Factor structure and psychometric properties of the Chinese version of the 20-item Pain Anxiety Symptoms Scale (ChPASS-20)

Running title: Pain anxiety in Chinese with chronic pain

Wing S. Wong[a*], Lance M. McCracken[b], Richard Fielding[c]

[a] Department of Psychological Studies, The Hong Kong Institute of Education, 10 Lo Ping Road, N. T., Hong Kong.

[b] Centre for Pain Services, Royal National Hospital for Rheumatic Diseases, Bath, UK

[c] School of Public Health & Department of Community Medicine, The University of Hong Kong, Pokfulam, Hong Kong.

*Corresponding author. Tel.: +852-2948-8936; fax: +852-2948-7794. Email address: wingwong@ied.edu.hk (W.S. Wong).

Abstract

Context: The Pain Anxiety Symptoms Scale (PASS) was designed to assess pain-related anxiety and fear. Although the scale is a reliable measure with good psychometric properties, its validity among ethnic Chinese has yet to be evaluated.

Objective: This study aimed to translate the English language version of the 20-item PASS into Chinese (ChPASS-20) and to evaluate its factor structure, reliability, and validity.

Methods: A total of 223 Chinese patients with chronic musculoskeletal pain attending orthopedic specialist clinics completed the ChPASS-20, the Chronic Pain Grade (CPG) questionnaire, the Chinese version of the 11-item Tampa Scale of Kinesiophobia (ChTSK11), the Hospital Anxiety and Depression Scale (HADS), and questions assessing socio-demographic and pain characteristics.

Results: Confirmatory factor analyses showed that all the five factor solutions tested met the minimum acceptable fit criterion. The four ChPASS-20 subscales and the entire scale demonstrated good internal consistency (Cronbach's αs: 0.72–0.92). All ChPASS-20 scales showed significant positive correlations with depression, pain intensity, and disability. Hierarchical multiple regression analyses showed the ChPASS-20 total score predicted concurrent depression ($F(4,159)=11.97$, $p<0.001$), pain intensity ($F(4,161)=2.47$, $p<0.05$) and pain disability ($F(4,191)=5.47$, $p<0.001$) scores, and the ChPASS-20 Avoidance subscale (std β = 0.21, $p<0.05$) emerged as significant independent predictor of concurrent pain disability.

Conclusion: Our data support the factorial validity, reliability and construct validity of the ChPASS-20 in a Chinese population.

Key words: Pain anxiety; Chronic pain; Chinese; Confirmatory factor analysis.

INTRODUCTION

Pain anxiety predicts decreased physical performance[1,2] and disability[3-5]. The 40-item Pain Anxiety Symptoms Scale (PASS-40) assesses anxiety and fear in exaggerated or persistent pain behavior,[5] and has four subscales: Fear of Pain, Cognitive Anxiety, Somatic Anxiety, and Avoidance.[6,7] Some studies of the PASS-40 produced five factors.[8] A short 20-item version (PASS-20) shows good psychometrics in relation to pain intensity, depression, and disability measures.[9] Confirmatory factor analysis (CFA)[10] suggest that 4-factor solutions[6] offer a better data-model fit for the PASS-20, conferring good psychometrics. A Korean version[11] with three subscales, Fearful Thinking, Physiological Response, and Avoidance, significantly correlates with physical and psychological functioning, pain severity, and depression.[11]

Despite being a psychometrically sound and widely employed measure of pain-related anxiety and fear[1,12,13] the PASS-20's utility within Chinese populations is unknown. We examined the PASS-20 in Chinese patients with chronic pain, and used CFAs to evaluate which factor structures reported in previous studies[9,11] were appropriate within a Chinese sample.

METHODS

Subjects

Following ethics approval consecutive patients with chronic musculoskeletal pain recruited between January-April 2009 from an orthopedics specialist out-patient clinic of a Hong Kong public hospital were approached during regularly scheduled clinical consultation visits and invited to participate. Eligible respondents were native Cantonese speakers aged 18 years or above who were willing and able to complete the study measures, and who gave fully-informed consent. Respondents completed a research assistant-administered interview on pain, socio-demographic characteristics and other study measures while waiting for medical consultation.

Measures

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

The PASS-20 assesses four pain anxiety dimensions, each of five items that measure Avoidance, Fear, Cognitive Anxiety, and Physiological Anxiety frequency.[9] The original PASS-20 was translated by the first author into traditional Chinese (ChPASS-20) then back-translated into English by a bilingual psycholinguist. This English back-translation was reviewed by the

original PASS developer (LMM) for content equivalence against the original PASS-20. Discrepancies were discussed and modifications made as needed, resulting in a first ChPASS-20 draft.

Next, 12 bilingual postgraduate students rated each ChPASS-20 and English PASS-20 item for fluency and semantic equivalence using a 5-point Likert scale (1=poor, 2=fair, 3=good, 4=very good, 5=excellent). Nine items were given modal ratings of 5, and the remainder ratings of 4, indicating excellent-to-good equivalence of the English-Chinese translation. This final version of the ChPASS-20 was then evaluated as follows.

Chronic Pain Grade (CPG)

Chronic pain was determined by affirmative answers to two questions: (1) "Are you currently troubled by physical pain or discomfort, either all the time, or on and off?" and (2) "Has this pain or discomfort persisted for more than 3 months?".[14] Subjects affirming both questions then specified the site(s) and duration of pain. Pain severity was assessed using the seven-item Chronic Pain Grade (CPG) questionnaire,[15] which measures pain persistence, intensity and disability/interference over the past 3 months. For intensity respondents rate current, average and worst pain intensity on a 0–10 Numerical Rating Scale (NRS) (0="No pain at all"; 10="Pain as bad as could be"). To assess pain persistence respondents indicated how many days out of the past three months days s/he was disabled by pain. Scores combine to classify respondents into five hierarchical pain grades (Table 2). The English[16] and Chinese[17] versions of the CPG possesses good psychometric properties.

Hospital Anxiety and Depression Scale (HADS)

The 14 items HADS used two seven-item subscales to measure anxiety (HADS-A) and depression (HADS-D),[18] Each subscale sums item scores which total 0-21, with higher scores indicating greater anxiety/depression. Summing all items gives a total score (HADS-Total). Psychometrics show good test-retest reliabilities and internal consistency for both HADS-A (r=0.89, Cronbach's α=0.93) and HADS-D (r=0.92, Cronbach's α=0.90) subscales.[19] The Chinese version has good psychometrics[20,21] with suggested cut-offs of 5/6, 8/9 and 15/16, for the HADS-A, HADS-D and HADS-T respectively.[20,21]

The Chinese 11-item Tampa Scale for Kinesiophobia (ChTSK11)

The ChTSK11 assesses fear of movement/(re)injury.[22] The original 17-item English version involves 4-point Likert scale ratings (1=strongly disagree; 4=strongly agree).[23,24] Despite different reported factor structures[25-28] the scale repeatedly shows good internal consistency and construct validity.[25,29] CFAs of the 11-item Chinese version of TSK[28,30] (ChTSK11) replicated a first-order two-factor correlated structure: Somatic Focus (ChTSK11-SF) and Activity Avoidance (ChTSK11-AA) that show Adequate-to-satisfactory internal consistency.[22] ChTSK11 total scores (ChTSK11-Total) range from 11-44.[22]

Statistical Analysis

SPSS (Statistical Package for the Social Sciences) 15.0[31] was used to compute sample descriptive statistics, internal consistency coefficients (Cronbach's αs) for individual ChPASS-20 scales, and their associations with validity criteria (Pain Intensity and Disability score, HADS scores, and ChTSK11 score). Pearson's correlation tests were performed to evaluate univariate relationships between PASS-20 scales and criterion variables (Pain Intensity and Disability score, HADS scores, and ChTSK11 score).

CFA was performed using EQS for Windows 6.1 structural equation modeling program.[32] Prior to CFAs, univariate skew, kurtosis and Mardia's coefficient for skewness and kurtosis were computed to normality assumptions in the data.[33] Each of the 20 ChPASS-20 items was specified to load on its respective factor based on five hypothesized PASS-20 models derived from the literature.[9,11] The one-factor model (Model 1) specified all ChPASS-20 items on a single latent construct. The four-factor correlated model[9] (Model 2), presumed ChPASS-20 items would be explained by four latent "first-order" factors. Each item was specified to load on a first-order factor (Avoidance, Fear, Cognitive, or Physiological Anxiety) with factors allowed to correlate. The five-factor hierarchical Model (Model 3),[9] hypothesized a priori that ChPASS-20 responses are explained by four first-order factors (Avoidance, Fear, Cognitive, and Physiological Anxiety) and one higher-order or second-order factor (Pain Anxiety Symptoms). The second-order factor was hypothesized to underlie each of the four first-order factors. The three-factor correlated model[11] (Model 4) specified the 20 items to load on three first-order factors (Fearful Thinking, Physiological Responses, or Avoidance), with factors were allowed to correlate. The four-factor hierarchical model (Model 5),[11] presumed one higher-order (Pain Anxiety Symptoms) explained

the three first-order factors. All model fitting was assessed using χ^2 statistic, comparative fit index (CFI)[34] non-normed-fit index (NNFI),[35] root mean square error of approximation (RMSEA),[36] and 90% confidence interval of RMSEA (CI). CFI and NNFI values of ≥0.90, and RMSEA values of ≤0.08 indicate good fit.[34, 36] Additionally, optimal model selection for representing the data was also based on model parsimony, where the simplest model fitting the data was preferred over more complex ones.

Three hierarchical multiple regression models were constructed to examine the association of ChPASS-20 scales with concurrent criterion variables (depression, pain intensity, and disability). In all models, socio-demographic variables significant in univariate analyses (p<0.05) were entered in the first block to control potential confounding.[*] Pain duration and number of pain sites were entered in the second block. The ChPASS-20 scales were entered in a final step. For Depression and Pain Disability models Pain intensity was included in the second block. The dependent variables of pain intensity and disability were indicated using CPG Characteristic Pain Intensity and Disability scores, respectively. Depression was indicated using HADS-D. Low variables multicollinearity (tolerance values 0.42-0.89) excluded inflated variance estimates in multiple regression models.

Results

Socio-demographic Characteristics

Of 242 patients invited to participate 16 refused outright and three did not complete the interview, leaving 223 patients comprising the final sample (response rate=92.2%). Mean sample age was 45.67 (SD=12.61) years and 58% were female (Table 1). About 59% of the patients reported monthly household incomes of <HK$25,000[†] and 67% were married or cohabited. Over 60% of the sample had completed secondary education and 14% tertiary education. While 57% reported no particular religious belief, 28% endorsed Buddhism, Daosim or ancestor worship as religion. Nearly 63% of the patients had full-time employment, whereas 9% were unemployed and 9% were homemakers.

Pain Characteristics

[*] Sociodemographic variables not reported in Table 5 were variables that were not significant in univariate analyses (p>0.05) and therefore excluded in multivariate analyses.
[†] $1 U.S. = $7.8 HK.

This sample averaged 2.22 (SD=1.50; range: 1-12) pain sites with 37.7% reporting one and 62.3% multiple pain sites (Table 2). The most common pain sites were leg (38.6%), hand/arm (37.2%), and lower back (33.2%). Patients reported an average of 3.96 years (SD=5.47, median=1.5, range, 3 months to 34 years) of pain duration. About 60% had had chronic pain for up to 2 year's duration and 21.1% for more than 5 years. Mean present, average, and worst pain scores were 2.93 (SD=2.54), 5.15 (SD=1.92), and 7.62 (SD=2.10), respectively. Mean pain interference scores were 5.21 (SD=2.43), 4.60 (SD=2.93), and 5.52 (SD=3.07) for daily activity, social activity, and working ability interference, respectively. Respondents reported 18.8 days (SD=33.17; range: 0-90 days) of pain-associated disability on average. CPG classified 41.7% of the sample as Grade III or above (high disability and moderately-to-severely limiting). Mean HADS-D and HADS-A scores were 4.06 (SD=4.05) and 5.60 (SD=5.13) respectively, lower than, and at the HADS-D (8/9) and HADS-A (5/6) cut-offs indicating a predominance of anxiety symptoms. Mean ChTSK11-SF (13.29, SD=2.79), ChTSK11-AA (15.88, SD=3.19), and ChTSK11-Total (29.18, SD=5.13) scores were comparable with previous Chinese chronic pain patient samples recruited from orthopaedic and pain clinics.[22]

Factorial validity of the ChPASS-20

ChPASS-20 item univariate skew estimates ranged from -0.95 to 1.59, univariate kurtosis estimates from -1.58 to 1.36 and Mardia's normalized estimate of multivariate kurtosis was 53.29, indicating non-normally distributed data. We therefore report the Satorra-Bentler chi-square statistic, as this incorporates a scaling correction for non-normal sampling distributions.[37]

CFAs showed that all five models fit the data well with CFI and NNFI meeting the minimum acceptable fit criterion (≥0.90) (Table 3). Of the five models, the one-factor model obtained the poorest data-model fit (CFI=0.91). Although the fit indices of Models 4 and 5 (Cho et al[11]) were slightly higher than those of Model 2 and 3 (McCracken and Dhingra[9]), based on the principle of parsimony the four-factor correlated model (Model 2) best represented the underlying structure of the ChPASS-20 in this Chinese sample. Standardized factor loadings of all items on their respective factors were statistically significant (p<0.05) (Figure 1).

Internal consistency, means (SD), and correlations of the ChPASS-20 scales with criterion measures

All ChPASS-20 scales demonstrated acceptable-to-good internal consistency, (Cronbach's α 0.72 to 0.92) (Table 4). The most highly endorsed dimension of pain anxiety symptoms in our sample was the Avoidance subscale, which attained the highest mean (13.21, SD=6.37). Mean Physiological Anxiety score (Mean=6.46; SD=5.65) was lowest of the ChPASS-20 subscales, and thus the least common dimension of pain anxiety indexed by ChPASS-20. The five ChPASS-20 scores were significantly correlated with each other (*r*s ranging from 0.55-0.79, all $p<0.01$) and all criterion variables in a positive direction (all $p<0.01$) (Table 4). ChPASS-20 scales were most strongly associated with HADS-A scores (*r*s ranging from 0.36-0.57, $p<0.01$).

Multivariate prediction of concurrent chronic pain adjustment from the ChPASS-20 scales

Controlling for socio-demographic and pain differences, hierarchical multiple regression analyses showed ChPASS-20 scales ($F(4,159)=11.97$, $p<0.001$) were significantly associated with concurrent HADS-D scores (Table 5). While ChPASS-20 scales jointly explained the biggest proportion of unique variance in the entire model (16%), no one individual ChPASS-20 subscale independently predicted depression ($p>0.05$).

Controlling for socio-demographic and pain differences, ChPASS-20 scales were significantly associated with concurrent pain intensity ($F(4,161)=2.47$, $p<0.05$), accounting for 5% of the total variance. Again no one subscale was a significant independent predictor of concurrent pain intensity (all $p>0.05$).

Controlling for socio-demographic and pain differences, ChPASS-20 scales ($F(4,191)=5.74$, $p<0.001$) associated significantly with CPG disability scores. Only 8% of variance was explained by ChPASS-20 scales , and only Avoidance subscale (std $\beta=0.21$, $p<0.05$) significantly predicted concurrent disability.

DISCUSSION

PASS-20 factor structures reported in previous studies[9,11] were replicated in Chinese patients with chronic pain. The ChPASS-20 scales evidenced good internal consistency, construct validity, and adequately predicted concurrent criterion validity.

CFAs of the five evaluated models met minimum acceptable fit criteria (CFI≥0.90), with the one-factor model obtaining the lowest CFI (=0.91) and NNFI (=0.89) values. Four- and

three-factor structures previously reported among US[10] and Korean[11] university pain clinic attendees respectively were replicated and equally legitimate in our Chinese sample. This suggests that the underlying latent constructs, and hence the components of pain anxiety measured by the PASS-20 are robust for these Chinese, US[10] and Korean[11] pain clinic attendees, lending preliminary support for the PASS-20's cross-cultural validity. Although we cannot test directly the cross-cultural factorial invariance, our findings suggest that Chinese and Western, and Chinese and Korean patients evidence comparable pain anxiety dimensions. Mean scores differences between the ChPASS-20, English and Korean versions therefore likely reflect true group differences in pain anxiety rather than reflecting different factor structures. Future studies to directly evaluate cross-cultural factorial invariance of PASS-20 are warranted.

Similar data-model fit suggests both correlated (Models 2 and 4) and hierarchical (Models 4 and 5) models offer equally plausible explanations for the pain anxiety construct. Because more parsimonious correlated models are preferred over hierarchical models we prefer the four-factor correlated structure to represent the ChPASS-20. A standard four-factor structure also facilitates cross-cultural and international comparisons.

Excepting the Fear subscale, mean ChPASS-20 scale scores (Avoidance=13.21; Cognitive=11.42; Physiological Anxiety=6.46) matched those of a north American pain sample (Avoidance=12.8; Cognitive=12.3; Physiological Anxiety=6.1),[10] suggesting similar pain anxiety levels. Referenced against a Dutch fibromyalgia sample (Avoidance=10.2; Fear=6.6), our Chinese sample reported higher Avoidance (=13.21) and Fear subscale (=10.01) scores.[10] Two previous Dutch studies reported higher mean Physiological Anxiety subscale scores whereas our Chinese sample emphasized fear-related emotional, and escape and avoidance behavioral responses to pain, contradicting stereotypes of excessive somatisation in these Chinese patients[38,39]. Emphasizing pain anxiety as fear and avoidance behaviors informs CBT approaches for pain management in Chinese patients. Focussing on emotional regulation coping strategies that help patients reduce pain anxiety and avoidance would probably be most effective.

ChPASS-20 scores correlated most strongly with HADS-A anxiety scores.[9,10] Associations between anxiety and pain-related fear seen in Western populations[40,41] also occur in the Chinese context. However, the PASS does not replace generic anxiety measures like the HADS-A, or other pain-related measures such as TSK and the Chronic Pain Coping Inventory (CPCI).[42,43] For instance, the PASS Avoidance subscale assesses anxious avoidance the CPCI

assess pain avoidance behaviours, superficially similar constructs and measures, but conceptually distinct. Care is required to choose the appropriate instrument for particular purposes.

Regarding predictive validity, only ChPASS-20 total score significantly predicted concurrent depression and pain intensity, explaining 5-16% of respective variance. Notably, only Avoidance (std β=0.21, p<0.05) offered significant independent prediction of concurrent pain disability. As previously reported,[10] the ChPASS-20 total score had higher reliability (Cronbach α>0.90) than its four subscales (Cronbach αs between 0.72-0.84), implying the total score has better predictive power than individual subscale scores. However, the low proportion of variance (5-8%) in pain outcomes explained by the ChPASS-20 implies other clinical/etiological factors and interactions with pain anxiety not assessed in this study await delineation.

Study limitations include some musculoskeletal pain participants having other co-morbid painful syndromes which possibly generated different pain levels, meanings and anxiety. However, musculoskeletal pain remains the largest group of pain conditions, so the ChPASS-20 findings remain applicable. Our translation was generated and validated within Cantonese-speaking Hong Kong. How well it performs in other Chinese populations awaits clarification. Being developed in and for western cultural contexts, the PASS may omit aspects specific to Chinese patients. Exploration of culturally-relevant chronic pain-related anxiety features among Chinese patients is required. Finally, this cross-sectional study prohibits conclusions about the causal direction between pain anxiety and adjustment outcome relationships. (WC 2,495)

Acknowledgement

The authors would like to thank all patients for the time in participating in this study, Dr Ip Fu Keung, at the Pamela Youde Nethersole Eastern Hospital Eastern Hospital and Mr Barry K. H. T Tam for assistance in data collection.

Reference

1. McCracken LM, Gross RT, Sorg PJ, Edmands TA. Prediction of pain in patients with chronic low back pain: Effects of inaccurate predictions and pain-related anxiety. Behavior Research and Therapy 1993;31:647-52.
2. Burns JW, Mullen JT, Higdon LJ, Wei JM, Lansky D. Validity of the Pain Anxiety Symptoms Scale (PASS): Prediction of physical capacity variables Pain 2000;84:247-52.
3. Crombez G, Vlaeyen JW, Heuts PH, Lysens R. Pain-related fear is more disabling than pain itself: evidence on the role of pain-related fear in chronic back pain disability. Pain 1999;80(1-2):329-39.
4. Strahl C, Kleinknecht RA, Dinnel DL. The role of pain anxiety, coping, and pain self-efficacy in rheumatoid arthritis patient functioning. Behaviour research and therapy 2000;38(9):863-73.
5. McCracken LM, Zayfert C, Gross RT. The Pain Anxiety Symptoms Scale: Development and validation of a scale to measure fear of pain. Pain 1992;50:67-73.
6. McCracken LM, Zayfert C, Gross RT. The Pain Anxiety Symptoms Scale (PASS): A multi-modal measure of pain-specific anxiety symptoms. Behavior Research and Therapy 1993;16:183-4.
7. Osman A, Barrios FX, Osman JR, Schneekloth R, Troutman JA. The Pain Anxiety Symptoms Scale: psychometric properties in a community sample. Journal of Behavioral Medicine 1994;17(5):511-22.
8. Larsen DK, Taylor S, Asmundson GJ. Exploratory factor analysis of the Pain Anxiety Symptoms Scale in patients with chronic pain complaints. Pain 1997;69:27-34.
9. McCracken LM, Dhingra L. A short version of the Pain Anxiety Symptoms Scale (PASS-20): preliminary development and validity. Pain research & management : the journal of the Canadian Pain Society = journal de la societe canadienne pour le traitement de la douleur 2002;7(1):45-50.
10. Roelofs J, McCracken L, Peters ML, Crombez G, van Breukelen G, Vlaeyen JW. Psychometric evaluation of the Pain Anxiety Symptoms Scale (PASS) in chronic pain patients. Journal of behavioral medicine 2004;27(2):167-83.
11. Cho S, Lee S-M, McCracken LM, Moon D-E, Heiby EM. Psychometric properties of a Korean version of the pain anxiety symptoms scale-20 in chronic pain patients. International journal of behavioral medicine 2010;17(2):108-17.
12. Hooten WM, Townsend CO, Bruce BK, Shi Y, Warner DO. Sex differences in characteristics of smokers with chronic pain undergoing multidisciplinary pain rehabilitation. Pain medicine 2009;10(8):1416-25.
13. Lautenbacher S, Huber C, Kunz M, Parthum A, Weber PG, Griessinger N et al. Hypervigilance as predictor of postoperative acute pain: its predictive potency compared with experimental pain sensitivity, cortisol reactivity, and affective state. The Clinical journal of pain 2009;25(2):92-100.
14. IASP. Classification of chronic pain. Descriptions of chronic pain syndromes and definitions of pain terms. Prepared by the International Association for the Study of Pain, Subcommittee on Taxonomy. Pain Supplement 1986;3(226):S1-226.
15. Von Korff M, Dworkin SF, Le Resche L. Graded chronic pain status: an epidemiologic evaluation. Pain 1990;40(3):279-91.
16. Smith BH, Penny KI, Purves AM, Munro C, Wilson B, Grimshaw J et al. The Chronic Pain Grade questionnaire: validation and reliability in postal research. Pain 1997;71(2):141-7.

17. Fielding R, Wong WS. The prevalence of chronic pain, fatigue, and insomnia in the general population of Hong Kong. Final report to the Health, Welfare and Food Bureau, Government of the Hong Kong Special Administrative Region, China Hong Kong: School of Public Health, the University of Hong Kong; 2008.
18. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand 1983;67(6):361-70.
19. Snaith R, Zigmond A. The Hospital Anxiety and Depression Scale: Manual. London: NFER-Nelson; 1994.
20. Leung CM, Ho S, Kan CS, Hung CH, Chen CN. Evaluation of the Chinese version of the Hospital Anxiety and Depression Scale. A cross-cultural perspective. Int J Psychosom 1993;40(1-4):29-34.
21. Leung CM, Wing YK, Kwong PK, Lo A, Shum K. Validation of the Chinese-Cantonese version of the hospital anxiety and depression scale and comparison with the Hamilton Rating Scale of Depression. Acta Psychiatr Scand 1999;100(6):456-61.
22. Wong WS, Kwok HY, Luk KDK, Chow YF, Mak KH, Tam BKH et al. Fear of movement/(re)injury in Chinese chronic pain patients: Factorial validity of the Chinese version of the Tampa Scale for Kinesiophobia. Journal of Rehabilitation Medicine in press.
23. Kori SH, Miller RP, Todd DD. Kinesiophobia: A new view of chronic pain behavior. Pain Management 1990;Jan/Feb:35-43.
24. Miller RP, Kori SH, Todd DD. Tampa Scale. Unpublished report. Tampa, FL; 1991.
25. Vlaeyen JW, Kole-Snijders A, Boeren RGB, van Eek H. Fear of movement/(re)injury in chronic low back pain and its relation to behavioral performance. Pain 1995;62:363-72.
26. Clark ME, Kori SH, Brockel J. Kinesiophobia and chronic pain: Psychometric characteristics and factor analysis of the Tampa Scale. American Pain Society Abstracts 1996.
27. Swinkels-Meewisse EJCM, Swinkels RAHM, Verbeek ALM, Vlaeyen JWS, Oostendorp RAB. Psychometric properties of the Tampa Scale for kinesiophobia and the fear-avoidance beliefs questionnaire in acute low back pain. Manual therapy 2003;8(1):29-36.
28. Woby SR, Roach NK, Urmston M, Watson PJ. Psychometric properties of the TSK-11: a shortened version of the Tampa Scale for Kinesiophobia. Pain 2005;117(1-2):137-44.
29. Lundberg MKE, Styf J, Carlsson SG. A psychometric evaluation of the Tampa Scale for Kinesiophobia --- from a physiotherapeutic perspective. Physiotherapy Theory and Practice 2004;20:121-33.
30. Roelofs J, Sluiter JK, Frings-Dresen MHW, Goossens M, Thibault P, Boersma K et al. Fear of movement and (re)injury in chronic musculoskeletal pain: Evidence for an invariant two-factor model of the Tampa Scale for Kinesiophobia across pain diagnoses and Dutch, Swedish, and Canadian samples. Pain 2007;131(1-2):181-90.
31. SPSS. Statistical Package for the Social Sciences. Chicago: SPSS, Inc.; 2002.
32. Bentler PM, Wu EJC. EQS/Windows: User's Guide. Los Angeles: BMDP Statistical Software; 1993.
33. Mardia K. Measures of multivariate skewness and kurtosis with application. Biometrika 1970;57:519-30.
34. Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling 1999;6(1):1-55.
35. Bentler P, Bonett D. Significance tests and goodness of fit in the analysis of covariance structures. Psychological bulletin 1980;88:588-606.
36. Browne MW, Cudeck R. Alternative ways of assessing model fit. In: Bollen KA, Long JS, editors. Testing structural equation models Newbury Park, CA: Sage; 1993.

37. Satorra A, Bentler P. Corrections to test statistics and standard errors in covariance structure analysis. In: Von Eye A, Clogg C, editors. Latent variable analysis: Applications for developmental research. Thousand Oaks, CA: Sage; 1994.
38. Mak WW, Zane NW. The phenomenon of somatization among community Chinese Americans. Soc Psychiatry Psychiatr Epidemiol 2004;39(12):967-74.
39. Parker G, Gladstone G, Chee KT. Depression in the planet's largest ethnic group: the Chinese. Am J Psychiatry 2001;158(6):857-64.
40. Asmundson GJ, Norton GR. Anxiety sensitivity in patients with physically unexplained chronic back pain: A preliminary report. Behavior Research and Therapy 1995;33:771-7.
41. Asmundson GJ, Taylor G J. Role of anxiety sensitivity in pain-related fear and avoidance. Journal of Behavioral Medicine 1996;19(6):577-86.
42. Jensen MP, Turner JA, Romano JM, Strom SE. The Chronic Pain Coping Inventory: Development and preliminary validation. Pain 1995;60(2):203-16.
43. Wong WS, Jensen MP, Mak KH, Tam BKH, Fielding R. Preliminary psychometric properties of the Chinese version of the Chronic Pain Coping Inventory in a Hong Kong Chinese population. Journal of Pain 2010;11(7):672-80.