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Original Article / Özgün Makale

Validity and reliability study of the Clinically Aligned Pain Assessment Scale in Turkish population

Klinik Olarak Uyumlu Ağrı Değerlendirme Ölçeği'nin Türk popülasyonunda geçerlik ve güvenirlik çalışması

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ABSTRACT

Background: This study aimed to translate the Clinically Aligned Pain Assessment (CAPA) Scale into Turkish, perform its cultural adaptation, and evaluate its validity and reliability in Turkish patients.

Patients and Methods: This single-center, cross-sectional study included a total of 105 patients with pain lasting at least one week between March 2026 and June 2026. The translation process followed standardized forward–backward procedures. Reliability was assessed using internal consistency and test-retest analysis (n = 68, 48-72 h). Construct validity was evaluated with exploratory factor analysis, and convergent validity was examined using Numeric Rating Scale (NRS).

Results: Of a total of 105 participants, 37 were male and 68 were female with a mean age of 46.90 ± 11.974 (range, 23 to 71) years. In the study, the CAPA-TR showed good internal consistency (Cronbach's alpha = 0.859) and excellent test-retest reliability (intraclass correlation coefficient = 0.959). Item–total correlations were above 0.30 for all items. Floor and ceiling effects were below acceptable thresholds. Exploratory factor analysis revealed a single-factor structure explaining 66.2% of the total variance. No significant correlation was found between CAPA-TR scores and NRS.

Conclusion: Our study results suggest that CAPA-TR is a valid and reliable multidimensional tool for pain assessment in Turkish-speaking patients. It provides a practical and patient-centered approach that may support more comprehensive evaluation of pain in clinical practice.

Keywords: Clinically Aligned Pain Assessment, multidimensional, pain assessment, reliability, validity.

ÖZ

Amaç: Bu çalışmada, Klinik Olarak Uyumlu Ağrı Değerlendirme (CAPA) Ölçeği'nin Türkçeye çevrilmesi, kültürel uyarlamasının yapılması ve Türk hastalarda geçerlik ile güvenirliğinin değerlendirilmesi amaçlandı.

Hastalar ve Yöntemler: Bu tek merkezli, kesitsel çalışmaya, Mart 2026 ile Haziran 2026 tarihleri arasında en az bir haftadır ağrısı olan toplam 105 hasta dahil edildi. Çeviri süreci, standart ileri-geri çeviri yöntemi doğrultusunda gerçekleştirildi. Güvenirlik, iç tutarlılık ve test-tekrar test analizi (n = 68, 48-72 saat) ile değerlendirildi. Yapı geçerliği açımlayıcı faktör analizi ile, yakınsak geçerlik ise Sayısal Derecelendirme Ölçeği (NRS) kullanılarak incelendi.

Bulgular: Toplam 105 katılımcının 37'si erkek, 68'si kadın olup, yaş ortalaması 46.90 ± 11.974 (dağılım, 23-71) yıldı. Çalışmada CAPA-TR iyi düzeyde iç tutarlılık (Cronbach alfa = 0.859) ve mükemmel test-tekrar test güvenirliği (sınıf içi korelasyon katsayısı = 0.959) gösterdi. Tüm maddeler için madde-toplam korelasyon katsayıları 0.30'un üzerindeydi. Taban ve tavan etkileri kabul edilebilir sınırların altında bulundu. Açımlayıcı faktör analizi, toplam varyansın %66.2'sini açıklayan tek faktörlü bir yapı ortaya koydu. Klinik Olarak Uyumlu Ağrı Değerlendirme-TR skorları ile NRS arasında istatistiksel olarak anlamlı bir korelasyon saptanmadı.

Sonuç: Çalışmamızın sonuçları, CAPA-TR'nin Türkçe konuşan hastalarda ağrı değerlendirmesi için geçerli ve güvenilir, çok boyutlu bir araç olduğunu göstermektedir. Bu araç, klinik uygulamada ağrının daha kapsamlı ve hasta merkezli değerlendirilmesini destekleyebilecek pratik bir yaklaşım sunmaktadır.

Anahtar sözcükler: Klinik Olarak Uyumlu Ağrı Değerlendirme, çok boyutlu, ağrı değerlendirmesi, güvenirlik, geçerlik.

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Pain leads many patients to seek medical care. It is also considered the fifth vital sign. In clinical practice, assessment often relies on tools such as the Numeric Rating Scale (NRS), Visual Analog Scale (VAS), and Faces Pain Scale (FPS). Although these instruments are simple and easy to administer, they primarily generate numerical pain intensity scores and do not adequately capture the impact of pain on patients' daily functioning and overall experience.[1]

Pain reporting may vary between individuals. Psychosocial status and personal characteristics influence these reports. Some patients may overestimate or underestimate their symptoms. This variability limits the standardization of intensity-based scales and reduces their reliability.[1,2]

The Brief Pain Inventory (BPI) was developed to overcome these limitations. It evaluates both pain intensity and its impact on daily life. It represents a multidimensional assessment approach.[2-4] Despite these advantages, its length and administration requirements limit routine use. This becomes more evident in busy clinical settings and in patients with lower educational levels.

Inadequate pain assessment may affect quality of life. It may also increase healthcare utilization. Therefore, practical and multidimensional tools are needed. These tools should be easy to apply and less dependent on patient education.

The Clinically Aligned Pain Assessment (CAPA) provides a brief and structured approach. It focuses on patient communication and can be integrated into routine clinical practice. Unlike numerical scales, CAPA evaluates comfort, change in pain, pain control, functional status, and sleep, thereby allowing a broader assessment while maintaining practicality.[5]

In the present study, we aimed to translate and culturally adapt the CAPA scale into Turkish and to examine its psychometric properties, including its validity and reliability, in a Turkish patient population.

PATIENTS AND METHODS

This single-center, cross-sectional study was conducted at İstanbul Atlas University School of Medicine, Department of Physical Medicine and Rehabilitation between March 2026 and June 2026. A written informed consent was obtained from each participant. The study protocol was approved by the Atlas University Clinical Research Ethics Committee (Date: 03.07.2025, No. 2025/03-03). The study was conducted in accordance with the principles of the Declaration of Helsinki. The translation, cultural adaptation, and psychometric evaluation were conducted in accordance with internationally recommended guidelines for the cross-cultural adaptation and validation of health measurement instruments.[6,7]

Patients experiencing pain for at least one week were eligible for inclusion. Individuals with both acute and chronic pain conditions were enrolled through consecutive sampling in a single-center outpatient setting. The inclusion criteria were age ≥ 18 years and the ability to read and understand Turkish. Patients with cognitive impairment or those unable to complete the second assessment were excluded from the study.

Sample size was calculated according to recommendations of five to 10 participants per item. A minimum of 100 participants was considered sufficient for psychometric evaluation.[7] A total of 105 patients were included. Test-retest reliability was evaluated in a subsample. Participants who met the criteria completed the second assessment within 48 to 72 h (n = 68). This sample size was considered adequate for reliability analysis.

Instrument

The CAPA was used as the main instrument. It is a structured and conversational tool and evaluates five domains: comfort, pain control, change in pain, functional ability, and sleep quality. The tool provides clinically meaningful information and remains practical in routine use.[5] The CAPA-TR was administered by a physician through a structured face-to-face interview. Participants did not complete the scale independently, consistent with the original conversational design of the CAPA instrument.

Translation and cross-cultural adaptation

The Turkish version of the CAPA-TR was developed using a forward-backward translation process in accordance with established cross-cultural adaptation guidelines.[6] Two bilingual clinicians independently translated the original English version into Turkish, and a consensus version was subsequently prepared. This version was then back-translated into English by a native English speaker who was blinded to the original instrument. An expert panel reviewed all versions to ensure conceptual equivalence, linguistic accuracy, and cultural appropriateness. The pre-final Turkish version was pilot-tested in a small group of patients to assess its clarity, comprehensibility, and cultural suitability. Based on participant feedback, minor revisions were made, and the final CAPA-TR

version was established (Appendix 1). Finally, the instrument was reviewed by clinicians with expertise in pain management to ensure item consistency and optimize its clinical usability.

Content validity

Content validity was assessed by experts in pain assessment and management. Each item was rated using a four-point Likert scale. Item-level and scale-level content validity indices were calculated. Values ≥ 0.80 were accepted as adequate.[8]

Data collection procedure

Data collection was performed in two stages. At the first visit (Day 0), participants completed CAPA-TR. A second assessment was conducted after 48 to 72 h. The main goal of this interval was to reduce recall bias and maintain clinical stability. Participants were instructed not to initiate any new treatment or medication during this period. At the second assessment, participants were asked whether any substantial change in symptoms or treatment occurred during the interval.

Statistical analysis

Statistical analysis was performed using the IBM SPSS for Windows version 29.0 software (IBM Corp., Armonk, NY, USA). Continuous data were presented in mean ± standard deviation (SD) or median (min-max), while categorical data were presented in number and frequency. Normality was tested using the Kolmogorov-Smirnov test. None of the variables showed normal distribution. Group comparisons were performed using the Mann-Whitney U test. Relationships between variables were examined using Spearman correlation analysis. Reliability analysis included internal consistency, item difficulty, response distribution, item-total correlation, floor and ceiling effects, Cronbach's alpha if item deleted, and test-retest reliability. Validity analysis included construct and convergent validity. Convergent validity was evaluated using correlation with NRS. Construct validity was assessed using exploratory factor analysis (EFA). Suitability for factor analysis was tested using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity. The EFA was performed using principal component analysis with varimax rotation. A p value of <0.05 was considered statistically significant.

RESULTS

Of a total of 105 participants, 37 were male and 68 were female with a mean age of 46.90 ± 11.974 (range, 23 to 71) years. Demographic data of the participants are summarized in Table 1. No significant difference was found in the mean CAPA-TR scores between sexes (p = 0.844). No significant difference was observed between pain types (acute versus chronic) (p = 0.540). No significant correlation was detected between continuous demographic variables and mean CAPA-TR score (Table 2).

Table 1. Descriptive statistics of continuous demographic variables

Variables	n	Mean ± SD	Median	25th-75th percentile
Age (year)	105	46.90 ± 11.974	47.0	37.0-57.0
Body mass index (kg/m^2)	105	26.62 ± 2.789	26.6	24.3-28.9
Education duration (year)	105	11.73 ± 2.725	12.0	9.0-14.0
Pain duration (week)	105	15.00 ± 8.596	14.0	7.0-22.0

SD, standard deviation.

Table 2. Comparison of CAPA scores according to categorical variables

	n	Mean ± SD	Median	25th-75th percentile	p
Sex					
Female	68	1.600 ± 0.6162	1.8	1.2-2.0	0.844
Male	37	1.605 ± 0.5587	1.8	1.2-2.0	
Pain type					
Acute pain	26	1.515 ± 0.6886	1.800	1.000-2.000	0.540
Chronic pain	79	1.630 ± 0.5612	1.800	1.200-2.000	

CAPA, Clinically Aligned Pain Assessment; SD, standard deviation.

Table 3. Descriptive statistics of individual CAPA items and overall CAPA Score

Scale items	Mean ± SD
CAPA comfort	1.67 ± 0.805
CAPA change	1.70 ± 0.831
CAPA control	1.63 ± 0.763
CAPA function	1.41 ± 0.615
CAPA sleep	1.60 ± 0.729
CAPA mean	1.602 ± 0.594

CAPA, Clinically Aligned Pain Assessment; SD, standard deviation.

Reliability analysis

Internal consistency

The Cronbach's alpha coefficient for CAPA-TR scale was 0.859 (5 items). The Tukey's Test of Additivity indicated that item scores could be combined to obtain a total score. Factor analysis was used to examine the contribution of each item to the total score.

Item difficulty

The mean and SD values of each item are presented in Table 3.

Item response distribution and floor-ceiling effects

Item response distributions are shown in Table 4. The proportion of extreme responses (scores 0 and 4) was low for all items. The highest category (score 4) was selected by very few participants. Floor and ceiling effects were evaluated based on minimum and maximum possible scores. All values remained below 15%.

Item-total correlation and Cronbach's alpha if item deleted

Removal of individual items did not result in a substantial change in Cronbach's alpha. A slight increase was observed when the second item (CAPA Change) was removed (Table 5). Item-total correlations exceeded 0.30 for all items. The lowest value was observed for CAPA Change (item 2) (r = 0.33).

Table 4. Distribution of responses to each CAPA item

	Test (n = 105)		Retest (n = 68)	
	n	%	n	%
Comfort				
Not comfortable at all	7	6.7	5	7.4
Slightly comfortable	36	34.3	24	35.3
Moderately comfortable	47	44.8	39	57.4
Completely comfortable	15	14.3	0	0.0
Change in pain				
Getting worse	8	7.6	5	7.4
About the same	32	30.5	24	35.3
Getting better	48	45.7	32	47.1
Much better	17	16.2	7	10.3
Pain control				
Unable to control pain	7	6.7	5	7.4
Partially effective	36	34.3	22	32.4
Mostly controlled	51	48.6	34	50.0
Fully controlled	11	10.5	7	10.3
Functioning				
Unable to perform daily activities	7	6.7	11	16.2
Pain significantly limits activities	48	45.7	35	51.5
Pain slightly limits activities	50	47.6	22	32.4
No limitation	0	0.0	0	0.0
Sleep				
Sleep severely disrupted by pain	7	6.7	5	7.4
Sleep moderately affected	36	34.3	23	33.8
Sleep slightly affected	54	51.4	40	58.8
Normal sleep	8	7.6	0	0.0

CAPA, Clinically Aligned Pain Assessment.

Inter-item correlations

The CAPA Change item showed lower correlations with other items. These correlations remained statistically significant. Higher correlations were observed among the remaining items (Table 6).

Test-retest reliability

Intraclass correlation coefficients (ICC) are presented in Table 7. The ICC value for the CAPA-TR mean score was 0.959. Lower ICC values were observed for CAPA Function domain. Other items showed higher ICC values.

Validity analysis

Convergent validity

Correlations between CAPA-TR total score, individual items, and NRS are shown in Table 8. No statistically significant correlation was found between CAPA-TR scores and NRS.

Construct validity (exploratory factor analysis)

The EFA was performed. The KMO value was 0.745. Bartlett's Test of Sphericity was significant ($p < 0.001$). A single-factor structure was identified. This factor explained 66.2% of the total variance. Communality

Table 5. Item-total correlation and Cronbach's alpha if item deleted analysis

CAPA items	Scale mean if item deleted	Scale variance if item deleted	Corrected item–total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
CAPA comfort	6.34	5.381	0.747	0.727	0.793
CAPA change	6.30	6.695	0.333	0.114	0.907
CAPA control	6.38	5.219	0.866	0.870	0.759
CAPA function	6.60	6.127	0.759	0.647	0.800
CAPA sleep	6.41	5.860	0.688	0.736	0.810

CAPA, Clinically Aligned Pain Assessment.

Table 6. Inter-item correlations of the CAPA scale

		CAPA change	CAPA control	CAPA function	CAPA sleep
CAPA comfort	r	0.290	0.850	0.729	0.549
	p	0.003	0.000	0.000	0.000
CAPA change	r		0.304	0.293	0.233
	p		0.002	0.002	0.017
CAPA control	r			0.719	0.788
	p			0.000	0.000
CAPA function	r				0.487
	p				0.000

CAPA, Clinically Aligned Pain Assessment; r, Correlation coefficient.

Table 7. Test-retest reliability ICC

	ICC	95% CI		*p*
		Lower	Upper	
CAPA comfort	0.942	0.905	0.964	< 0.001
CAPA change	0.542	0.258	0.717	0.001
CAPA control	0.687	0.493	0.807	< 0.001
CAPA function	0.350	−0.054	0.599	0.040
CAPA sleep	0.956	0.929	0.973	< 0.001
CAPA mean score	0.959	0.933	0.974	< 0.001
NRS pain intensity	0.619	0.382	0.765	< 0.001

ICC, intraclass correlation coefficient; CI, confidence interval; CAPA, Clinically Aligned Pain Assessment.

Table 8. Correlations between CAPA Items, mean CAPA score, and NRS score

	NRS (baseline pain intensity)		
	n	r	*p*
CAPA comfort	−0.112	0.257	105
CAPA change	−0.039	0.696	105
CAPA control	−0.103	0.297	105
CAPA function	−0.093	0.348	105
CAPA sleep	−0.162	0.099	105
CAPA mean score	−0.083	0.403	105

CAPA, Clinically Aligned Pain Assessment; NRS, numeric rating scale; r, Spearman correlation coefficient.

values were lower for CAPA Change (0.205). The remaining items showed values above 0.68. Rotation was not applied due to the single-factor structure. Factor loadings were as follows: CAPA Control (0.948), CAPA Comfort (0.874), CAPA Function (0.870), CAPA Sleep (0.827), and CAPA Change (0.453). Based on the component score coefficient matrix, a weighted pain score was calculated as follows: Pain Score = 0.264 × Comfort + 0.137 × Change + 0.287 × Control + 0.263 × Function + 0.250 × Sleep.

DISCUSSION

In the present study, we translated and culturally adapted the CAPA scale into Turkish and to examine its psychometric properties, including its validity and reliability, in a Turkish patient population. Our study results support the use of CAPA-TR in Turkish clinical settings. The scale demonstrated acceptable validity and reliability and it can be applied safely in patient evaluation.[5] The methodological approach followed recommended procedures for scale adaptation and evaluation.[6,7]

Pain is a complex biopsychosocial phenomenon comprising multiple interacting dimensions. Consequently, unidimensional pain assessment tools are unable to fully capture this complexity.[9,10] Therefore, multidimensional assessment approaches have been developed to provide a more comprehensive evaluation of the pain experience. The CAPA scale is one such instrument, as it extends beyond pain intensity to assess clinically relevant domains of the patient's pain experience.[11,12] In the current study, item responses showed a balanced distribution. This finding suggests that the scale can distinguish differences between patients. In routine practice, NRS is frequently preferred. Ease of use explains this preference. However, NRS mainly reflects intensity. It provides limited information on functional impact and overall well-being. Exclusive reliance on such measures may lead to incomplete clinical evaluation.[13,14] Therefore, multidimensional tools remain necessary for assessing the impact of pain on daily life.[15,16]

In the current study, no significant correlation was observed between CAPA-TR and NRS scores. This result suggests that the two tools assess different aspects of pain rather than indicating a measurement problem. Current models emphasize that pain involves more than intensity alone.[10,11] Similar findings have been reported for multidimensional tools such as BPI. These tools often show weak or moderate correlations with intensity-based scales because they evaluate different domains.[3,4,15] This also indicates the limitation of single-item measures in reflecting the full complexity of pain.[5,17,18] From a clinical perspective, this finding suggests that CAPA-TR and NRS provide complementary rather than interchangeable information. While NRS primarily reflects pain intensity, CAPA-TR evaluates broader domains including function, sleep quality, pain control, and perceived change in pain.

The psychometric findings of CAPA-TR were consistent with accepted reliability and validity criteria.[17,19,20] Content validity results remained within recommended limits and supported the conceptual framework of the scale.[8] Lower test-retest reliability was observed in the "change" and particularly "function" domains. These domains may vary over short periods. Sensitivity to clinical fluctuations may explain this pattern rather than measurement error.[18]

The CAPA Change item demonstrated lower factor loading and communality values compared to the remaining items. However, its item-total correlation remained above the acceptable threshold, and removal of the item did not result in a meaningful improvement in internal consistency. Furthermore, perceived change in pain represents an important component of the original CAPA framework. Therefore, the item was retained in the Turkish version.

Nonetheless, this study has several limitations that should be acknowledged. First, the study was conducted at a single center, which may limit

the generalizability of the findings. Second, not all participants completed the retest assessment, resulting in a reduced sample size for the test-retest reliability analysis. Third, convergent validity was evaluated solely using the NRS, which may not adequately represent the multidimensional nature of pain. Future studies incorporating additional multidimensional pain assessment instruments may provide a more comprehensive evaluation of convergent validity.

Confirmatory factor analysis was not performed in the present study. Although EFA demonstrated a clear one-factor structure explaining 66.2% of the total variance, several CAPA-TR items exhibited substantial inter-item correlations, limiting further confirmatory modeling. Future studies with larger and more diverse samples are warranted to further examine the factorial structure of CAPA-TR using CFA.

Despite these limitations, the study included an adequate sample size and employed comprehensive psychometric analyses. The findings support the validity and reliability of CAPA-TR and suggest that it is a practical instrument for patient-centered, function-oriented pain assessment in Turkish clinical practice.

In conclusion, the CAPA-TR demonstrated satisfactory validity and reliability in a Turkish-speaking patient population. Unlike conventional pain assessment tools that primarily measure pain intensity, CAPA-TR provides a more comprehensive evaluation by incorporating clinically relevant domains such as functional impact, patient experience, and changes in pain over time. These findings support the use of CAPA-TR as a valid, reliable, and clinically applicable instrument for patient-centered pain assessment in both clinical practice and research. Future multi-center studies involving more diverse populations are warranted to further confirm its psychometric properties and facilitate its broader implementation.

Conflict of Interest

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Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

AI Disclosure

The author declare that artificial intelligence (AI) tools were not used, or were used solely for language editing, and had no role in data analysis, interpretation, or the formulation of conclusions. All scientific content, data interpretation, and conclusions are the sole responsibility of the author. The author further confirm that AI tools were not used to generate, fabricate, or 'hallucinate' references, and that all references have been carefully verified for accuracy.

REFERENCES

1. Gordon DB. Acute pain assessment tools: Let us move beyond simple pain ratings. Curr Opin Anaesthesiol 2015;28:565-9. doi: 10.1097/ACO.0000000000000225.
2. Gordon DB, de Leon-Casasola OA, Wu CL, Sluka KA, Brennan TJ, Chou R. Research gaps in practice guidelines for acute postoperative pain management in adults: Findings from a review of the evidence for an American Pain Society Clinical Practice Guideline. J Pain 2016;17:158-66. doi: 10.1016/j.jpain.2015.10.023.
3. Gordon DB, Polomano RC, Pellino TA, Turk DC, McCracken LM, Sherwood G, et al. Revised American Pain Society Patient Outcome Questionnaire (APS-POQ-R) for quality improvement of pain management in hospitalized adults: preliminary psychometric evaluation. J Pain. 2010 Nov;11(11):1172-86. doi: 10.1016/j.jpain.2010.02.012.
4. Cleeland CS, Ryan KM. Pain assessment: global use of the Brief Pain Inventory. Ann Acad Med Singap 1994;23:129-38.
5. 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;25:3186-91. doi: 10.1097/00007632-200012150-00014.
6. Topham D, Drew D, Moxham L. A new approach to pain assessment: the Clinically Aligned Pain Assessment (CAPA) tool. J Nurs Care Qual 2017;32:E1-7.
7. Mokkink LB, Terwee CB, Patrick DL, Alonso J, Stratford PW, Knol DL, et al. The COSMIN checklist for assessing the methodological quality of studies on measurement properties of health status measurement instruments: an international Delphi study. Qual Life Res 2010;19:539-49. doi: 10.1007/s11136-010-9606-8.
8. Polit DF, Beck CT. The content validity index: Are you sure you know what's being reported? Critique and recommendations. Res Nurs Health 2006;29:489-97. doi: 10.1002/nur.20147.
9. Raja SN, Carr DB, Cohen M, Finnerup NB, Flor H, Gibson S, et al. The revised International Association for the Study of Pain definition of pain: Concepts, challenges, and compromises. Pain 2020;161:1976-82. doi: 10.1097/j.pain.0000000000001939.
10. Gatchel RJ, Peng YB, Peters ML, Fuchs PN, Turk DC. The biopsychosocial approach to chronic pain: Scientific advances and future directions. Psychol Bull 2007;133:581-624. doi: 10.1037/0033-2909.133.4.581.
11. Fillingim RB, Loeser JD, Baron R, Edwards RR. Assessment of chronic pain: Domains, methods, and mechanisms. J Pain 2016;17:T10-20. doi: 10.1016/j.jpain.2015.08.010.
12. Melzack R, Katz J. Pain in the 21st century: the neuromatrix and beyond. In: Faigman DL, Kaye DH, Saks MJ, Sanders J, editors. Psychological knowledge in court. New York: Springer; 2007. p. 129-148.
13. Hjermstad MJ, Fayers PM, Haugen DF, Caraceni A, Hanks GW, Loge JH, et al. Studies comparing Numerical Rating Scales, Verbal Rating Scales, and Visual Analogue Scales for assessment of pain intensity in adults: A systematic literature review. J Pain Symptom Manage 2011;41:1073-93. doi: 10.1016/j.jpainsymman.2010.08.016.
14. Williamson A, Hoggart B. Pain: A review of three commonly used pain rating scales. J Clin Nurs 2005;14:798-804. doi: 10.1111/j.1365-2702.2005.01121.x.

15. 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:S240-52. doi: 10.1002/acr.20543.
16. Chou R, Gordon DB, de Leon-Casasola OA, Rosenberg JM, Bickler S, Brennan T, et al. Management of postoperative pain: A Clinical Practice Guideline From the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council. J Pain 2016;17:131-57. doi: 10.1016/j.jpain.2015.12.008.
17. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, et al. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol 2007;60:34-42. doi: 10.1016/j.jclinepi.2006.03.012.
18. Turk DC, Okifuji A. Psychological factors in chronic pain: Evolution and revolution. J Consult Clin Psychol 2002;70:678-90. doi: 10.1037//0022-006x.70.3.678.
19. Koo TK, Li MY. A guideline of selecting and reporting ıntraclass correlation coefficients for reliability research. J Chiropr Med 2016;15:155-63. doi: 10.1016/j.jcm.2016.02.012.
20. Prinsen CAC, Mokkink LB, Bouter LM, Alonso J, Patrick DL, de Vet HCW, et al. COSMIN guideline for systematic reviews of patient-reported outcome measures. Qual Life Res 2018;27:1147-57. doi: 10.1007/s11136-018-1798-3.