

Factors associated with the Pain Catastrophizing Scale and validation in a sample of the Turkish population

Mustafa SÜREN^{1*}, İsmail OKAN², Aziz Mehmet GÖKBAKAN³, Ziya KAYA¹, Ünal ERKORKMAZ⁴, Semih ARICI¹, Serkan KARAMAN¹, Mürsel KAHVECİ¹

¹Department of Anesthesiology and Reanimation, Faculty of Medicine, Gaziosmanpaşa University, Tokat, Turkey

²Department of General Surgery, Faculty of Medicine, Gaziosmanpaşa University, Tokat, Turkey

³Department of Psychiatry, Faculty of Medicine, Gaziosmanpaşa University, Tokat, Turkey

⁴Department of Biostatistics, Faculty of Medicine, Sakarya University, Sakarya, Turkey

Received: 19.06.2012

Accepted: 15.03.2013

Published Online: 02.01.2014

Printed: 24.01.2014

Aim: The aim of this study was to validate the Pain Catastrophizing Scale (PCS) in the Turkish population and to investigate its correlation with the demographic and clinical characteristics of patients.

Materials and methods: Volunteer patients, who were scheduled for elective surgery and who applied to the Outpatient Clinic of Anesthesiology for preoperative evaluation, were asked to complete a PCS form. The patient's age, sex, educational level, marital status, presence of chronic pain, and American Society of Anesthesiologists score were recorded, and PCS scores and demographic variables were compared statistically.

Results: Of the 257 patients enrolled in the study, 136 were male, 121 female, and the median age was 40. The 3 subscales in the Turkish version of the PCS consisted of rumination, magnification, and helplessness. Internal consistency of PCS was found to be congruent with Cronbach's $\alpha = 0.90$. Significantly higher PCS scores were found in women with chronic pain. In addition, patients who graduated from primary school had statistically higher scores compared to those who graduated from high school.

Conclusion: In accordance with the original scale, demographic specifications of the Turkish version of the PCS were found congruent. PCS scores in our population were found compatible with the literature review.

Key words: Catastrophizing, pain, preoperative period, pain perception, validation studies

1. Introduction

One important concept related with the psychological perception of pain that has recently garnered attention is catastrophizing. The literature contends that patients who tend to catastrophize perceive pain as stronger than it actually is (1,2). Patients who catastrophize exaggerate pain, ruminate about painful sensations, and show an inability to control pain. They also tend to amplify the threat value of the condition, which stimulates pain (1,2). Experienced pain has been found to increase from 7% to 33% in pain ratings depending on the extent of the catastrophizing (3), which could help to predict the pain experience (1,3).

The Pain Catastrophizing Scale (PCS) was developed in 1995 by Sullivan et al. to measure the degree of individual pain catastrophizing (4). PCS scores have been found to reliably predict certain variables, such as severe pain, disability, and emotional disturbances, which occur following trauma or tissue damage (2-6).

Although many recent studies have elucidated on the role of the PCS score with significant results (1-4), none have been published that focus on the validation of the PCS within the Turkish population. Here, we aim to determine the relationship of the PCS score with the demographic and clinical characteristics of patients who applied to the Outpatient Clinic of Anesthesia for surgical preoperative evaluation.

2. Materials and methods

2.1. Patients

The study was approved by the Gaziosmanpaşa University Medical School Ethics Committee. Patients who were admitted to the Outpatient Clinic between June 2011 and August 2011 for preoperative evaluation for an elective surgical procedure were included. After they were informed about the study, patients who were less than 18 years old

* Correspondence: mustafasuren@yahoo.com

or more than 70 years old, were unwilling to participate, suffered from alcohol or substance abuse, needed urgent surgery, had acute pain, or were uncooperative were excluded from the study.

2.2. Procedure

The patients' demographic characteristics, including age, sex, educational status, marital status; clinical conditions, such as the presence of chronic pain (pain lasting more than 6 weeks); and American Society of Anesthesiologists (ASA) scores were recorded. The level of catastrophizing was assessed by using the PCS. The PCS was delivered to patients during their visit to the Department of Anesthesiology Outpatient Clinic. Patients were helped with completing the questionnaire as required (e.g., illiterate patients). The patients' demographic and clinical characteristics, as well as their respective PCS scores, were recorded into a database by the corresponding author, and the data were analyzed.

2.3. The Pain Catastrophizing Scale

The PCS is used to evaluate the patient's feelings, thoughts, and emotions related to pain and catastrophizing. It is a self-administered questionnaire with 13 items and 3 subscales: helplessness, magnification, and rumination. A 5-point scale is used for each item, with higher values representing greater catastrophizing. The scores for each item are added to determine the subscales, and the total score is calculated by the summation of all items. The PCS scores range from 0 to 52 points (4).

The PCS has not yet been conducted for the Turkish population. To establish the Turkish version of the PCS, we obtained permission from the original authors. With regard to our translation procedure, the original version of the PCS was translated from English to Turkish by 4 people: a native English-speaker (university graduate living in Turkey for 3 years), 2 members of the Faculty of Education from Gaziosmanpaşa University, and a nonmedical professional (lawyer). Two English linguistic academicians from the Department of English Language, Faculty of Education, Gaziosmanpaşa University translated the Turkish version of the PCS to English (back-translated) (2,7). A committee of 3 people (a health professional, a Turkish linguist, and an English linguist) then rendered each question into its most comprehensible form. A physician delivered the PCS to the patients during their visit to the Anesthesiology Outpatient Clinic.

2.4. Statistical analysis

The Mann-Whitney U test was used to compare the PCS and subscale scores between 2 groups, and the Kruskal-Wallis analysis was used for comparing the PCS and subscale scores among groups. For multiple comparisons, the Bonferroni-adjusted Mann-Whitney U test was used. The PCS totals and the PCS subscale scores

were computed for reliability analysis using Cronbach's alpha coefficients (6). The PCS and subscale scores were presented in the median and interquartile ranges (quarters 1 to 3). Spearman's correlation coefficient was used to determine the relationship between PCS and subscale scores and other parameters. The categorical variables were presented as counts and percentages. $P < 0.05$ was considered significant. Analyses were performed using commercial software (IBM SPSS Statistics 19, SPSS Inc., Somers, NY, USA).

3. Results

During the indicated period, 257 patients were included in the study. The median age was 40 years old (interquartile: 27.50–51.00), with 121 female patients (47.1%). There were 13 patients (5.1%) who were illiterate, while 134 patients (52.1%) had a primary school education, 55 patients (21.4%) had a high school education, and 55 patients (21.4%) had a university degree (Table 1).

PCS total (PCS-T) scores and PCS subscale scores were found to be significantly higher in women. The presence of chronic pain during the completion of the PCS scores had a significant effect on the PCS-T and PCS subscale scores as a positive correlation between pain and PCS (Table 1).

The PCS-T and helplessness subscale scores of patients with primary school degrees were statistically higher than those of patients with high school degrees (Table 1).

A positive correlation was found between PCS-T scores [14.0 (6.0–23.0)] and the subscale scores (i.e. scores of rumination [5 (2.0–10.0)], magnification [3 (1.0–6.0)], and helplessness [4 (1.0–9.5)]) (Table 2). Cronbach's reliability coefficients were found to be 0.83, 0.80, 0.55, and 0.90 for subscales of helplessness, rumination, and magnification and for T-PCS, respectively. All subgroups of the PCS were adequate according to internal consistency and Cronbach's alpha of magnification was reliable at an intermediate level ($\alpha = 0.55$).

No significant correlation was observed between either marital status and PCS-T and subscale scores or the ASA score and the PCS-T and subscale scores.

4. Discussion

In accordance with the original PCS, which was generated in English, the Turkish version of the scale was found to present identical demographic characteristics. Similar to the data of the validation of the original scale, all 3 subscales of the Turkish version (rumination, magnification, and helplessness), as well as the total of the scale, showed high internal consistency and similar correlation coefficients with the original scale (Table 2) (4). Internal consistency of PCS-T was found to be congruent with Cronbach's $\alpha = 0.90$.

Table 1. Distribution of the PCS scores.

		n	PCS* scores
Total		257	14.0 [6.0–23.0]
Sex	Female	121	17.0 [7.5–26.0]
	Male	136	10.0 [4.0–20.0]
	P		0.001
Chronic pain	No	177	9.0 [4.0–17.0]
	Yes	80	23.0 [16.0–33.0]
	P		0.001
Education	No education	13	21.0 [6.5–29.5]
	Primary school	134	16.0 [6.75–26.0]
	High school	55	8.0 [4.0–18.0]
	University	55	12.0 [5.0–20.0]
	P		0.024**

PCS*: Pain catastrophizing scale.

***: There was a statistically significant difference between primary school and high school graduates ($P < 0.05$).

Table 2. Correlation coefficients (r) between PCS* and subscales.

	PCS*		Helplessness		Magnification	
	r	P	r	P	r	P
Helplessness	0.898	<0.001	–		–	
Magnification	0.750	<0.001	0.574	<0.001	–	
Rumination	0.898	<0.001	0.724	<0.001	0.578	<0.001

PCS*: Pain catastrophizing scale.

Studies carried out over the last 30 years reveal that psychological stress has a considerable impact on pain (8–12). Pain catastrophizing consists of negative pain cognition induced by a response to the pain experience (4). Catastrophizers, by definition, negatively evaluate their ability to control pain. The close relationship between pain catastrophizing and negative mood necessitates precise measurement of these constructs (1,3). Clinical studies indicate that catastrophizing correlates significantly with mood and personality variables, such as depression, fear of pain, coping strategies, mental state, personal traits, and anxiety (1–3). Although catastrophizing is a general cognitive distortion observed in people with depression, the tendency of chronic pain patients to “catastrophize”

has also received considerable attention in recent years. Regarding chronic pain, catastrophizers tend to expect damaging consequences and lack pain control as a result of futile cognitive processes (13). Therefore, psychological assessment of patients suffering from pain would be helpful for long-term management of these patients. Previous studies revealed a positive correlation between increased catastrophizing and female sex, anxiety, and postoperative pain severity (3,9,14–18).

The present study is the first in the evaluation of factors associated with the PCS score in the Turkish population. We observed that PCS scores of female patients were higher than those of male patients. Similar results were obtained by Turner et al., in which female patients who had spinal

cord damage tended to catastrophize significantly more than male patients (19). In a recent study, Kırdemir and Özorak put forth that women perceived pain more intensely due to the fact that their threshold to pressure pain was lower than men's (20). In a study of 36 male and 64 female patients with knee osteoarthritis, Keefe et al. also suggested that female patients' PCS scores were higher than those of males (16). Women also demonstrated overt pain behavior, such as guarded movements and joint rigidity. These signs may be related to physical factors, but it is worth considering that they may serve as eliciting needed care and attention from the family circle. In this context, patient-spouse communication deserves to be considered to expose pain-related behaviors. Although many studies (3,4,15,17,21) showed that female sex was associated with increased PCS scores, Granot and Ferber observed no significant relationship between sex and PCS scores in patients who underwent abdominal surgery (1). Similarly, Ruscheweyh et al. concluded that there was no correlation between PCS scores and sex (22). The authors of both studies explained their findings by small sample size and cultural differences (1,22).

Age is another factor evaluated in studies associated with PCS scores (1,3,23). Papaioannou et al. evaluated PCS scores in patients who underwent lumbar disc fusion within 3 age groups: 20–40, 40–60, and >60 years old. They did not find any correlation between age and PCS scores (14). The same results, in which there was no correlation between age and PCS or PCS subscale scores, were obtained in the present study, as well.

Pain presence at the time of the catastrophizing measurement was found to correlate with PCS scores in previous studies (18,24–26). In our study, 80 patients out of 257 were suffering from chronic pain, and the patients who actually had pain presented with higher PCS (Table 1) and PCS subscale scores. In concordance with our study, Forsythe et al. assessed 48 patients who were to undergo total knee prosthesis replacement (27). Of these patients, 36 were suffering from chronic pain, and those who had pain at the time of the assessment showed significantly higher PCS scores compared to the patients without pain at that time (Table 1).

References

1. Granot M, Ferber SG. The roles of pain catastrophizing and anxiety in the prediction of postoperative pain intensity: a prospective study. *Clin J Pain* 2005; 21: 439–45.
2. Fernandes L, Storheim K, Lochting I, Grotle M. Cross-cultural adaptation and validation of the Norwegian pain catastrophizing scale in patients with low back pain. *BMC Musculoskelet Disord* 2012; 13: 1–9.
3. Sullivan MJ, Thorn B, Haythornthwaite JA, Keefe F, Martin M, Bradley LA, Lefebvre JC. Theoretical perspectives on the relation between catastrophizing and pain. *Clin J Pain* 2001; 17: 52–64.
4. Sullivan MJ, Bishop SR, Pivik J. The Pain Catastrophizing Scale: Development and validation. *Psychol Assess* 1995; 7: 524–32.

Yap et al. concluded that educational status had no impact on PCS scores (28). Similarly, Granot and Ferber, in a group of 38 patients, did not observe a significant relationship between educational status and PCS scores (1). However, in our study, PCS scores of high school graduates were higher than those of primary school graduates, but they scored lower on the helplessness subscale. The relationship between PCS scores and educational status could be due to the specific educational systems of countries, and this would be an interesting field of research. Our study suggests that people tend to overestimate their distress as their education level rises.

Pain is a sensation that differs from person to person, and it is not only related to tissue damage, but to personal psychological traits, as well. Postoperative pain is a troublesome condition for patients, their relatives, doctors, health institutions, and governments. The levels of PCS scores were found to positively correlate with the severity of postoperative pain (1,14). It has been suggested that patients with higher PCS scores were also those who consumed higher amounts of analgesics and whose pain was most likely to become chronic and severe (1,3,29). We generally cannot predict the severity of postoperative pain before the procedure. However, cognitive assessment tools, such as PCS scores, could help clinicians to more precisely manage postoperative care by obtaining preoperative data.

In conclusion, the Turkish version of the PCS shows appropriate demographic properties, similar to the original one. The associated factors, such as patient's sex and educational status, could guide clinicians to predict which patients may have higher PCS scores and, therefore, a subsequent risk of severe pain. Thus, treatments may be modified based on patient's associated factors.

Acknowledgments

We wish to express our gratitude to Serkan Dođru, İsmail Şentürk, Zekeriya Başkal, Ali Osman Solmaz, Hikmet Günal, Haluk Özdemir, and Özlem Süren. There was no financial support or sponsorship and the authors declare that there are no conflicts of interest.

5. Tremblay I, Beaulieu Y, Bernier A, Crombez G, Laliberté S, Thibault P, Velly AM, Sullivan MJ. Pain Catastrophizing Scale for Francophone Adolescents: a preliminary validation. *Pain Res Manag* 2008; 13: 19–24.
6. Marić A, Banožić A, Ćosić A, Kraljević S, Sapunar D, Puljak L. Validation of the Croatian pain catastrophizing scale through a study on the influence of medical education on pain catastrophizing. *Period Biol* 2011; 113: 171–5.
7. Deyo RA. Pitfalls in measuring the health status of Mexican Americans: comparative validity of the English and Spanish Sickness Impact Profile. *Am J Public Health* 1984; 74: 569–73.
8. Frischenschlager O, Pucher I. Psychological management of pain. *Disabil Rehabil* 2002; 24: 416–22.
9. Turk DC, Okifuji A. Psychological factors in chronic pain: evolution and revolution. *J Consult Clin Psychol* 2002; 70: 678–90.
10. Keefe FJ, Abernethy AP, Campbell LC. Psychological approaches to understanding and treating disease-related pain. *Annu Rev Psychol* 2005; 56: 601–30.
11. Johnson C, Birthwistle J, Davis C. Pain in upper abdominal malignancy. *Turk J Med Sci* 2007; 37: 327–31.
12. Paksoy Erbaydar N, Çilingiroğlu N. Chronic pain and depression: a descriptive survey among adult primary health care centre patients. *Turk J Med Sci* 2010; 40: 707–14.
13. Lee EJ, Wu MY, Lee GK, Cheing G, Chan F. Catastrophizing as a cognitive vulnerability factor related to depression in workers' compensation patients with chronic musculoskeletal pain. *J Clin Psychol Med Settings* 2008; 15: 182–92.
14. Papaioannou M, Skapinakis P, Damigos D, Mavreas V, Broumas G, Palgimesi A. The role of catastrophizing in the prediction of postoperative pain. *Pain Med* 2009; 10: 1452–9.
15. Leeuw M, Goossens ME, Linton SJ, Crombez G, Boersma K, Vlaeyen JW. The fear-avoidance model of musculoskeletal pain: current state of scientific evidence. *J Behav Med* 2007; 30: 77–94.
16. Keefe FJ, Lefebvre JC, Egert JR, Affleck G, Sullivan MJ, Caldwell DS. The relationship of gender to pain, pain behavior, and disability in osteoarthritis patients: the role of catastrophizing. *Pain* 2000; 87: 325–34.
17. Pavlin DJ, Sullivan MJ, Freund PR, Roesen K. Catastrophizing: a risk factor for postsurgical pain. *Clin J Pain* 2005; 21: 83–90.
18. Sullivan MJL, Tripp DA, Santor D. Gender differences in pain and pain behavior: the role of catastrophizing. *Cog Ther Res* 2000; 24: 121–34.
19. Turner JA, Jensen MP, Warmis CA, Cardenas DD. Catastrophizing is associated with pain intensity, psychological distress, and pain-related disability among individuals with chronic pain after spinal cord injury. *Pain* 2002; 98: 127–34.
20. Kırdemir P, Özorak Ö. Can postoperative pain and analgesic need be predicted in preoperative period? *Türkiye Klinikleri J Med Sci* 2011; 3: 951–9.
21. Osman A, Barrios FX, Kopper BA, Hauptmann W, Jones J, O'Neill E. Factor structure, reliability, and validity of the pain catastrophizing scale. *J Behav Med* 1997; 20: 589–605.
22. Ruscheweyh R, Nees F, Marziniak M, Evers S, Flor H, Knecht S. Pain catastrophizing and pain-related emotions: influence of age and type of pain. *Clin J Pain* 2011; 27: 578–86.
23. Wood BM, Nicholas MK, Blyth F, Asghari A, Gibson S. Catastrophizing mediates the relationship between pain intensity and depressed mood in older adults with persistent pain. *J Pain* 2013; 14: 149–57.
24. Sullivan MJ, Stanish W, Waite H, Sullivan MJ, Tripp DA. Catastrophizing pain, and disability in patients with soft-tissue injuries. *Pain* 1998; 77: 253–60.
25. Severeijns R, Vlaeyen JW, van den Hout MA, Weber WE. Pain catastrophizing predicts pain intensity, disability, and psychological distress independent of the level of physical impairment. *Clin J Pain* 2001; 17: 165–72.
26. Sullivan MJ, Lynch ME, Clark AJ. Dimensions of catastrophic thinking associated with pain experience and disability in patients with neuropathic pain conditions. *Pain* 2005; 113: 310–5.
27. Forsythe ME, Dunbar MJ, Hennigar AW, Sullivan MJ, Gross M. Prospective relation between catastrophizing and residual pain following knee arthroplasty: two-year follow-up. *Pain Res Manag* 2008; 13: 335–41.
28. Yap JC, Lau J, Chen PP, Gin T, Wong T, Chan I, Chu J, Wong E. Validation of the Chinese pain catastrophizing scale (HK-PCS) in patients with chronic pain. *Pain Med* 2008; 9: 186–95.
29. Keefe FJ, Rumble ME, Scipio CD, Giordano LA, Perri LM. Psychological aspects of persistent pain: current state of the science. *J Pain* 2004; 5: 195–211.