Journal of Advanced Biomedical Sciences

https://jabs.fums.ac.ir/
Online ISSN: 2783-1523

Journal of Advanced Biomedical Sciences

Fasa University of Medical Sciences

Psychometric Properties of the Persian Version of the Comfort Measuring Scale in Iranian Elderly Individuals with Chronic Conditions: A Multicenter Cross-Sectional Study

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Article Info

Article Type:
Original Article

Article history:
Received
09 Feb 2026
Received in revised form
19 Apr 2026
Accepted
25 Apr 2026
Published online
24 Jul 2026

Publisher
Fasa University of Medical Sciences

Abstract

Background & Objectives: Population aging is frequently accompanied by chronic disease trajectories and cumulative functional and psychosocial losses, all of which can undermine older adults' overall sense of comfort. In this population, comfort is a fundamental human need that healthcare providers are ethically and professionally obliged to promote through intentional care strategies.

Materials & Methods: This multicenter cross-sectional study aimed to translate the Comfort Measuring Scale into Persian and examine its psychometric properties for use among Iranian older adults with chronic conditions. The instrument's measurement characteristics, including validity and reliability, were evaluated in accordance with COSMIN standards.

Results: Item-level CVI scores ranged from 0.87 to 1.00, and the scale-level CVI was 0.96. Exploratory factor analysis identified a five-factor structure comprising Self-realization and Belonging, Normality of Life, Spirituality and Meaning of Life, Control, and Safety. Factor loadings ranged from 0.64 to 0.92, exceeded the conventional threshold for factor retention, and accounted for 67.78% of the total variance, thereby meeting the predefined adequacy criteria. Subsequent confirmatory factor analysis supported the proposed factor structure and demonstrated excellent goodness-of-fit indices (χ^2/df = 1/109, RFI = 0.641, GFI = 0.951, RMSEA = 0.021, CFI = 0.951, NFI = 0.665, TLI = 0.948, PCFI = 0.888, and PNFI = 0.620). The scale also showed strong internal consistency, with a Cronbach's alpha of 0.90 for the full instrument.

Conclusion: The Persian version of the Comfort Measuring Scale demonstrated robust psychometric properties, supporting its use for assessing comfort among older adults with chronic conditions.

Keywords: Validation study, Iran, Chronic illness, Quality of life, Instrument development.

Cite this article: Bijani M, Marques R, Khiyali Z, Pourshahri E, Taghinezhad A, Shakeri Sh, et al. Psychometric Properties of the Persian Version of the Comfort Measuring Scale in Iranian Elderly Individuals with Chronic Conditions: A Multicenter Cross-Sectional Study. J Adv Biomed Sci. 2026; 16(3): 265-274.
DOI: 10.18502/jabs.v16i3.21622

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Introduction

The rapid growth of the global older population has emerged as a major social and public health concern worldwide (1). According to the World Health Organization, the proportion of adults aged 65 years and older is projected to increase from 9% in 2019 to 16% by 2050 (2). Iran reflects this demographic shift: the proportion of individuals aged 65 years and older rose from 2.4% in 1989 to 4.6% in 2019, and projections suggest that this figure will exceed 26.1% by 2051, meaning that nearly one-quarter of the country's population will consist of older adults (3,4). As longevity increases and the older population expands, the prevalence of chronic conditions is expected to rise accordingly (3). Chronic illnesses, defined as conditions that persist for more than three months, progress slowly, and require ongoing management, include cardiovascular diseases, cancer, chronic respiratory disorders, and diabetes (5,6). These conditions often cause persistent pain, reduce quality of life, increase dependence on caregivers, and contribute to dissatisfaction and psychological distress in older adults. When chronic pain coexists with mental health problems such as anxiety or depression, the combined effect may intensify functional limitations, initiate a harmful cycle of declining health (7), and ultimately compromise an individual's comfort (8). Consequently, comfort should be prioritized as a core dimension of physical, psychological, and social well-being (9).

Comfort is inherently multidimensional, subjective, and dynamic. It reflects a state of well-being and relief in which physical, psychological, social, and spiritual tensions arising from internal demands or external pressures are diminished or resolved (9). In Comfort Theory, Kolcaba conceptualizes comfort as a strengthened, immediate state achieved when human needs related to relief, ease, and transcendence are met. This experience is assessed across four contextual domains: physical, psycho-spiritual, sociocultural, and environmental. Importantly, comfort extends far beyond the mere absence of pain or other physical discomforts (9,10).

Comfort is not synonymous with the elimination of pain or physical distress alone (9). The physical domain refers to bodily sensations; the psycho-spiritual domain encompasses internal feelings, self-concept, and self-esteem; the sociocultural domain concerns interpersonal relationships and community connections; and the environmental domain pertains to external factors such as lighting, temperature, and color (11). In recent years, comfort has increasingly been recognized as a key indicator of healthcare quality and nursing performance (6). Empirical studies have shown that Comfort Theory can guide both direct patient care and environmental design, thereby supporting tailored strategies to improve patient comfort (12,13). However, delivering comfort-oriented care is inherently complex and context dependent, because outcomes are shaped not only by the interventions implemented but also by individuals' subjective evaluations of comfort and discomfort (6).

Research Gap and Significance of the Study

Understanding the determinants of comfort among older adults with chronic illness is essential for designing effective, evidence-based nursing interventions (14). Reliable assessment of comfort in older patients with chronic disease, followed by the implementation of culturally and clinically appropriate strategies, plays a critical role in optimizing patient outcomes (8). Although several comfort-related scales have been validated for specific populations or settings (6,11), they may not adequately capture the cultural, linguistic, and social particularities of Iranian older adults. Therefore, the development or rigorous validation of a culturally sensitive and comprehensive comfort assessment tool for this vulnerable population is a crucial priority

in geriatric health care, public health, and policymaking. Without such a measure, comfort assessments may be inaccurate, care plans may be suboptimal, and clinical decisions may lack an appropriate empirical foundation. To address this gap, the present study aimed to translate and validate the Persian version of the Comfort Measuring Scale for older adults with chronic conditions, thereby strengthening culturally informed assessment, reinforcing evidence-based practice, and ultimately supporting improvements in the quality of life of older adults in Iran.

Materials and Methods

Study Design and Setting

This cross-sectional study examined the measurement properties of the Persian version of the Comfort Measuring Scale for older adults living with chronic illnesses. Data were collected from elderly individuals in the medical wards of hospitals located in five cities in Fars Province, Iran, between July and November 2025. We implemented a staged validation strategy that included assessments of face validity, content validity, reliability, operationalized as internal consistency and test-retest stability, and construct validity, which was examined through both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). All stages of instrument appraisal were conducted in accordance with COSMIN guidelines (15).

Sample Size and Eligibility

Although classical methodological guidance commonly recommends enrolling between five and ten participants per item in factor-analytic studies (16), we used convenience sampling within the participating hospitals and recruited two independent cohorts: one cohort of 250 older adults for EFA and a separate cohort of 250 older adults for CFA. A simple random sampling approach was used to recruit participants.

Inclusion and Exclusion Criteria

Participants were eligible if they were aged 60 years or older, provided informed consent, possessed basic literacy, that is, they were able to read and write, and had been living with a chronic condition for at least three months. We excluded individuals whose clinical condition deteriorated to the extent that continued participation became impracticable, as well as those who withdrew consent at any stage.

Comfort Measuring Scale in Elderly Individuals with Chronic Conditions

The instrument, which was developed and psychometrically validated by Marques et al., contains 38 self-administered items that assess various domains of comfort. It comprises five subscales: Self-realization and Belonging (11 items), Normality of Life (8 items), Spirituality and Meaning of Life (8 items), Control (5 items), and Safety (6 items). Each item is rated on a five-point scale, with 1 and 2 indicating not comfortable at all and slightly comfortable, respectively, and 4 and 5 indicating very comfortable and totally comfortable, respectively (6). Data were collected in Portuguese settings, including elderly individuals in the medical wards of hospitals in the Lisbon area and in residential care facilities or participants' homes (6), between June 2022 and June 2024.

Translation

Translation and cross-cultural adaptation were performed in accordance with World Health Organization procedures and with permission from the scale's authors (17). For the forward translation from English to Persian, two translators worked independently, after which their versions were reconciled into a single preliminary draft. This draft was then back-translated into English by two other bilingual translators, who were different from the original translators, to verify conceptual equivalence and identify possible inconsistencies. The Persian version was finalized through an

iterative reconciliation process conducted by the research team and, where necessary, in consultation with the original developers. A pretest was conducted as a pilot study to assess item clarity, comprehensibility, and the time required for completion in the present study. In the pilot phase, at least 30 participants were recruited (18).

The pre-final instrument was further pretested with a convenience sample of 50 older adults living with chronic conditions to identify unclear or incomprehensible items, as well as content that was not culturally appropriate for the study population. Suggestions for revision were subsequently incorporated on the basis of the feedback received. The participants selected for the pilot test were not included in the final main study sample.

Psychometric Evaluation of the Persian Version Comfort Measuring Scale in Elderly Individuals with Chronic Conditions

The finalized Persian instrument underwent a comprehensive psychometric evaluation in accordance with COSMIN standards. The evaluation included face and content validity assessments, estimation of internal consistency using Cronbach's alpha, appraisal of temporal stability through test-retest analysis, and examination of construct validity using both EFA and CFA.

Face Validity

Qualitative Assessment

To assess item clarity, contextual relevance, and practical applicability, we conducted in-person semi-structured interviews with a purposive sample of 15 older adults living with chronic illnesses. Through directed questioning and iterative discussion, participants evaluated the comprehensibility of each item, reflected on its clinical relevance, and commented on the feasibility of using the scale in routine geriatric practice.

Quantitative Assessment

A separate expert panel of 15 assessors, comprising five gerontologists and ten measurement specialists, independently rated the importance of each item on a five-point Likert scale (1 = entirely unimportant; 5 = critically important). Items with an impact score greater than 1.5 were retained, thereby ensuring that only elements judged essential by subject-matter experts remained in the instrument (19).

Content Validity

Qualitative Evaluation

Fifteen content experts, including six specialists in instrument development, four gerontology experts, and five practicing nurses from elderly care clinics, systematically examined each item for grammatical accuracy, syntactic clarity, readability, and cultural congruence. The committee's consolidated feedback informed targeted revisions to item wording and presentation (19).

Quantitative Evaluation

Content validity was quantified in two sequential stages. First, item-level content validity ratios (CVR) were calculated according to Lawshe's method, in which experts classified items as unnecessary (1), useful but not essential (2), or essential (3). Second, the revised Persian Comfort Measuring Scale was administered to an independent sample of 15 participants, who rated each item for relevance, clarity, and simplicity on a four-point scale (1 = not relevant; 4 = highly relevant). These responses were used to calculate item-level and scale-level content validity indices (CVI). The predefined acceptance thresholds were CVR > 0.49 and CVI > 0.80 (20).

Normal distribution

Skewness values between −2 and +2 and kurtosis values between −7 and +7 were considered indicative of a normal distribution (21).

Exploratory factor analysis

Although standard recommendations typically advise enrolling between three and ten respondents per questionnaire item for

exploratory factor analysis (16), we planned conservatively to accommodate potential attrition and therefore targeted a minimum of six respondents per item. Construct validity was examined using exploratory factor analysis with Varimax rotation. Factors with eigenvalues greater than 1.00 were retained, and factor loadings of 0.50 or higher were pre-specified as the criterion for a stable solution. Sample adequacy for the EFA sample (n = 250) was evaluated using the Kaiser-Meyer-Olkin statistic and Bartlett's test of sphericity, with acceptable cutoffs defined as KMO > 0.70 and Bartlett's $p < 0.05$. All items met the a priori loading criterion (≥ 0.50), and therefore no deletions were necessary.

Confirmatory Factor Analysis

Confirmatory factor analysis was conducted on an independent validation cohort of 250 older adults with chronic conditions, separate from the exploratory sample. Analyses were performed in AMOS version 21.0, and model adequacy was evaluated using conventional fit indices. The a priori thresholds for acceptable fit were a goodness-of-fit index (GFI) > 0.90, root mean square error of approximation (RMSEA) < 0.08, Tucker-Lewis Index (TLI) > 0.90, and comparative fit index (CFI) > 0.90 (20).

Reliability of the Persian adaptation of the Comfort Measuring Scale for older adults with chronic illness was assessed using two complementary approaches: internal consistency and test-retest reliability. Internal consistency was estimated using Cronbach's alpha, with coefficients of 0.70 or higher considered satisfactory (22).

Data analysis

Descriptive analyses were performed using SPSS version 27 (SPSS Inc., Chicago, IL, USA). Confirmatory factor analysis was conducted using SPSS Amos version 26.

Results

A total of 500 older adults living with chronic illnesses participated in the study. The mean age of the sample was 65.14 years (SD = 3.48). A detailed breakdown of the participants' sociodemographic and clinical characteristics is presented in Table 1.

Table 1. Individual characteristics of the subjects (n=500).

Variable		Frequency	Percentage
Gender	Male	274	54.8
	Female	226	45.2
Education Level	Elementary school	175	35
	<Diploma	218	43.6
	>Diploma	107	21.4
Marital status	Single	58	11.6
	Married	356	71.2
	widowed	86	17.2
History of chronic illness	Respiratory disease	46	8.64
	Cerebrovascular disease	34	6.8
	Cardiovascular disease	90	18
	Kidney disease	46	9.2
	Neurological disease	30	6
	Liver disease	18	.3.6
	Metabolic disease	60	12
	Neoplastic disease	28	5.6
	Osteoarticular disease	54	10.8
	More than one chronic disease	94	18.8

Face Validity

Both the patient informants and the expert panel, which included older adults living with chronic illnesses and measurement-development specialists, concurred that the items were clear, concise, and well aligned with the study objectives. Every item exceeded the predetermined impact-score threshold of 1.5.

Content Validity

Content validity was strongly supported by the CVR and CVI indices. Based on evaluations by 15 experts and applying Lawshe's criteria, each item exceeded the CVR cutoff of 0.33, with values ranging from 0.66 to 1.00; consequently, no items were discarded. Item-level CVI scores ranged from 0.87 to 1.00, and the scale-level

Table 2. Varimax factor loadings of the items of the instrument.

Item	Factor loading
1. "I feel safe"	0.70
2. "I feel informed"	0.86
3. "I feel that I can obtain what I need"	0.68
4. "I feel cared for by competent people"	0.69
5."I feel trust toward other people"	0.75
6. "I feel that my situation is under control"	0.80
7."I feel able to decide on the current situation"	0.79
8."I feel in control of my situation"	0.68
9."I feel in control of my life"	0.92
10."I feel able to make decisions"	0.86
11."I feel able to manage my priorities"	0.69
12."I feel good the way I am"	0.77
13."I feel good in my personal relationships"	0.83
14."I feel able to maintain/restore my personal relationships"	0.91
15."I feel free to discuss my experiences"	0.72
16."I feel free to discuss my feelings"	0.65
17."I feel that those around me are affectionate toward me"	0.92
18."I feel that other people care about me"	0.88
19."I feel respected"	0.79
20."I feel treated with dignity"	0.68
21."I feel understood"	0.90
22."I feel gratitude"	0.66
23."I feel that, when I need it, I have people who help me"	0.77
24.I feel able to help others"	0.81
25."I feel at peace"	0.86
26."I feel calm"	0.79
27."I feel united with a higher power"	0.73
28."I feel that life has been worth living"	0.92
29."I feel that life is worth living"	0.64
30."I feel able to think about my life and my death"	0.66
31."I feel able to talk about my life and my death"	0.84
32."I feel well, physically"	0.91
33."I feel able to take care of myself"	0.87
34."I feel able to carry out my routines"	0.65
35."I feel that my needs are met"	0.68
36."I feel independent"	0.80
37."I feel that I perform my usual roles (personal, family, social)"	0.79
38. "I feel useful"	0.76

Table 3. CFA fit index results of the Persian Version of the Comfort Measuring Scale.

Fit Index	χ2/df	TLI	GFI	CFI	RMSEA
Acceptable Fit Criteria	≤ 3	>90	0.90 ≤ GFI ≤ 0.95	0.90 ≤ CFI ≤ 0.95	0.05 ≤ RMSEA ≤ 0.08
Model	1.109	0.948	0.957	0.951	0.021

Table 4. Cronbach's alpha of subscales and the entire the Persian version of the Comfort Measuring Scale in Elderly Individuals with Chronic Conditions.

Factors	Subscale	Items	Cronbach's alpha
1	Self-realization and belonging	11	0.95
2	Normality of life	8	0.91
3	Spirituality and meaning of life	8	0.88
4	Control	5	0.89
5	Safety	6	0.92
Entire Questionnaire		38	0.90

CVI was 0.96, thereby satisfying the predefined adequacy criteria.

Construct Validity

Exploratory factor analysis demonstrated very good sampling adequacy, with a KMO statistic of 0.89. Bartlett's test of sphericity was highly significant ($p < 0.001$), indicating that the correlation matrix was suitable for factor extraction. None of the 38 items was removed for having loadings below 0.50; the highest loading was 0.92 and the lowest was 0.64. Accordingly, no items were deleted. The items yielded the following factors: (1) Self-realization and Belonging (11 items, 27.88% of the total variance); (2) Normality of Life (8 items, 11.24% of the total variance); (3) Spirituality and Meaning of Life (8 items, 10.31% of the total variance); (4) Control (5 items, 12.41% of the total variance); and (5) Safety (6 items, 11.24% of the total variance). Collectively, these five factors explained 67.78% of the total variance in the Persian Comfort Measuring Scale for older adults with chronic conditions. The factor loadings for the items are reported in Table 2.

A second confirmatory factor analysis confirmed the five-factor structure comprising Self-realization and Belonging, Normality of Life, Spirituality and Meaning of Life, Control, and Safety, and supported its theoretical stability and coherence. The model fit indices ($\chi^2/df = 1.109$, RFI = 0.641, GFI = 0.951, RMSEA = 0.021, CFI = 0.951, NFI = 0.665, TLI = 0.948, PCFI = 0.888, and PNFI = 0.620) further confirmed the strength of the model, indicating a highly satisfactory fit between the hypothesized five factors and the observed data (Table 3).

Reliability

The Persian adaptation of the Comfort Measuring Scale demonstrated a high degree of internal consistency, as reflected by a Cronbach's alpha of 0.90 (Table 4).

Cut-off point of the questionnaire

Based on the consensus of the research team, the questionnaire cut-off points were determined as follows: the minimum score is 38 and the maximum is 190. A score of 38 to 113 indicates low comfort, a score of 114 to 152 indicates moderate comfort, and a score of 153 to 190 indicates optimal comfort.

Discussion

The primary aim of this study was to translate the Comfort Measuring Scale into Persian for use among older adults living with chronic health conditions and to rigorously examine its psychometric properties within the sociocultural context of southern Iran.

Exploratory factor analysis yielded a five-

factor structure with loadings ranging from 0.64 to 0.92, exceeding the conventional threshold for factor retention and explaining 67.78% of the total variance. These findings are consistent with those reported by Marques et al. (6), who also identified a five-factor structure accounting for 61.35% of the variance, with factor loadings ranging from 0.57 to 0.88.

Confirmatory factor analysis conducted on an independent validation subsample supported the consistency and internal coherence of the five-factor model. Collectively, the fit indices indicated that the model was adequate (χ^2/df = 1.109, RFI = 0.641, GFI = 0.951, RMSEA = 0.021, CFI = 0.951, NFI = 0.665, TLI = 0.948, PCFI = 0.888, and PNFI = 0.620), suggesting that the proposed structure explained the observed data well. When these fit statistics are compared with those reported by Marques et al., which were less favorable (RMSEA = 0.086, CFI = 0.811, TLI = 0.798, and SRMR = 0.066) (6), it appears that the factorial structure is broadly stable across studies, although the Persian version demonstrated stronger empirical alignment in the present sample. This difference may be attributable to cultural factors and sampling procedures.

Reliability analyses also confirmed the psychometric strength of the instrument. The alpha coefficients for the individual domains ranged from 0.88 to 0.95, with an overall alpha of 0.90 (22). These coefficients were broadly consistent with those reported by Marques et al. (6), whose internal consistency values ranged from 0.82 to 0.93 and whose ICC was similarly 0.95, indicating internal homogeneity and temporal stability across contexts. In the present study, the participants' comfort scores were highest in the *Self-realization and Belonging* dimension and lowest in the *Control* dimension. In contrast, compared with the findings of Marques et al., a higher level of comfort was observed in the *Spirituality and Meaning of Life* dimension, whereas a lower level was reported in the *Normality of Life* dimension. This discrepancy may also reflect cultural conditions and differences in sampling.

Limitation

Several methodological limitations should be considered. First, the use of convenience sampling may have introduced selection bias, despite efforts to recruit participants across different times and days and to maximize sample diversity. Second, the exclusive reliance on self-report measures may have increased susceptibility to response biases, including socially desirable responding and acquiescence, which may have influenced participants' ratings.

Conclusion

Ageing is often accompanied by discomfort when it occurs in the context of chronic illness. By identifying the factors that contribute to comfort, healthcare professionals, particularly nurses, can implement more effective care strategies. For older adults living with chronic diseases, this may lead to improvements in the quality of care delivered. Overall, the psychometric findings indicate that the Persian version of the Comfort Measuring Scale has excellent construct validity, high internal consistency, and excellent test-retest reliability. Accordingly, the instrument may be regarded as a valid and reliable tool for assessing comfort in older adults with chronic illnesses and may support individualized care planning, strengthen clinical decision-making, and contribute to evidence-based healthcare practices and policies aimed at improving the quality of life of older adults living with chronic health conditions.

Acknowledgements

The authors gratefully acknowledge Fasa University of Medical Sciences for providing financial assistance. They also thank the

Clinical Research Development Unit of Fasa Valiasr Hospital for its logistical support in facilitating the conduct of this research.

Conflict of Interest

The authors declare that they have no competing interests.

Ethical Considerations

Before enrollment, all participants signed an informed consent form. This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. The anonymity and confidentiality of participants and their data were maintained throughout the study. All procedures were carried out in accordance with relevant regulations and ethical guidelines, ensuring that the study was conducted in an ethical and responsible manner.

Code of Ethics

The Institutional Research Ethics Committee of Fasa University of Medical Sciences (IR.FUMS.REC.1404.103) approved the study protocol.

Data Availability

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Funding

This study did not receive dedicated financial support from public agencies, commercial entities, or non-profit organizations.

Authors' Contributions

MB, RM, ZK, AT and NA conceptualized and organized the study. SK and EP were responsible for data collection and execution. MB and EP designed and/or executed the statistical analyses. All authors contributed to the manuscript's preparation and critical review, and they have all approved the final version.

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