlaeyen & Linton, 2000), developed to explain the psychosocial aspects of the transition from acute to chronic pain, proposes that if pain is confronted recovery is likely, and if it is avoided a cycle of disuse, disability and depression results, exacerbating the pain experience (Bogduk, 2006; Leeuw, Goossens, van Breukelen, et al., 2007; Leeuw, Goossens, Linton, et al., 2007b). Appropriate coping responses to pain can include fear, escape and avoidance, in fact these are essential for survival in terms of human evolutionary adaptation, but this is only suitable as short term solutions to imminent danger. If this behaviour continues it can negatively influence the musculoskeletal system (Vlaeyen & Linton, 2000). Also, because avoidance behaviour occurs in anticipation of pain rather than as a response to pain, a learned, protective, habitual movement pattern develops and can produce dysfunction (Vlaeyen & Linton, 2000; Waddell, 2004). It has been noted that pain catastrophising, elevated pain-related fear and fear avoidance beliefs about work during the acute period, increased pain, the risk of future chronic LBP and disability (Leeuw, Goossens, van Breukelen, et al., 2007). Much of the research around fear avoidance beliefs of practitioners has focused on beliefs of chronic LBP and very little on beliefs surrounding shorter duration of LBP in the acute and sub-acute range.

The Role of Health Care Practitioners and Low Back Pain

In western society, osteopaths, chiropractors and physiotherapists are the main allied health professions that treat and manage LBP (Pincus et al., 2007). General practitioners (GP) may be the first contact some people have with a practitioner, however, in NZ the ACC system allows the public to directly access allied health providers. Allied health providers, when compared to GPs, tend to spend more time with patients (Houben, Gijsen, Peterson, de Jong, & Vlaeyen, 2005) and therefore may have a greater opportunity, directly and indirectly, to influence their recovery.

After screening for any underlying pathology the current best practice guidelines indicate that practitioners need to advise their patients to remain active and continue their usual work as much as possible during an episode of LBP (ACC, 2004). Other advice includes, controlling symptoms by taking simple non-opioid analgesics, providing reassurance that most LBP resolves within 4-6 weeks, and convey a message that it is unlikely there is anything sinister underlying a person's pain symptoms (ACC, 2004; Leeuw, Goossens, van Breukelen, et al., 2007; Leeuw, Goossens, Linton, et al., 2007a; Leeuw, Houben, et al., 2007). It appears to be important that people with LBP receive an explanation that pain itself is not a disabling condition (Loisel et al., 2001). Although this information has been promoted amongst practitioners by various government agencies and professional groups, studies have shown that some practitioners engage only superficially, or not at all with these directives (Bishop, Foster, Thomas, & Hay, 2007a; Coudeyre et al., 2006; S. Linton et al., 2002).

Allied health practitioners are generally gravitating toward a more biopsychosocial model of practice (rather than the biomedical model of healthcare) in which more patient-centred and 'tailored' management is provided. Employing this method of interaction may make it more difficult to adhere to best practice guidelines. In a qualitative study of GPs and physiotherapists in the United Kingdom (UK) exploring what factors influenced guideline adherence it was found that although practitioners acknowledge guidelines they regarded maintaining their relationship with the patient more important than 'imposing' guidelines (Corbett, Foster, & Ong, 2009).

Personal experience of pain can shape practitioners' beliefs around LBP and how it should be managed. Considering that most people experience LBP this is a relevant factor of the practitioners' management of patients with LBP. As much as a personal experience of LBP may provide the practitioner with greater empathy towards their patients (Daykin and Richardson 2004), if the practitioners' beliefs have been influenced negatively they may inadvertently pass this on to their patients. Considering that patients' expectations of their recovery can influence speed of improvement (Linde et al., 2007) it is important the practitioners briefly explore the patients' expectations and beliefs about their LBP within the first few treatment sessions. This could be achieved by utilising a questionnaire such as the Back Beliefs Questionnaire (Bostick, Schopflocher, & Gross, 2013), or simply asking questions regarding the patients' expectations. If the beliefs and behaviours identified are unhelpful to recovery these can be modified by means of education and support (Buchbinder, Jolley, & Wyatt, 2001; Latimer, Maher, & Refshauge, 2004).

Health Care Practitioners' Fear Avoidance Beliefs

An efficient clinical environment relies on the practitioner making swift clinical decisions for their patients. Three factors on which decisions are based are prior clinical experience, and the relationship with the patient and the practitioners own beliefs (Corbett et al., 2009). In a qualitative study that examined practitioners' attitudes and self-reported behaviour in relation to guideline adherence for patients with LBP, Corbett et al. (2009) report that practitioners draw heavily on "their own beliefs about the effectiveness of treatments", potentially influencing their decisions around adherence to best practice guidelines with advice and management for low back pain patients.

If patients are at risk of being fear-avoidant, practitioners can inadvertently exacerbate this fear and increase the patient's perceived threat of pain. This can happen due to the practitioners' facial expressions, tone of voice and advice offered (Leeuw, Goossens, van Breukelen, et al., 2007). These behaviours, conscious or subconscious, reflect the beliefs of practitioners and can induce or reinforce the detrimental beliefs of their patients towards recovery from LBP (Leeuw, Goossens, van Breukelen, et al., 2007). A qualitative study that explored beliefs of six UK physiotherapists and twelve of their patients concluded that in order to maximise rehabilitation potential of

their patients, physiotherapists needed to be aware of their own beliefs around LBP and how those beliefs affected their chosen management of their patients (Daykin & Richardson, 2004).

Some studies have identified the under-provision of evidence based advice from practitioners toward their patients with LBP may be due to the practitioners own fear-avoidance beliefs (Bishop et al., 2007a; Main, Foster, & Buchbinder, 2010). This in turn may influence the beliefs and consequent behaviour of the patient. There is evidence that practitioners hold a wide range of beliefs about pain that correlate with their recommendations to patients (Coudeyre et al., 2006; Pincus et al., 2007; Poiraudau, Rannou, Le Henanff, et al., 2006). Further to this practitioners have been shown to hold similar fear-avoidant beliefs to their patients being “moderately fear avoidant overall” (Rainville et al., 2011) and this belief construct has been noted to be a strong predictor of their work and activity recommendations to patients (International Association for the Study of Pain, 1994).

Belief Changes with Education

Research shows that beliefs around LBP can be changed by educating the individual about the best physical approach to LBP (Buchbinder et al., 2001). In addition to this a need to inform the individual of the nature of pain has been identified to quell any misinformed beliefs around LBP that can be detrimental to that persons’ recovery. Identifying predictors of adverse outcomes early in the treatment of LBP can provide opportunities for interventions that reduce the probability of persistent pain (Loisel et al., 2001).

A large Australian study that aimed to evaluate the effectiveness of a campaign designed to alter beliefs about back pain for both the general public and practitioners found that providing positive messages about back pain improved beliefs about back pain and appeared to positively influence the management of back pain (Buchbinder et al., 2001). Other research has found that “changes in cognitive factors were not significantly associated with changes in pain intensity” however, reductions in disability were related to decreased fear-avoidance beliefs and increased perceptions of control over pain (Woby, Watson, Roach, & Urmston, 2004).

It has been shown that intervention can change the patients' beliefs and behaviour at any stage of their LBP progression with beneficial results (Leeuw, Goossens, van Breukelen, et al., 2007), however early intervention was significantly more effective (Keefe et al., 2004). Intervention from practitioners such as reassurance, encouraging normal participation in daily activities, and prescribing analgesics at the acute stage to support and encourage activity has proven to be of benefit (Keefe et al., 2004). In NZ these interventions are endorsed by ACC (ACC, 2004). However, some practitioners continue to under-provide their patients with this information and support, or worse, give conflicting advice to current best practice (Leeuw, Goossens, van Breukelen, et al., 2007). A study that employed the HC-PAIRS to measure physiotherapy students' beliefs about LBP reported their HC-PAIRS scores changed favourably following a teaching module on chronic LBP (Latimer et al., 2004). This positive change in practitioner beliefs about chronic LBP after an intervention indicates practitioner beliefs can be modified with education.

Instruments Measuring Health Care Practitioners' Attitudes and Beliefs Toward Low Back Pain

Much of the literature to date has focused on pain-related fear of the patient and subsequent disability. The influence of beliefs of other individuals surrounding the patient, especially health care practitioners, has received little attention. Recently there has been a shift of focus to study these external factors influencing psychosocial aspects of people in pain. There are several instruments available that are designed to measure practitioners' attitudes and beliefs toward LBP, these include the FABT (Linton et al., 2002), TSK-HC (Houben et al., 2005), Back-PAQ (Darlow et al., 2014a), Fear Avoidance Beliefs Questionnaire for Health Care Practitioners FABQ-HCP (Coudeyre et al., 2006) and the Health Care Pain and Impairment Relationship Scale (HC-PAIRS) (Rainville, Bagnall, & Phalen, 1995). Most of these have been developed for patients and then later adapted for practitioners, but some have been specifically developed to measure attitudes and beliefs of practitioners. Several of the instruments for the practitioner population have been adapted from patient population instruments measuring the same construct. These instruments have had limited

psychometric testing but have already been used in studies aiming to investigate practitioners' attitudes and beliefs toward LBP (Houben et al., 2005; S. Linton et al., 2002) and how they may influence their treatment and management of their patients with LBP (Bishop et al., 2007a). The lack of psychometric validation has been documented as a limitation in several of these studies (Houben et al., 2005). In a review of available instruments measuring practitioner beliefs Bishop et al. (2007) identified that further psychometric testing and development was needed for most instruments and "should be a priority to ensure they are robust and valid measures of attitudes and beliefs of practitioners about back pain". A study of NZ occupational therapists (Cross, 2010) also identified a lack of psychometric testing for instruments measuring practitioner fear-avoidance beliefs; specifically the FABT, the TSK-HC and the FABQ-HCP.

Some instruments specifically refer to 'chronic' pain, for example the HC-PAIRS, and others, although developed for pain patients in general, are worded in such a way that they can be included for use in acute/sub-acute cases FABT, TSK-HC, Back-PAQ and the FABQ-HCP. A study that aimed to examine the psychometric properties of the Tampa Scale for Kinesiophobia (TSK) and Fear Avoidance Beliefs Questionnaire (FABQ) for use on patients with acute LBP found that the questionnaires had acceptable psychometric properties on this different population (Swinkels-Meewisse, Swinkels, Verbeek, Vlaeyen, & Oostendorp, 2003). This finding indicates that it is probable the application of other similar questionnaires may be extended to the acute/sub-acute low back pain population. A limitation of this study was the short time between test and retest (24 hours) increasing the risk of participants recalling their responses from the first test.

Some instruments measuring practitioner attitudes and beliefs around LBP without specifically referring to chronic pain in the phrasing of items could potentially be applied to an acute/sub-acute context; these include the FABT (S. Linton et al., 2002), Photos of Daily Activities for Health Care Practitioners (PHODA-HCP) (Ruud M. A. Houben et al., 2005), TSK-HC (Ruud M. A. Houben et al., 2005), Back Pain Attitudes Questionnaire (Back-PAQ) (Darlow et al., 2014b), and the FABQ-HCP (Coudeyre et al., 2006). The PHODA-HCP consists of 98 photos that are rated on a scale from 0-100 rating the degree of perceived harmfulness to their back. The high

administration burden this presents could result in participant fatigue. The FABQ-HCP is presented in two sections: firstly fear-avoidance beliefs about physical activity, and secondly, fear-avoidance beliefs about work. In the ‘work’ section some items would be redundant for certain occupations, for example, the item “my work is too heavy for me” may not be relevant for an administrator but applicable for a builder. To develop the FABQ for a practitioner population the instructions were modified but the item phrasing remained the same. The similar wording for both practitioner and patient versions could potentially cause confusion as practitioner respondents would need to adjust the phrasing to apply to *their* patients’ back pain.

Overview of Instruments

The following instruments measure practitioners’ attitudes and beliefs toward back pain. For all instruments the items are worded in such a way as to be relevant for acute/sub-acute or chronic LBP. The PHODA-HCP and FABQ-HCP are not included due to the limitations noted previously.

Fear Avoidance Beliefs Tool

The FABT was specifically developed to measure fear avoidance beliefs of practitioners (Linton et al., 2002). This questionnaire contains 14 items rated on a 5 point Likert scale from ‘completely disagree’ to ‘completely agree’ with 7 items reverse scored (5, 6, 7, 10, 11, 13, 14). Higher scores on this measure indicate higher fear avoidance beliefs. Most of the items were adapted from fear avoidance belief measures designed for the patient population, including the TSK, the FABQ and the Pain and Impairment Relationship Scale (PAIRS) (S. Linton et al., 2002). The FABQ, TSK (Swinkels-Meewisse et al., 2003) and PAIRS (Slater, Hall, Atkinson, & Garfin, 1991) have been shown to be psychometrically reliable and valid. Items in the FABT that were drawn from the TSK, FABQ and PAIRS were reworded to be specific for practitioners. Internal consistency for the FABT tool was only tested for two items ($r=0.60$). These items were considered by Linton et al. (2002) to be new, that is they had not been adapted from other questionnaires. It also demonstrated adequate content validity and limited construct validity in the study it was designed for (Bishop et al., 2007; Cross, 2010; S. Linton et al., 2002; SLinton, Vlaeyen, &

Ostelo, 2002). Linton et al. (2002) argues that because the FABT was formed from verified reliable and valid measurement tools the psychometric properties would be relatively robust. However, this cannot be assumed and should be established with appropriate psychometric testing of the new tool.

Tampa Scale of Kinesiophobia for Health Care Practitioners

The TSK-HC, a modified version of the TSK (Vlaeyen, Kole-Snijders, Boeren, & van Eek, 1995), was developed by Houben et al. (2004) to measure practitioners' concerns around fear of movement and re-injury. The TSK-HC consists of 17 items rated on a Likert scale from 'strongly disagree' to 'strongly agree'. It has demonstrated good internal consistency (Cronbach's $\alpha=0.81$) and limited construct validity (Ruud M. A. Houben et al., 2005) but lacks any reported test-retest reliability.

Back Pain Attitudes Questionnaire

The Back-PAQ was developed in NZ by Darlow et al. (2014b) to measure practitioner and public beliefs about back pain. Darlow et al. (2014b) point out that existing tools measuring practitioner beliefs about back pain focus on the practitioners' view of their patients' back pain, rather than their own personal beliefs. The Back-PAQ was developed so that the practitioners' own beliefs were captured.

The development of the Back-PAQ involved in-depth interviews with people experiencing acute and chronic back pain to explore reasons for constructs such as fear avoidance beliefs, low outcome expectations and catastrophising (Darlow et al., 2014b). Six broad themes were identified and items were developed from these themes and adapted from previous surveys. A multidisciplinary research team then reviewed these items, and pilot testing of the initial item set received positive feedback. Exploratory factor analysis was conducted based on data collected from 602 members of the New Zealand public and provided evidence of acceptable internal consistency (Cronbach's $\alpha = 0.61$; 95% CI 0.56 to 0.66) and identified 5 components in the 10 item version; psychological influences on recovery ($\alpha =0.78$), prognosis of back pain ($\alpha=0.64$), relationship between back pain and injury ($\alpha=0.60$), activity participation during back pain ($\alpha=0.58$) and vulnerability of the back ($\alpha=0.50$) (Darlow et al., 2014b).

The Back-PAQ has 34 items split into sections for example 'these questions are about your own back' and is rated on a 5 point Likert scale ranging from 'false' to 'true'. Responses are scored from -2 (true) to 2 (false). Negative scores reflect beliefs that are unhelpful to recovery. The Back-PAQ is highly relevant to the NZ context, is current, and further psychometric analysis is required making it an excellent candidate instrument for further study.

There are limited instruments available to triangulate construct validity of instruments that require investigation of construct validity; especially within the context of acute/sub-acute LBP. The HC-PAIRS (Rainville et al., 1995) measures practitioners' attitudes and beliefs towards 'chronic' pain. It has adequate construct validity and internal consistency (Cronbachs $\alpha = 0.78$) and is reported to have limited test-retest reliability (Bishop et al., 2007; Cross, 2010). It has been shown to have four dimensions of attitudes and beliefs 'functional expectations', 'social expectations', 'need for cure' and 'projected cognition' (Rainville et al., 1995) and has been noted to measure a belief system that is comparative to the fear avoidance construct (Cross, 2010). Therefore, the HC-PAIRS would usefully serve as a comparison for investigating construct validity of other instruments measuring the fear avoidance construct.

Conclusion

It has been established that practitioners can influence patients' beliefs around LBP and potentially their recovery with advice and management that is not considered best practice. It is pertinent that practitioners' attitudes and beliefs toward LBP are identified and if necessary, modified to avoid provision of inappropriate messages that are known to contribute to delayed recovery, and prolonged disability for their patients.

There are several available instruments that capture practitioners' beliefs around LBP; however, not many of these have undergone rigorous psychometric evaluation even though there are studies that have employed these measures to investigate interventions. It has been recognised in the literature that further testing on the existing instruments is needed to ascertain if they are reliable and valid or further

development is required. To address this gap in the research, this study aimed to investigate the test-retest reliability, construct validity and internal consistency of the FABT, the TSK-HC and the Back-PAQ using the HC-PAIRS to triangulate construct validity.

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Section 2: Manuscript

Note:

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**Investigation of instruments measuring healthcare
practitioners' attitudes and beliefs toward low back pain:
Psychometric properties and survey of New Zealand
osteopaths and manipulative physiotherapists**

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Abstract

Investigation of instruments measuring healthcare practitioners' attitudes and beliefs toward low back pain: Psychometric properties and survey of New Zealand osteopaths and manipulative physiotherapists

Background: The socioeconomic burden of low back pain highlights the need for effective management of this problem. Healthcare practitioner beliefs are thought to influence the advice and management given to patients with low back pain. The psychometric properties of instruments that measure practitioner beliefs have not previously been rigorously tested with manual therapists.

Objectives: To investigate internal consistency, test-retest reliability and construct validity of the FABT, the TSK-HC, the Back-PAQ and the HC-PAIRS. A secondary aim was to explore the beliefs of NZ osteopaths and manipulative physiotherapists about low back pain.

Method: An online and postal survey was administered twice, 14 days apart; the first generated the psychometric properties of the FABT, the TSK-HC, the Back-PAQ and the HC-PAIRS and gather descriptive characteristics of respondents. The second gathered test-retest information.

Results: Data from n=91 osteopaths and n=35 manipulative physiotherapists were analysed. The FABT, TSK-HC and Back-PAQ each demonstrated acceptable internal consistency, (Cronbach's α =0.92, 0.91, and 0.91 respectively), and excellent test-retest reliability (lower limit of 95% CI for intraclass correlation coefficient >0.75). All instruments showed moderate correlation (Pearson's r =0.51-0.78, p <0.001) suggesting good convergent validity. There was a medium to large effect (Cohen's d >0.47) for the mean difference in scores, for all instruments, between professions.

Conclusions: This study established adequate internal consistency, test-retest reliability and construct validity for the FABT, the TSK-HC and the Back-PAQ. Previously reported internal consistency, test-retest and construct validity of the HC-PAIRS were confirmed, and test-retest reliability was excellent. Osteopathy and manipulative physiotherapy respondents in this study reported attitudes and beliefs that were moderately unhelpful to recovery from low back pain.

Keywords: back pain, fear-avoidance, kinesiophobia, attitudes, beliefs, psychometric properties

Introduction

Low back pain (LBP) is a well recognised problem in the Western world (World Health Organisation, 2010), and is considered a leading cause of health loss in New Zealand (NZ) (Ministry of Health & Accident Compensation Corporation, 2013). As such, the cost to society and people experiencing LBP is high if recovery is delayed. It is important healthcare practitioners convey accurate evidence-based information and advice to patients presenting with LBP to promote optimum recovery rates.

However, some research has shown that practitioners give advice that conflicts with evidence-based guidelines for LBP (Coudeyre et al., 2006; S. J. Linton, J. Vlaeyen, & R. Ostelo, 2002). It has been suggested that practitioners' attitudes and beliefs can negatively influence advice offered to LBP patients (Leeuw, Goossens, Linton, et al., 2007; J. Rainville et al., 2011). To investigate practitioners' attitudes and beliefs several instruments have been adapted for use based on versions initially developed for patients, such as the Fear Avoidance Beliefs Tool (FABT) (S. Linton, J. Vlaeyen, & R. Ostelo, 2002), and the Tampa Scale of Kinesiophobia for Health Care Practitioners (TSK-HC) (International Association for the Study of Pain, 1994). One recently developed instrument, the Back Pain Attitudes Questionnaire (Back-PAQ) (Darlow et al., 2014), was designed for dual use in patients and practitioners.

Although the FABT and TSK-HC have been previously used in studies investigating practitioners' attitudes and beliefs, their psychometric properties have not been rigorously tested (Bishop, Thomas, & Foster, 2007; Cross, 2010). In NZ, osteopaths and manipulative physiotherapists provide a substantial proportion of healthcare services for people with LBP. The attitudes and beliefs of these practitioners in relation to LBP have not previously been explored. Consequently, the primary aim of this study was to investigate internal consistency, test-retest reliability and construct validity of the FABT, TSK-HC and Back-PAQ. The second aim was to report the attitudes and beliefs of NZ osteopaths and manipulative physiotherapists toward LBP using these instruments, and examine any differences between professional groups.

Methods

Participant recruitment

Participants were registered NZ osteopaths and manipulative physiotherapists. NZ osteopaths were recruited from a database of current NZ osteopaths previously used for research purposes provided by Unitec, NZ. Osteopaths received an email invitation and link to an online questionnaire. Those without a valid email address were mailed printed invitations and questionnaires. Email invitations to New Zealand Manipulative Physiotherapy Association (NZMPA) members were sent by the NZMPA on behalf of the researcher. An invitation and link to the questionnaire was also posted on the NZMPA Twitter site. All potential respondents were emailed one reminder 7 days after the initial invitation. All participants provided informed consent after reading printed or online documentation. The study was approved by the Unitec Research Ethics Committee (UREC 2013-1056).

Design

All questionnaires were administered twice, 14 to 17 days apart. Data from the first administration (Round 1) was used for calculation of psychometric properties and included descriptive characteristics of respondents. Data from the second administration (Round 2) was used to determine test-retest reliability. Descriptive scores for each instrument were based on Round 1 responses. Study design and reporting of results was informed by the **C**onsensus-based **S**tandards for the Selection of Health **M**easurement **I**nstruments (COSMIN) (Mokkink et al., 2010); and the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) (Eysenbach, 2004).

Data collection procedures

Data was collected using postal and online survey software (SurveyMonkey, CA, USA). Participants could withdraw their data up until data extraction commenced. Each instrument was paginated separately and all items required a response for the participant to proceed. Duplicate entries from the same respondent were prevented by establishing a unique site visitor status. A \$20 petrol voucher was offered to the first 20 participants to complete Round 2 of the survey. Responses were considered valid if they were received within a three week period of the initial invitation being

distributed. The second survey was filled out within 17 days of the first. Surveys outside of these parameters were excluded (n=4).

Pilot testing of the survey

A convenience sample of registered (n=7) and postgraduate student osteopaths (n=3) were invited to complete the questionnaires and provide feedback on ease of use and administration burden. Several minor changes in presentation and pagination were made in response to feedback. These osteopaths and student osteopaths were excluded from the main study.

Instruments investigated

Fear Avoidance Beliefs Tool

The FABT was developed by Linton et al. specifically to measure fear avoidance beliefs of practitioners (S. Linton et al., 2002). The FABT questionnaire contains 14 items rated on a 5 point Likert scale from ‘completely disagree’ to ‘completely agree’ with 7 items reverse scored (5, 6, 7, 10, 11, 13, 14). Scores can range from 14 to 70; higher scores indicate higher fear avoidance beliefs.

The items were adapted from fear avoidance belief measures designed for the patient population; the Tampa Scale for Kinesiophobia (TSK), the FABQ and the Pain and Impairment Relationship Scale (PAIRS) (S. Linton et al., 2002). The items from the TSK, FABQ and PAIRS were reworded to be specific for practitioners. Internal consistency for this tool was only tested for two items ($r=0.60$). These items were considered by Linton et al. (2002) to be ‘new’, that is, they were not adapted from other questionnaires whose psychometric values were proven to be acceptable.

Tampa Scale of Kinesiophobia for Health Care Practitioners

The TSK-HC, a modified version of the TSK (Vlaeyen, Kole-Snijders, Boeren, & van Eek, 1995), was developed by Houben et al. (2005) to measure practitioners’ concerns around fear of movement and re-injury. Items were reworded to be specific to practitioners, for example the item “my lower back pain would probably be relieved if

I were to do exercises” was changed to “the lower back pain would probably be relieved if the patient were to do exercises”. The TSK-HC consists of 17 items rated on a Likert scale from ‘strongly disagree’ to ‘strongly agree’, and has good internal consistency ($\alpha=0.81$) and limited construct validity (Ruud M. A. Houben et al., 2005). Scores range from 17 to 88, with higher scores representative of beliefs unhelpful to recovery.

Translation of the Tampa Scale of Kinesiophobia for Health Care Practitioners

The TSK-HC has previously been published only in Dutch. For the purposes of this study the TSK-HC was translated to English by one translator before back-translation to Dutch by a second translator. Each translator worked independently, and was blind to the other version of the questionnaire. The back-translation was compared with the original version for any discrepancies and none were found. The translations and comparisons were completed by trained linguists fluent in Dutch and English. The translation process was based on guidelines proposed by Beaton et al. (2013).

Changes made to the TSK-HC instructions

The original instructions for the TSK-HC were laborious and several words were considered redundant. After consideration, the instructional wording was modified slightly to improve readability for participants.

Back Pain Attitudes Questionnaire

The Back-PAQ was developed in NZ to measure beliefs about back pain of practitioners and the public (Darlow et al., 2014). Darlow et al. (2014) point out that existing instruments measuring practitioner beliefs about back pain focus on the practitioners’ view of their patient’s back pain rather than their own beliefs; therefore they are less able to capture an accurate insight into their beliefs. The development of the questionnaire involved in-depth interviews with people experiencing acute and chronic back pain to explore reasons for constructs such as fear avoidance beliefs, low outcome expectations and catastrophising (Darlow et al., 2014).

Exploratory analysis of the Back-PAQ involved data collected from 602 New Zealanders and provided evidence of acceptable internal consistency ($\alpha=0.70$; 95% CI 0.66 to 0.73) (Darlow et al., 2014). There is no reported test-retest reliability or

construct validity data available for the Back-PAQ. The Back-PAQ has 34 items, each item is rated on a 5 point Likert scale ranging from ‘false’ to ‘true’. Responses are scored from -2 (true) to 2 (false) with 11 items reverse scored (1, 2, 3, 15, 16, 17, 27, 28, 29, 30, 31). Scores range from -68 to 68 with negative scores reflecting beliefs that are unhelpful to recovery.

Health Care Pain and Impairment Relationship Scale

The Health Care Pain and Impairment Relationship Scale (HC-PAIRS) measures practitioners’ attitudes and beliefs towards chronic pain and serves as a predictor for recommendations regarding work and activity. The HC-PAIRS is based on the Pain and Impairment Relationship Scale (PAIRS) developed for the public (Riley, Ahern, & Follick, 1988). This version was modified to be specific to practitioners (J. Rainville, Bagnall, & Phalen, 1995).

The HC-PAIRS includes 15 items, each item rated on a 6-point Likert scale ranging from ‘completely disagree’ to ‘completely agree’ with 3 items reverse scored (1, 6, 14). Scores can range from 15 to 90 with higher scores on this scale indicating stronger beliefs that LBP validates disability. The HC-PAIRS which has adequate construct validity, internal consistency ($\alpha = 0.84$) and limited test-retest reliability (Cross, 2010; International Association for the Study of Pain, 1994; J. Rainville, Carlson, Polatin, Gatchel, & Indahl, 2000) was included in this study to triangulate construct validity of the FABT, TSK-HC, and the Back-PAQ.

Data analysis

Raw data was exported from online questionnaire software and tabulated. Missing, spoiled, or incomplete responses to an instrument were removed (Round 1, n=13; Round 2, n=5). To check for normality of distribution the Shapiro-Wilk statistic was calculated, together with skewness and kurtosis, and visual inspection of P-P and Q-Q plots. Given that the sample size was $n > 30$, and based on exploration of normality, all statistical tests employed were considered robust to breaches of normality (Field, 2009). Descriptive statistics were calculated for participants and independent t-tests used to investigate difference in age, years in practice and hours worked per week.

As a measure of convergent construct validity (Streiner, Norman, & Cairney, 2003) for each instrument, Pearson's correlation coefficients were calculated in pair-wise fashion. We used Fleiss' (1986) descriptors for the magnitude of correlation coefficient.

Test-retest reliability (between Round 1 and 2) for each instrument was calculated using an intra-class correlation (ICC) coefficient (model 2,1) based on a two-way repeated analysis of variance (ANOVA), and a 95% confidence interval was constructed for each coefficient. All ICCs were interpreted using Fleiss' (1986) descriptors ≤ 0.40 as 'poor', 0.40 to 0.75 as 'fair to good', and > 0.75 as 'excellent'. Paired samples t-tests were used to check for systematic difference between rounds and Cohen's effect statistic (Cohen's $d = (\text{Mean}_{\text{Osteo}} - \text{Mean}_{\text{Physio}}) / ((\text{SD}_{\text{Osteo}} + \text{SD}_{\text{Physio}}) / 2)$) used to interpret the magnitude of these differences. Standard error of measurement (SEM) was calculated for each instrument using the formula $\text{SEM} = \text{SD}_{\text{pooled}} * \sqrt{(1 - \text{ICC})}$ where SD = pooled standard deviation (Wu, Chuang, Li, Lee, & Hong, 2011). Minimum Detectable Change at a 90% confidence interval (CI) (MDC_{90}) was calculated using $\text{MDC}_{90} = 1.65 * \sqrt{2} * \text{SEM} = 1.65 * \sqrt{2} * \text{SD}_{\text{pooled}} * \sqrt{(1 - r)}$ (where 1.65 is the 2-tailed z-score). To assist with interpretation we expressed MDC_{90} as a percentage of the scale width.

Internal consistency for each instrument was calculated using Cronbach's α . We interpreted Cronbach's $\alpha > 0.7$ as representative of acceptable internal consistency (Pallant, 2010). Differences in mean scores between osteopath and physiotherapist respondents for each instrument were investigated using independent samples t-tests. Levene's test for homogeneity of variance was used to inform interpretation of independent t-tests. All statistical analysis was conducted using SPSS v22 (IBM Corp., Armonk, NY).

Results

The sample comprised 126 participants; 91 osteopaths and 35 manipulative physiotherapists. In Round 1, 13 respondents were excluded due to incomplete responses for one or more instruments, no consent (on postal administration) or being

un-registered. In Round 2, data from 5 respondents was excluded because it was incomplete, and 5 because of possible contamination through mixed mode (use of both postal and online) responses (Dillman & Christian, 2005).

Response rates

There was a good response rate from osteopath respondents electronically (30.7%) and a poor response rate from manipulative physiotherapists (8.75%) in Round 1 (Cook, Heath, & Thompson, 2000). This represents 15.7% and 8.3% of the population respectively. Due to 'no consent', 'no registration' or 'incomplete data' there was a drop out rate of 3.3% Round 1 (n=11) and 3.9% Round 2 (n=3) for osteopaths and 0.5% Round 1 (n=2) and 6.2% Round 2 (n=2) for manipulative physiotherapists. [Response rate details can be seen in Thesis Appendix 1].

Descriptive characteristics of respondents

Out of the 126 respondents 63 were female. The mean age of all respondents was 44 years old. Both cohorts were similar with regards to the variable of 'hours worked per week'. They varied slightly with the variable of 'years practicing' and differed significantly with the variable 'further training'. Table 1 shows the details on the descriptor characteristics of respondents.

Table 1. Descriptive characteristics of respondents

	Osteopath	Manip physiotherapist ^c	P-value
Gender			
Male	56% (n=51/91)	34% (n=12/35)	
Female	44% (n=40/91)	66% (n=23/35)	
% of whole profession			
Male	10.5% (n=51/484)	2.9% (n=12/410)	
Female	8.2% (n=40/484)	5.6% (n=23/410)	
Age (y)			
Mean (95%CI)	45.6 (43.3-47.9)	44.3 (39.9-48.7)	0.58
Min-max	25-68	24-73	
Years practicing			
Mean (95%CI)	14.6 (12.8-16.4)	19.86 (15.4-24.3)	0.04
Min-Max	1-33	2-50	
Hours worked per week			
Mean (95%CI)	33.2 (31.2-35.2)	32.5 (28-37)	0.79
Min-Max	10-50	1-60	
Education			
Diploma	23%	29%	
Bachelor Degree	14%	40%	
Honours Degree	22%	0%	
Masters Degree	40%	25%	
Doctoral Degree	<3% ^b	6%	
Further training ^a			
Yes	45 (49%)	32 (91%)	
No	46 (51%)	3 (9%)	

Notes: a = defined as attending a low back pain related post-graduate training course; b = Rounded up to 3% to protect the privacy of respondents; c = Manipulative physiotherapist

Internal consistency

Cronbach's α was calculated for the FABT, TSK-HC, Back-PAQ and HC-PAIRS as $\alpha = 0.92, 0.91, 0.91$ and 0.91 respectively, suggesting a strong relationship between items.

Test-retest reliability

Table 2 summarises the results for test-retest reliability. Evaluation of test-retest reliability indicated 'excellent' reliability for all four instruments with the lower limit of the CI for each being $>.75$ (Fleiss, 1986).

There was minimal systematic error on retesting. The mean score difference between Round 1 and Round 2 was $-.95$ to $.15$ across all instruments. The only significant difference between Round 1 and 2 was for the TSK-HC ($p < 0.01$), however, the effect size was trivial (Cohen's $d = -0.15$).

Construct validity

All questionnaires showed moderate correlation (Pearson's $r = 0.51$ to 0.78) suggesting good convergent validity (Streiner et al., 2003). See Table 3 for details.

Measurement error

MDC is considered the "minimum amount of change that is not likely to be due to chance variation in measurement" (Haley & Fragala-Pinkham, 2006). MDC is derived from the SEM which is the amount of error that is considered to be measurement error (Heinemann, 2010). Results of the MDC₉₀ score and SEM are listed in Table 2.

Difference in scores of instruments between professions

The mean difference in scores between professions ranged from -4.63 , for Back-PAQ to 7.79 for HC-PAIRS (effect sizes medium to large). Details are shown in Table 4.

Table 2. Internal consistency, test-retest reliability for all measures (pooled data from osteopaths and manipulative physiotherapists)

Measure	Cronbach's- α	ICC (95% CI)	Descriptor ^a	Mean Difference R1 vs R2 (95% CI)	P- value	Effect Size ^b	MDC ₉₀	SEM	% Scale width of the MDC ₉₀
FABT	0.92	0.85 (0.78 to 0.87)	Excellent	0.15 (-0.53 to 0.84)	<0.66	0.02 Trivial	2.21	0.95	3.2
TSK-HC	0.91	0.84 (0.77 to 0.89)	Excellent	-0.95 (-1.66 to -0.23)	<0.01	-0.15 Trivial	2.33	1.00	3.4
Back-PAQ	0.91	0.84 (0.76 to 0.89)	Excellent	-0.35 (-1.52 to 0.83)	<0.56	-0.03 Trivial	1.69	3.94	2.5
HC-PAIRS	0.91	0.83 (0.76 to 0.88)	Excellent	0.12 (-0.96 to 1.21)	<0.82	0.01 Trivial	1.58	3.69	1.7

Notes: a = Descriptors for magnitude of ICC based on the recommendations of Fleiss (1986); b = Descriptors for effect size based on Hopkins et al. (2009); R1 = Round 1; R2 = Round 2; MDC₉₀ = minimum detectable change (90% confidence interval); SEM = standard error of measurement; FABT= Fear Avoidance Beliefs Tool, TSK-HC= Tampa Scale of Kinesiophobia for Health Care Practitioners, Back-PAQ= Back Pain and Attitudes Questionnaire, HC-PAIRS= Health Care Pain and Impairment Relationship Scale

Table 3. Construct validity matrix

	FABT	TSK-HC	Back-PAQ
TSK-HC	r=0.77*		
Back-PAQ	r=0.51*	r=-0.58*	
HC-PAIRS	r=0.68*	r=0.67*	r=0.64*

Notes: * = $p < 0.001$; r values are Pearson's correlation coefficient; FABT=Fear Avoidance Beliefs Tool, TSK-HC=Tampa Scale of Kinesiophobia for Health Care Practitioners, Back-PAQ=Back Pain and Attitudes Questionnaire, HC-PAIRS=Health Care Pain and Impairment Relationship Scale

Table 4. Difference in scores of instruments between professions

Measure	Profession	n	Mean	SD	Mean Difference (95% CI)	P-value	Effect Size ^{a,b}
FABT	Osteo	91	34.56	5.51	5.08 (2.79 to 7.36)	<0.001	0.84 (large)
	Physio	35	29.49	6.51			
TSK-HC	Osteo	91	34.54	5.48	5.85 (3.65 to 8.06)	<0.001	1.03 (large)
	Physio	35	28.69	5.93			
Back-PAQ	Osteo	91	2.25	10.06	-4.63 (-8.55 to -0.72)	0.021	-0.47 (medium)
	Physio	35	6.89	9.67			
HC-PAIRS	Osteo	91	48.19	9.01	7.79 (4.35 to 11.07)	<0.001	0.92 (large)
	Physio	35	40.40	7.99			

Notes: FABT=Fear Avoidance Beliefs Tool, TSK-HC=Tampa Scale of Kinesiophobia for Health Care Practitioners, Back-PAQ=Back Pain and Attitudes Questionnaire, HC-PAIRS=Health Care Pain and Impairment Relationship Scale; a = Effect size reported is Cohen's *d* (Cohen, 1988); b = Descriptors for effect size based on Hopkins et al. (2009)

Discussion

The primary objective of this study was to examine internal consistency, test-retest reliability and construct validity of the FABT, TSK-HC, Back-PAQ, and the HC-PAIRS. Scores for all instruments displayed excellent internal consistency and test-retest reliability. The correlation between each instrument was good indicating acceptable construct validity. A secondary objective was to explore beliefs of the NZ manipulative physiotherapists and osteopath respondents. Across all instruments, the mean group scores were in the middle range of the scale indicating that both osteopath and physiotherapist respondents hold beliefs that could be considered less than optimal for practitioners' delivery of care to people with LBP. There were significant scoring differences on each instrument between professions, with manipulative physiotherapist respondents holding beliefs that were slightly more in line with best practice guidelines than osteopaths.

Instruments

The items of the instruments hold underlying constructs such as fear-avoidance, kinesiophobia, low outcome expectations and catastrophising thus revealing if practitioners hold beliefs that are unhelpful to the recovery of their patients with LBP. There is a strong evidence base that shows lower fear-avoidance beliefs are beneficial for better health outcomes for patients (Leeuw, Goossens, van Breukelen, Boersma, & Vlaeyen, 2007). With this in mind, uncovering practitioner beliefs that might be seen as detrimental to LBP recovery is a step towards modifying these beliefs to improve the quality of patient care. Establishing the satisfactory psychometric properties of these instruments adds rigour to further research into the role that practitioner attitudes have on patients' beliefs about their LBP and subsequent recovery.

Fear Avoidance Beliefs Tool

The internal consistency for the FABT in this study was in the range described by Pallant (2010) to be acceptable when Cronbach's $\alpha > 0.7$). In a previous study the FABT was reported to have satisfactory internal consistency (Cronbach's $\alpha = 0.60$) (S. J. Linton et al., 2002) however, Linton et al.'s study was compromised by inadequate

testing of all items on the questionnaire. There has been no previous investigation of test-retest reliability or construct validity of this instrument therefore, it appears the current study is the first to report these psychometric values. This instrument is useful to specifically measure fear-avoidance beliefs of practitioners and has shown adequate internal consistency, test-retest reliability and construct validity; as a result it can now be used confidently in exploring practitioner beliefs. There are no previous reports about the responsiveness of the FABT and this study did not include such a test. Responsiveness of the FABT therefore requires still investigation.

Tampa Scale of Kinesiophobia for Health Care Practitioners

The TSK-HC had acceptable internal consistency in this study, which was comparable to a previous study by Houben, Ostelo, et al. (2005). The TSK-HC had a moderate correlation to all other instruments tested. The correlation with the HC-PAIRS was slightly stronger than the findings of Houben, Ostelo, et al. (2005). There are no previous reports for test-retest reliability of the TSK-HC; in this study test-retest was found to be excellent. This instrument is proficient in measuring practitioners' levels of kinesiophobia and with only 14 items it offers a low administrative burden.

Back Pain Attitudes Questionnaire

Internal consistency for the Back-PAQ was acceptable and this finding is higher than the Cronbach's $\alpha = 0.7$ reported by the original developers of this instrument (Darlow et al., 2014). The Back-PAQ had a moderate correlation to the other instruments analysed and test-retest reliability was considered excellent. As a relatively new instrument specifically designed for the NZ population measuring beliefs unhelpful to back pain recovery, this instrument has revealed excellent psychometric properties previously not reported. The Back-PAQ may offer an advantage over other instruments in that it particularly measures the practitioners 'own' beliefs about back pain rather than their beliefs about their patients' back pain. Darlow et al. (2014) proposes that this difference provides greater insight into practitioner advice and management of back pain. Aside from this study the Back-PAQ has not yet been used to explore practitioners' beliefs.

Health Care Pain and Impairment Relationship Scale

The HC-PAIRS was used in this study as a comparison for the purposes of considering construct validity, and has previously been demonstrated to have sound internal consistency, test-retest and construct validity (International Association for the Study of Pain, 1994). This study found the HC-PAIRS to have acceptable internal consistency which was stronger than the previously reported Cronbach's α of 0.83 (International Association for the Study of Pain, 1994) and 0.78 (International Association for the Study of Pain, 1994; J. Rainville et al., 1995). Test-retest was considered excellent and was higher than previously reported (J. Rainville et al., 2000). Although not novel, the findings of this study further confirm previous work.

In descriptive studies investigating the role of practitioner beliefs in patient management using the FABT and the TSK-HC (Ruud M. A. Houben et al., 2005; S. Linton et al., 2002), one of the limitations has been an absence of robust psychometric testing of these instruments and therefore the findings have needed to be interpreted with caution. The results of this study reinforce the findings of previous studies that have employed these instrument.

Difference in scores between professions

Recent literature has emphasised the role of practitioners' beliefs influencing the information they provide to LBP patients and the negative impact these beliefs may have on recovery (Leeuw, Goossens, Linton, et al., 2007; J. Rainville et al., 2011). There is limited research about differences in attitudes or beliefs between professions, especially within the NZ healthcare context. Cross (2010) explored beliefs of NZ occupational therapists and reported an association between fear-avoidant beliefs and recommendation of home assistance that, based on accepted best practice, were considered unhelpful for recovery. Cross' study (2010), however, had a low response rate and investigated a different professional group to this study, therefore is not directly comparable, but does suggest fear-avoidance beliefs are not only present in NZ healthcare practitioners but may influence advice in a way that is unhelpful to recovery.

Although both professions had scores on all instruments in the middle of the range, there was a significant difference (medium to large effect size) in scores between professions. Respondent physiotherapists' scores indicated their beliefs and attitudes are more in line with the literature regarding best practice guidelines for the management of acute/sub-acute LBP (ACC, 2004; Tulder et al., 2006). The reasons for this apparent difference are unclear, especially considering that manipulative physiotherapists and osteopaths share a number of similarities, for example, they are both primary healthcare practitioners sharing a substantial focus on musculoskeletal care in their practice (Harvey, Burton, Moffett, & Breen, 2003). Obviously, some variation between the two professions must exist to explain the differences in attitudes or beliefs as indicated by the scores of the instruments in this study. Considering how closely related these two professions are, the explanatory reasons for these differences may be subtle and challenging to explain without further in-depth investigation. An obvious place to commence this investigation would lie in exploring variation in training and education between the professions.

Training and education

One main difference in education between osteopaths and manipulative physiotherapists in NZ, is the hospital training that an undergraduate physiotherapy student experiences prior to postgraduate training in manipulative physiotherapy. In a contemporary healthcare environment that is increasingly focussed on evidence-based practice, we hypothesise that the clinical exposure to these concepts as part of routine practice may favourably bias physiotherapy students towards guideline adherence. In contrast osteopaths do not practice in publicly-funded healthcare facilities and therefore may not receive exposure to evidence-based practice to the same extent, which may partly explain differences in beliefs. This argument assumes that 'education' has a direct influence on the development of practitioners' attitudes and beliefs.

A second difference in the education of NZ osteopaths and manipulative physiotherapists is the timing of post-graduate clinical training in relation to professional registration. Postgraduate training for manipulative physiotherapists is undertaken after the development of entry level clinical competency and professional registration (NZMPA, 2014), whereas osteopaths complete post-graduate training

prior to professional registration. This presents a situation where osteopathy students are obtaining a high level of criticality at a postgraduate level (New Zealand Qualifications Authority, 2013) whilst concurrently seeking to attain clinical competence (Dreyfus, 2004) prior to professional registration. Manipulative physiotherapists, however, attain clinical competency at undergraduate level before being required to engage in a higher level of criticality at postgraduate level. Postgraduate training requires an elevated level of criticality in comparison to undergraduate studies which, although requiring a level of critical thinking, are less demanding (New Zealand Qualifications Authority, 2013). Given these facts, it is plausible there is greater ease in developing criticality without concurrently establishing clinical skills (Domholdt, 2000), and that manipulative physiotherapists gain a higher level of criticality from their postgraduate training than osteopaths. Assuming that a higher level of criticality leads to greater guideline adherence, this argument could partly explain the inter-professional difference of instrument scores.

In order for this argument to be plausible as an explanation of the inter-professional differences observed in this study, the study sample would need to include a substantial proportion of respondents holding the (NZ) Master of Osteopathy degree, and this is true of the study sample. In addition to this, 91% of physiotherapy respondents reported having completed some form of post-graduate training (in the form of a LBP related course) opposed to 49% of osteopathic respondents.

Strengths and limitations

The sample size, particularly of osteopaths, and overall response rate are a strength of this study. The sample of osteopaths was approximately 20% of the whole NZ profession (29% response rate), however, the sample of manipulative physiotherapists was less well represented (8.3% response rate of NZMPA members only). Although higher response rates have been reported in surveys of NZ osteopaths (Carrington, 2009) this may have been due to a systematic schedule of repeated reminders. Due to being sensitive of ‘over-researching’ a small population, this study employed only one follow-up by comparison to the three follow-ups that Carrington (2009) employed.

By including two professional groups in this study the potential for contrast was introduced; owing to the response rate, though, the findings are representative of the NZ osteopathy population only, and cannot be generalised to NZ manipulative physiotherapists. A convenience sample was recruited, therefore the widely recognised potential for responder bias cannot be excluded (Fowler, 2009), and the findings should be interpreted cautiously.

To our knowledge this study offers the first English translation of the TSK-HC, previously only available in Dutch (International Association for the Study of Pain, 1994). The translation process, although mostly consistent with guidelines proposed by Beaton et al. (2013), was non-compliant in three aspects because the items of the instrument were not considered to be culturally complex. Firstly, Beaton et al. (2013) suggests translating from source into English and back-translating on two separate occasions using different translators; this was only done once in the current study. Secondly, a review is suggested of all translation reports from a committee of ‘experts’; this step was completed by the ‘back-translator’ only. Finally, a test of the pre-final version was not completed because of logistical constraints.

A minor change to the TSK-HC instructions was made to improve readability. This was undertaken to reduce participant fatigue and encourage completion. The benefit of a higher completion rate was thought to outweigh the possibility of the changes altering the integrity of the TSK-HC.

Like all studies employing self-reported measures there is potential for social bias to occur leading to an overemphasis of explicit attitudes. According to Houben et al. (2005) social bias occurs when people engage in deliberate processing (explicit attitudes) whereas implicit attitudes “come to mind more automatically and are therefore only measurable through a person’s reactions”. The findings of this study reflect explicit processing, and must be interpreted with this in mind. Implicit attitudes are more revealing and less likely to be affected by social bias, but more difficult to investigate as they are unconscious (R. M. A. Houben et al., 2005). Implicit attitudes and beliefs towards back pain have been explored in patient populations (Goubert, Crombez, Hermans, & Vanderstraeten, 2003) however, do not

appear to have been investigated in a practitioner population.

Further research

The instruments evaluated in this study have shown excellent internal consistency, test-retest reliability, and adequate construct validity. To further evaluate these instruments a measure of responsiveness would be appropriate for the FABT, TSK-HC, and the Back-PAQ (see supplementary material: Summary of psychometric properties). Establishing responsiveness would aid interpretation of studies investigating educational interventions intended to positively influence practitioner attitudes and beliefs that are unhelpful to recovery from LBP.

The difference in beliefs between osteopath and physiotherapist respondents found in this study have not previously been reported. However, because the manipulative physiotherapist sample was not strongly represented, these results cannot be generalised; a larger study is therefore recommended. Given the strength of evidence showing that fear-avoidance beliefs are less favourable for ideal health outcomes (Leeuw, Goossens, Linton, et al., 2007; J. Rainville et al., 2011), it is important that the origin of belief differences between professions is identified. A qualitative study that considered deeper understanding of these belief differences could help to shape practitioners' education at undergraduate or postgraduate level.

Conclusions

This study established adequate internal consistency, test-retest reliability and construct validity for the FABT, the TSK-HC and the Back-PAQ. The recognised psychometric properties of the HC-PAIRS were confirmed and in addition to this test-retest reliability was found to be excellent.

Osteopathy and manipulative physiotherapy respondents in this study were found to hold attitudes and beliefs that could be considered less than optimal for practitioners' delivery of care to people with LBP, with significant differences in scores between professional groups. Reasons for the inter-professional differences in beliefs found in this study are obscure and worthy of future research. Although the results described

here give some insight into beliefs and attitudes of the respondents they are not able to be generalised to the wider population due to low response rates from the manipulative physiotherapy population.

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Online Supplementary material

Table S1. Summary of psychometric properties

Instrument	FABT	TSK-HC	Back-PAQ	HC-PAIRS
Content validity	++	++	++	++
Construct validity	++	++	++	++
Internal consistency	+++	+++	+++	+++
Test-retest reliability	+++	+++	+++	+++
Responsiveness	0	0	0	++
Measure published in English	Y	Y	Y	Y

Notes: (+) = existing ratings from Cross (2010) ; (+) = **bold** represents the findings of this study; (Y) = Yes, (N) = No; Ratings: none (0), limited (+), adequate (++) , or strong (+++) adapted from Bishop et al. (2007) and Lohr et al. (1996) (as cited in Cross, 2010); FABT=Fear Avoidance Beliefs Tool, TSK-HC=Tampa Scale of Kinesiophobia for Health Care Practitioners, Back-PAQ=Back Pain and Attitudes Questionnaire, HC-PAIRS=Health Care Pain and Impairment Relationship Scale

English Version of the Tampa Scale of Kinesiophobia for Health Care Practitioners

We are interested in your views of lower back pain as a practitioner. Please indicate the level you agree or disagree by ticking the boxes accordingly.

		Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree
1.	I am worried that a patient with lower back pain will be injured when doing exercise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	If a patient with lower back pain were to try to overcome it, the pain will get worse.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	The lower back pain indicates that there is something dangerously wrong with the patient's body.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	The lower back pain would probably be relieved if the patient were to do exercises.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	People aren't taking the medical condition of a person with back pain seriously enough.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Lower back pain will put a patient at risk for the rest of their life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7.	Lower back pain means that the patient has injured their body.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8.	Just because something aggravates the pain does not mean it is dangerous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

		Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree
9.	Someone with lower back pain has a higher chance to accidentally injure themselves.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	The safest way to prevent lower back pain from getting worse is avoiding unnecessary movements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	The back pain would be less if there wasn't something dangerously wrong with the patient's body.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Despite the pain, the patient would be better off if they were physically active.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	The pain indicates when one has to stop with physical exercises in order to avoid injury.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14.	It's really not safe for someone with lower back pain to be physically active	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.	Someone with lower back pain can't do all the things normal people do because it's too easy to get injured.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.	If something is causing the patient a lot of pain, it is not dangerous.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17.	A patient should not have to exercise if they are in pain.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section 3: Appendices

Appendix 1. Response Rate

Response rate calculations

	Sent	Responded	No Consent	Not Registered	Incomplete	Total	Response Rate (%)		Representation of APC ^a holders (%)
							Responded	Total	
Osteo R1 Electronic	277	85	1	1	7	76	30.7	27.4	15.7
Osteo R2 Electronic	76	71			3	68	93.4	89.5	14
Osteo R1 Postal	76	17	1		1	15	22.4	19.7	3
Osteo R2 Postal	10	5				5	50	50	1
Physio R1	400	37			2	35	9.3	8.75	8.3 ^b
Physio R2	32	28			2	26	87.5	81.3	6.3 ^b

Notes: R1=Round 1, R2=Round 2; a=Annual Practicing Certificate; b=These figures only represent members of the NZMPA, there may be manipulative physiotherapists belonging to other organisations

Appendix 2. Ethics Documentation

Approval Letter



Wendy Rushworth
181 Shaw Rd
Oratia
Auckland

22.8.13

Dear Wendy,

Your file number for this application: **2013-1056**

Title: **Evaluation of the reliability and validity of tools for measuring health care practitioners' attitudes and beliefs toward low back pain.**

Your application for ethics approval has been reviewed by the Unitec Research Ethics Committee (UREC) and has been approved for the following period:

Start date: 9.8.13

Finish date: 9.8.14

Please note that:

1. The above dates must be referred to on the information AND consent forms given to all participants.
2. You must inform UREC, in advance, of any ethically-relevant deviation in the project. This may require additional approval.
3. Organisational consent/s must be cited and approved by your primary reader prior to any organisations or corporations participating in your research. You may only conduct research with organisations for which you have consent.

You may now commence your research according to the protocols approved by UREC. We wish you every success with your project.

Yours sincerely,

Gillian Whalley
Deputy Chair, UREC

cc: Rob Moran
Cynthia Almeida

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Waitakere campus
5-7 Ratanui St
Henderson
Auckland 0612
New Zealand

Letter of extension

Wendy Rushworth
181 Shaw Rd
Oratia
Auckland

21.8.14

Dear Wendy,

Your file number for this application: 2013-1056

Title: Evaluation of the reliability and validity of tools for measuring health care practitioners' attitudes and beliefs toward low back pain.

Your application for amendments to the above ethics approval has been reviewed by the Unitec Research Ethics Committee (UREC) and has been approved for the following period:

Start date: 11.8.14

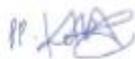
Finish date: 11.8.15

Please note that:

1. The above dates must be referred to on the information AND consent forms given to all participants.
2. You must inform UREC, in advance, of any ethically-relevant deviation in the project. This may require additional approval.
3. Organisational consent/s must be cited and approved by your primary reader prior to any organisations or corporations participating in your research. You may only conduct research with organisations for which you have consent.

You may now commence your research according to the protocols approved by UREC. We wish you every success with your project.

Yours sincerely,



Gillian Whalley
Deputy Chair, UREC

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Appendix 3. Information Sheet For Participants

Appendix 4. Consent Form

Appendix 5. Questionnaire as distributed