RESEARCH ARTICLE

Validation, reliability, and cross-cultural adaptation study of Graded Chronic Pain Scale Revised into Turkish in patients with primary low back pain

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Abstract

Objective: This study aims to assess the adaptation of the Graded Chronic Pain Scale–Revised to the Turkish language and psychometric properties in patients with primary low back pain.

Methods: The translation from the original text into the Turkish language was carried out step by step in accordance with the recommendations. Structural validity was analyzed by exploratory factor analysis (EFA). Reliability was carried out by internal consistency and test–retest analysis. Convergent validity was evaluated through scales composed in accordance with the research standards for chronic low back pain with the National Institutes of Health Task Force recommendations.

Results: One hundred thirty-five patients, 58 (43%) men and 77 (57%) women, completed the study. A two-factor structure was obtained according to EFA. The first factor consisted of questions 3, 4, and 5, and the same questions constitute the Pain, Enjoyment of Life, and General Activity scale. Cronbach α coefficient $r = 0.814$ (good internal consistency) was calculated for internal consistency.

Conclusion: In this article, we presented the cross-cultural adaptation process of Graded Chronic Pain Scale–Revised to the Turkish language and evidence of its validity and reliability in a sample of patients with primary low back pain.

KEYWORDS
Anxiety, cross-cultural adaptation, low back pain, pain catastrophizing, Turkey

INTRODUCTION

According to the International Association for the Study of Pain, pain is a personal experience that is affected by biological, psychological, and social factors in different ways, and the person learns the concept of pain through these experiences.[1] Chronic pain should be considered as a "disease" that does not serve a beneficial purpose. Although there is no clear time for transition from acute pain to the chronic period, it is generally accepted that persistent pain beyond the expected recovery time is pathological.[2] Low back pain (LBP) is an extremely common symptom experienced by people of all age groups. LBP is one of the most important causes of disability, as well as an important socioeconomic problem. The worldwide prevalence of LBP that limits movement has been found to be 7.3%.[3,4] Given the multidimensional nature of chronic pain, special assessment tools are required to elucidate sensory, cognitive, and psychological dimensions. The scales guide researchers in terms of pain mechanisms, treatment guidance, and evaluation of treatment results.[5]

The Graded Chronic Pain Scale (GCPS)[6] evaluates the global severity of chronic pain based on pain

intensity and pain-related disability. The inclusion of quantitative self-assessment scores for intensity and disability in addition to a categorical rating distinguishes disabled from nondisabled people with intense pain. VonKorff et al.[7] developed the Graded Chronic Pain Scale–Revised (GCPS-R) as a revised form of the original scale in 2019. The GCPS-R assesses a 3-month period for chronicity and a week for current pain intensity, whereas the first scale assesses a 1-, 3-, or 6-month period. The GCPS-R evaluates not only specific anatomically defined pain states of a person but also chronic pain status in general. A three-item Pain, Enjoyment of Life, and General Activity (PEG) scale[8] was added to the GCPS-R. The GCPS-R is useful for characterizing change in pain status in qualitative terms.[6,7]

In this study, we aimed to analyze the factor structure and examine the psychometric properties of the Turkish (TurGCPS-R) version of the GCPS-R and to make this scale available in Turkish pain studies.

MATERIALS AND METHODS

Permissions

First, we contacted Prof. Michael VonKorff (the original GCPS-R developer) by e-mail and gave preliminary information about the study. Ethical approval (2020.12.1.02.181.r1.189) was obtained from the Institutional Review Board of Istanbul Bağcılar Training and Research Hospital Clinical Research Ethics Committee.

Cultural adaptation

Forward, backward translation, pilot test application, and face validity

Translation procedure and pilot test were completed step by step in accordance with the guidelines.[9,10] Two independent and well-spoken English-speaking medical doctors (whose specialty is not algology, neurology, or psychiatry, and who have not previously participated in chronic pain studies [MD1 and MD2]) and 2 independent professional translators (T1 and T2) made the translation into Turkish from the original English version of the GCPS-R (forward translation stage). These 4 forward translations (MD1, MD2, T1, and T2) were synthesized under the original scale guidance with information from a third independent translator (T3) and researchers (authors S.A.T. and E.Ş.; synthesis stage). After the synthesis stage, 2 medical doctors (who did not participate in the first and second stages, who were not experts in algology, psychiatry, and neurology, and who did not have previous chronic pain studies [MD3

Key Points

- Graded Chronic Pain Scale (GCPS) evaluates the global severity of chronic pain based on pain intensity and pain-related disability. The GCPS-R evaluates not only specific anatomically defined pain states of a person but also chronic pain status in general.
- In this study, we aimed to analyze the factor structure and examine the psychometric properties of the Turkish (TurGCPS-R) version of the GCPS-R and to make this scale available in Turkish pain studies.
- One hundred thirty-five patients (58 men [43%] and 77 [57%] women) completed the study.
- In this article, the cross-cultural adaptation process of GCPS-R to the Turkish language and evidence of its validity and reliability in a sample of patients with primary LBP are presented.
- The results show that TurGCPS-R is a reliable, valid, and useful tool if a short, easy, and convenient method is needed to grading the severity of chronic pain in patients with LBP. In addition, we also presented the psychometric evaluation of the PEG scale that is located in the first factor of TurGCPS-R.

and MD4]) and 2 translators (did not participate in the first and second stages [T4 and T5]) translated from the Turkish version to its original language (backward translation phase). The back-translation was reviewed by a good English-speaking executive researcher (author İ.A.Ş.) and an independent translator (T6) for any inconsistencies in meaning and terminology. After determining that there was no significant difference in meaning, the scale was administered as a pilot test to 20 participants (aged ≥18 years old, who had complaints of LBP for 3 months or longer, 8 [40%] men and 12 [60%] women, 46.65 ± 10.8 years; pilot test phase). The pilot test data were not included into the main study. At this stage, the time taken for the participants to read, understand, and answer 6 questions was calculated with a chronometer, and the mean (standard deviation [SD]) time to complete the questionnaire was 51.67 (15.27) s. Feedback from the pilot test phase for TurGCPS-R: similar to the original scale,[7] the questions were easy to understand and answer (face validity). The final agreement was reached by the research and translation team (MD1 + MD2 + T1 + T2 + T3 + E.Ş. + S.A.T. + MD3 + MD4 + T4 + T5 + İ.A.Ş. + T6; expert committee final evaluation phase), and the questionnaire (Appendix 1) was done to the new participants (Appendix 1).

Sampling and participants

The sample size required for the study was determined according to the recommended quality criteria (7 samples per question and at least 100 samples in total).[11] As a result, 135 patients (58 men [43%] and 77 women [57%]) with primary LBP were included in the study. Data were collected from 2 different centers. Patients who visited the Algology Clinics of Istanbul Bağcılar Training and Research Hospital and Başakşehir Çam and Sakura City Hospital in order to get help due to LBP complaints (for at least ≥3 months) were invited to the study.

Primary LBP was diagnosed by algology specialties (authors S.A.T. and İ.A.Ş.) in accordance with the diagnosis and treatment algorithms.[12–14] Criteria for selecting participants were to read, write, and speak in Turkish and be 18 years old or older. Participation in the study was based on volunteering; detailed information was given to each participant, their written consent was obtained, and they were asked to carefully read each question and fill in the information in the best way (participants were asked to fill in the scales in the most comfortable conditions for them at their home). Patients with cancer, patients with new-onset (<3 months) complaints of pain, patients with a known significant mental and psychiatric disease, and those who went on to emergency surgery or interventional procedures were not included in the study.

Sociodemographic data form and evaluation of pain characteristics

Information on age, height, weight, employment status, education level, economic level (monthly income per person), marital status, presence of additional disease, and previous back surgery, if any, was requested from the participants. On the diagram, they marked the starting and extension regions of LBP (divided into pain zone; 1 = back pain [BP], 2 = leg pain [LP], 3 = low back and leg pain [LBWR]). Data on duration of LBP, characteristics of the pain, the relationship between time and pain, and conditions that could increase or decrease their pain were requested from all participants.

Scales used in the study

Graded Chronic Pain Scale–Revised

The new scale consisting of 6 questions has been developed as a revised form[7] of the original scale.[6] There is a categorical grading scheme and numerical self-rating scores for pain intensity and disability. The first 2 questions ask the frequency of pain and how the pain affects life and work activities and evaluate the last 3 months. They are scored between 0 and 4 (0 = never to 4 = every day). Questions 3 to 5 (PEG scale) evaluate the severity of pain in the last 7 days and are scored between 0 and 10 points. Question 3 asks for the intensity of pain. Questions 4 and 5, respectively, ask how pain hinders the enjoyment of life and how it affects general activities. The sixth question has 2 answers (1 = yes and 2 = no) and asks whether the person can work in pain or pain. If "never" or "some days" is marked for the first question, it is grade 0 (no chronic pain). If one of the "most days" or "every day" options is marked in the first question, then the second question is evaluated. If "most days" or "every day" is marked for the second question, it is grade 3 (high-impact chronic pain [HICP]). If "most days" or "every day" is marked in question 1 and "never" or "some days" is marked in question 2, look at the PEG scale. If the PEG score is 12 or greater, it is grade 2 (bothersome chronic pain); if the PEG score is less than 12, it is grade 1 (mild chronic pain).[7,8]

The Quebec Back Pain Disability Scale

The Quebec Back Pain Disability Scale (QBPDS) is used to assess pain-related disability and functional limitations and is evaluated with 20 different activities: bed and rest items: S = 1–3, sitting and standing items: S = 4–6, ambulatory items: S = 7–9, movement items: S = 10–12, and bending/bending items: S = 13–16, and large/heavy moving objects items: S = 17–20. Each activity is measured using a Likert scale between 0 points (not difficult at all) and 5 points (not possible). The total score is recorded between 0 and 100, with higher scores indicating more disability.[15] Turkish validation has been provided.[16]

Short Form 36

The Short Form 36 (SF-36) is used to evaluate the quality of life (QOL) based on health status. It consists of 8 subscales (physical function, pain, limitation due to physical problem, restriction due to emotional problems, emotional well-being, social function, energy-fatigue, and general health perception). The evaluation is done in Likert type except for the fourth and fifth subscales; the fourth and fifth items are answered as yes or no. The scale does not only give a single total score, but it also gives a separate total score for each subscale. The subscales assess health between 0 and 100, with 0 including poor health, whereas 100 indicates good health.[17] Turkish validation has been provided.[18]

Pain Catastrophizing Scale

The Pain Catastrophizing Scale (PCS) is used to assess the degree of pain-related catastrophic thoughts. It

consists of 3 subscales: rumination subscale measures the inability to prevent ruminative thoughts, anxiety, and pain-related thoughts. The magnification subscale reflects the intensity of pain discontent and anticipation of negative consequences. The helplessness subscale reflects the inability to cope with pain. There are 13 items, and the total PCS score ranges from 0 to 52. Higher scores correspond to higher pain disaster levels, and detection of PCS total score of 30 or greater is clinically significant.[19] The test was validated in Turkish.[20]

Pain Anxiety Symptom Scale Short Form 20

The Pain Anxiety Symptom Scale Short Form 20 (PASS-20) is a scale used to assess pain-related anxiety. It consists of 4 subscales that evaluate the physiological symptoms of cognitive anxiety, flight/avoidance behaviors, fear of pain, and anxiety. The total score is between 0 and 100, with higher scores indicating more pain-related anxiety.[21] The Turkish validity and reliability study of the test has been provided.[22] In our study, 4-point Likert scale was used for easier understanding and adaptation (0–80 points).

Numeric Rating Scale (NRS)

The Numeric Rating Scale (NRS) is a 1-dimensional scale of pain intensity in adults. The participant is asked to choose a number that best reflects the intensity of pain (0 = no pain and 10 = pain as bad as you can imagine and worst pain imaginable). Higher scores indicate greater pain intensity.[23]

Beck Depression Inventory

The Beck Depression Inventory (BDI) is a 21-item measure of depression severity that reflects how patients felt during the last week. Each item is scored between 0 and 3. High scores reflect more severe depressive symptoms (0–9 = minimal depression with absent, 10–14 = mild depression, 15–24 = moderate depression, 25–29 = severe depression; and >30 = extreme depression).[24] It gives similar and appropriate results with other depression screening questionnaires in evaluating depressive symptoms in pain.[25] Turkish validity study was conducted.[26]

Beck Anxiety Inventory

The Beck Anxiety Inventory (BAI) is an anxiety severity scale with 21 questions. Each item is scored between 0 and 3. The total score ranges from 0 to 63 and determines minimum anxiety (scores 0–10), mild anxiety (scores 11–20), moderate anxiety (scores 21–30), and severe anxiety (scores 31–63).[27] Its Turkish validity study has been done.[28]

Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI) is a questionnaire that evaluates sleep quality and disturbances during the previous 4 weeks and uses 14 questions based on a 0 to 3-point scale (3 = negative result) and 4 open-ended questions. The PSQI scores range from 0 to 21 points. A global score of 5 or greater reflects a specific and sensitive measure of poor sleep quality.[29] There is a Turkish validity study.[30]

Statistical analysis

Statistical analyses were performed using the IBM Statistical Package for Social Sciences (SPSS) Statistics software version 25 (IBM Corp., Armonk, NY).[31] Descriptive statistics are expressed as mean ± SD, median, percentage (%), and range. The p values less than 0.05 was considered statistically significant. The suitability of quantitative data to normal distribution was tested with the Shapiro–Wilk test.[31,32]

Psychometric properties

The analysis of the psychometric properties of TurGCPS-R was carried out based on validity and reliability.

Validity

Validity describes how well the data collected covers the actual area of research and is actually the degree to which the construct measures what it says it measured.[33]

Face validity

During the pilot test phase, a simple categorical scale containing "yes" and "no" answers was used for comprehensible and answerable, and all participants ($n = 20$) reported that it had been comprehensible and answerable.

Construct validity

The Kaiser–Meyer–Olkin (KMO) test evaluates whether the sample size is sufficient for factor analysis, and the Bartlett sphericity test evaluates whether the correlation matrix between scale items is equal to the unit matrix. (KMO should be >0.6 and $p < 0.05$ for Bartlett test of

sphericity.) Exploratory factor analysis (EFA) was used to evaluate the construct validity of the scale. Principal component analysis using the "varimax" rotation method was used for EFA. To determine the number of factors, Kaiser eigen value criterion (eigenvalue factor 1) and scree test (number of factors in the slope plot just before the elbow) were used.[33–35] Sensitivity and selectivity for grade 3 were calculated with the sixth item of the GCPS-R scale.[7]

Convergent validity

Pain-related disability and functional impairment were evaluated with the SF-36 subscales (physical functioning, role physical, and bodily pain) and QBPDS. The statistical relationship between GCPS-R and SF-36 and QBPDS was evaluated using Spearman correlation coefficient (Spearman ρ). Neuropsychological properties and mental health were evaluated with PASS-20, PCS, BDI, BAI, and SF-36 subscales (role emotional and mental health). The statistical relationship between GCPS-R and tests used to measure neuropsychological properties was evaluated using Spearman ρ. The SF-36 subscales (general health, vitality, and social functioning) and PSQI tests were used to assess the QOL, and statistical relationships with the GCPS-R were tested with Spearman ρ.[32,36]

Reliability

Reliability is defined as the extent to which the results can be reproduced when the research is repeated under the same conditions. Reliability was evaluated by internal consistency (Cronbach α coefficient, for $\alpha = 0.9 \leq \alpha$ [excellent], $0.8 \leq \alpha < 0.9$ [good], $0.7 \leq \alpha < 0.8$ [acceptable]) and test–retest reliability. In addition, item–total correlations and interitem correlations were calculated to investigate whether all items of TurGCPS-R evaluate the same basic properties.[33,36,37] Test–retest reliability indicates the stability and consistency of a scale over a period. The third, fourth, and fifth questions of the GCPS-R want to know the last 1 week and are a time-related scale. The retest period was planned as 1 week, and test–retest was applied to 40-sample groups after 1 week in order to prevent recall bias and to avoid variations that may occur because of the prolongation of the patient's pain state. Percent agreement, Cohen κ coefficient, and Gwet agreement coefficient (AC) were used for the test–retest reliability of the GCPS-R phases.[38]

Evaluation of sociodemographic characteristics and low back pain

Statistical relationships between some sociodemographic characteristics and PEG scale and grading (according to the GCPS-R scoring algorithm: grades 0, 1, 2, and 3)[7] were examined (Table 1). The comparisons of two groups in qualitative variables for PEG were examined using the Mann–Whitney U test and the relationship between quantitative variables using Spearman ρ. For grading, the relationship between qualitative characteristics was examined using Pearson χ^2 or Fisher exact test, whereas the relationship between quantitative features was evaluated with Spearman ρ.[32,36,39] The NRS was used to assess pain intensity, and the statistical relationship between pain intensity, and pain side was evaluated with the χ^2 test.

Psychiatric evaluation

Interviews were conducted by a psychiatrist (author E.Ş.) in accordance with the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition,[40] and psychiatric disorders accompanying LBP were evaluated.

RESULTS

Clinical sample

One hundred thirty-five patients (58 men [43%] and 77 women [57%]) completed the study. The mean ± SD age was found to be 47.44 ± 11.68 years (19 to 79-year age range). Body mass index (BMI) mean ± SD value was $29.07 ± 4.97$ kg/m^2 (range = 18.52–45.01 kg/m^2; 25–29.9 kg/m^2 = overweight). The average monthly income per person was calculated as 2226.28 ± 1938.05 Turkish Liras (TL; range = 0–12,000 TL). (In Turkey, the minimum wage at the time of study is 2.825.90 TL [\$406].) Other sociodemographic characteristics of the participants are summarized in Table 1. In addition, the same table shows the gender, age, BMI, monthly income, work status, education level, marital status, comorbid diseases, and the presence of failed lumbar surgery and the statistical relationships with TurGCPS-R's PEG scale and grading. The mean ± SD PEG scale total scores were calculated as 22.85 ± 5.22. Statistically, the relationship between PEG scale and those with only education level and coronary artery disease was found to be significant ($p < 0.05$). When the grading was examined, grade 0 (chronic pain absent) was detected in 13 (9.6%) patients, grade 2 (bothersome chronic pain) in 19 (14.1%) patients, and grade 3 (HICP) in 103 (76.3%) patients. When the relationship between grading and sociodemographic characteristics was examined, only a statistically significant ($p < 0.05$) relationship was found with employment status.

When the LBP characteristics of the participants ($n = 135$) were examined, the mean ± SD duration of pain was calculated as 52.18 ± 64.43 months. Mean pain intensity was 7.85 ± 1.41 (moderate). Table 2 summarizes the pain characteristics of the participants. In addition,

TABLE 1 Sociodemographic characteristics of patients with primary low back pain and statistical relations with PEG scale and grading

	n (%)	Mean (SD)/range	PEG[a] mean (SD)	p value[b]	Grade[c] 0 n (%)	Grade 2 n (%)	Grade 3 n (%)	p value[d]
Gender								
Men	58 (43)		22.75 (4.87)		7 (5.2)	6 (4.4)	45 (33.3)	
Women	77 (57)		22.92 (5.51)	.67	5 (3.7)	12 (8.9)	60 (44.4)	0.39
Total	135 (100)		22.85 (5.22)		12 (8.9)	18 (13.3)	105 (77.8)	
Age (years)		47.44 (11.68)/19–79		0.53				0.46
BMI[e]		29.07 (4.97)/18.52–45.01		0.10				0.64
Average monthly income (TL)[f]		2226.28 (1938.05) /0–12,000		0.28				**0.07**
Working status								
Working	60 (44.4)		22.08 ± 5.36		10 (7.4)	12 (8.9)	38 (28.1)	
Left job	27 (20)		22.14 ± 4.20		0	2 (1.5)	25 (18.5)	**0.03**
Never worked	37 (27.4)		24.86 ± 4.42	0.05	2 (1.5)	3 (2.2)	32 (23.7)	
Retired	11 (8.1)		22.00 ± 7.70		0	1 (0.7)	10 (7.4)	
Education level								
Course	13 (9.6)		**26.69 ± 3.79**	**0.01**	0	0	13 (9.6)	0.55
Elementary	70 (51.9)		23.17 ± 4.91		7 (5.2)	10 (7.4)	53 (39.3)	
Middle school	23 (17)		22.17 ± 5.15		2 (1.5)	5 (3.7)	16 (11.9)	
High school	19 (14.1)		**20.68 ± 4.58**		2 (1.5)	1 (0.7)	16 (11.9)	
University	10 (7.4)		21.30 ± 7.68		1 (0.7)	2 (1.5)	7 (5.2)	
Marital status								
Single	14 (10.4)		22.28 ± 4.21		0	2 (1.5)	12 (8.9)	
Married	106 (78.5)		23.02 ± 5.21	0.39	12 (8.9)	14 (10.4)	80 (59.3)	0.46
Widow	7 (5.2)		22.14 ± 8.87		0	0	7 (5.2)	
Divorced	8 (5.9)		22.12 ± 3.56		0	2	6	
Comorbidity								
Diabetes	19 (14.1)		23.26 (5.3)	0.63	1 (0.7)	2 (1.5)	16 (11.9)	0.75
Hypertension	29 (21.5)		24.44 (4.5)	0.07	0	4 (3)	25 (18.5)	0.16
Thyroid function deficiency	19 (14.1)		23.42 (4.83)	0.65	1 (0.7)	3 (2.2)	15 (11.1)	0.80
Coronary artery disease	13 (9.6)		25.84 (3.5)	**0.02**	0	0	13 (9.6)	0.12
FBS								
Yes	28 (20.7)		23.92 (4.92)	0.14	0	2 (1.5)	26 (24.8)	0.075
No	107 (79.3)		22.57 (5.28)		12 (8.9)	16 (11.9)	79 (58.5)	

Abbreviations: BMI, body mass index; FBS, failed back surgery; GCPS-R, Graded Chronic Pain Scale–Revised; N, number; PEG, Pain, Enjoyment, and General Activity scale; SD, standard deviation; TL, Turkish Liras; TurGCPS-R, Turkish Graded Chronic Pain Scale–Revised.

p value < 0.05 are indicated in bold because it is statistically related.

[a]PEG score: GCPS-R 3, 4, and 5. TurGCPS-R factor 1 questions scores are collected.

[b]P, comparisons of two groups in qualitative variables for PEG Mann–Whitney U test and the relationship between quantitative variables was examined with Spearman ρ.

[c]Grading was obtained from the GCPS-R scoring algorithm: grade 0: Chronic Pain Absent; grade 2: bothersome chronic pain; grade 3: high-impact chronic pain.

[d]The relationship between qualitative features and grading was evaluated with χ^2 or Fisher full probability test, and the relationship between quantitative features was evaluated with Spearman ρ.

[e]BMI calculated using the formula kg/m^2; TL $1 = 6.96 TL.

[f]Study took place in Turkey in the period in which the minimum wage = 2825.90 TL ($406).

when the relationship between pain intensity and pain site was examined statistically (χ^2), a significant relationship ($p < 0.05$) was found between pain intensity and patients with BP and LP. When the relationship between grading and pain site was examined in the same table, no statistical relationship was found ($p > 0.05$).

TABLE 2 Participants' low back pain characteristics and the statistical relationships between pain intensity and pain site and grading and pain site

	Mean (SD)	n (%)	BP	BPWR	LP	p value[a]
Pain duration (months)	52.18 (64.43)					
Pain intensity[b]						
0–4 (mild)		0	0	0	0	**0.047**
5–7 (moderate)		55 (40.7)	16 (11.9)	35 (25.9)	11 (8.1)	0.053
8–10 (severe)		80 (59.3)	12 (8.9)	45 (33.3)	16 (11.9)	**0.015**
0–10 (total)	7.85 (1.41)	135 (100)	28 (20.8)	80 (59.3)	27 (20)	0.571
Time–pain relation						
Always—constant		87 (64.4)				
Rhythmic—periodic		39 (28.9)				
Short instant temporary		9 (6.7)				
Pain characteristic[c]						
Cramping spasm		81 (60)				
Numbness-paresthesia		73 (54)				
Sinking		65 (48.1)				
Like it is on fire		46 (34.1)				
Throbbing		60 (44.4)				
Carving		23 (17)				
Like electric shock		17 (12.6)				
Grading[d]						
Grade 0		13 (9.6)	3 (2.2)	7 (5.2)	3 (2.2)	
Grade 1		0	0	0	0	
Grade 2		19 (14.1)	5 (3.7)	13 (9.6)	1 (.7)	
Grade 3		103 (76.3)	20 (14.8)	60 (44.4)	23 (17)	
p value[e]			0.65	0.502	0.26	

Abbreviations: BP, back pain; BPWR, back pain with radiation; GCPS-R, Graded Chronic Pain Scale–Revised; LP, leg pain; N, number; NRS, Numeric Rating Scale; SD, standard deviation.

p value < 0.05 are indicated in bold because it is statistically related.

[a]Relationship between pain intensity and pain site, χ^2.

[b]Pain intensity assessed by NRS.

[c]One patient reported more than one character of pain, if any.

[d]Grading was obtained from the GCPS-R scoring algorithm; grade 0: chronic pain absent; grade 2: bothersome chronic pain; grade 3: high-impact chronic pain.

[e]Statistical relationship between grade and pain site, χ^2.

Construct validity

After the KMO value (KMO = 0.722) and Bartlett test of sphericity ($\chi^2 = 360.722$, $p < 0.001$) showed the data's suitability for factor analysis, the EFA for TurGCPS-R was done. Item 6 ("Are you not working or unable to work due to pain or a pain condition? yes/no") was removed (the main purpose was to reduce the number of variables and classify the variables if possible and necessary). Because of the factor analysis, a 2-factor structure was obtained, and this 2-factor structure corresponded to 83.66% of the total variance. The first factor met 59.30%, and the second factor met 24.36%. According to the factor loadings, the first factor consisted of the fourth item (factor load = 0.907), third item (factor load = 0.900), and fifth item (factor load = 0.896), respectively. The second factor consisted of the first item (factor load = 0.903) and second item (factor load = 0.840). Factors, items, factor loadings, and communalities values for the TurGCPS-R scale are given in Table 3. The scree graph of the eigen value of a factor is given in Figure 1. The PEG scale consists of third, fourth, and fifth questions of GCPS-R, and these questions constitute factor 1 according to TurGCPS-R's EFA. When the sensitivity and specificity (χ^2) of item 6 of CGPS-R with grade 3 were examined, 90 (84.1%) of 107 patients who marked "were not working or unable to work due to pain or pain condition" had HICP detected. This showed high sensitivity in identifying persons with other indicators of HICP for TurGCPS-R as in the original scale[7] (Figure 1).

Convergent validity of TurGCPS-R

The mean (SD) and range values of all scales and their subscales that are used in the study are given in Table 4.

**TABLE 3** Factor, item, and factor loadings for TurGCPS-R

Factor	Items	Factor loadings[a]	Communalities[a]
1 (Variance 59.303%)	Q4: During the past 7 days, what number best describes how pain has interfered with your enjoyment of life?	0.907	0.835
	Q3: What number best describes your pain, on average?	0.900	0.817
	Q5: During the past 7 days, what number best describes how pain has interfered with your general activity?	0.896	0.824
2 (Variance 24.361%)	Q1: In the past 3 months, how often did you have pain?	0.903	0.867
	Q2: Over the past 3 months, how often did pain limit your life or work activities?	0.881	0.840
Explained total variance: 83.66%			

Abbreviation: TurGCPS-R, Turkish Graded Chronic Pain Scale–Revised.

[a]Extraction method: principal component analysis, rotation method: Varimax with Kaiser normalization; Q, question of TurGCPS-R.
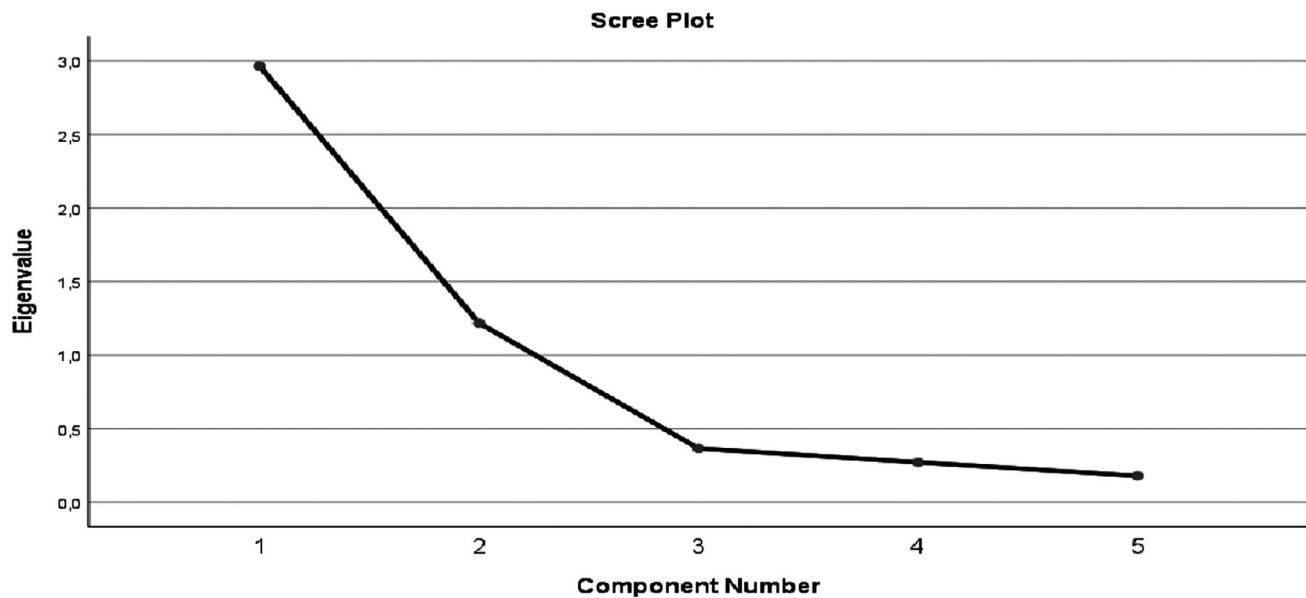
FIGURE 1 Findings of the screen test. Scree plot for the 5 items of Turkish Graded Chronic Pain Scale–Revised (TurGCPS-R)

Disability and functional impairment

The statistical relationship (Spearman ρ) among the TurGCPS-R, PEG scale (TurGCPS-R factor 1 according to EFA), and grading (GCPS-R scoring algorithm)[7] with the scales measuring disability and functional impairment is given in Table 5. As assumed, there was a negative correlation ($p < 0.05$ and $p < 0.01$) among the TurGCPS-R, PEG scale, grading, and the SF-36 subscales (physical functioning, role function physical aspect, and bodily pain). There was a positive correlation ($p < 0.05$ and $p < 0.01$) between the TurGCPS-R and PEG scale with the subscales and total score of the QBPDS, and also a strong positive correlation between grading and QBPDS ($p < 0.01$) was found.

Neuropsychological properties and mental health

The statistical relationship (Spearman ρ) among the TurGCPS-R, PEG scale, and the scales that evaluate neuropsychological properties and mental health is shown in Table 6. A positive correlation ($p < 0.05$ and $p < 0.01$) was determined between the TurGCPS-R and PEG scale with all subscales (rumination, magnification, and helplessness) and total scores of PCS. There was a strong positive correlation ($p < 0.01$) with the TurGCPS-R and PEG scale with the total score of PASS-20. There was no statistical significance detected for the physiological anxiety (PASS-20 subscale) and the TurGCPS-R's factor 2 items, but a strong positive correlation was found for factor 1 items ($p < 0.01$). The mean value of the PASS-20 physiological anxiety subscale was calculated as 5.76 ± 4.92 (0–20 range) and had the lowest score compared to the other subscales. No statistical relationship was found between both depression and anxiety scales and TurGCPS-R and PEG scale. The mean BDI value was calculated as 17.66 ± 8.71 (15–24 points = moderate depression) and the BAI mean value 17.54 ± 12.24 (21 = mild anxiety). Similarly, no statistical relationship was found between SF-36 subscales (role function emotional aspect and mental health) and our scale (Table 6).

TABLE 4 Mean, SD, and range values of the scales used to evaluate the convergent validity of the TurGCPS-R

	Mean	SD	Min–max (range)
SF−36			
Physical functioning	47.33	24.14	5–100 (0–100)
Role function physical aspect	24.62	32.41	0–100 (0–100)
Bodily pain	27.87	21.93	0–77.5 (0–100)
Social functioning	51.58	25.01	0–100 (0–100)
Role function emotional aspect	32.83	39.47	0–100 (0–100)
Mental health	53.83	19.01	0–100 (0–100)
General health	54.44	21.45	0–90 (0–100)
Vitality	39.77	19.62	0–85 (0–100)
QBPDS			
Total	54.42	18.10	11–97 (0–100)
PCS			
Rumination	11.02	4.57	0–16
Magnification	7.20	3.17	0–12
Helplessness	15.022	6.11	0–24
Total	33.2	12.89	4–52 (0–52)
PASS−20			
Cognitive	13.47	4.99	0–20
Escape/avoidance	13.54	4.22	0–20
Fear	12.74	5.29	0–20
Physiological anxiety	5.76	4.92	0–20
Total	45.52	15.91	3–80 (0–80)
BDI			
Total	17.66	8.71	2–40 (0–63)
BAI			
Total	17. 54	12.24	1–55 (0–63)
PSQI			
Total	8.62	3.55	0–21 (0–21)

Note: Number = 135.

Abbreviations: BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; Min–max, the smallest and largest values that the participants obtained from the scales; PASS-20, Pain Anxiety Symptom Scale; PCS, Pain Catastrophizing Scale; PSQI, Pittsburgh Sleep Quality Index; QBPDS, Quebec Back Pain Disability Scale; SD, standard deviation; SF-36, Short Form 36; TurGCPS-R, Turkish Graded Chronic Pain Scale–Revised.

QOL and general health

The statistical relations (Spearman ρ) among the TurGCPS-R, PEG scale, and the tests that measure QOL, and general health are given in Table 7. Higher scores for the SF-36 subscales (general health, vitality, and social role functioning) reflect better QOL. As expected, a negative correlation ($p < 0.05$ and $p < 0.01$) was found among the TurGCPS-R, PEG scale, and tests measuring QOL and general health, but no statistical relationship was found with PSQI.

Reliability of TurGCPS-R

The Cronbach α value of the TurGCPS-R was found to be $r = 0.814$ (good internal consistency). The Cronbach α value

was calculated as $r = 0.903$ (excellent) for the TurGCPS-R first factor, and the Cronbach α value for the second factor was calculated as $r = 0.782$ (acceptable). Item–total correlation coefficients of the items in the TurGCPS-R scale were observed to range from 0.4 (item 1) to 0.8 (item 5). When any of the items in the TurGCPS-R were removed, no significant increase was observed in Cronbach α coefficient. Table 8 presents the item–total correlations, Cronbach α coefficients obtained when the item was removed, and the mean (SD) values of TurGCPS-R and subscales. In Table 9, statistical (Spearman ρ) relationships among items, PEG scale, and grading are given, and a strong ($p < 0.01$) positive correlation was found. Item–total and inter-item correlation results showed that all items support the same basic structure. Test–retest reliability results are given in Table 10 (Gwet AC =0.9667, $p < 0.0001$). All results support the reliability of the scale (Table 10).

TABLE 5 Statistical relationships between scales measuring disability and functional impairment with TurGCPS-R, PEG Scale, and grading

	Q1	Q2	Q3	Q4	Q5	PEG[a]	Grade[b]
SF−36							
Physical functioning							
CC	−0.236[c]	−0.294[c]	−0.353[c]	−0.312[c]	−0.351[c]	−0.362[c]	−0.310[c]
Role function physical aspect							
CC	−0.225[c]	−0.266[c]	−0.065[d]	−0.117[d]	−0.179[e]	−0.132[d]	−0.301[c]
Bodily pain							
CC	−0.393[c]	−0.405[c]	−0.415[c]	−0.446[c]	−0.443[c]	−0.477[c]	−0.375[c]
QBPDS							
QQ 1–3							
CC	0.232[c]	0.189[e]	0.202[e]	0.269[c]	0.251[c]	0.272[c]	0.207[e]
QQ 4–6							
CC	0.196[e]	0.193[e]	0.390[c]	0.438[c]	0.417[c]	0.458[c]	0.224[c]
QQ 7–9							
CC	0.261[c]	0.167[d]	0.453[c]	0.401[c]	0.393[c]	0.450[c]	0.190[e]
QQ 10–12							
CC	0.255[c]	0.329[c]	0.443[c]	0.469[c]	0.541[c]	0.530[c]	0.295[c]
QQ 13–16							
CC	0.302[c]	0.273[c]	0.326[c]	0.348[c]	0.369[c]	0.385[c]	0.246[c]
QQ17–20							
CC	0.246[c]	0.323[c]	0.379[c]	0.348[c]	0.494[c]	0.483[c]	0.304[c]
QBPDS total							
CC	0.316[c]	0.313[c]	0.472[c]	0.445[c]	0.544[c]	0.560[c]	0.313[c]

Abbreviations: CC, correlation coefficient; PEG, Pain, Enjoyment, and General Activity scale; Q, question of TurGCPS-R; SF-36, Short Form 36; QBPDS, Quebec Back Pain Disability Scale; TurGCPS-R, Turkish Graded Chronic Pain Scale–Revised.

[a]PEG score was calculated by the sum of GCPS-R's third, fourth, and fifth questions (TurGCPS-R factor 1).

[b]The grading was obtained as a result of the GCPS-R scoring algorithm; QQ, question of QBPDS; QQ 1–3, bed and rest items; QQ 4–6, sitting and standing items; QQ 7–9, ambulatory items; QQ 10–12, movement items; QQ 13–16, bending/bending items; QQ17–20, items of handling large/heavy objects. Relationship between scales was evaluated with Spearman ρ.

[c]Correlation is significant at the 0.01 level (2-tailed).

[d]p value > 0.5.

[e]Correlation is significant at the 0.05 level (2-tailed).

DISCUSSION

Surveys are used as data collection tools in scientific research, and the main purpose is to reach the relevant information through surveys in the most valid and reliable way the GCPS has been shown to be valid[41,42] and reliable[43,44] in the evaluation of chronic pain. Thanks to its ability to evaluate the effect of pain on daily, social, and work activities, GCPS has been used for many years. However, one difficulty with GCPS is that scoring is complex.[23] The GCPS–R was recently developed by VonKorff et al.[7] to define mild, bothersome, and HICP and meet the need for scales with simpler test items and simpler scoring. In the pilot test phase of our study, the sample group ($n = 20$) was asked to read, understand, and fill in the questions, and this process took less than 1 min (51.679 ± 15.279 s). The feedback was that the scale questions were easy to understand and answer (face validity), and none of the participants received assistance during the pilot test phase in reading and answering the questions. The GCPS has previously been adapted into English, German, Italian, Brazilian Portuguese, Spanish, Greek, and Arabic languages.[41,43,45–49] However, as far as we know, our study is the first study of validity, reliability, and cross-cultural adaptation on behalf of GCPS-R. The translation phase was carried out step by step with great care in accordance with the instructions.[9,10]

When evaluating the psychometric properties, although the original scale[7] consisted of 6 items, the sixth question (whether the person was not working or unable to work because of pain or a pain condition) was not used in grading of chronic pain. The sixth question was included because of the clinical significance of identifying individuals who were unable to work due to pain. VonKorff et al.[7] pointed out that this item could be excluded or modified at the request of GCPS-R users without affecting the results of chronic pain grade. In our

TABLE 6 Statistical relations among TurGCPS-R, and PEG Scale, and scales used to measure neuropsychological properties and mental health

	Q1	Q2	Q3	Q4	Q5	PEG[a]
PCS						
Rumination						
CC	0.219[b]	0.230[c]	0.392[c]	0.420[c]	0.403[c]	0.442[c]
Magnification						
CC	0.175[b]	0.255[c]	0.344[c]	0.359[c]	0.433[c]	0.417[c]
Helplessness						
CC	0.232[c]	0.234[c]	0.401[c]	0.450[c]	0.493[c]	0.489[c]
PCS total						
CC	0.229[c]	0.255[c]	0.411[c]	0.451[c]	0.493[c]	0.494[c]
PASS−20						
Cognitive						
CC	0.211[b]	0.307[c]	0.520[c]	0.515[c]	0.496[c]	0.557[c]
Escape/avoidance						
CC	0.192[b]	0.205[b]	0.344[c]	0.405[c]	0.407[c]	0.429[c]
Fear						
CC	0.151[d]	0.213[b]	0.405[c]	0.425[c]	0.483[c]	0.476[c]
Physiological anxiety						
CC	0.024[d]	0.041[d]	0.258[c]	0.336[c]	0.335[c]	0.338[c]
PASS−20 total						
CC	0.183[b]	0.226[c]	0.478[c]	0.525[c]	0.534[c]	0.560[c]
BDI						
Total score						
CC	0.047[d]	0.127[d]	0.104[d]	0.109[d]	0.139[d]	0.125[d]
BAI						
Total score						
CC	−0.018[d]	0.004[d]	0.131[d]	0.105[d]	0.125[d]	0.137[d]
SF−36						
Role functional emotional Asp						
CC	−0.170[b]	−0.110[d]	−0.135[d]	−0.056[d]	−0.108[d]	−0.107[d]
Mental health						
CC	0.004[c]	−0.050[c]	0.020[c]	0.031[c]	0.023[c]	0.033[c]

Abbreviations: BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; CC, correlation coefficient; PASS-20, Pain Anxiety Symptom Scale; PCS, Pain Catastrophizing Scale; PEG, Pain, Enjoyment, and General Activity scale; Q, question of TurGCPS-R; SD, standard deviation; SF-36, Short Form 36; TurGCPS-R, Turkish Graded Chronic Pain Scale–Revised.

[a]PEG score, calculated by the sum of GCPS-R 3, 4, and 5 questions (TurGCPS-R factor 1); relationship between scales was evaluated with Spearman ρ.

[b]Correlation is significant at the 0.05 level (2-tailed).

[c]Correlation is significant at the 0.01 level (2-tailed).

[d]p value > 0.5.

study, construct validity was evaluated by EFA, and we implemented EFA by removing sixth items. The 5-item TurGCPS-R created a 2-factor structure in accordance with EFA. The first factor consisted of questions 3, 4, and 5, and these questions constitute the PEG scale that was added to GCPS-R.[7,8] In our scale, the first factor (PEG scale) met 59.30% of the total variance. Questions 1 and 2, which make up the second factor, are used in defining HICP.[7] The second factor met 24.36% of the total variance. Factor loadings were calculated to be $r = 0.881$ even for the lowest item. As for the results measuring the reliability, good internal consistency was found ($r = 0.814$ for α); $\alpha = 0.903$ (excellent) was calculated for the first factor (PEG scale). The original study results of Krebs et al.[8] calculated $\alpha = 0.73$ and 0.89 for PEG. Item–total and interitem correlation results showed that all items of TurGCPS-R evaluated the same basic features. All results support the reliability of TurGCPS-R.

The National Institutes of Health Task Force report[50] recommended a dataset for all studies on chronic LBP as research standards for chronic LBP. The scales used to evaluate convergent validity were selected in accordance

TABLE 7 Statistical relations among TurGCPS-R, and PEG Scale, and scale measuring quality of life

	Q1	Q2	Q3	Q4	Q5	PEG[a]
SF−36						
General health						
CC	−0.208[b]	−0.191[b]	−0.313[c]	−0.236[c]	−0.290[c]	−0.300[c]
Vitality						
CC	−0.233[c]	−0.184[b]	−0.200[b]	−0.164[d]	−0.192[b]	−0.197[b]
Social role functioning						
CC	−0.272[c]	−0.215[b]	−0.223[c]	−0.209[b]	−0.259[c]	−0.249[c]
PSQI						
Total						
CC	0.207[b]	0.239[c]	0.122[d]	0.155[d]	0.248[c]	0.120[d]

Abbreviations: CC, correlation coefficient; PEG, Pain, Enjoyment, and General Activity scale; PSQI, Pittsburgh Sleep Quality Index; Q, question of TurGCPS-R; SD, standard deviation; SF-36, Short Form 36; TurGCPS-R, Turkish Graded Chronic Pain Scale–Revised.

[a]PEG score, calculated by the sum of GCPS-R 3, 4, and 5 questions (TurGCPS-R factor 1).

[b]Correlation is significant at the 0.05 level (2-tailed).

[c]Correlation is significant at the 0.01 level (2-tailed).

[d]p value > 0.5.

TABLE 8 TurGCPS-R and its subscales item–total correlations, Cronbach α coefficients when item is deleted, and mean (SD) values

	Scale mean if item deleted	Scale variance if item deleted	Corrected item–total correlation	Cronbach α if item deleted	Mean (SD)
Q1	26.00	30.85	0.391	0.837	3.47 (0.656)
Q2	26.33	29.93	0.422	0.830	3.15 (0.778)
Q3	21.80	20.08	0.755	0.727	7.67 (1.665)
Q4	21.90	16.01	0.827	0.703	7.57 (2.082)
Q5	21.87	17.41	0.800	0.710	7.61 (1.940)
Factor 2					
Q1	3.15	0.60	0.65	0.782	6.62 (1.30)
Q2	3.47	0.43	0.65	0.903	
Factor 1					
Q3	15.18	14.56	0.785		22.85 (5.22)
Q4	15.28	11.21	0.843		
Q5	15.24	12.41	0.816		
TurGCPS-R (total scale)					29.47 (5.84)

Note: Number = 135.

Abbreviations: Q, question of TurGCPS-R; SD, standard deviation; TurGCPS-R, Turkish Graded Chronic Pain Scale–Revised.

with this report. As expected, statistically significant relationships ($p < 0.05$ and $p < 0.001$) were found among the TurGCPS-R, PEG scale, and grading and scales assessing pain-related disability and functional impairment. Factors such as thoughts that make pain catastrophic and pain-related anxiety may be associated with the development, aggravation, and prolongation of pain.[51] In this study, a positive correlation ($p < 0.05$ and $p < 0.001$) was found between our scale and scales that measured both conditions. A strong positive correlation ($p < 0.01$) was found with the PEG scale and the total scores and subscales of both scales. SF-36 is a scale that

evaluates physical and mental health and can be used by anyone regardless of demographics or disease. SF-36 also evaluates health-related QOL.[17,23,52] It has been used frequently in similar studies.[43,46,52] Statistically significant ($p < 0.05$ and $p < 0.001$) relationships were found among 6 subscales of SF-36 with TurGCPS-R. Statistical relationships were also found meaningless ($p > 0.05$) between the scales evaluating anxiety and depression and the two subscales of SF-36 (emotional role difficulties and mental health) with our scale. The findings showed that the TurGCPS-R was an important determinant of pain-related disability, catastrophic thoughts, and pain

TABLE 9 Interitem correlation statistics of TurGCPS-R

	Q1	Q2	Q3	Q4	Q5	PEG[a]	Grade[b]
Q1	1.000						
Q2	0.651[c]	1.000					
Q3	0.258[c]	0.334[c]	1.000				
Q4	0.330[c]	0.345[c]	0.768[c]	1.000			
Q5	0.346[c]	0.408[c]	0.704[c]	0.826[c]	1.000		
PEG[a]	0.350[c]	0.397[c]	0.880[c]	0.946[c]	0.924[c]	1.000	
Grade[b]	0.585[c]	0.765[c]	0.266[c]	0.271[c]	0.276[c]	0.302[c]	1.000

Abbreviations: Q, question of TurGCPS-R; PEG, Pain, Enjoyment, and General Activity scale; TurGCPS-R, Turkish Graded Chronic Pain Scale–Revised.

[a]PEG score was calculated by the sum of GCPS-R third, fourth, and fifth questions (TurGCPS-R factor 1).

[b]The grading was obtained as a result of the GCPS-R scoring algorithm.

[c]Correlation is significant at the 0.01 level (2-tailed).

TABLE 10 Test–retest reliability of TurGCPS-R

	Coefficient	p value
Percent agreement	0.9737	<0.0001
Cohen/Conger κ	0.8742	<0.0001
Gwet AC	0.9667	<0.0001

Abbreviations: Gwet AC, Gwet agreement coefficient; TurGCPS-R, Turkish Graded Chronic Pain Scale–Revised.

anxiety in a Turkish sample with chronic LBP. Results support the concurrent validity of TurGCPS-R.

As a result, statistical differences and consistent findings were found between grade 2 and grade 3 chronic pain in terms of activity limitation criteria and pain-related catastrophe and pain-related anxiety thoughts. However, the fact that this situation is not valid for anxiety–depression symptoms supports that it is different from bothersome chronic pain in terms of activity limitations in accordance with the HICP definition stated by VonKorff et al.[7,53]

The fact that both algologists (authors S.A.T. and İ.A.Ş.) in the study also have neurology specialties, and the evaluation of all participants and scales by psychiatry (author E.Ş.) and neurology (author N.K.I.) specialists suggests that the study has advantages in terms of psychometric analysis.

The sample consisted of patients who admitted to algology clinics with the complaint of LBP. Patients with chronic pain who have resistance to conventional treatments are consulted to algology clinics in Turkey. Therefore, grade 3 LBP was detected in the vast majority (76.3%) of the participants. This rate is 10% in general population surveys.[53] This value may be an indicator of the validity of the scale in terms of detecting the HICP of the TurGCPS-R. In outpatient clinic admissions, because the rate of female admission is higher than that in male admission, gender inequality occurred in our sample, but no statistical relationship ($p > 0.05$) was found between genders and PEG scale and grading. In addition, taking patients in order due to the working

conditions of the polyclinic may have led to the inability of randomization and selection bias. In order for TurGCPS-R to be generalized to other pain situations other than LBP, a different sampling involving various chronic pain patients is needed. Our team continues to work on the chronic pain population.

This study was carried out in 2 different centers of Turkey's largest city, Istanbul. Therefore, a sample with different ethnic and cultural identities could be reached. The hospital region where the study was conducted is located in the region where low-income people live and textile workers work predominantly. In the sociodemographic data in our study, only a statistical relationship ($p < 0.05$) was found between employment status and grading. When examining pain characteristics, a statistical relationship ($p < 0.05$) between pain intensity and pain side was found only in patients with pain localized in the lumbar region. These data support our suggestion in terms of employees. Nevertheless, it needs to be supported by a different study with wider participants.

CONCLUSION

In this article, the cross-cultural adaptation process of GCPS-R to the Turkish language and evidence of its validity and reliability in a sample of patients with primary LBP are presented. The results show that TurGCPS-R is a reliable, valid, and useful tool if a short, easy, and convenient method is needed to grading the severity of chronic pain in patients with LBP. In addition, we also presented the psychometric evaluation of the PEG scale that is located in the first factor of TurGCPS-R.

CONFLICT OF INTEREST
The authors state that they don't have any conflict of interest.

DATA AVAILABILITY STATEMENT
The datasets generated during and/or analysed during the current study are avaliable from the corresponding author on reasonable request.

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REFERENCES
1. International Association for the Study of Pain. IASP Terminology. http://www.iasp-pain.org/Education/Content.aspx?ItemNumber=1698. Accessed March 10, 2021.
2. Cohen SP, Raja SN. Pain. In Goldman-Cecil Medicine. 25 th ed. International Edition. Goldman L, Schafer AI eds. Elsevier; 2015: 133–43.
3. Vos T, Barber RM, Bell B, Bertozzi-Villa A, Biryukov S, Bolliger I, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet. 2015;386(9995):743–800. https://doi.org/10.1016/S0140-6736(15)60692-4
4. Ferreira ML, Machado G, Latimer J, Maher C, Ferreira PH, Smeets RJ. Factors defining care-seeking in low back pain—a meta-analysis of population based surveys. Eur J Pain. 2010;14(7):747.e1. https://doi.org/10.1016/j.ejpain.2009.11.005
5. Bendinger T, Plunkett B. Measurement in pain medicine. BJA Educ. 2016;16(9):310–5. https://doi.org/10.1093/bjaed/mkw014
6. VonKorff M, Ormel J, Keefe F, Dworkin SF. Grading the severity of chronic pain. Pain. 1992;50(2):133–49. https://doi.org/10.1016/0304-3959(92)90154-4
7. VonKorff M, DeBar LL, Krebs EE, Kerns RD, Deyo RA, Keefe FJ. Graded Chronic Pain Scale Revised: mild, bothersome, and high-impact chronic pain. Pain. 2020;161(3):651–61. https://doi.org/10.1097/j.pain.0000000000001758
8. Krebs EE, Lorenz KA, Bair MJ, Damush TM, Wu J, Sutherland JM, et al. Development and initial validation of the PEG, a three-item scale assessing pain intensity and interference. J Gen Intern Med. 2009;24(6):733–8. https://doi.org/10.1007/s11606-009-0981-1
9. Wild D, Grove A, Martin M, Eremenco S, McElroy S, Verjee-Lorenz A, et al. Principles of good practice for the translation and cultural adaptation process for patient-reported outcomes (PRO) measures: report of the ISPOR Task Force for Translation and Cultural Adaptation. Value Health. 2005;8(2):94–104. https://doi.org/10.1111/j.1524-4733.2005.04054.x
10. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. Spine (Phila Pa, 1976) 2000;25(24):3186–91. https://doi.org/10.1097/00007632-200012150-00014
11. Terwee CB, Bot SD, de Boer MR, van der Windt DAWM, Knol DL, Dekker J, et al. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol. 2007;60(1):34–42. https://doi.org/10.1016/j.jclinepi.2006.03.012
12. Balagué F, Mannion AF, Pellisé F, Cedraschi C. Non-specific low back pain. Lancet. 2012;379(9814):482–91. https://doi.org/10.1016/S0140-6736(11)60610-7
13. Airaksinen O, Brox JI, Cedraschi C, Hildebrandt J, Klaber-Moffett J, Kovacs F, et al. Chapter 4. European guidelines for the management of chronic nonspecific low back pain. Eur Spine J 2006;15(suppl 2):S192–300. https://doi.org/10.1007/s00586-006-1072-1
14. Oliveira CB, Maher CG, Pinto RZ, Traeger AC, Lin C-WC, Chenot J-F, et al. Clinical practice guidelines for the management of non-specific low back pain in primary care: an updated overview. Eur Spine J. 2018;27(11):2791–803. https://doi.org/10.1007/s00586-018-5673-2
15. Kopec JA, Esdaile JM, Abrahamowicz M, Abenhaim L, Wood-Dauphinee S, Lamping DL, et al. The Quebec Back Pain Disability Scale. Measurement properties. Spine (Phila Pa, 1976) 1995;20(3):341–52. https://doi.org/10.1097/00007632-199502000-00016
16. Melikoglu MA, Kocabas H, Sezer I, Bilgilisoy M, Tuncer T. Validation of the Turkish version of the Quebec Back Pain Disability Scale for patients with low back pain. Spine (Phila Pa, 1976). 2009;34(6):E219–24. https://doi.org/10.1097/BRS.0b013e3181971e2d.
17. Ware JE Jr. SF-36 Health Survey Update. Spine. 2000;25(24):3130–9. https://doi.org/10.1097/00007632-200012150-00008
18. Koçyiğit H, Aydemir Ö, Fişek G, Ölmez N, Memiş AK. Reliability and validity of the Turkish version of Short Form-36 (SF-36)] [in Turkish. İlaç ve tedavi der. 1999;12(2):102–6.
19. Sullivan MJ, Bishop SR, Pivik J. The Pain Catastrophizing Scale: development and validation. Psychol Assess. 1995;7(4):524–32. https://doi.org/10.1037/1040-3590.7.4.524
20. Süren M, Okan İ, Gökbakan AM, et al. Factors associated with the Pain Catastrophizing Scale and validation in a sample of the Turkish population. Turk J Med Sci. 2014;44(1):104–8. https://doi.org/10.3906/sag-1206-67
21. McCracken LM, Dhingra L. A short version of the Pain Anxiety Symptoms Scale (PASS-20). Pain Res Manag. 2002;7(1):45–50. https://doi.org/10.1155/2002/517163
22. Kisacik P, Devesan G, Arin G, et al. AB1240-HPR Turkish Version of the Short Version of the Pain Anxiety Symptom Scale (PASS-20) and its test–retest reliability and validity: preliminary report. Ann Rheum Dis. 2015;74:1349. https://doi.org/10.1136/annrheumdis-2015-eular.5203
23. Hawker GA, Mian S, Kendzerska T, French M. Measures of adult pain: Visual Analog Scale For Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP). Arthritis Care Res (Hoboken). 2011;63(suppl 11):S240–52. https://doi.org/10.1002/acr.20543
24. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. Arch Gen Psychiatry. 1961;4:561–71. https://doi.org/10.1001/archpsyc.1961.01710120031004
25. Choi Y, Mayer TG, Williams MJ, Gatchel RJ. What is the best screening test for depression in chronic spinal pain patients? Spine J. 2014;14(7):1175–82. https://doi.org/10.1016/j.spinee.2013.10.037
26. Hisli N. [A reliability and validity study of Beck Depression Inventory for university students] [in Turkish]. J Psychol. 1989;7(23):3–13.
27. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. J Consult Clin Psychol. 1988;56(6):893–7. https://doi.org/10.1037//0022-006x.56.6.89
28. Ulusoy M, Sahin NH, Erkmen H. [The Turkish version of the Beck Anxiety Inventory: psychometric properties] [in Turkish]. J Cogn Psychother. 1998;12:163–72.
29. Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index a new instrument for psychiatric practice and research. Psychiatry Res. 1989;28:193–213. https://doi.org/10.1016/0165-1781(89)90047-4

30. Ağargün MY, Kara H, Anlar O. [The Validity and Reliability of the Pittsburgh Sleep Quality Index] [in Turkish]. Türk Psikiyatri Derg. 1996;7:107–11.

31. IBM SPSS Statistics for Windows. Version 25.0. Armonk, NY: IBM Corp.; 2017.

32. Shapiro SS, Wilk MB. An analysis of variance test for normality (complete samples). Biometrika. 1965;52(3–4):591–611. https://doi.org/10.2307/2333709

33. Pallant J. SPSS Survival Manual: A Step by Step Guide to Data Analysis Using IBM SPSS, 7th edn. Sydney, NSW, Australia: Allen & Unwin; 2020.

34. Kaiser HF. A second generation little jiffy. Psychometrika. 1970;35(4):401–15. https://doi.org/10.1007/BF02291817

35. Bartlett MS. Tests of significance in factor analysis. Br J Math Stat Psychol. 1950;3(2):77–85. https://doi.org/10.1111/j.2044-8317.1950.tb00285.x

36. Agresti A. An Introduction to Categorical Data Analysis, 3rd edn. Hoboken, NJ: John Wiley & Sons; 2013.

37. Cronbach LJ. Coefficient alpha and the internal structure of tests. Psychometrika. 1951;16:297–334. https://doi.org/10.1007/BF02310555

38. Gwet KL. Testing the difference of correlated agreement coefficients for statistical significance. Educ Psychol Meas. 2016;76(4):609–37. https://doi.org/10.1177/0013164415596420

39. Fay MP, Proschan MA. Wilcoxon–Mann–Whitneyor t-test? On assumptions for hypothesis tests and multiple interpretations of decision rules. Stat Surv. 2010;4:1–39. https://doi.org/10.1214/09-SS051

40. Association AP. Diagnostic and Statistical Manual of Mental Disorders (DSM-5VR). Philadelphia, PA: American Psychiatric Association Publishing; 2013.

41. 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. https://doi.org/10.1016/s0304-3959(97)03347-2

42. Penny KI, Purves AM, Smith BH, Chambers WA, Smith WC. Relationship between the chronic pain grade and measures of physical, social and psychological well-being. Pain. 1999;79(2–3):275–9. https://doi.org/10.1016/s0304-3959(98)00166-3

43. Salaffi F, Stancati A, Grassi W. Reliability and validity of the Italian version of the Chronic Pain Grade Questionnaire in patients with musculoskeletal disorders. Clin Rheumatol. 2006;25(5):619–31. https://doi.org/10.1007/s10067-005-0140-y

44. Dunn KM, Jordan K, Croft PR. Does questionnaire structure influence response in postal surveys? J Clin Epidemiol. 2003;56(1):10–6. https://doi.org/10.1016/s0895-4356(02)00567-x

45. Klasen BW, Hallner D, Schaub C, Willburger R, Hasenbring M. Validation and reliability of the German version of the Chronic Pain Grade Questionnaire in primary care back patients. Psychosoc Med. 2004;1:Doc07. PMID: 19742049.

46. Bracher ES, Pietrobon R, Eluf-Neto J. Cross-cultural adaptation and validation of a Brazilian Portuguese version of the chronic pain grade. Qual Life Res. 2010;19:847–52. https://doi.org/10.1007/s11136-010-9637-1

47. Ferrer-Peña R, Gil-Martínez A, Pardo-Montero J, Jiménez-Penick V, Gallego-Izquierdo T, La Touche R. Adaptation and validation of the Spanish version of the graded chronic pain scale. Reumatol Clin. 2016;12:130–8. https://doi.org/10.1016/j.reuma.2015.07.004

48. Papaioannou M, Diakomi M, Georgoudis G, Argyra E, Vadalouca A, Siafaka I. The Chronic Pain Grade Questionnaire: validity, reliability and responsiveness in Greek chronic hip pain sufferers. Hippokratia. 2018;22(1):37–42.

49. Alhalal E, Jackson KT. Evaluation of the Arabic version of the Chronic Pain Grade Scale: psychometric properties. Res Nurs Health. 2021;44(2):403–12. https://doi.org/10.1002/nur.22116

50. Deyo RA, Dworkin SF, Amtmann D, Andersson G, Borenstein D, Carragee E, et al. Report of the NIH Task Force on research standards for chronic low back pain. J Pain. 2014;15(6):569–85. https://doi.org/10.1016/j.jpain.2014.03.005

51. Vowles KE, Zvolensky MJ, Gross RT, Sperry JA. Pain-related anxiety in the prediction of chronic low-back pain distress. J Behav Med. 2004;27:77–89. https://doi.org/10.1023/B:JOBM.0000013645.40613.42

52. LoMartire R, Äng BO, Gerdle B, Vixner L. Psychometric properties of Short Form-36 Health Survey, EuroQol 5-dimensions, and Hospital Anxiety and Depression Scale in patients with chronic pain. Pain. 2020;161(1):83–95. https://doi.org/10.1097/j.pain.0000000000001700

53. Von Korff M, Scher AI, Helmick C, et al. United States National Pain Strategy for Population Research: concepts, definitions, and pilot data. J Pain. 2016;17(10):1068–80. https://doi.org/10.1016/j.jpain.2016.06.009

APPENDIX

DERECELENDİRİLMİŞ KRONİK AĞRI ÖLÇEĞİ-YENİLENMİŞ

1.Soru: Son 3 ay içinde ne sıklıkta ağrınız oldu?

  1.Asla   2.Bazı Günler   3.Çoğu Gün   4.Her Gün

2. Soru: Son 3 ay içinde ağrınız, yaşamınızı veya iş aktivitelerinizi (faaliyetleriniz) ne sıklıkla sınırladı?

  1.Asla   2.Bazı Günler   3.Çoğu Gün   4.Her Gün

ŞİMDİ SON 7 GÜN İÇİNDE VAR OLAN AĞRILARINIZI DÜŞÜNÜN

3. Soru: Ortalama olarak ağrınızı en iyi hangi sayı tanımlar?

0	1	2	3	4	5	6	7	8	9	10
Ağrı yok										Hayal edilecek seviyede şiddetli ağrı

4. Soru: Son 7 gün içinde, ağrınızın yaşamdan zevk almanızı nasıl engellediğini en iyi hangi sayı tanımlar?

0	1	2	3	4	5	6	7	8	9	10
Etkilemez										Tamamiyle etkiler

5. Soru: Son 7 gün içinde, ağrınızın genel aktivitelerinizi (faaliyetlerinizi) nasıl engellediğini en iyi hangi sayı tanımlar?

0	1	2	3	4	5	6	7	8	9	10
Etkilemez										Tamamiyle etkiler

6. Soru: Ağrı veya ağrılı durum nedeniyle çalışmıyor ya da çalışamıyor musunuz?

    1-Evet   **2-Hayır**