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Psychometric Properties of the Persian Version of the Chronic Pain Acceptance Questionnaire in Patients with Chronic Pain in Isfahan, Tehran, and Yazd, Iran

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Abstract

Quantitative Study

Background: Acceptance and commitment therapy (ACT) is one of the evidence-based therapies for chronic pain. One of the measuring tools used in this approach is the Chronic Pain Acceptance Questionnaire (CPAQ). The aim of the present study was to determine the psychometric properties of the CPAQ in a sample of patients with chronic pain in Isfahan, Tehran, and Yazd, Iran.

Methods: This was a cross-sectional, methodological study. The statistical population included all Iranian patients with chronic pain. The sample consisted of 228 patients with chronic pain; the patients were simultaneously selected from medical centers affiliated to Isfahan University of Medical Sciences, Baqiyatallah Hospital in Tehran, and the Medical Clinics in Yazd. To determine the validity of the CPAQ, the Pain Disability Index (PDI), Pain Catastrophizing Scale (PCS), Pain Anxiety Syndrome Scale (PASS-20), and Satisfaction with Life Scale (SWLS) were used. SPSS software and correlation analysis methods, confirmatory factor analysis, and Cronbach's alpha were used.

Results: The reliability of the CPAQ was determined to be 0.79 using Cronbach's alpha method, and its validity was confirmed through inverse correlation with the scores of the PDI (-0.319), PCS (-0.228), PASS (-0.355), and SWLS (0.19); all correlation coefficients were significant ($P < 0.01$).

Conclusion: The validity and reliability of the CPAQ in Iranian patients with chronic pain have been confirmed. Thus, it can be used as a research tool for the measurement of acceptance index and commitment therapy outcome in Iranian patients.

Keywords: Chronic pain; Psychometric properties; Chronic Pain Acceptance Questionnaire; Validity; Reliability

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Introduction

The International Association for the Study of Pain (IASP) defines pain as "an unpleasant sensory and psychological experience that is associated with possible or actual tissue damage or occurs during periods of such damages" (Caraceni & Portenoy, 1999). Chronic pain syndrome (CPS) is a common problem that poses grave challenges for therapists due to its complex nature, ambiguous etiology, and poor response to treatment (Treede et al., 2015). Chronic pain is a very common problem, and it is estimated that 20% of people in the world suffer from it; some studies have reported that 15 to 20% of referrals to physicians are patients with chronic pain (Gureje, Von Korff, Kola, Demyttenaere, Posada-Villa, & Iwata, 2008). The prevalence of chronic pain in Iran is estimated to range from 14% to 21% (Ghaffari, Alipour, Jensen, Farshad, & Vingard, 2006). One of the reasons that chronic pain is one of the most problematic issues of the present age is its comorbidity with psychiatric disorders. The most common psychiatric disorders associated with chronic pain are depression (10 to 100% in these patients), anxiety (with a higher prevalence than that of depression), sleep disorders, and substance abuse (a much higher prevalence than that in the general population) (Mohammadzadeh et al., 2015).

The annual cost of pain management is $ 60 billion, which is more than the annual cost of cardiovascular diseases (CVDs). It is also the cause of the loss of 700 million working days. Furthermore, chronic pain is a disorder that affects behavior and lifestyle (Akmaz, Uyar, Yıldırım, & Korhan, 2018) and can be associated with extensive physical and emotional suffering and occupational limitations (Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006). Cross-sectional and prospective studies show that these consequences can be improved with a degree of pain acceptance associated with better performance (Mason, Mathias, & Skevington, 2008; McCracken, 1998; McCracken & Eccleston, 2003; McCracken & Eccleston, 2005). Significant improvements have been made regarding the physical, psychological, and quality of life (QOL) outcomes of these patients after the implementation of acceptance-based programs in an interdisciplinary setting for pain management (McCracken, MacKichan, & Eccleston, 2007; McCracken, Vowles, & Eccleston, 2005; Vowles, McCracken, & Eccleston, 2007). Therefore, psychological therapies for chronic pain have recently obtained a special position, and acceptance and commitment therapy (ACT) is the most novel one (McCracken, Vowles, & Eccleston, 2004; Anvari, Ebrahimi, Neshatdoust, Afshar, & Abedi, 2014).

The 4 most common questionnaires for measuring pain acceptance are the Chronic Pain Acceptance Questionnaire (CPAQ), Illness Cognitions Questionnaire (ICQ), Pain Solutions Questionnaire (PaSol), and Acceptance of Illness Scale (AIS) (Reneman, Dijkstra, Geertzen, & Dijkstra, 2010). McCracken (1998), with 160 chronic pain patients referred for a pain management treatment, reported the Cronbach's alpha without factor analysis of the CPAQ to be equal to 0.84 and approved its construct validity through negative correlation with pain intensity, pain-related anxiety, avoidance, depression, and physical and psychosocial disability ($-0.66 < r < -0.28$).

Reneman et al. (2010), in a review study, compared the psychometric features of these 4 questionnaires in 9 dimensions (including construct and criterion validity, and internal reliability) and concluded that the CPAQ is the most appropriate tool for this purpose. Moreover, the CPAQ is the only questionnaire developed in the theoretical framework of pain acceptance. The CPAQ has been translated and its psychometric features have been determined in different languages, including German (Nilges,

Köster, & Schmidt, 2007), Chinese (Ning, Ming, Mae, & Ping, 2008), Swedish (Wicksell, Olsson, & Melin, 2009; Rovner, Årestedt, Gerdle, Börsbo, & McCracken, 2014), Italian (Bernini, Pennato, Cosci, & Berrocal, 2010; Monticone, Ferrante, Rocca, Nava, Parini, & Cerri, 2013), Spanish (Rodero, García-Campayo, Casanueva, del Hoyo, Serrano-Blanco, & Luciano, 2010), Korean (Cho, Heiby, McCracken, Moon, & Lee, 2012), Turkish (Akmaz et al., 2018), and Finnish (Ojala, Piirainen, Sipilä, Suutama, & Häkkinen, 2013). The aim of the present study was to investigate the psychometric properties of the Persian version of the CPAQ in a sample of patients with chronic pain in Tehran, Isfahan, and Yazd, Iran.

Methods

This was a cross-sectional, methodological study. The study participants included 228 patients with chronic pain; they were simultaneously selected through convenience sampling method from multiple centers in Baqiyatallah Hospital in Tehran, Educational and Medical Centers affiliated to Isfahan University of Medical Sciences, and the Neurology Clinic in Yazd in 2017. The study inclusion criteria were diagnosis of chronic pain based on the criteria of the IASP, age of 20-65 years, duration of pain of at least 6 months, non-cancerous pain, normal intelligence, and literacy to understand the questionnaire items, and willingness to participate in the study. The study exclusion criteria included serious neurological problems, cognitive and intelligence problems, and serious psychiatric disorders such as psychotic disorder.

Demographic and pain details questionnaire: This questionnaire includes items regarding age, sex, education, and type, duration, and location of pain.

Chronic Pain Acceptance Questionnaire: The CPAQ was developed by McCracken et al. (2004). It is widely used in researches related to chronic pain. The CPAQ includes 20 items in the 2 subscales of activity engagement (daily activities despite the pain) and pain willingness (relative lack of effort to avoid or control pain). The items are scored on a 7-point scale. The total score of the CPAQ ranges from 0 to 120, and higher scores indicate more pain acceptance. Psychometric studies in different cultures have reported the validity and reliability of the CPAQ to various degrees. The reliability (Cronbach's alpha) of the CPAQ in German, Chinese, Italian, Spanish, Korean, and Finnish samples was reported as equal to 0.84, 0.92, 0.91, 0.83, 0.80, and 0. 88, respectively. (Nilges et al., 2007; Bernini et al., 2010; Monticone et al., 2013; Rodero et al., 2010; Cho et al., 2012; Ojala et al., 2013).

Pain Anxiety Symptoms Scale: Pain-related fear and avoidance behaviors are assessed using the Pain Anxiety Symptoms Scale (PASS-20). The PASS consists of 20 items, which assess the frequency of symptoms on a 6-point scale. The total score of the PASS-20 ranges from 0 to 100, and higher scores indicate more avoidance and anxiety. The PASS-20 has an internal reliability of 0.81 and convergent and divergent validity of 0.95 (McCracken & Dhingra, 2002).

Pain Catastrophizing Scale: The Pain Catastrophizing Scale (PCS) is a 13-item scale that measures pain-related catastrophizing in the 3 subscales of helplessness, magnification, and rumination. The range of the total score of the PSC is 0-52. A high validity and reliability have been reported for this scale (Sullivan, Bishop, & Pivik, 1995).

Pain Disability Index: The Pain Disability Index (PDI) is a 7-item self-report scale that measures the extent to which chronic pain affects physical and mental functioning in 7 important aspects of life (family responsibility, recreation, social and occupational activity, sexual behavior, self-care, and life support practices). The items are scored on a scale ranging from 0 (full capacity) to 10 (full disability). The range of

the total score of this questionnaire is 0-70, and higher scores indicate more disability. A high predictive and structural validity have been reported for this scale, and its intra-class correlation was reported as equal to 0.76 (Soer et al., 2013).

Satisfaction with Life Scale: The Satisfaction with Life Scale (SWLS) was developed by Diener et al. and includes 5 statements that measure the cognitive component of well-being. The internal consistency of this scale using Cronbach's alpha and test-retest methods was reported at 0.83 and 0.69, respectively. Its validity was approved through convergent and divergent validity based on a positive correlation with the Oxford Happiness Inventory (OHI) and a negative correlation with the Beck Depression Inventory (BDI) (Pavot, Diener, Colvin, & Sandvik, 1991).

Implementation procedure: First, the questionnaires were translated by 2 translators simultaneously (forward translation). Then, the revised version was translated into the original language by a bilingual translator. The final version was reviewed, adapted, and finalized in the meetings of the research team. After preparing the final questionnaires, 228 participants who had referred to clinics in Isfahan, Baqiyatallah Hospital (Tehran), and Yazd due to chronic pain were selected based on the study inclusion and exclusion criteria. Questionnaires were completed by participants in appropriate psychological conditions.

Data analysis: Data were analyzed using psychometric statistical methods in SPSS software (version 20, IBM Corp., Armonk, NY, USA). To evaluate the questionnaire's reliability, the internal consistency test (Cronbach's alpha) and intraclass correlation coefficient (ICC) were used. Pearson's correlation coefficient was used to determine convergent and divergent validity, and factor analysis was performed to determine the construct validity and its factors structure.

Results

The participants included 288 patients with chronic pain. Their mean age was 45 ± 16.07 years; a majority of the participants were women (71.9%), married (91.7%), and had a diploma and lower education level (87%). The most common pain type was various pain (23.4%), low back pain (17.5%) joint and musculoskeletal (21.5%), and internal pain (18.8%). The demographic characteristics of the participants are presented in table 1.

Reliability: The results are presented in table 2. Findings show that the CPAQ and both of its subscales have good reliability, but the total score of the CPAQ showed a higher internal consistency with Cronbach's alpha of 0.79. The ICC of the CPAQ (ICC = 0.694) was higher than its subscales. However, the total coefficients of the questionnaire and its subscales were significant ($P < 0.01$).

Table 1. Demographic characteristics of participants and type and location of pain

Variable	Value
Age (Mean ± SD)	45 ± 16.07
Gender: female [n (%)]	167 (71.9)
Married [n (%)]	209 (91.7)
Illiterate and elementary education	17 (7.5)
Under diploma and diploma	200 (87)
Bachelor's degree or higher	11 (4.8)
Headache	27 (11.8)
Low back pain	40 (17.5)
Joint and musculoskeletal pain	49 (21.5)
Pain in the hands and shoulders	17 (7)
Internal pain	43 (18.8)
Various pains	53 (23.4)

Table 2. Cronbach's alpha coefficient and intraclass correlation coefficient of the Persian version of the Chronic Pain Acceptance Questionnaire

Subscales	Cronbach's alpha	ICC (CI)*
CPAQ	0.79	0.694 (0.663-0.748)
Pain Willingness	0.73	0.574 (0.485-0.748)
Activity Engagement	0.71	0.624 (0.546-0.693)

*ICC: Intraclass correlation coefficient; CI: Confidence interval; CPAQ: Chronic Pain Acceptance Questionnaire

Validity: To determine the validity of the Persian version of the CPAQ in a sample of Iranian patients with chronic pain, the simultaneous convergent and divergent validity was calculated using the correlation of the CPAQ with some questionnaires that were theoretically convergent or divergent. Its construct validity was also determined through factor analysis.

As seen in table 3, the total CPAQ score and the pain willingness subscale scores have a significant correlation with life satisfaction (0.19 and 0.17, respectively) ($P < 0.01$). Moreover, they have a significant inverse correlation with scales that theoretically contradict acceptance, such as pain anxiety, pain catastrophizing, pain disability, helplessness, pain magnification, and rumination ($P < 0.01$). Although the subscales of activity involvement did not correlate with life satisfaction, they showed a significant inverse correlation with other psychopathological scales of pain anxiety, pain magnification, and rumination (-0.18, 0.18, and 0.14, respectively) ($P < 0.05$), revealing its divergent construct validity.

Factor structure: To determine the construct validity and factor structure of the CPAQ in the Iranian culture, the factor analysis was used with confirmatory and oblimin rotation methods. Sample adequacy indices (KMO = 0.751) were calculated, which confirmed the sample size adequacy, and Bartlett's test of sphericity revealed homogeneity of variance (chi-square test = 1124.672; $P < 0.0001$). The minimum factor load was considered to be 0.30, so items with a value lower than this value on the factors were removed. The results presented in table 4 show that 10 items are loaded on the first factor, and 8 items are loaded on factor 2, and 2 items (numbers 3 and 17) are not loaded on any of the factors.

Discussion

The aim of the present study was to determine the psychometric features of the Persian version of the CPAQ in a sample of patients with chronic pain.

Table 3. Correlation coefficient of the Persian version of the Chronic Pain Acceptance Questionnaire score with criterion questionnaires (Part I)

Questionnaires	Life satisfaction	Pain Anxiety Symptoms Scale	Pain catastrophizing	Disabling pain
CPAQ	0.19**	-0.36**	-0.28**	-0.32**
Willingness subscale	0.17**	-0.21**	-0.19**	-0.35**
Activity subscale	0.025	-0.18**	-0.012	-0.05
Questionnaires	**Helplessness**	**Magnification of pain**	**Ruminant with pain**	**Pain intensity**
CPAQ	-0.22**	-0.27**	-0.29**	0.29
Willingness subscale	-0.19**	-0.13	-0.18**	0.06
Activity subscale	-0.03	-0.18*	-0.14*	0.05

CPAQ: Chronic Pain Acceptance Questionnaire
* Significant at the level of 0.95, ** Significant at the level of 0.95

Table 4. Factor analysis of the Persian version of the Chronic Pain Acceptance Questionnaire

Items	Factor 1	Factor 2
9. I lead a full life even though I have chronic pain.	0.807	
8. There are many activities I do when I feel pain	0.782	
13. Keeping my pain level under control takes priority whenever I am doing something.	0.707	
4. My life is going well, even though I have chronic pain.	0.699	
12. Despite the pain, I am now sticking to a certain course in my life.	0.675	
20. I have to struggle to do things when I have pain.	0.620	
6. Although things have changed, I am living a normal life despite my chronic pain.	0.579	
1. I am getting on with the business of living no matter what my level of pain is.	0.373	
10. Controlling my pain is less important than any other goals in my life.	0.322	
5. It is not necessary for me to control my pain in order to handle my life well.	0.303	
3. It is OK to experience pain.	-	-
14. Before I can make any serious plans, I have to get my pain under control.		0.764
11. My thoughts and feelings about pain must change before I can take important steps in my life.		0.619
7. I need to concentrate on eliminating my pain.		0.606
16. I will have better control over my life if I can control my negative thoughts about pain.		0.588
15. When my pain increases, I can still take care of my responsibilities.		0.518
4. I would gladly sacrifice important things in my life to better control this pain.		0.517
19. It is a great relief to realize that I do not have to change my pain to get on with life.		0.422
18. My worries and fears about what pain will do to me are real.		0.407
17. I avoid putting myself in situations in which my pain might increase.		-

The reliability of the CPAQ and the pain willingness and activity engagement subscales was determined through internal consistency using Cronbach's alpha to be 0.79, 0.73, and 0.71, respectively, and their ICC was 0.69, 0.57, and 0.62, respectively. According to our findings, Cronbach's alpha coefficient of the Persian version of the CPAQ ($\alpha = 0.88$) is similar to that of the Italian version ($\alpha = 0.86$) (Bernini et al., 2010; Monticone et al., 2013), and the Turkish version ($\alpha = 0.94$) and its pain willingness ($\alpha = 0.88$) and activity engagement subscales ($\alpha = 0.91$), the Swedish version ($\alpha = 0.80$) and its pain willingness ($\alpha = 0.83$) and activity engagement subscales ($\alpha = 0.73$) (Wicksell et al., 2009), and the Finnish version ($\alpha = 0.86$) (Ojala et al., 2013). These results are consistent with the meta-analysis findings of psychometric studies of the CPAQ (Reneman et al., 2010), which reported its reliability as 0.62-0.85. The findings of the present study are within this range. Therefore, these findings indicate the optimal reliability of this questionnaire in the Iranian patient population.

The convergent and divergent validity of the CPAQ was assessed through its correlation with the scales commonly used in various pain studies. The results showed that the total score of the CPAQ had a significant direct correlation with the SWLS. Moreover, it had a significant inverse correlation with the PSS-20, PCS, and the subscales of pain disability, helplessness, pain magnification, and rumination with pain. These findings confirm the validity of the questionnaire in Iranian patients with chronic pain. These findings support the psychometric results of the Arabic version of the CPAQ (Huijer, Fares, & French, 2017) that established convergent validity through the correlation of the CPAQ scores with QOL, anxiety, and depression scales. These findings are also consistent with the psychometric results of the Italian version reported by Monticone et al. (2013); they reported a divergent

validity through correlation with the PCS, and Hospital Anxiety and Depression Scale (HADS). Moreover, it supports the convergent validity of the Swedish version (Wicksell et al., 2009) through correlation with the Quality of Life Scale (QOLS), anxiety and depression questionnaire, and fear of pain scale. In addition, the findings of the present study are consistent with the results of psychometric studies of the Korean version (Cho et al., 2012) and the Finnish version (Ojala et al., 2013) that confirmed the convergent and divergent validity of the CPAQ through its correlation with QOLS, and Pain Anxiety Symptoms Scale, pain intensity, and BDI.

The findings of this study support this questionnaire and the theory of ACT, emphasizing that pain acceptance, rather than trying to control and avoid pain, can lead to more flexibility, and thus, psychological adjustment (Mason et al., 2008; McCracken, 1998; McCracken & Eccleston, 2003; McCracken et al., 2005).

One of the findings in this study was the lack of a significant correlation between pain acceptance and pain intensity, which is not consistent with the findings of previous studies (Rovner et al., 2014; Cho et al., 2012). Seemingly, accepting pain is theoretically associated with psychological resilience, which leads to value-based action and activity despite the pain. This finding supports the results of clinical trials (Anvari et al., 2014) that showed the effectiveness of ACT in improving life satisfaction, and reducing pain anxiety, pain catastrophizing, and pain disability but did not have effect on pain intensity.

Another goal of this study was to determine the factor structure of the CPAQ and determine its construct validity. The results of the factor analysis of the CPAQ items (Table 4) showed that the best CPAQ factor structure in the context of the Iranian cultural is 2-factor structure. Factor load of 0.32-0.80 on 2 factors indicates the construct validity of the Persian version of the CPAQ. CPAQ and its 2 subscales of activity engagement and pain willingness have the desired validity in the Iranian population. These findings are consistent with previous studies on the Turkish (Akmaz et al., 2018), Korean (Cho et al., 2012), and Italian (Monticone et al., 2013) versions, which found the 2-factor structure to be the best structure.

The important difference between the factor structure of the questionnaire in the present study and previous studies is that items number 3 and 17 had no significant load on any factors and needed to be revised and corrected. Furthermore, items number 15 and 19, which in the original version were loaded on pain willingness, are loaded on activity engagement. In contrast, items number 13 and 20 are loaded on the pain willingness subscale instead of loading on the activity engagement subscale. This difference in factor structure may indicate a difference in the social perception of pain and activity between the Iranian society and Western societies.

Conclusion

The findings indicate that the Persian version of the CPAQ has desirable psychometric features and a high reliability and validity. This questionnaire, as a valid tool for research related to pain, can also be considered as a valid instrument in clinical trials to measure changes based on third-wave behavioral therapies.

Conflict of Interests

Authors have no conflict of interests.

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