JCOMS eISSN:2783-3127 https://journalofcoms.com

Journal of

Current Oncology and Medical Sciences

Vol. 4, No. 4

Original Free Access

Psychometric evaluation and factor structure of the Persian coping strategies questionnaire in chronic low back pain patients

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Abstract

Introduction: This study aimed to investigate the factor structure and psychometric properties of the Coping Strategies Questionnaire (CSQ) in Persian in people with non-specific chronic low back pain (NSCLBP).

Materials and methods: Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were employed to determine the CSQ's factor structure. Reliability was assessed using the Intraclass Coefficient and Cronbach's Alpha.

Results: 13 variables, accounting for 74.94% of the total variance, were identified using EFA; based on Parallel Analysis, the first four components—ignoring pain sensations, praying, diverting attention, and catastrophizing—were kept. A sufficient model fit was not shown by the CFA results ($\chi^2/df = 1.77$, CFI = 0.884, TLI = 0.84, and RMSEA = 0.081). All subscales had Cronbach's alpha and test-retest reliability between 0.75 and 0.88 and 0.7 and 0.83, respectively.

Conclusion: According to the study's findings, there are four-factor structures in the Persian version. Additionally, it was stated that the item-total correlations, agreement, and test-retest reliability were all at a good and acceptable level.

Keywords: Coping strategies questionnaire, Chronic non-specific low back pain, Factor structure, Psychometric properties, Parallel analysis

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Received:2024.9.8, Accepted: 2024.11.28

Introduction

The term "coping" describes the methods employed to address the detrimental impacts of stress. These strategies encompass ways people address pain and disability, and are both cognitive (e.g., praying, counting numbers, and activities that create a sense of detachment from the environment) and behavioral (e.g., walking and talking to others)(1).

The type of coping strategy varies depending on the situation and culture; thus, an adaptive solution (or maladaptive: Coping strategies, such as catastrophizing, are associated with increased pain and disability) in a culture may be maladaptive (or adaptive: Coping strategies, such as ignoring pain, have been associated with reduced pain and disability) in another (2). In recent years, researchers pay more attention to the importance of the effects of appraisal and coping on the performance of people with chronic pain, Studies have also reported a moderate to strong association between coping strategies, pain intensity, psychological characteristics, and physical function (3).

Review articles have established a relationship between maladaptive coping strategies and persistent pain control challenges in individuals experiencing chronic lower back pain. Studies have found that coping strategies including praying, hoping, and diverting attention are more closely associated with the degree of pain, whereas self-statements and pain-ignoring techniques are better indicators of disability. However, inconsistent findings in the literature highlight the complexity of categorizing coping strategies as adaptive or maladaptive. Pain is experienced and managed differently across cultures, leading to variability in coping strategies and their effects on pain. The significance of specific coping strategies is influenced by cultural variables and the metrics used to evaluate outcomes. In addition, personality traits themselves may differ across cultures. The impact of coping strategies on disability resulting from chronic low back pain within Iranian society remains unclear(4).

One of the appropriate tools for evaluating and identifying coping strategies is the Coping Strategies Questionnaire (CSQ), designed by Rosenthal and Keefe in 1983 and frequently used in studies (5). One advantage of this tool is its patient-centered approach, which assesses patients' problems across all dimensions, particularly their quality of life, along with its robust psychometric properties (6). The original version of this scale contains 48 items (5). The questionnaire has been adapted into six languages, with acceptable validity and reliability; however, no stable factor structure has been reported (7-13). Asghari et al. (2005) translated this questionnaire into Persian among people with chronic pain and finally designed a 42-item Persian version. Six cognitive strategies and one behavioral strategy are included in this assessment (9). The seven subscales' Cronbach's alpha coefficients varied from 0.74 to 0.83, demonstrating the high level of internal consistency (9). Prior research examining the factor structure of the CSQ has not identified a consistent and valid factor configuration, although certain patterns have emerged across various populations, cultures, and methodologies (14-17).

Researchers hypothesize that these differences could be caused by the scales that Rosenstiel and Keefe (1983) proposed (5), their operationalization, and the variations in coping methods arising from the heterogeneity of pain conditions and cultural contexts (13).

The purpose of this study was to comprehensively examine the Coping Strategies Questionnaire (CSQ)'s factor structure and reliability in Persian, with a focus on people with NSCLBP. The following are the study's hypotheses:

1. The CSQ demonstrates statistically significant and acceptable internal consistency and test-retest reliability.
2. Each item's correlation with the relevant subscale, after deducting the score of that item, is significant.
3. The factors extracted in the study are consistent with the factor structure of the original questionnaire.

Methods

Using a convenience selection technique, 120 patients with chronic low back pain who visited physiotherapy centers in Tehran between the fall and winter of 2017

were chosen for this cross-sectional study. An informed consent form, certified by the appropriate ethics committee, was signed by each participant.

Participants were Persian-speaking, literate, and had a history of NSCLBP (Chronic back pain can initially be classified as inflammatory disorders (18); however, over time, the lack of appropriate treatment, along with psychological risk factors and the adoption of maladaptive coping strategies, can lead to the development of chronic back pain), with pain in the area between the 12th rib and the ischial tuberosity lasting more than three months(19, 20). Exclusion criteria included a history of spinal stenosis (21), lumbar discopathy and radicular pain in the lower extremities (22), pregnancy, and a history of psychological treatment. Sample size considerations vary: to obtain valid factors, samples should be representative and sufficient in size. According to Guilford (23), the minimum sample size is 200 people, however, Kline argues this figure may be exaggerated, noting that samples of 100 with a clear factor structure are often adequate (24). Another approach is to use the participant-to-item ratio, with 1:3, 1:6, and 1:10 ratios commonly recommended. This study adopted a 1:3 ratio (25, 26). Hair et al. also consider a sample size of 100 or more sufficient (27). In the present study, the minimum sample size was set at 120 people. Sixty participants retook the CSQ ten to twelve days later to assess reliability (28). The tools used in this study were:

CSQ

The purpose of the Coping Strategies Questionnaire (CSQ) is to determine the coping mechanisms employed by people with chronic pain. This assessment consists of 48 items, including six diverse cognitive strategies and two behavioral strategies, the “increasing pain” item was excluded from the analysis due to its low reliability. The CSQ comprises seven subscales, each containing six items: praying or hoping (items 14, 15, 18, 22, 28, 36); coping self-statements (items 6, 8, 20, 23, 31, 32); diverting attention (items 3, 9, 12, 26, 27, 38); reinterpreting pain sensations (items 1, 4, 10, 16, 29, 41); catastrophizing (items 5, 11, 13, 25, 33, 37); ignoring pain sensations (items 17, 19, 21, 24, 30, 35); and increasing behavioral activities (items 2, 7, 34, 39, 40, 42). Seven choices are available for each item: 0 means never use, 3 means use occasionally, and 6 means constantly use. Higher scores on each subscale, which ranges from 0 to 36, indicate a stronger preference for a particular coping mechanism. With Cronbach's alpha coefficients for every subscale surpassing 0.70, the Persian version of the CSQ exhibits great psychometric qualities as well as good internal consistency comparable to the original version (9).

Visual analog scale (VAS)

The Visual Analog Scale (VAS) is a popular self-report instrument for gauging the severity of pain. With endpoints marked "no pain" and "worst imaginable pain," participants rate their level of pain by placing a mark on a 100-mm line. The VAS has demonstrated strong psychometric properties, including reliability and validity, and is a standard tool in pain research (29, 30).

Statistical Analysis

Reproducibility measures the consistency of results obtained from repeated administration of a test to the same individuals under stable conditions (31). Test-retest reliability involves administering the same assessment to the same participants on at least two occasions (28), To assess the relative reliability, a random two-way model with a 95% confidence interval was employed. Values greater than 0.7 were considered acceptable for both internal consistency (Cronbach's alpha) and correlation coefficients (ICC) (31, 32). Scores from many test administrations were evaluated for absolute reliability using standard error of measurement (SEM) (31), utilizing the equation SEM = s √ (1-r)), in where "s" stands for the standard deviation and "r" for the ICC. Using the formula, the minimum detectable changes (MDC) were determined ($SEM \times 1.96 \times \sqrt{2}$) (32, 33).

Agreement: A Bland-Altman plot was used to evaluate agreement between test and retest subscales. The outcome measure of this method was the mean difference and limitation of agreement, with a 95% confidence interval (34).

Item-total correlation (ITC): ITC was analyzed using the Spearman correlation coefficient, which allowed the correlation between each item and the related subscale to be displayed following the subtraction of

each item's score. Correlation coefficients greater than 0.4 were deemed appropriate (35).

Factor structure: EFA is a multivariate statistical method that reveals latent factors that account for observable data patterns, thus revealing the underlying relationships between variables. Factor analysis was implemented through the use of BM SPSS Amos 17 structural equation modeling software (SPSS Inc., Chicago, IL, USA). Sample adequacy was evaluated using the Kaiser-Meyer-Olkin (KMO) test (a value greater than 0.77 indicates sufficiency), and if considerable variance was found, the Bartlett test of sphericity was performed to establish whether the items were suitable for component analysis. Items were only included in the analysis if their factor loading was larger than 0.4; eigenvalues >1 were regarded as the main factors (13). In a sample of Iranian people with NSCLBP, the model fit of the Persian version of the CSQ was assessed using Confirmatory Factor Analysis (CFA) (31). The model's efficacy was assessed using the model fit indices, Researchers compare goodness-of-fit indices to predetermined cutoff values (such as CFI >.950) obtained from simulation tests in order to assess model fit in CFA. Methodologists have warned that goodness-of-fit cutoffs are only applicable in environments that are comparable to the simulated scenarios that inspired them. Fixed cutoffs for common GOFs (i.e., $\chi 2$, $\chi 2$/df, CFI, TLI, and RMSEA) are nevertheless often utilized in practical research in spite of these cautions (36). A good model fit is indicated by values like $\chi 2$ / df < 3, Tucker-Lewis Index (TLI) ≥ 0.90, Comparative Fit Index (CFI) ≥ 0.90, and Root Mean Square Error of Approximation (RMSEA) ≤ 0.08 (37).

Parallel analysis (PA) was also used to obtain the appropriate number of factors, which was performed using O'Connor syntax in SPSS-17 software. Data simulation based on real data and the elimination of variables with eigenvalues less than one form the basis of this approach. The total amount of factors is the deciding factor when the simulated data's eigenvalue is higher than the real data's eigenvalue (38, 39).

Results

The participants' average age was 36.36 years, with a standard deviation of 10.51 years. According to a 100-mm visual analog scale, the average pain intensity measured during the evaluation was 30.9 mm. According to demographic data, 70.8% of participants were female and 29.2% were male. The distribution of educational backgrounds was as follows: 19.1% had a diploma, 48.4% had a bachelor's degree, and 32.5% had earned a master's or doctoral degree. Table 1 contains more background data on the individuals involved. The data distribution across all subscales was non-normal; therefore, non-parametric methods were employed for statistical analysis.

Table 1. Demographic characteristics of subjects with NSCLBP (n=120).

	Range	Mean	Standard Deviation
Age (year)	19-68	36.36	10.51
BMI	16.02-35.32	24.86	3.72
VAS (mm)	20-70	30.9	10.9
Duration (month)	3-240	27.84	37.28

BMI; Body Mass Index, VAS; Visual Analogue Scale

The test-retest reliability results for all subscales ranged from 0.75 to 0.88, indicating good reliability. Cronbach's alpha values were reported between0.7-0.83, indicating good internal consistency of the subscales. The subscales' ICC, SEM, MDC, and Cronbach's alpha values are displayed in Table 2.

Table 2. Test-retest reliability of Persian version of CSQ in subjects with NSCLBP (n=50).

Subscales	ICC (95% interval confidence)	Cronbach's alpha	SEM	MDC
Diverting attention	0.74(0.60-0.83)	0.79	3.48	9.64
Reinterpretation	0.85(0.77-0.91)	0.77	2.63	7.29
Catastrophizing	0.85(0.76-0.90)	0.83	2.77	7.67
Ignoring pain	0.78(0.66-0.86)	0.83	3.42	9.47
Praying/hope	0.88 (0.81-0.93)	0.82	3.21	8.89
self-statement	0.78 (0.67-0.86)	0.80	3.28	9.09
Increasing activity levels	0.82 (0.72-0.89)	0.7	2.68	7.44

ICC: intraclass correlation coefficient, SEM: Standard Error of Measurement, MDC: minimal detectable

The results of Bland-Altman Plots indicated that the mean difference of all subscales ranged from -0.8 to 1, with upper and lower limits of agreement ranging from 7.7 to 10.1 and -11.1 to -6.5, respectively. Figure 1 configured Bland-Altman Plots of all 7 subscales of the CSQ.

The Spearman correlation between each item and its matching subscale varied from 0.358 to 0.707, as seen in Table 3. According to this data, each item's correlation with its subscale was consistently higher than its association with other subscales. Furthermore, all items exhibited a statistically significant correlation with their respective subscales, with a P-value of less than 0.001.

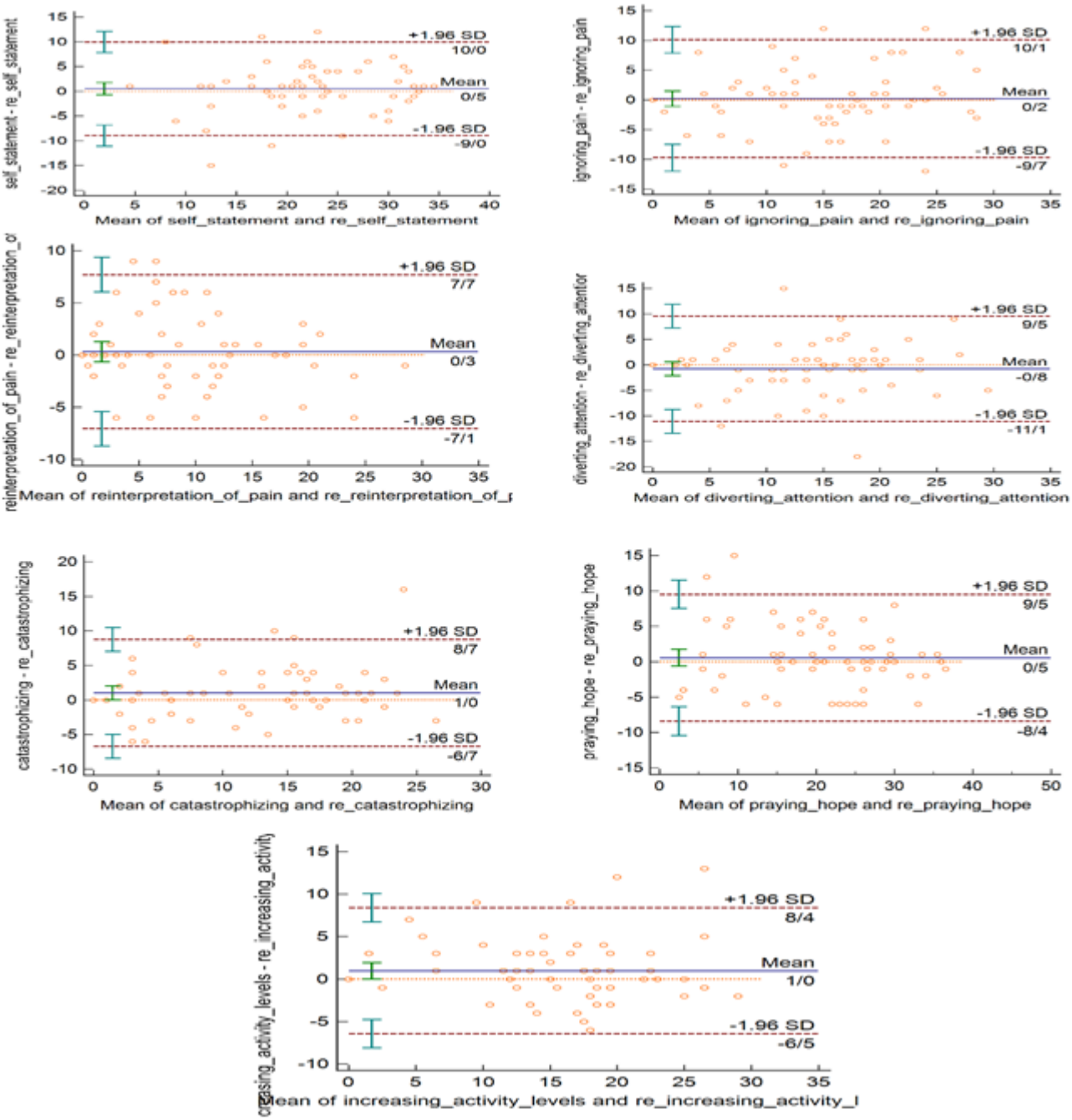

Figure 1. Bland-Altman Plot of subscales of Coping strategies Questionnaire in subjects nonspecific chronic Low Back Pain (n=120), the figure shows the mean difference of all subscales was in the limitation agreement range.

Table 3. Item-Total correlation of Persian version of CSQ in subjects with NSCLBP (n=120).

Items	Diverting attention	Reinterpretation	Catastrophizing	Ignoring pain	Praying- hope	self-statement	Increasing Activity levels
I 3	0.501**	0.420**	-0.269**	0.385**	0.312**	0.497**	0.375**
I 9	0.443**	0.291**	0.000	0.237**	0.177	0.174	0.298**
I 12	0.468**	0.406**	0.074	0.249**	0.336**	0.315**	0.314**
I 26	0.663**	0.429**	0.027	0.264**	0.427**	0.404**	0.472**
I 27	0.296**	0.441**	0.148	0.249**	0.521**	0.493**	0.473**
I 38	0.658**	0.434**	-0.001	0.276**	0.294**	0.395**	0.343**
I 1	0.442**	0.441**	0.086	0.268**	0.313**	0.366**	0.193*
I 4	0.350**	0.472**	-0.080	0.330**	0.072	0.165	0.159
I 10	0.280**	0.445**	0.060	0.204*	0.190*	0.191*	0.140
I 16	0.432**	0.628**	0.091	0.346**	0.164	0.184*	0.336**
I 29	0.444**	0.674**	0.022	0.446**	0.237**	0.257**	0.352**
I 41	0.359**	0.526**	0.079	0.488**	0.310**	0.377**	0.438**
I 5	0.018	0.068	0.558**	-0.167	-0.038	-0.227*	0.046
I 11	-0.019	-0.019	0.667**	-0.209*	0.049	-0.294**	-0.032
I 13	-0.024	0.096	0.473**	-0.275**	-0.079	-0.330**	-0.034
I 25	0.068	0.120	0.617**	-0.097	0.393**	0.006	0.194*
I 33	0.012	0.089	0.667**	-0.128	0.252**	-0.033	0.218*
I 37	-0.016	0.021	0.588**	-0.227*	0.248**	-0.224*	0.027
I 17	0.291**	0.307**	-0.357**	0.503**	0.075	0.413**	0.307**
I 19	0.428**	0.496**	-0.092	0.588**	0.244**	0.446**	0.328**
I 21	0.189*	0.275**	-.243**	0.623**	0.094	0.392**	0.361**
I 24	0.315**	0.425**	-0.142	0.596**	0.199*	0.376**	0.357**
I 30	0.235**	0.241**	-0.216*	0.516**	0.180*	0.538**	0.437**
I 35	0.182*	0.353**	-0.171	0.636**	0.067	0.392**	0.472**
I 14	0.364**	0.224*	0.166	0.081	0.482**	0.341**	0.287**
I 15	0.296**	0.229*	0.283**	0.080	0.707**	0.273**	0.256**
I 18	0.550**	0.278**	0.088	0.226*	0.560**	0.494**	0.487**
I 22	0.329**	0.142	0.053	0.199*	0.405**	0.405**	0.316**
I 28	0.338**	0.296**	0.291**	0.127	0.663**	0.236**	0.263**
I 36	0.356**	0.286**	0.135	0.225*	0.646**	0.302**	0.333**
I 6	0.436**	0.374**	0.070	0.277**	0.406**	0.506**	0.365**
I 8	0.335**	0.243**	-0.183*	0.291**	0.437**	0.502**	0.235**
I 20	0.429**	0.246**	-0.233*	0.502**	0.267**	0.555**	0.341**
I 23	0.319**	0.192*	-0.343**	0.425**	0.230*	0.488**	0.233*
I 31	0.518**	0.403**	-0.160	0.610**	0.366**	0.666**	0.628**
I 32	0.127	0.012	-0.158	0.436**	0.170	0.444**	0.362**
I 2	0.303**	0.254**	0.074	0.296**	0.261**	0.229*	0.440**
I 7	0.267**	0.061	0.047	0.157	0.144	0.220*	0.245**
I 34	0.383**	0.278**	0.133	0.370**	0.291**	0.311**	0.481**
I 39	0.378**	0.351**	-0.043	0.494**	0.197*	0.403**	0.351**
I 40	0.525**	0.344**	0.101	0.333**	0.421**	0.418**	0.485**
I 42	0.334**	0.287**	0.085	0.430**	0.211*	0.362**	0.500**

In 120 patients with non-specific chronic low back pain, the CSQ questionnaire's EFA were: The KMO test (0.753) and the Bartlett test of sphericity (P-value = 0.000, degree of freedom = 861, Chi-square test = 56/2675) showed that the questionnaire items were appropriate for the major component's statistical analysis. From the factor analysis, 13 factors with eigenvalues of 10.23, 4.73, 2.44, 2.35, 1.91, 1.48, 1.36, 1.33, 1.24, 1.18, 1.15, 1.01, and 1.00 were extracted, accounting for 74.94% of the total variance. The first factor (items 5, 11, 13, 33, 25, 37) is 24.35% of the total variance, the second factor (items 17, 30, 31, 32, 34, 42) is 11.26% of the total variance, the third factor (Items 18, 38, 27, 26) is 5.80% of the total variance, the fourth factor (items 15, 28, 36) is 5.60% of the total variance, the fifth factor (items 16, 29 and 41) is 4.5 total, the sixth factor of variance (items 19, 21 and 24) is 3.5 total variance. The next seven factors were composed of three (6, 7, and 8), two (22 and 14), three (23, 39, and 40), two (9 and 12), one (10), one (4), and one (2) item, respectively. Four items 1, 3, 20, and 35 were removed due to cross-loading of Eigenvalues less than 0.2. The scree plot diagram in Figure 2 shows five or six factors.

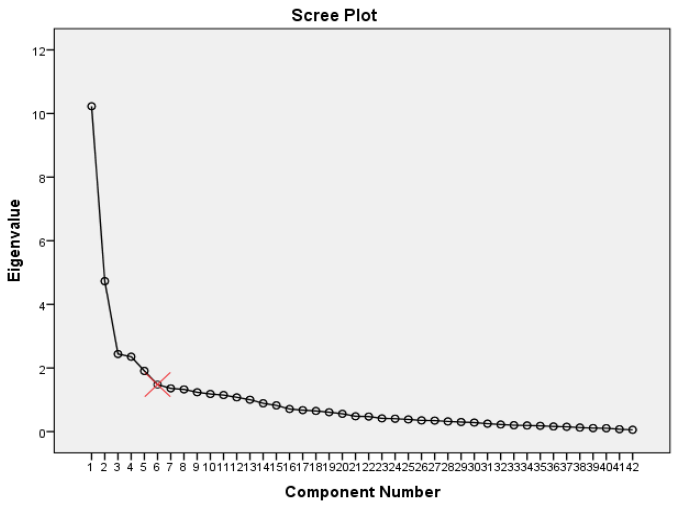

Figure 2. Scree Plot of the Persian version of CSQ in subjects with nonspecific chronic low back pain (n=120). The red multiplication symbol indicates the cut-off point for determining the appropriate number of factors.

Due to the high number of factors, data simulation was used in parallel analysis to determine the proper number of components, which ultimately stayed at the first four. Confirmatory factor analysis yielded the following fit indices: $\chi^2/df = 1.77$, CFI = 0.884, TLI = 0.84, and RMSEA = 0.081. The structural equation model is depicted in Figure 3. Table 4 shows the factor loads from the varimax-rotated matrix.

Table 4. Factor loadings of Persian version of the CSQ in subjects with nonspecific chronic low back pain (n=120).

Items	Factor I catastrop-hizing	Factor II Ignoring pain	Factor III Diverting attention	Factor IV praying
I 5	0.782			
I 11	0.756			
I 13	0.553			
I 25	0.675			
I 33	0.803			
I 37	0.664			
I 17		0.472		
I 30		0.674		
I 31		0.581		
I 32		0.827		
I 34		0.578		
I 35		0.591		
I 42		0.609		
I1			0.435	
I3			0.419	
I 18			0.510	
I 20			0.436	
I 26			0.722	
I 27			0.804	
I 38			0.634	
I 15				0.818
I 28				0.871
I 36				0.867

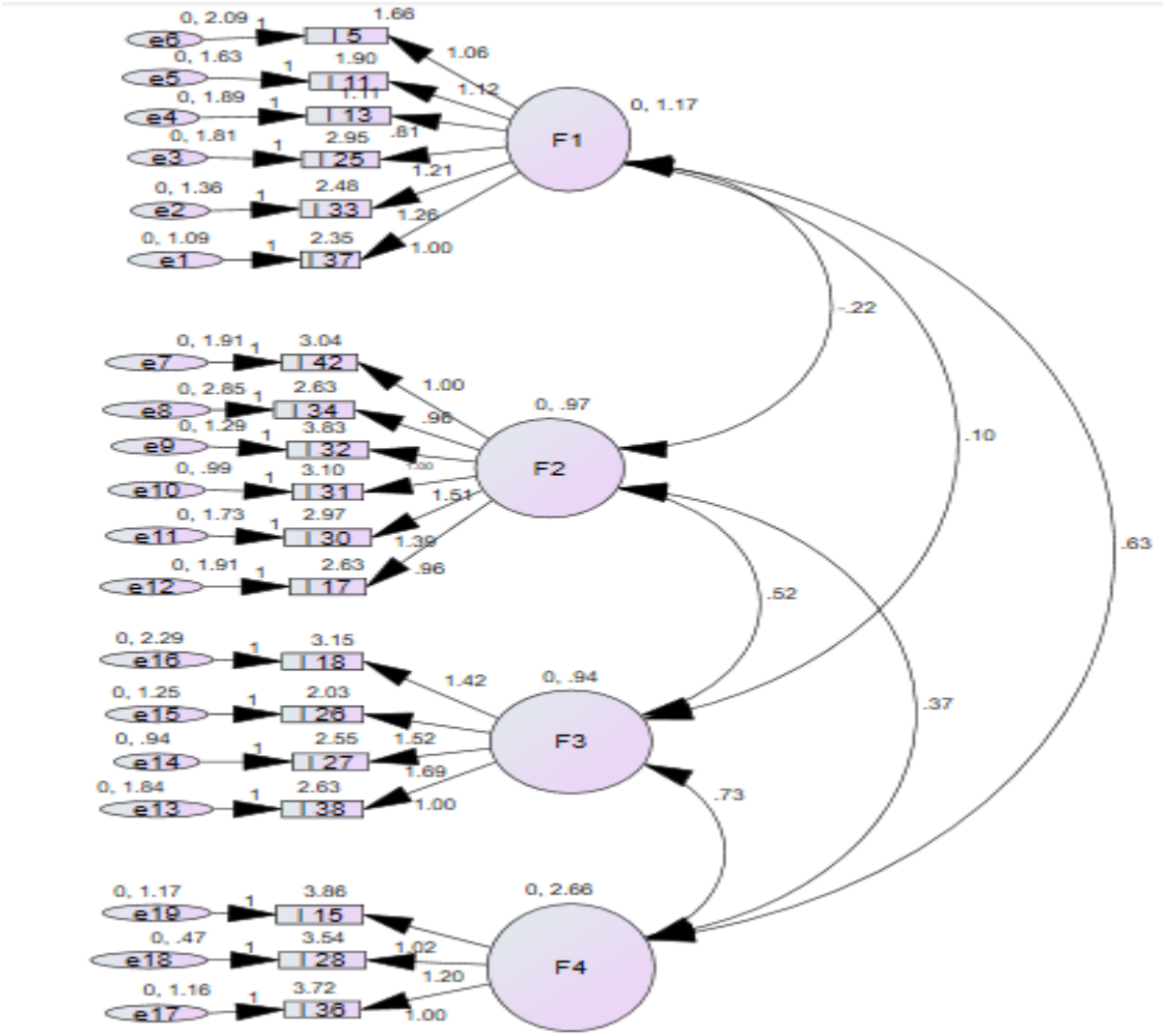

Figure 3. the structural equation model of the Persian version of CSQ in subjects with nonspecific chronic low back pain (n=120), The figure represents four factors and their respective items extracted from the structural equation model of the Persian version of CSQ.

Discussion

The four-factor structure and sufficient reliability of the Persian version of the CSQ enable its usage in Persian-speaking communities. Reliability and agreement: The ICC values in this study ranged from 0.74 to 0.88 for all subscales, indicating good reliability of the respective subscales; that is, the individual ranking in the overall test group for two measurements has remained at an acceptable level. The subscales' Cronbach's alpha coefficients fell between 0.7 to 0.83, which is in line with research by Asghari, Verra, and Stoffel that found comparable reliability ranges for the CSQ subscales (9, 10, 13). Furthermore, in this study, the CSQ subscales maintained reliable scores when administered to 60 participants over a short test-retest interval, mirroring results seen in both the original version and other language adaptations of the questionnaire (5) . Although prior studies included participants with a variety of chronic pain conditions and spinal cord injuries rather than NSCLBP specifically, their reliability findings align closely with those of the present study, underscoring the stability of the CSQ across populations (9, 10, 13). Additionally, the Bland-Altman plot appeared to be no obvious bias because the mean difference was about zero. The two strategies showed good agreement, as evidenced by the comparatively narrow limitation of agreement. The hypothesis of good agreement was further supported by the scatter plot's random structure (40).

The MDCs for the CSQ subscales were as follows: attention = 9.63%, reinterpretation of pain = 7.28%, catastrophizing = 7.66%, ignoring pain = 9.47%, praying-hope = 8.88%, self-statement = 9.08%, and increasing activity levels = 7.43%. The MDC values indicate the minimum change needed in subscale scores to be considered clinically meaningful. With these figures, therapists and researchers can now interpret subscale scores in terms of their underlying clinical importance and further establish evidence for the validity of any change that has occurred (41).

To figure out the degree of relationship between each item, item total correlation was also assessed. Item discrimination and each item's connection with the overall scale were assessed using corrected item–total score correlation (42). The Spearman correlation between each item and its matching subscale varied from 0.358 to 0.707, according to the results shown in Table 3. According to this finding, each item's association with its subscale was consistently higher than its connection with other subscales. Furthermore, all items exhibited a statistically significant correlation with their respective subscales, with a P-value of less than 0.001.

The Persian version of the CSQ has a strong structure, as seen by the high correlation found between its items and the associated subscales. This close alignment between items and subscales reinforces the validity of the Persian CSQ as a reliable measurement tool (41).

Factor analysis: Thirteen factors were identified via Exploratory Factor Analysis, with eigenvalues greater than 1, which explained 74.94% of the total variance. Due to the high number of factors, a parallel analysis was performed which revealed the results for four factors. The first factor consisted of the catastrophizing subscale items of the original version; hence, the name "catastrophizing" was chosen. The second factor included six items initially belonging to the ignoring pain, self-statement, and activity increase subscales, but as all items primarily addressed ignoring pain, this factor was named "ignoring". The third factor consisted from three items of the original version of the diverting attention subscale and a praying/hope subscale item, all of which referred to diverting the individual's attention, so this subscale was called "the diverting attention". The fourth factor The fourth factor included three items from the praying/hope subscale, focusing specifically on prayer, and was named "praying". The four-factor model's goodness-of-fit results were similar to those found by Harland et al (2003) in a similar study of people with chronic low back pain. This may mean that the type of disease affects the coping strategies that people use (15).

In a study by Tutle et al. (1991), 4 factors (Catastrophizing, Praying and Hoping, Reinterpreting Pain Sensations, and Diverting attention) were identified in people with chronic pain, 43% of whom had low back pain and accidental pain (17). The results of EFA in another study on people with chronic neck pain caused by accidents showed five factors: distraction, ignoring pain sensations, reinterpreting pain sensations, catastrophizing, and praying and hoping (43).

In an EFA of people with fibromyalgia, Stoffel et al. (2013) identified six factors (Catastrophizing, Ignoring Pain, Diversion, Reinterpreting Pain Sensations, Praying, and Hoping) (13), and Harland et al. (2014) in a study that used the 24-item version in people with low back pain also identified four factors: catastrophizing, ignoring pain sensations, diverting attention, and reinterpreting pain sensations (14). According to the studies mentioned above, the four factors confirmed in this study were almost similar to those of previous studies. However, as mentioned above, the variety of items in each factor in these studies is different, which can be explained by the different populations, culture, and type of disease of the participants. The consequence of culture influencing coping strategies is that a given coping approach may be both predominant and adaptive in one culture, while just the opposite may be the case for another. Differences in cultural approaches to pain, rooted in historical and socio-economic contexts, probably underlie these differences in the factor structures found in the present studies (44).

The results of confirmatory factor analysis have shown that the 42-item version did not have an excellent fit, and the shortened versions of 24 and 27 items had a better fit (13).

Identifying coping strategies for chronic nonspecific back pain is important in both treatment and research. For example, van der Hulst et al (2010) showed

adaptive and maladaptive coping strategies were associated with decreasing and increasing back muscle activity ,respectively (45) in other hand, Physical therapists can better understand the coping strategies used by people with NSCLBP and adjust their interventions by using the CSQ scale in rehabilitation. For patients with NSCLBP, this may result in better functional outcomes and more efficient pain management (46). Results obtained on the CSQ scale may yield useful information about the pain experience of the individual and aid in planning specific treatment packages. For example, a patient who scores high on catastrophizing might undergo rehabilitation programs with more emphasis on physical therapy and interventions of a cognitive-behavioral nature that deal with the negative thoughts and feelings associated with pain (47).

This study has different demographics compared to another research. While most participants in previous studies were middle-aged males, our sample had a higher percentage of females of lower average age. Both studies did reveal similar internal consistency and reliability. However, there was variation in the number of factors extracted; thus, it might be indicative that age and gender could modify the choice of coping strategies among back pain patients (4, 47). Further investigation on the possible relationship is required.

Limitation: Lack of confirmatory factor analysis in another similar population and minimum sample size, lack of predictive validity, and conducting a longitudinal study to examine changes in coping strategies over time are among the limitations of the present study.

Conclusion

The outcomes of the current study demonstrate that the Persian version of the CSQ is an acceptable tool for assessing coping strategies of Iranians with chronic low back pain and it can be used in rehabilitation clinics to identify cognitive and behavioral strategies of patients. This questionnaire has good reliability and internal consistency. To enhance the model's validity, future research should conduct a secondary confirmatory factor analysis on a new dataset. Additionally, investigating the construct validity and responsiveness of the questionnaire would be valuable. This comprehensive analysis would further strengthen the findings. The study's findings should be regarded cautiously because selection bias may have had an impact (48).

Author contribution

SK-GA performed Conceptualization, Methodology, Writing - Original Draft and Investigation. **BA** and **MS** performed Supervision and Writing - Review & Editing. **ST** performed Software. **AS** performed Formal analysis. **MS** and **MS** performed data collection.

Acknowledgments

The authors thank all the participants in this study.

Conflict of interest

There is no Conflicts of interest/competing interests.

Funding

There is no funding.

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