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ПРИМЕНЕНИЕ ШКАЛЫ КАТАСТРОФИЗАЦИИ БОЛИ К БЕЛОРУССКИМ ПАЦИЕНТАМ С ХРОНИЧЕСКОЙ БОЛЬЮ*

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У пациентов с хронической болью одной из наиболее существенных детерминант интенсивности боли и связанной с ней нетрудоспособностью является катастрофизация боли, определяемая в качестве когнитивной ошибки. Шкала катастрофизации боли (PCS) была разработана для оказания помощи как в планировании обращения, так и оценки ее переживания пациентами. На сегодняшний день не имеется ее русскоязычной версии, адаптированной для белорусов. Для применения шкалы в клинических условиях и изучения русскоговорящих пациентов она была переведена нами на русский язык. Целью исследования является перевод и культурная адаптация шкалы для русскоязычной популяции и проверка ее внутреннего соответствия. конструктной валидности и надежности.

Ключевые слова: катастрофизация боли, хроническая боль, валидность, надежность.

THE USE OF PAIN CATASTROPHIZING SCALE (PCS) AMONGST BELORUSSIAN CHRONIC PAIN PATIENTS

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In patients with chronic pain, catastrophizing as a cognitive error is a significant determinant of self-rated pain intensity and disability. The Pain Catastrophizing Scale (PCS) was developed to assist with both treatment planning and outcome assessment; to date, no Russian version has been validated in Belarus. To enable the use of the PCS in clinical settings and research in Russian-speaking patients, the PCS had to be translated. The purpose of this study was therefore to translate and cross-culturally adapt the PCS into Russian and to test internal consistency, construct validity and reproducibility of the PCS.

Keywords: Pain catastrophizing, chronic pain, Validity, Reliability.

INTRODUCTION

Chronic pain is a burden for pain patients and is associated with high socioeconomic costs [1]. The underlying construct of chronic pain is complex, and biopsychosocial factors influence both its development and its maintenance: psychological components, such as unhelpful pain cognitions [2], depression, and fearful or catastrophizing thoughts, can influence perceived pain,quality of life [3],physical performance [2, 4], and subjective disability [4].

Cognitive errors have important roles not only in pain experience but also in how patients react to pain and adjust with it. Catastrophizing as a cognitive error is defined as a maladaptive response to pain and is characterized by an experience of heightened pain intensity and difficulty in disengaging from pain [4]; it is an

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important predictor of pain severity, and of how people cope with pain [5, 6], and appears to predict future disability better than do other variables [4, 7]. Some studies have indicated that pain catastrophizing predicts depression and also pain catastrophising has a moderating role in the relation between pain intensity and depression [8]. It mediates the reduction in depression, the perception of pain and the behavior in response to cognitive-behavioral or graded exercise therapy [9, 10]. Baseline catastrophising and depression were the main predictors for pain (as measured at the baseline) 6 to 12 months later in patients [11].

Diminishing catastrophizing thoughts can positively influence coping with pain, and behavioral and cognitive traits [12, 13]. In psychological research, it has been shown that pain catastrophizing behavior can influence those involved with the catastrophizers, leading to overcautious treatment decisions [14, 15]. For all these reasons, diminishing catastrophizing thoughts should constitute an important ingredient of therapy for chronic pain [10]. The Pain Catastrophizing Scale (PCS) was developed in the English language by Sullivan et al. [16] to screen patients with catastrophizing thoughts and to improve treatment planning, implementation, and outcome assessment. The English version of the PCS has been well investigated and its psychometric properties are good [16-19]. A systematic search of the literature revealed that, there is a Russian version of this scale in Russia [20], but surely there are cultural differences even between two same language countries and this can effect on application of this language (Semantic, Idiomatic, Experiential, Conceptual differences) [21], so can't use the Russian version of this scale in another Russian-speaking countries such as Belarus. Also, to date, no validated Russian version exists in Belarus. To be able to evaluate interventions targeting pain catastrophizing and investigate its significance in Belarusian chronic pain patients, we should translate and cross-culturally adapt the English PCS into Russian.

So the aim of this study was to cross-culturally adapt the English version of the PCS into Russian and to evaluate its psychometric properties (internal consistency, construct validity, factor structure, and reproducibility) in a large group of patients with chronic pain in Belarus.

METHODS

Study design

The study was carried out in a two-step procedure; firstly, the PCS was translated and cross-culturally adapted; and secondly, the Russian PCS was tested for psychometric properties in a cross-sectional design with a 1-week follow-up for test-retest.

Translation and cross-cultural adaptation

The official language of Belarusian People is Russian language. At first, the translation into Russian and cross-cultural adaptation of the original English version of the PCS into Russian was carried out in accordance with previously published guidelines [21]. Two native Russian speakers (T-1, T-2) carried out independent translations of the PCS from English to Russian. T-1 was a psychologist; T-2 was a professional translator. The forward translations were compared with one another and with the original English version. After discussing any discrepancies, the two versions were synthesized to form one common Russian version. And also, this version was compared with two Russian versions of this scale that were prepared in Russia (pain society of Russia) and in Centre for Research on Pain, Disability and Social Integration: Dr. Michael Sullivan who is originator of the English version of the PCS. And then one expert committee consisting of the translators, one health professional and the researchers in our research group reviewed all translations. The task of this expert committee was to ensure semantic and idiomatic equivalence and experiential and conceptual equivalence (i.e.,to address any peculiarities specific to the cultures examined) between the Russian and English versions of the questionnaire. After discussion about discrepancies, consensus on a pre-final version was achieved. The goal of the pre-final Russian PCS was that it should be as concise and easy to understand as possible. The first 15 patients with pain at each participating clinic reviewed the pre-final Russian PCS. None of the patients had difficulties in understanding the meaning of items or responses. Since the pre-final version was highly acceptable and easy-to-comprehend, no changes were made and the final version of the Russian PCS was equal to the pre-final.

Participants

A total of 150 participants were recruited from different clinical settings in Minsk, Belarus, between June 2013 and October 2013. Eligible participants were patients with non-homogeneous chronic pain for six months or more prior to inclusion, aged 18 and over, and were able to speak, read and write in Russian. The only exclusion criterion was serious immediate life-threatening diseases and having very intensive pain [22]. the inclusion was performed by a clinician, mostly a neurologist, seeing the patients at their clinic. 27 patients were excluded because they did not return the baseline questionnaires without giving any reason for not participating. A total of 123 patients, 90 women and 53 men, were included; 50 patients from neurology department in hospital and 73 patients from a clinic in Institute of Neurology and Neurosurgery.

Thirty-six patients participated in the test-retest design and filled the PCS at retest. Baseline characteristics of the whole sample and the test-retest subgroup are presented in Table 1. All patients received oral information about the study. Signed informed consent was obtained from all patients.

Table 1 – Questionnaire scores at baseline

	Pcs-rum	Pcs-mag	Pcs-help	Pcs-total	DASS-D	DASS-A	DASS-S	RMD	MPI-Intens
mean	8.2	3.86	7.62	19.7	4.69	4.49	7.27	10.85	3.65
S.D	4.61	3.07	4.92	11.29	4.43	4.47	4.68	6.41	1.47
max	16	12	21	43	20	19	19	24	6
In%	51%	32%	36%	45%	23%	23%	38%	45%	60%

Pcs-help, PCS helplessness subscale; Pcs-mag, PCS magnification subscale; Pcs-rum, PCS rumination subscale; Pcs-total, PCS total score; RMD, Ronald-Morris Disability Questionnaire; DASS-D,DASS-depression subscale; DASS-A, DASS-anxiety subscale; DASS-S,DASS-stress subscale; MPI-Intens, MPI-pain intensity subscale.; max, highest possible score; in %, mean value in proportion to the highest possible score.

Procedures and measures

The included patients filled in the PCS, socio-demographic information, and concurrent measures at the first attendance for assessment. Patients consenting to participate at the retest filled in the PCS between test and retest at the second attendance, preferably with a one-week interval.

The Pain Catastrophizing Scale (PCS)

The PCS comprises 13 items focusing on thoughts and feelings. The original PCS was evaluated in undergraduate students and was found to be a reliable and valid measure of catastrophizing with a three factor solution; rumination (4 items), ruminative thoughts, worry, and inability to inhibit pain-related thoughts; magnification (3 items), magnification of the unpleasantness of pain and expectancies for negative outcomes; and, helplessness (6 items), inability to deal with painful situations [16]. Patients score the 13 items on a 5-point likert scale, ranging from 0 (not at all) and 4 (all the time), relating the items to the past painful experience. Separate sub-scores for the dimensions (range, rumination 0–16; magnification 0–12; and helplessness 0–24 points) or a total score (range, 0–52 points) can be calculated for the PCS. A higher score indicates higher pain catastrophizing. Internal missing values were replaced with mean values if the number of missing items did not exceed two items, except for analysis of data quality.

Concurrent measures

The patients were asked to complete a questionnaire booklet,which contained a series of questionnaires intended to assess the PCS's construct validity. From the literature, interrelationships were expected between pain-related catastrophizing and various other variables. For example, previous studies have found low to moderate positive correlations (ranging from 0.26 to 0.64) between catastrophizing and depression [16, 23] fear of activity [24], disability [25, 26] poor coping style [3] and pain intensity [6] and anxiety [27]. Further, catastrophizers were shown to have three to five times greater emotional distress and higher pain intensity than non-catastrophizers ($P<0.01$) [16]. To cover these constructs,we chose the following questionnaires for inclusion in the questionnaire booklet: DASS,

a screening instrument to assess depression, anxiety and stress [28]; and the Roland–Morris (RM) questionnaire [29],to measure disability in everyday activities due to chronic pain. The latter 24-item questionnaire was cross-culturally adapted from the original version [30] with a slight modification. The original version of Roland–Morris (RM) questionnaire is about low back pain and because in this study was used a non-homogeneous group of chronic pain, not just back pain, so the word of "back pain" was replaced with "pain". This modified questionnaire has been employed in previous studies and has been confirmed the validity and reliability [31, 32]. This scale has high level of internal consistency, Cronbach's б for the scale has been estimated as 0.90, and high level of intraclass correlation coefficient in test-retest with 1-week interval (ICC=0.91). The questionnaire booklet also contained the pain intensity scale of Multidimensional Pain Inventory (MPI). This subscale has a good reliability and validity that has been approved in previous studies. [33, 34]

Statistical analysis

Sample size was based on the quality criteria recommended by Terwee et al. [35], who suggest a minimum of 50 patients for assessing construct validity, reproducibility, and floor or ceiling effects, and a minimum of 100 patients for assessing factor analysis and internal consistency. Descriptive analysis included mean (SD) and number (%). Missing data and end effects were described.

Floor and ceiling effects were determined in two ways: firstly, in the traditional manner of calculating the number of individuals obtaining, respectively, the lowest (0) or highest (52) possible PCS scores, where a limit of 15% of patients should not be exceeded [35]; and secondly, by computing the proportion of individuals obtaining a score within the limits of the minimum detectable change (95% confidence interval) at the two ends of the scale.

Concurrent validity, a component of construct validity, indicates the extent to which the instrument's scores relate to those of other instruments in the manner expected. The authors hypothesized that the PCS would measure aspects of the patient's health/complaints that were different from but related to those measured by the other questionnaires (see earlier),which should result in moderate positive correlation coefficients, not exceeding 0.7. The Spearman rank correlation coefficient was used to compare the relationships between the PCS and the RM,pain intensity and DASS subscales.

Internal consistency was assessed with factor analysis. Factor analysis uncovers the latent structure (dimensions) of the items within the instrument. In the present study was used method of principal components analysis with components extraction by varimax rotation. Principal components analysis decomposes the original data into a set of linear variates [36], whereas factor analysis derives a mathematical model from which factors are estimated. Principal components analysis is concerned only with establishing which linear components exist within the data and how a particular variable might contribute to each component. In contrast, factor analysis only estimates the underlying factors [37].

Internal consistency was also assessed with Cronbach's б, using the data from the baseline questionnaires. Cronbach's б indicates the strength of the relationship between all the items within the test instrument and indicates whether the items are sufficiently interrelated to justify their combination in an assessment-instrument [38]. The PCS has three subscales, and the Cronbach's б was reported for each separately; however, for the purposes of comparison with the original English version [16], the internal consistency was also reported for the whole scale despite the fact it is not theoretically correct to do so, since Cronbach's б indicates the correlation among items that measure one single construct and the PCS is a multidimensional scale. A Cronbach's alpha coefficient between 0.70 and 0.95 has been considered acceptable homogeneity [35].

Reproducibility indicates the extent to which the same results are obtained on repeated administrations of a given instrument when no change is expected. The intraclass correlation coefficient of agreement (ICC) and the standard error of measurement (S.E.M.) for the repeated trials were computed to examine the reproducibility of measurements [39]. The S.E.M. was used to indicate the "minimum detectable change" (MDC95%) for the PCS, that is, the degree of change required in an individual's score in order to establish it (with a given level of confidence) as being a "real change," over and above measurement error [40]. Statistical significance was accepted at the $P<.05$ level. The

statistical package SPSS 16.0 for Windows was used for all analyses.

RESULTS

Cross-cultural adaptation of the PCS

Pretest of the final version

The general comments of the 15 patients who pre-tested the questionnaire indicated that the wording was easy to understand and the layout was good. No ambiguities prevented the answering of the questions. Some patients with a very low level of catastrophizing mentioned that some phrases of the PCS were a little "over the top," but, interestingly, the catastrophizers did not consider these terms as inappropriate. This indirectly substantiated the validity of the questionnaire.

Study sample

Of the 150 patients eligible, 123 patients signed the informed consent letter and returned the baseline questionnaire booklet (82% return rate). They had a mean (S.D.) age of 47.22 (14.72) years. Ninety (62.9%) were female and fifty-three (37.1%) male. The analyses of internal consistency, factor analysis, and concurrent validity were carried out on these 123 data sets. Of the 123 participants, randomly were selected 36 participants to complete again these questionnaires in 7 days later. Hence, 36 data sets were available for the reproducibility analysis. Generally, the patients showed moderate pain intensity (3.6, on a 0–6 MPI) and moderate disability (10.6, on the 0–24 RM) at baseline. PCS scores were low to moderate, with mean scores ranging from 3.86 (magnification subscale) to 8.2 (rumination subscale).

Missing data, normality of score distribution at baseline

The following "missing data" rules were applied to the scoring of the PCS: One missing value was allowed for the rumination subscale, and one missing value for the magnification subscale, no missing values were allowed for the helplessness subscale. For scoring the total score, two missing values were allowed. For the individual items, there were between zero and two missing values, and for the whole scale, 2.1% data were missing. As long as the missing rules were not contravened, the scores for the whole scale or the subscales were extrapolated from the mean value of the remaining responses. Scoring the subscales was possible after imputation in 99.3% cases for the helplessness subscale, magnification subscale, and for rumination subscale, and 97.9% for the total scale.

Moderate floor effects but minimal ceiling effects were found using the traditional approach: the lowest possible scores were found in 5.4% of the cases for the helplessness subscale, 22.5% for magnification, 4.7% for rumination, and 3.1% for the total scale. Highest possible scores were found for the rumination subscale, at a prevalence of 7 % and magnification subscale at a prevalence of 0.8%. All of them are not exceeded from 15% whole of patients except of floor effect of magnification subscale (22.5%). However, using the perhaps more relevant approach of examining the proportion of patients with scores lying within the range of the MDC95% at the two ends of the scale, there were 23% floor effects for the total scale, 44% for helplessness, 36.4% for magnification, and 27.9% for rumination; the corresponding ceiling effects were 2.32% for the total scale, 4.65% for helplessness, 3.87% for magnification, and 25.5% for rumination.

Also, a Kolmogorov-Smirnov test ($p>0.05$) [41] and a visual inspection of their histograms, normal Q-Q plots and box plots showed that the exam scores were approximately normally distributed with a skewness of 0.25 (SE=0.20) and a kurtosis of -0.73 (SE=0.4) [42].

Construct validity: relationship between PCS and other parameters at baseline

Overall, low to moderate correlations were found between the PCS whole scale scores and the scores of the other scales (Table 2), with positive correlation coefficients ranging from 0.24 (for the correlation with pain intensity) to 0.54 (with DASS-depression), 0.49(with DASS-anxiety), 0.52(with DASS-stress) and 0.36(with RMD). All of correlation coefficients were significant ($p<0.01$), except of correlation between pain intensity and helplessness subscale that was not significant.

To assess whether these correlations were influenced by other factors, several subgroup analyses were carried out: these revealed that the correlation coefficients between the PCS and the other scales were not dependent on gender, age, or the duration of pain (i.e., the correlation coefficients were similar for men and women, all of participants in different age range and with different duration of pain: results not shown).

Table 2 – Concurrent validity

	PCS-rumi	PCS-magn	PCS-helpl	PCS-total	RMD	DASS-D	DASS-A	DASS-S	MPI-Intens
PCS-rum	1								
PCS-mag	0.63								
PCS-help	0.73	0.67							
PCS-total	0.9	0.83	0.92						
RMD	0.3	0.3	0.36	0.36					
DASS-D	0.48	0.5	0.46	0.54	0.45				
DASS-A	0.44	0.52	0.39	0.49	0.32	0.73			
DASS-S	0.48	0.51	0.43	0.52	0.33	0.72	0.68		
MPI-Intens	0.27	0.21	0.169	0.24	0.51	0.35	0.28	0.34	1

Bivariate Spearman rank correlation coefficients.($p<0.01$)Pcs-help, PCS helplessness subscale; Pcs-mag, PCS magnification subscale; Pcs-rum, PCS rumination subscale; Pcs-total, PCS total score; RMD, Ronald-Morris Disability Questionnaire; DASS-D,DASS-Depression subscale; DASS-A, DASS-anxiety subscale; DASS-S,DASS-stress subscale; MPI-Intens, MPI-pain intensity subscale.

Exploratory factor analysis

The principal components analysis revealed a three-factor structure similar to that found by the originator of the PCS [16]: helplessness= Items 2–5; rumination=Items 8–11 and 1; magnification=Items 6, 7, 13 and 12. Unlike Sullivan et al. [16], Item 1 scored higher on the rumination factor than the helplessness factor and item 12 scored higher on the magnification factor than the helplessness (see Table 3). The model explained 69.7% of the total variance; component 1 explained 51.7%, component 2 = 9.42%, and component 3 = 8.53%. The second model, created using factor analysis with oblique rotation, also suggested a three-factor structure similar to that reported in first model.

Table 3 – Pain Catastrophizing Scale factor structure by Principal Components Analysis with loadings (n = 123)

Pain Catastrophizing Scale		**Components**		
		Rumination	**Helplessness**	**Magnification**
1	I worry all the time about whether the pain will end.	0.71	0.16	0.27
8	I anxiously want the pain to go away.	0.81		
9	I can't seem to keep it out of my mind.	0.65		
10	I keep thinking about how much it hurts.	0.64		
11	I keep thinking about how badly I want the pain to stop.	0.78	0.16	0.28
2	I feel I can't go on.		0.71	
3	It's terrible and I think it's never going to get any better.		0.75	
4	It's awful and I feel that it overwhelms me.		0.78	
5	I feel I can't stand it anymore.	0.38	0.7	0.15
6	I become afraid that the pain will get worse.		0.28	0.77
7	I keep thinking of other painful events.			0.83
12	There's nothing I can do to reduce the intensity of the pain.	0.21	0.06	0.6
13	I wonder whether something serious may happen.		0.32	0.79

Extraction Method: Principal Component Analysis; varimax rotation with Kaiser normalization. Rotation converged in six iterations; values below 0.3 are suppressed. The model explained 69.7% of the total variance; component 1 explained 51.7%, component 2 = 9.42%, and component 3 = 8.53%.

Internal consistency of the PCS at baseline

Good internal consistency was found, with Cronbach's б values of 0.83 (helplessness), 0.85 (magnification), 0.88 (rumination), and 0.92 (total scale).

When using the same three-factor structure as in the original study, the Cronbach's alpha for two subscales were lower: the helplessness =0.8 and the rumination = 0.87. But the Cronbach's alpha for the magnification subscale was higher, about 0.9.

Reproducibility of PCS

Reproducibility analysis was conducted on the data from the 36 patients with a return interval for the second questionnaire booklet of 7 days. General health, pain intensity, and disability did not differ significantly between the two assessment time points. Intraclass correlation coefficient ICCs is shown in Table 4. The mean difference between repeated measures for the PCS and its subscales, and ICCs, S.E.M.'s, and the MDCs are shown in Table 4. Acceptable to good reproducibility was found, and S.E.M. values ranged from 0.5 to 2.17.

Table 4 – Reproducibility of the PCS

	t2-t1	ICC	S.E.M	MDC
PCS-Helplessness	-0.4 (24)	0.98	0.65	1.8
PCS-Magnification	-0.02 (12)	0.97	0.5	1.38
PCS-Rumination	-0.3 (16)	0.98	0.64	1.77
PCS-total scale	-0.8 (52)	0.96	2.17	6.01

t2–t1, mean values at t1 subtracted from t2 (values in parentheses are the highest possible scores for the given attribute; ICC, intraclass correlation coefficient of agreement (t1*t2).

DISCUSSION

Translation and cross-cultural adaptation of the PCS

The aim of the present study was to cross-culturally adapt the PCS, for use with Russian-speaking patients in Belarus, and to examine the psychometric properties of the Russian version produced. Overall, the Russian version of the PCS showed good psychometric properties. In the following, the translation process and the results concerning validity and reliability will be discussed.

The process of translating the English PCS was carried out strictly in accordance with established guidelines [v] and was tried to adapt phrases and words in English version according to Belarusian culture and their application in Belarus. There weren't special problems in this processes and after in implementation. The study was conducted with patients living in the Russian-speaking country of Belarus. There are very few grammatical or semantic differences in the use of the written Russian language among the Russian-speaking countries. Thus, we believe that the current version can likely be used without difficulty in other Russian-speaking countries.

Psychometric properties of the PCS

The Russian PCS showed good construct validity. Convergent validity was examined by investigating the strength of the relationship between the PCS scores and the scores for other pain-related constructs such as pain intensity, disability, depression, anxiety and stress. Similar to the findings of previous studies [16, 24, 25], correlation coefficients for these relationships ranged from 0.36 to 0.56. This represents moderate agreement, which confirms that the PCS assesses a different construct, but one that is related to the above-mentioned constructs, and it can thus be considered suitable as part of the multidimensional battery of assessments in chronic pain patients. Nonetheless, the fact that some correlations approached or exceeded 0.5 suggests there may be some redundancy among the measures [43]. The principal component factor analysis of the Russian PCS largely replicated the results of former studies and showed that the three-factor solution was reliable in terms of its construct validity. Principal components analysis with varimax rotation revealed almost the same factor structure as that proposed by Sullivan et al. [16] overall there is no determined difference between the current model and the original model of Sullivan when comparing the Cronbach's alpha for the two different models. The items contained in each of the three subscales should therefore remain as proposed by Sullivan et al. [16], with Items 1–5 and 12 in the

helplessness subscale; Items 6, 7, and 13 in magnification; and Items 8–11 in rumination. The scores for the PCS are given by the sum of specific items for the subscales or by the sum of all items for the total score. We consider the latter to be somewhat problematic because the PCS actually comprises three individual subdomains. Hence, in future studies, it is recommended that the scores for the subscales and the total score always be reported separately. The internal consistency of the Russian PCS was examined using Cronbach's б, an item correlation test that reflects the homogeneity of all the items. The Cronbach's б for the subscales and the total scale (0.81–0.92) were slightly higher than those reported in the original study of Sullivan et al. [16] (between 0.60 and 0.87). The similar values in different samples [17] are further endorsement of the good internal consistency of the Russian version of the questionnaire. Cronbach's б's greater than 0.8 are generally recommended for psychometric scales [44], although for individual patient assessments in the clinical situation, and б coefficient of at least 0.9 is recommended [45]. Thus, from this perspective, the Russian PCS for all of the subscales (helplessness, rumination, magnification) is suitable not only for group analyses but also for the interpretation of individual scores. As mentioned in Methods, it should be noted that the determination of a single б coefficient for the 13-item scale as a whole is not theoretically correct because, by definition, Cronbach's б indicates the correlation among items that measure one single construct and the PCS is a scale with three dimensions. However, we present it here for better comparability with the original study [16], where the Cronbach's б for the total scale was also given. The Russian version of the PCS showed reasonably excellent ICCs, ranging from 0.97-0.99. ICCs greater than 0.7 are generally considered acceptable; greater than 0.8, good; and over 0.9, excellent [46], although it is also acknowledged that the ICC is highly dependent on the between-subject variance in the group of subjects under investigation [47]. Our sample did not show any significant differences from test to retest in general health, disability, or pain intensity, justifying the application of a reproducibility analysis. The ICCs reported in the present study for the whole-scale Russian PCS were higher than those reported for the original English version of the PCS (ICC=0.75) [16], although in the latter study the longer time interval of 6 weeks between test and retest may have increased the variability and decreased the ICC.

CONCLUSION

The psychometric properties of our Russian version of the PCS were comparable to those reported by Osman et al. and Van Damme et al. [17, 18, 19] and exceeded those of the original English version [16]. The PCS showed good internal consistency and the three-factor structure, reported in previous studies, could be replicated. It also showed acceptable to good reproducibility, with a minimal detectable change score of approximately 13 points. Tests of concurrent validity showed that it represents a different construct compared with existing chronic pain-related questionnaires but has the desired overlap. The PCS represents a valuable tool for use in scientific studies and in the clinical setting in patients with chronic pain in Russian-speaking country, Belarus. Future studies should investigate whether the PCS is sufficiently sensitive to detect a change in catastrophizing thoughts over time, after specific treatment modalities. Also, In future studies, the uniqueness of the construct "pain catastrophizing" should be investigated using multiple regression models.

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