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Research Paper

Validation of the Caregiver Burden Inventory for Persian-speaking Caregivers of Stroke Patients

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ABSTRACT

Background and Aim: Stroke is a leading global health concern, ranking second in mortality and third in causing long-term disability. The caregiver burden (CB) associated with stroke patients is significant. The CB inventory (CBI) is a widely used tool to assess CB; however, its psychometric properties in Persian for stroke caregivers remain unexplored. This methodological study aimed to translate and validate the CBI for use among caregivers of stroke patients in Iran.

Materials and Methods: The CBI was translated into Farsi using a forward-backward procedure. A sample of 112 caregivers of stroke patients completed the translated CBI. Exploratory factor analysis (EFA) and known-group comparison were used to assess construct validity. Cronbach's α coefficient was calculated to assess the instrument's reliability.

Results: The Mean±SD age of caregivers was 47.06±9.07 years, with a majority being female (79.5%). EFA yielded four factors explaining 68.6% of the variance: 1) Developmental and physical health, 2) Time dependency, 3) Emotional health, and 4) Social relationships. Cronbach's α for the total CBI was 0.94, with subscale alphas ranging from 0.80 to 0.93.

Conclusion: This study provides evidence for the reliability and validity of the Persian version of the CBI for measuring CB among Iranian caregivers of stroke patients. These findings can inform the development of targeted interventions to improve caregiver well-being and patient outcomes.

Keywords:
Translation, Validity, Reliability, Caregiver burden inventory (CBI), Stroke patients

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Introduction

Stroke is a major public health concern globally, ranking second in mortality and third in causing long-term disability. This burden continues to rise, with a significant proportion of stroke survivors experiencing long-term impairments [1]. Studies report that around 80% of stroke patients who survive the initial phase (approximately 62% at one year) require assistance due to physical or cognitive limitations [2, 3]. Caregiving, often provided by family members or close contacts, refers to the task-oriented support offered to these individuals [4].

The caregiver's responsibilities, coupled with the absence of support, inadequate preparation for caregiving, the patient's level of dependency, chronic disabling conditions, complex care activities, deteriorating health status, and uncertain future, can result in caregiver burden (CB). This burden often leads to social isolation, a decrease or loss of leisure activities, hindrance of professional activities, unemployment, and lack of time for self-care [5-10]. Screening for CB is essential for developing effective psychoeducational and psychotherapeutic interventions, enhancing formal support networks, and increasing the caregiver's ability to cope with their situation. By doing so, caregivers can avoid or reduce tension and improve the quality of life for everyone involved [11, 12].

The CB inventory (CBI) defines burden according to five categories: time dependency, emotional health, physical health, development, and social relationships [13]. This multidimensional approach enables clinicians to more effectively tailor support strategies to meet the unique needs of caregivers. The CBI, a commonly used tool across various caregiver populations, has demonstrated its effectiveness in comprehensively evaluating the impact of burden [14-20]. The present study aimed to assess the applicability and reliability of the Persian version of the CBI in caregivers of stroke patients. This is the first investigation to examine the adoption and validation of this questionnaire following its translation into Persian.

The study is methodological, and aimed at translating and evaluating the validation of the CBI among caregivers of stroke patients.

Methods

Translation procedure

This study employed a rigorous translation process using the recommended forward-backward method. Following permission from the questionnaire developer, two university translators fluent in both English and Persian independently produced two separate translations of the instrument. To ensure accuracy, the research team then compared and selected the most appropriate phrasing for each question, resulting in the first draft of the Persian version. Subsequently, two English language experts back-translated this draft into English. Finally, the original English version and the back-translated English version were meticulously compared by the research team to identify any discrepancies. Necessary corrections and edits were then implemented by a Persian language and literature expert to finalize the Persian translation.

Validity

To assess the face validity of the questionnaire aimed at evaluating patients' comprehension of expressions, ten caregivers who met the study's criteria were asked for their opinion on the questionnaire's completion. The research team considered their feedback along with the patients' feedback and made necessary changes to the questionnaire. To ensure qualitative content validity, ten experts in the field were asked to review the questionnaire and provide feedback based on criteria, such as grammar, appropriate word usage, and correct placement of phrases.

Participants and study setting

This study targeted family caregivers of stroke patients undergoing rehabilitation services. Inclusion criteria were: 1) Being a family member of a patient with a specialist-diagnosed stroke, at least one-month post-hospital discharge; 2) Being over 18 years old and the primary caregiver for the patient; and 3) Obtaining informed consent from both caregivers and patients. Exclusion criteria comprised incomplete questionnaires, lack of consent, and transfer of caregiving responsibilities to a formal caregiver. Following approval from the Research Ethics Committee of Qom University of Medical Sciences and collaboration with rehabilitation centers, 112 eligible caregivers meeting these criteria were recruited. The participants were briefed on the purpose and implementation of the study.

Instrument

The CBI was completed by the subjects'. The CBI, consisting of 24 items, was developed in 1989 to assess both objective and subjective caregiving burden [13]. Objective burden refers to the duration of care, caregiving responsibilities, and potential financial constraints. Subjective burden pertains to the physical, mental, social, and emotional strain experienced by caregivers while caring for their loved ones. Long-term effects of caregiving may include limitations on social life, uncertainty about caregiving needs, constant worries, a sense of heavy responsibility, and increased prevalence of depression among caregivers. The CBI comprises five subscales: time dependency, developmental care, physical care, social care, and emotional care burden. Respondents rated each item on a four-point Likert scale (0-3).

In addition, demographic and medical information, including age, gender, marital status, education level, relationship to the patient, living status (place and type of residence), caregiver's occupation, and patient's clinical status was also obtained.

Data analysis

Exploratory factor analysis (EFA) was employed to investigate the CBI's factor structure. The Kaiser-Meyer-Olkin (KMO) test assessed sampling adequacy, with values exceeding 0.90 considered excellent and above 0.80 deemed good. Following the calculation of the inter-item correlation matrix, factors were extracted and subjected to varimax rotation for enhanced interpretability. Items with loadings <0.4 were retained for further analysis. The scree plot and eigenvalue methods were used to determine the optimal number of factors. Internal consistency, a measure of reliability, was evaluated using Cronbach's α coefficient for the total scale and each subscale. Statistical analyses were performed using SPSS software, version 16, with a significance level set at α=0.05.

Results

Samples' characteristics

Caregivers in the study ranged in age from 17 to 66 years, with a Mean±SD age of 44±12.06 years. The age of patients included ranged from 31 to 86 years, with a Mean±SD age of 60.41±11.44 years. The duration of disease among patients ranged from 0.01 to 27 years, with a Mean±SD of 2.8673±4.353085 years. Among the patients, the number of children ranged from none to ten, with 93.3% of patients having at least one child. Table 1 presents the demographic and medical characteristics of the study sample.

The KMO index for this factor analysis model was 0.853, and Bartlett's sphericity test was significant at the level of 0.0001 with a value of 1616.18. This suggests that implementing factor analysis based on the resulting correlation matrix in the studied sample was appropriate. The analysis identified two factors with an eigenvalue greater than one, explaining 68.6% of the variance. Table 2 presents the estimated factor loadings of the factor model. The factor loadings for all questions ranged from 0.50 to 0.92, indicating the appropriateness of the questionnaire's structure. All question loadings were significant. Figure 1 suggests that four factors were sufficient to explain the factor structure of the CBI.

The first factor was related to development and physical health items (6-14), the second factor was time dependency (1-5), the third factor was emotional health (15-19), and the fourth factor was social relationships (19-24). Further information about the factor structure is reported in Table 1.

Reliability

In consideration of the known group comparison (Table 2), it was observed that the caregivers of patients who were fully dependent experienced a greater burden of care in comparison to those who were caring for patients with relative dependence.

The internal consistency of the CBI was evaluated using Cronbach's α coefficient, which is presented in Table 3. The coefficient for the whole questionnaire was 0.94, while the subscale coefficients ranged from 0.80 to 0.93.

Discussion

This study aimed to translate and validate the Persian version of the CBI for caregivers of stroke patients. The results support the instrument's reliability and construct validity, demonstrating its suitability for measuring CB in this population. These findings align with previous research on the CBI's psychometric properties [14, 15, 21-23]. This involved assessing the validity and reliability of the CBI, which is a crucial step in determining its usefulness for investigating CB and strain in both clinical and research contexts. A standardized scoring method for CB can also facilitate comparisons across different caregiver populations.

Table 1. Principal component analysis of the CBI

Items		Factor 1	Factor 2	Factor 3	Factor 4
Development and physical health	SQ13	0.824			
	SQ12	0.821			
	SQ14	0.802			
	SQ11	0.74			
	SQ8	0.737			
	SQ9	0.701			
	SQ7	0.668			
	SQ6	0.667			
	SQ15	0.586			
Time dependency items	SQ3		0.924		
	SQ4		0.887		
	SQ2		0.855		
	SQ1		0.839		
	SQ5		0.736		
Emotional health items	SQ10			0.591	
	SQ17			0.791	
	SQ18			0.747	
	SQ16			0.717	
	SQ19			0.633	
Social relationships Items	SQ21				0.695
	SQ23				0.673
	SQ22				0.646
	SQ20				0.578
	SQ24				0.548

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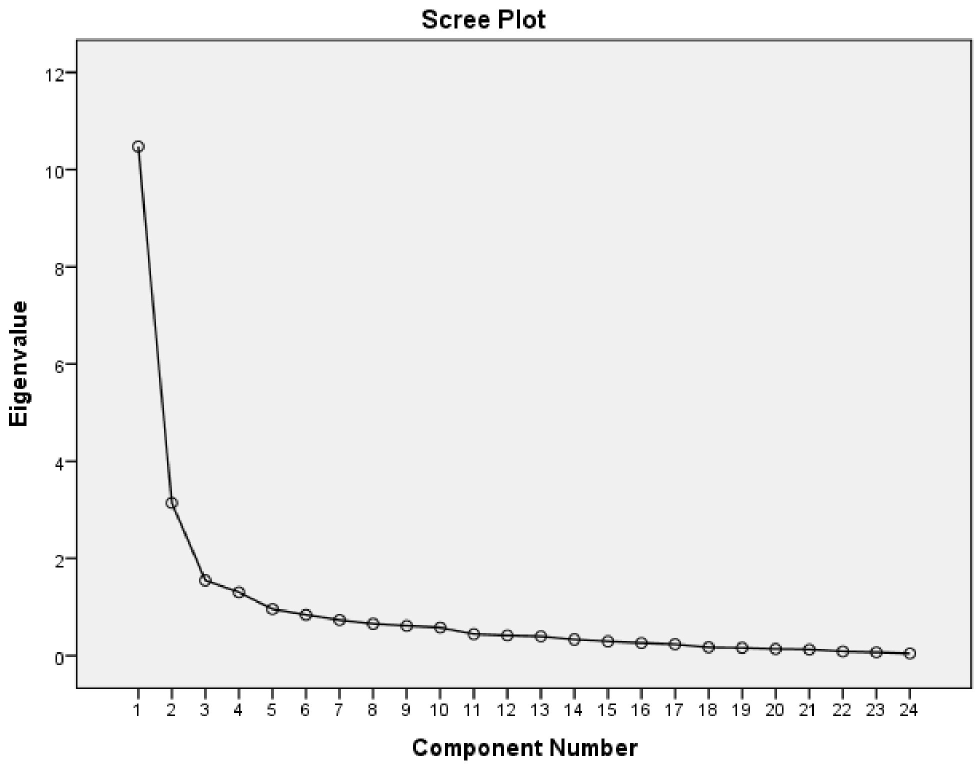

Figure 1. Scree plot illustrating the factor loading of the CBI

According to factor analysis, the Persian adaptation of the CBI exhibited a four-factor structure. The four identified factors were development and physical health, emotional health, time dependency, and social relationships. However, it is worth noting that this factor structure differed from the original version of the questionnaire. It is important to acknowledge that using the Persian CBI in various cultural contexts may result in differences in the factor structure. Notably, the original subscales of 'physical health' and 'development' were merged into a single subscale named 'development and physical health' in the Persian CBI version. In comparison, Greco et al. [17] identified a five-factor structure in the Italian version for caregivers of heart failure patients, including time dependency, developmental, physical, social, and emotional burden. Similarly, Shafiezadeh et al. [24] reported a three-factor structure (time dependency, emotional/psychological, and physical burden) in the CBI for caregivers of Alzheimer's patients. These findings indicate that the factor structure of the CBI may be influenced by the specific caregiving context and patient population.

Table 2. Known-group comparison of the CBI

Factor	Mean±SD		P
	Fully Dependent Patient (n=43)	Relative Dependent Patient (n=69)	
Development and physical Health	21.05±4.46	15.7581±4.32	0.001
Time dependency	28.11±9.93	23.01±7.83	0.006
Emotional health	12.3±4.87	10.32±3.59	0.024
Social relationships	15.52±4.38	12.33±4.4	0.001
Total scale	77.41±19.24	60.22±15.02	0.001

Table 3. Reliability of the CBI

Factor	Item Number	Possible Score Range	Mean±SD	Cronbach's α
Development and physical health	9	9-36	24.70±8.96	0.938
Time dependency	5	5-25	17.89±5.05	0.936
Emotional health	5	5-25	10.98±4.19	0.825
Social relationships	5	5-25	13.42±4.61	0.800
Total scale	24	24-120	66.42±18.63	0.941

The construct validity of the Persian CBI was assessed using a known-groups comparison method in this study. The results showed that caregivers of fully dependent patients scored significantly higher on the Persian CBI dimensions compared to caregivers of patients with relative dependence that was consistent with previous study [25].

The internal consistency of the Persian version of the CBI was found to be high, with a Cronbach's α coefficient of 0.94 for the whole questionnaire. This indicates that the Persian version of the CBI is a reliable tool for measuring CB in stroke patients that was consistent with previous studies [14, 15, 21-23]. The findings of this study have significant implications for healthcare professionals who treat stroke patients and their caregivers. The Persian version of the CBI can be employed to identify caregivers who are experiencing elevated levels of burden, which can assist healthcare professionals in providing suitable support and interventions to enhance caregiving outcomes. Furthermore, the Persian version of the CBI can be utilized in future research to examine the contributing factors to CB in stroke patients and to assess the efficacy of interventions aimed at reducing CB.

This study provides initial evidence for the reliability and validity of the Persian CBI for measuring CB in stroke patients. However, a relatively small sample size limits the generalizability of the findings. Future research with larger and more diverse samples is warranted to confirm these results.

Conclusion

CBI is a suitable instrument for assessing CB in stroke patients. The CBI has several features that make it a practical tool, including its simple scoring system, adequate reliability and validity, short completion time, and the ability to examine different dimensions of care burden. These features make the CBI an attractive option for healthcare professionals who work with stroke patients and their caregivers. The CBI can assist in identifying caregivers who require additional support and interventions to improve caregiving outcomes. Overall, the validation of the Persian version of the CBI is an important contribution to the field of caregiving research and highlights the importance of developing culturally sensitive measures of CB.

Ethical Considerations

Compliance with ethical guidelines

This study is part of a research project approved by the Ethics Committee of Qom University of Medical Sciences, Qom, Iran (Code: IR.MUQ.REC.1400.048).

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Authors' contributions

Study design: Zahra Taheri-Kharameh and Seyed Mojtaba Alavi; Data collection: Hanieh Ghasemi, Zeinab Moghaddam, Aida Ebipoor, Zahra Nematnejad and Mohammadamin Shabani; Data analysis: Zahra Taheri-Kharameh; Writing the manuscript: Zahra Taheri-Kharameh, Seyed Mojtaba Alavi and Masoud Hassanvand Amouzadeh; Review, editing and final approval: All authors.

Conflict of interest

The authors declared no conflict of interest.

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References

[1] Feigin VL, Brainin M, Norrving B, Martins S, Sacco RL, Hacke W, et al. World Stroke Organization (WSO): Global stroke fact sheet 2022. Int J Stroke. 2022; 17(1):18-29. [DOI:10.1177/17474930211065917] [PMID]

[2] Anderson CS, Linto J, Stewart-Wynne EG. A population-based assessment of the impact and burden of caregiving for long-term stroke survivors. Stroke. 1995; 26(5):843-9. [DOI:10.1161/01.STR.26.5.843] [PMID]

[3] Han B, Haley WE. Family caregiving for patients with stroke: Review and analysis. Stroke. 1999; 30(7):1478-85. [DOI:10.1161/01.STR.30.7.1478] [PMID]

[4] Dewey HM, Thrift AG, Mihalopoulos C, Carter R, Macdonell RA, McNeil JJ, et al. Informal care for stroke survivors: Results from the North East Melbourne Stroke Incidence Study (NEMESIS). Stroke. 2002; 33(4):1028-33. [DOI:10.1161/01.STR.0000013067.24300.B0] [PMID]

[5] Dunbar SB, Khavjou OA, Bakas T, Hunt G, Kirch RA, Leib AR, et al. Projected costs of informal caregiving for cardiovascular disease: 2015 to 2035: A policy statement from the American Heart Association. Circulation. 2018; 137(19):e558-e77. [DOI:10.1161/CIR.0000000000000570] [PMID]

[6] McLennon SM, Bakas T, Jessup NM, Habermann B, Weaver MT. Task difficulty and life changes among stroke family caregivers: Relationship to depressive symptoms. Arch Phys Med Rehabil. 2014; 95(12):2484-90. [DOI:10.1016/j.apmr.2014.04.028] [PMID]

[7] Pucciarelli G, Vellone E, Savini S, Simeone S, Ausili D, Alvaro R, et al. Roles of changing physical function and caregiver burden on quality of life in stroke: A longitudinal dyadic analysis. Stroke. 2017; 48(3):733-9. [DOI:10.1161/STROKEAHA.116.014989] [PMID]

[8] Roth DL, Fredman L, Haley WE. Informal caregiving and its impact on health: A reappraisal from population-based studies. Gerontologist. 2015; 55(2):309-19. [DOI:10.1093/geront/gnu177] [PMID]

[9] Young ME, Lutz BJ, Creasy KR, Cox KJ, Martz C. A comprehensive assessment of family caregivers of stroke survivors during inpatient rehabilitation. Disabil Rehabil. 2014; 36(22):1892-902. [DOI:10.3109/09638288.2014.881565] [PMID] [PMCID]

[10] Fernandes Md, Garcia TR. [Determinatives of family caregiver's tension while caring the dependent elderly (Portuguese)]. Rev Bras Enferm. 2009; 62(1):57-63. [DOI:10.1590/S0034-71672009000100009] [PMID]

[11] Caro CC, Mendes PV, Costa JD, Nock LJ, Cruz DM. Independence and cognition post-stroke and its relationship to burden and quality of life of family caregivers. Top Stroke Rehabil. 2017; 24(3):194-9. [DOI:10.1080/10749357.2016.1234224] [PMID]

[12] Adelman RD, Tmanova LL, Delgado D, Dion S, Lachs MS. Caregiver burden: A clinical review. JAMA. 2014; 311(10):1052-60. [DOI:10.1001/jama.2014.304] [PMID]

[13] Novak M, Guest C. Application of a multidimensional caregiver burden inventory. Gerontologist. 1989; 29(6):798-803. [DOI:10.1093/geront/29.6.798] [PMID]

[14] Bertelli S, Ferrara P, Di Modica S, Bergamelli E, Gambini O, D'Agostino A, et al. Adaptation and validation of the Caregiver Burden Inventory in eating disorders. J Eat Disord. 2022; 10(1):34. [DOI:10.1186/s40337-022-00560-7] [PMID]

[15] Conti A, Clari M, Garrino L, Maitan P, Scivoletto G, Cavallaro L, et al. Adaptation and validation of the Caregiver Burden Inventory in Spinal Cord Injuries (CBI-SCI). Spinal Cord. 2019; 57(1):75-82. [DOI:10.1038/s41393-018-0179-7] [PMID]

[16] Valer DB, Aires M, Fengler FL, Paskulin LM. Adaptation and validation of the Caregiver Burden Inventory for use with caregivers of elderly individuals. Rev Lat Am Enfermagem. 2015; 23(1):130-8. [DOI:10.1590/0104-1169.3357.2534] [PMID]

[17] Greco A, Pancani L, Sala M, Annoni AM, Steca P, Paturzo M, et al. Psychometric characteristics of the caregiver burden inventory in caregivers of adults with heart failure. Eur J Cardiovasc Nurs. 2017; 16(6):502-10. [DOI:10.1177/1474515117693890] [PMID]

[18] Tramonti F, Barsanti I, Bongioanni P, Bogliolo C, Rossi B. A permanent emergency: A longitudinal study on families coping with amyotrophic lateral sclerosis. Fam Syst Health. 2014; 32(3):271-9. [DOI:10.1037/fsh0000032] [PMID]

[19] Zavagli V, Varani S, Samolsky-Dekel AR, Brighetti G, Pannuti F. Worry as a risk factor for mental and somatic diseases. A research on home-cared cancer patients family caregivers. G Ital Med Lav Ergon. 2012; 34(2):B17-22. [Link]

[20] Han SH, Kim B, Lee SA; Korean QoL in Epilepsy Study Group. Contribution of the family environment to depression in Korean adults with epilepsy. Seizure. 2015; 25:26-31. [DOI:10.1016/j.seizure.2014.11.011] [PMID]

[21] Muhamad NA, Mihat O, Ramly R, Aziz AA, Kamaruddin R, Mansor WNAW, et al. Translation, cross-cultural adaptation, reliability and validity of the malay version of alcohol, smoking and substance involvement screening test (ASSIST) V3. 1. Health. 2018; 10(07):985. [DOI:10.4236/health.2018.107073]

[22] Uhm KE, Jung H, Oh-Park M, Lee BR, Kim EJ, Kim JH, et al. Reliability and validity of the Korean version of the Caregiver Burden Inventory. Int J Rehabil Res. 2021; 44(3):209-14. [DOI:10.1097/MRR.0000000000000474] [PMID]

[23] Vázquez FL, Otero P, Simón MA, Bueno AM, Blanco V. Psychometric properties of the Spanish version of the caregiver burden inventory. Int J Environ Res Public Health. 2019; 16(2):217. [DOI:10.3390/ijerph16020217] [PMID]

[24] Shafiezadeh A, Heravi-Karimooi M, Mirzaee A, Rejeh N, Sharif Nia H, Montazeri A. Psychometric characteristics of the Iranian Caregiver Burden Inventory (CBI) in caregivers of elderly patients with Alzheimer. Health Qual Life Outcomes. 2020; 18(1):255. [DOI:10.1186/s12955-020-01509-7] [PMID]

[25] Silverio VS, Porras VA, Costa IR. Caregiver burden in relation to cognitive status and dependence on activities of daily living in stroke patients: A cross-sectional study in the Dominican Republic. Revista Científica de la Sociedad de Enfermería Neurológica (English ed). 2022; 56:37-42. [DOI:10.1016/j.sedeng.2021.05.001]