

THE ROLE OF PAIN RELATED ANXIETY IN THE FUNCTIONING OF PATIENTS WITH KNEE OSTEOARTHRITIS IN MALAYSIA.

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ABSTRACT

The aim of this cross-sectional study was to investigate the relationship between pain related anxiety and the clinical outcomes of function and pain in a group of Malaysian patients with knee osteoarthritis (OA). A convenience sample of 61 patients with knee OA were recruited from Seberang Jaya hospital in Malaysia (18 male, 43 female; age 56 ± 8 years; range, 45-84 years). Three participants were excluded from the analysis due to missing data.

Function was measured using the Knee Injury and Osteoarthritis Outcome Score (KOOS), pain was measured using the (0-10) pain numerical rating scale, and pain related anxiety was measured using the Pain Anxiety Symptoms Scale (PASS). Age, gender, BMI and duration of pain were also recorded. Data was analysed using simple correlations and multiple regression. Pain related anxiety was a statistically significant independent predictor of function explaining 15% of the variance within a regression model with pain (15%) and age (5%) also making significant independent contributions to the model. In contrast, pain related anxiety though correlated with pain ($r = 0.30$, $p = 0.02$) was not a statistically significant independent predictor of pain. Pain related anxiety is a significant independent predictor of function, but not pain, in Malaysian patients with OA knee. This is the first study to demonstrate a relationship between pain related anxiety and function in an OA knee pain sample in a non-westernised culture. The findings demonstrate the importance of pain related anxiety as a construct across cultures. Pain related anxiety should be addressed in the clinical management of Malaysian patients with OA knee.

KEY WORDS: Osteoarthritis, knee, chronic pain, anxiety, culture.

INTRODUCTION

Knee Osteoarthritis (OA) is one of the most common chronic pain conditions in Malaysia. Fourteen percent of the

population report joint pain of which 65% is attributable to knee OA (Veerpan et al. 2007). Malaysian knee OA patients report a high degree of pain and functional impairment with difficulty in a range of activities of daily living (ADLs) including walking and squatting (Veerpan et al. 2004). Thus it is important that appropriate management strategies are used to treat this specific patient population.

Cognitive behavioural management strategies in line with the biopsychosocial model of care are strongly recommended in the management of patients with chronic pain conditions (Gatchel & Turk, 2002; Morley et al. 1999; McCracken & Turk, 2002; Keefe et al. 2005). However, the majority of research into the bio psychosocial model of chronic pain has come almost exclusively from western countries in Europe and North America (Sarda et al. 2009). There is strong evidence to show that culture has a significant impact upon a person's pain experience and their attitudes and beliefs as to how it should be managed (Bates et al. 1993; Bates et al. 1994; Bates et al. 1997; Sanders et al. 1992). Sanders et al. (1992) found that chronic pain patients from the USA, New Zealand and Italy had significantly greater levels of psychological impairment compared to Japanese, Mexican and Columbian patients. These cultural factors may mean that certain elements of the bio psychosocial model identified in western countries may be more relevant in some cultures compared to others. For example, Sarda et al. (2009) compared the effects of different psychological constructs, such as self-efficacy and depression, on disability and work status in Australian and Brazilian chronic pain patients. Although there were many similarities between groups in the Australian group depression but not self-efficacy was a significant predictor for work status, whilst this finding was reversed in the Brazilian group (Sarda et al. 2009). This suggests that different psychological issues should be focussed upon for different cultures to ensure a tailored management approach and that we shouldn't assume that factors in one culture are of similar importance in another. However, Sarda et al. (2009) do argue that there results showed more similarities than differences between cultures in relation to pain related cognitions and functioning.

Pain-related anxiety is a measure of fear and anxiety responses to pain (McCracken & Dinghra, 2002). Pain-related anxiety has been shown to be an important predictor of pain and function in patients with chronic pain as measured by the Pain Anxiety Symptoms Scale (PASS) (McCracken et al. 1992; McCracken & Dinghra, 2002). Furthermore, improvement in pain-related anxiety is associated with improvements in a range of clinical outcomes including pain (McCracken et al. 2002). Again, this work has been undertaken almost exclusively on North American and European samples. Considering the effects of culture on the pain experience (Bates et al. 1993; Bates et al. 1994) there is a need to replicate these findings in non-westernised cultures such as Malaysia before targeting pain-related anxiety as part of a pain management strategy within that culture. If cultural issues are ignored in the assessment

and treatment of patients, many expensive interventions may be relatively ineffective (Bates et al. 1997).

The aim of this study was to investigate the relationship between pain-related anxiety, as measured by the PASS, and the key clinical outcomes of pain and function in a group of Malaysian patients with knee OA.

METHODS

Overview

In this cross sectional study, participants from Malaysia with OA knee completed a series of questionnaires to assess the level of function, pain and pain related anxiety. The role of pain related anxiety as a determinant of pain and function was assessed using simple correlations and multiple regressions.

Participants

A convenience sample was recruited from patients referred for physiotherapy with OA knee by an orthopaedic consultant between February and March 2011. The study aimed to recruit ≥ 50 participants. A previous study of chronic musculoskeletal participants [n=282] (14% had lower limb pain) reported a correlation between pain related anxiety, using the PASS as used in this study, and function of $r = 0.44$ ($p < 0.01$) (McCracken and Dhingra, 2002). Using this strength of correlation ($r = 0.44$) a power calculation was undertaken which found that 50 participants would be required to ensure 90% power with an alpha level of 0.05.

Participants were included if they had bilateral chronic knee osteoarthritis (confirmed by an orthopaedic medical officer), were aged between 45-65 years old, were newly referred for physiotherapy and had no other co-existing conditions which might impair their functioning e.g. multiple sclerosis, multi-joint OA, etc. The study only included participants with bilateral knee OA because it is more common than unilateral knee OA in Malaysia (Veerapen et al. 2004), increasing the relevance of the study to the Malaysian OA knee population. Participants were excluded if they were having an acute exacerbation of symptoms such as acute pain coupled with inflammation, if they were unable to complete the questionnaires for whatever reason e.g. illiteracy.

This study received ethical approval from Teesside University, School of Health and Social Care, Research Governance and Ethics Committee (Study number 298/10) and from the Malaysian Ministry of Health (study number NMRR-10-1141-7920).

Outcome measures

Data was collected via three standardized questionnaires; the pain numerical rating scale (NRS) (Von Korff et al., 2000), the Knee Injury and Osteoarthritis Outcome Score (KOOS) (Roos and Toksvig-Larsen, 2003) and the 20-items Pain Anxiety Symptoms Scale (PASS-20) (McCracken et al. 1992).

Numerical Rating Scale (NRS)

Numerical Rating Scale (NRS) was used to measure pain intensity. The NRS consisted of a horizontal line 10cm in length labeled with numbers from 0 to 10 denoting intensity

of pain where 0 represented no pain and 10 represented worse possible pain. Participants were instructed to circle the number that best represents the severity of intensity of pain at that moment in time. The NRS has been shown to be a valid and reliable to measure of pain (Von Korff et al., 2000).

Knee injury and Osteoarthritis Outcome Score (KOOS)

The Knee injury and Osteoarthritis Outcome Score (KOOS) is a 42-item self-administered questionnaire. The KOOS consists of five subscales in the area of pain (nine items), symptoms (seven items), Function in daily living (seventeen items), function in sport and recreation (five items) and quality of life (four items). A 5 point likert-scale exists for all items ranging from 0 (No Problems) to 4 (Extreme Problems). The total scores are transformed to a 0–100 scale, with zero representing extreme functional knee problems and 100 representing no functional knee problems. The KOOS has demonstrated a good level of reliability and validity as a measure of function in both western and non-western cultures (Roos and Toksvig-Larsen, 2003; Roos and Lohmander, 2003a; Salavati et al. 2008).

The Pain Anxiety Symptoms Scale-20 (PASS-20)

Pain Anxiety Symptoms Scale-20 (PASS-20) is used to assess pain related anxiety (McCracken et al. 1992). The PASS-20 is a 20-item self-report measure of fear and anxiety behavior. Items are rated for frequency of occurrence on a 6 point scale ranging from 0 (never) to 5 (always). The PASS-20 is scored from 0-100 and higher scores indicate a higher level of pain related anxiety. It consists of four 5-item subscales measuring cognitive anxiety response, escape and avoidance, fearful thinking, and physiological anxiety response. The PASS-20 is a reliable and valid measure of pain related anxiety in western cultures such as the UK (McCracken et al. 1992; McCracken & Dinghra, 2002).

Procedures

Participants were provided with the questionnaires whilst in the waiting room for their first physiotherapy appointment at the Seberang Jaya Hospital in Malaysia. The participant could complete the questionnaire alone or ask for assistance from administration staff or the researcher. On completion of the questionnaires patient's returned the anonymous questionnaires to a confidential drop box located in the physiotherapy unit. Demographics data including gender, age, BMI, ethnicity, and duration of pain were then measured.

Data analysis

Participant characteristics are presented as means (standard deviation). Simple correlations were performed to assess the relationship between 1) pain related anxiety and pain and 2) pain related anxiety and function. Multiple regressions, using the standard method where all the independent (or predictor) variables were simultaneously entered into the equation, were performed to assess the individual contribution of pain related anxiety to pain and function controlling for age, gender, BMI, ethnicity and duration of pain. When assessing the contribution of pain related anxiety to function, pain was also entered into the model. Data was analyzed using Statistics Package for Social Sciences (SPSS) version 18.0.

RESULTS

Participants

Sixty one participants with knee OA volunteered for this study. The descriptive characteristics for these patients are shown table 1. Three participants were excluded from further analysis as they provided incomplete questionnaires.

Correlation analysis

Correlations were performed between the two primary clinical outcome measures (pain and function) and the pain anxiety symptoms scale (table 2). Correlations between pain and function and the other descriptive characteristics were also performed (table 2). Function was significantly correlated with gender, age, pain related anxiety and pain. Pain was significantly correlated with duration of pain, pain related anxiety and function.

Table 1: Participant characteristics

Characteristic	Value
Gender (females)	43
Age (years)	56 (8)
BMI (kg.m ⁻²)	29 (6)
Duration of pain (years)	3.3 (2.3)
Pain (NRS 0-10)	6.2 (1.5)
Function (KOOS 0-100%)	43.6 (14.4)
Pain related anxiety (PASS 0-100)	62.8 (19.4)
Ethnicity	
Malay	n = 16
Chinese	n = 23
Indian	n = 19

This table shows the participant characteristics for the 58 participants who completed the study. For pain a higher score denotes worse pain. For function a higher score denotes better function. Data are presented as mean (1 standard deviation).

Table 2: Simple correlational analysis

	Function (KOOS)		Pain (NRS)	
	correlation	p-value	correlation	p-value
Gender	-0.28	0.03*	0.10	0.47
Age	-0.31	0.02*	0.01	0.97
BMI	-0.06	0.33	0.05	0.71
Ethnicity	-0.14	0.31	0.07	0.59
Duration of pain	-0.21	0.12	0.28	0.03*
Pain related anxiety (PASS)	-0.51	<0.01*	0.30	0.02*
Function (KOOS)	n/a	n/a	-0.53	<0.01*
Pain (NRS)	-0.53	<0.01*	n/a	n/a

This table shows the correlation for n=58 between pain and function and the following variables: gender, age, BMI, duration of pain, and pain related anxiety. Correlations that included the pain (NRS) variable, ethnicity or gender, were performed using Spearman's rho correlations all other correlations were Pearson's correlations. * denotes statistical significance at the p<0.05 level.

Multiple regression: Function

The variables gender, age, BMI, ethnicity, pain related anxiety, and pain were entered into the multiple regression model to predict variability in function. The simple diagnostics found no evidence of multicollinearity and the normal probability plot of the regression standardised residual showed no evidence of deviation from normality. The model was found to be a statistically significant predictor of function explaining 48% (adjusted R² = 0.48) of the variance (F [7, 50] = 8.400, p<0.01). Pain, pain related anxiety, and age were all found to be independent significant predictors of function within the model explaining 15%, 15% and 5% of the variance, respectively (table 3).

Table 3: Multiple regression to predict function

Model	Standard. beta coefficient	t-value	p-value	Part correlation	variance explained
Age	-0.24	-2.35	0.02	-0.23	5.1%*
Gender	-0.12	-1.26	0.22	-0.12	1.4%
BMI	0.14	1.35	0.18	0.13	1.7%
Ethnicity	-0.17	-1.54	0.13	-0.15	2.2%
Duration of pain	0.15	1.27	0.21	0.12	1.5%
PASS	-0.45	-4.09	<0.01	-0.39	15.4%*
Pain (NRS)	-0.44	-4.09	<0.01	-0.39	15.4%*

* denotes statistical significance at the p<0.05 level. n=58

Multiple regression: Pain

The variables age, gender, BMI, ethnicity, duration of pain, and pain related anxiety were entered into the logistical regression model to predict variability in pain. The simple diagnostics found no evidence of multicollinearity and the normal probability plot of the regression standardised residual showed no evidence of deviation from normality. The model was not a statistically significant predictor of variance in pain (adjusted R² = 0.10; F [6, 51] = 2.022, p=0.08) (table 4). Furthermore, within this model pain related anxiety was not a statistically significant predictor of pain.

Table 4: Multiple regression to predict pain

Model	Standard. beta coefficient	t-value	p-value	Part correlation	variance explained
Age	-0.04	-0.33	0.74	-0.04	0.1%
Gender	0.07	0.55	0.59	0.07	0.5%
Ethnicity	-0.07	-0.50	0.62	-0.06	0.4%
BMI	-0.02	-0.14	0.89	-0.02	<0.1%
Duration of pain	0.37	2.50	0.02	0.32	10.2%*
PASS	0.21	1.45	0.15	0.18	3.2%

PASS = pain related anxiety measured using the Pain Anxiety Symptoms Scale. * denotes statistical significance at the p<0.05 level.

DISCUSSION

Pain-related anxiety has been shown to predict pain and function in patients with chronic pain (McCracken et al. 1992; McCracken & Dingsra, 2002) and is therefore an important psychological factor to target in the bio psychosocial management of chronic pain. However, this work has been undertaken in western cultures in North America and Europe. Cultural factors can influence the importance of different psychological variables in relation to the pain experience and its management (Bates et al. 1997; Bates et al. 1994; Bates et al. 1993; Sanders et al. 1992). The aim of this study was to investigate the relationship between pain-related anxiety and the key clinical outcomes of pain and function in a group of Malaysian patients with chronic OA knee pain. Pain-related anxiety was found to be a statistically significant independent predictor of function but not pain in Malaysian OA knee patients. Patients with higher levels of pain-related anxiety had lower levels of functioning. This is the first study to show that pain related anxiety as measured by the PASS may be an important psychological variable to focus upon in the management of chronic pain patients from a non-westernised culture.

48% of the variance in function was explained using multiple regression modelling consisting of the variables age, gender, BMI, duration of pain, pain related anxiety, and pain. Pain and pain-related anxiety were found to make similar independent contributions to function each explaining 15% of the variance, with age explaining a further 5% of the variance. The other variables did not make significant independent contributions to the model. These findings demonstrate that pain-related anxiety is similarly predictive of function as pain itself indicating its importance in this clinical group. The results of this study are broadly in agreement with studies on chronic pain populations from Western cultures. Burns et al. (2000) found that pain-related anxiety as measured by the PASS was a significant independent predictor of physical capacity in a group of chronic pain patients (68% of which had low back pain) in the USA contributing 9% of the variance (Burns et al. 2000). The focus on back pain patients in the Burns et al. (2000) study may limit any comparison between it and the current study. In contrast, Heuts et al. (2004) investigated the relationship of pain-related fear (measured using the Tampa Scale of Kinesiophobia [TSK] (Kori et al. 1990) to function in a group of knee and hip OA patients in the Netherlands. Pain related fear is considered a component of pain related anxiety within the PASS. Pain related fear explained 9-10% of the variance in function and 40% when combined with pain levels. The findings of Heuts et al. (2004) are closely in line with the findings of the current study in a Malaysian population. The level of correlation between pain related anxiety and self-reported function in the current study was similar to that reported previously for UK chronic pain patients ($r = 0.44$, $p < 0.01$) (McCracken and Dingsra, 2002).

Overall these findings show that pain-related anxiety is similarly

related to function in Malaysian patients as it is to patients in North America and Europe. This supports the targeting of this psychological factor in Malaysian patients with OA knee and suggests a level of cultural validity for pain-related anxiety as an important pain management variable.

Although pain-related anxiety was correlated to pain intensity levels ($r = 0.30$, $p = 0.02$) when entered into the multiple regression model as a predictor of pain along with age, gender, BMI, ethnicity and duration of pain, only duration of pain was found to be a statistically independent predictor of pain explaining 10% of the variance. Thus, pain-related fear does not appear to be an important predictor of pain intensity in this specific patient population. The correlation data between pain-related fear and pain intensity was similar to the relationship previously reported for UK chronic pain patients ($r = 0.34$, $p < 0.01$, $n = 282$), the majority of whom were back pain patients (McCracken & Dingsra, 2002).

The finding that the relationship between pain related anxiety and pain and function is similar between this group of Malaysian patients and previous North American and European studies (Burns et al. 2000; McCracken & Dingsra, 2002; Heuts et al. 2004) suggests that pain related anxiety is an important psychological factor across cultures. This is in agreement with the findings of Sarda et al. (2009) that culturally different chronic pain patients generally have more similarities than differences in relation to their cognitions and how it affects them functionally. The cultural validity of the pain related anxiety is compounded by the complex ethnic make-up of the Malaysian population, predominantly individuals of Malaysian, Chinese and Indian background, reflected in this sample of patients. In this study pain related anxiety was an important predictor of function controlling for ethnicity.

Clinical implications

This study supports the importance of adopting a traditional westernised biopsychosocial approach to the management of Malaysian patients with OA, with special emphasis on the importance of pain related anxiety. The fact that the pain related fear had a similar level of impact on patient function as pain itself stresses its importance. The health care system in Malaysia is predominantly medically orientated and many health care practitioners follow a medical model of care (Shamsudin, 2002). Clinicians dealing with knee OA in Malaysia need to have the biopsychosocial model of care emphasised within their training to encourage them to adapt a more biopsychosocial approach in their patient management.

Limitations

A limitation of this study was the cross sectional nature of the design, thus no inferences about causality can be made. Longitudinal studies are needed to identify if changes in pain related fear are related to changes in function. Additionally, RCTs are needed to investigate if interventions aimed at

reducing pain-related anxiety in Malaysian patients with OA knee are effective in improving clinical outcomes. Convenience sampling was used and so the sample may not be representative of the Malaysian population with OA Knee pain. The sample size was relatively small which increased the risk of a type II statistical error, thus true relationships may not have been identified. However the sample size was greater than the number identified in the apriori power calculation and was consistent with previous studies which have attempted to investigate the role of various biopsychosocial factors in self-reported pain and function (Creamer et al. 2000; Maly et al. 2006). A number of the participants required some help from the researcher to understand the English version of the questionnaire that was used in this study. This may have resulted in some biasing of the responses provided. If there had been a Malay/Chinese/Indian version of this questionnaire that would have negated this limitation, however no such translation exists and it was beyond the scope of this study to develop such a translation. Considering the results of this study such a translation is clearly warranted.

CONCLUSIONS

Pain related anxiety contributes to the functional impairment of chronic pain patients in western cultures and as such should be targeted in the biopsychosocial management of these patients. As culture can affect an individual's pain experience it is important to investigate if pain related anxiety is an important factor for Malaysian patients with knee OA to ensure that addressing pain related anxiety in this culture is appropriate. Pain related anxiety was a significant independent predictor of function but not pain in Malaysian patients with OA knee. This is the first study to show this relationship in non-westernised patients suggesting that this construct be addressed when managing this specific patient population.

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