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Original Article

The Psychometric Evaluation of the Coping with MS Caregiving Inventory (CMSCI) for Iranian Caregivers

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ABSTRACT

Background: Coping refers to cognitive and behavioral efforts made to manage stressful situations. Caring for people with multiple sclerosis (MS) is associated with increased stress among caregivers. Recognizing and managing caregivers' coping strategies can facilitate the rehabilitation of people with MS and improve the quality of care. Therefore, this study was conducted to translate and evaluate the validity and reliability of the Persian version of the Coping with MS Caregiving Inventory (CMSCI).

Methods: In this methodological study, 170 caregivers of people with MS were investigated. The Persian translation of this scale was conducted using the International Quality of Life Assessment (IQOLA) method. The face validity of the CMSCI was assessed through a survey of 10 caregivers, and content validity was evaluated using both qualitative and quantitative methods, including the content validity index and the content validity ratio. To evaluate the reliability of the CMSCI, a test–retest procedure was conducted with 54 caregivers who completed the questionnaire twice at an interval of 10 days. Internal consistency was assessed using Cronbach's alpha.

Results: The mean (SD) age of caregiver participants in this study was 42.3 (11.1) years. The mean (SD) age of people with MS under the caregivers' care was 38.6 (9.2) years. The test–retest reliability coefficient of the CMSCI was calculated as 0.82, indicating acceptable stability. The internal consistency of the CMSCI, assessed using Cronbach's alpha, was 0.75.

Conclusion: The Persian version of the CMSCI demonstrated good validity and reliability for assessing coping strategies among caregivers of people with MS. Considering the vital role of caregivers in the treatment team and the impact of effective coping strategies on the quality of care for people with MS, the use of the CMSCI can be beneficial for evaluating and improving the rehabilitation process for both people with MS and their caregivers.

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Introduction

Multiple sclerosis (MS) is a chronic neurodegenerative disease of the central nervous system that can lead to a range of debilitating symptoms, including impairments in balance, movement, vision, cognition, as well as sexual and urinary dysfunctions [1]. The care required by these patients is usually provided by family members or friends, who are considered informal caregivers. These individuals undertake a comprehensive range of activities, from assisting with daily tasks to providing sustained emotional support for the patient [2].

Caring for a patient struggling with a chronic illness such as MS is a stressful situation and is often accompanied by negative changes in the caregiver's overall physical and psychological health [3]. Long-term caregiving for people with MS is associated with health problems, a decreased quality of life, as well as increased levels of depression and anxiety. Depending on the level of cognitive disability in people with MS and the duration of caregiving, caregiver burden and psychological distress may increase [2]. Moreover, evidence indicates that caregivers of people with MS encounter additional challenges, including time constraints that limit their ability to engage in regular and preferred activities due to caregiving responsibilities [4]. Collectively, these challenges have the potential to intensify caregivers' psychosocial responses.

People manage stress through the use of "coping" strategies and, as a result, adopt various approaches when faced with stressful situations. Coping is defined as a set of coordinated behavioral and cognitive efforts used to address a stressor, which may change over time as individuals respond to the demands of a specific situation [3]. Individuals generally employ a combination of two main categories of coping strategies: problem-focused and emotion-focused. Gathering information and actively responding to a problem are examples of problem-focused strategies, whereas avoidance and fear are associated with emotion-focused strategies. Assessing coping strategies can help individuals manage stress-related symptoms [5].

Specialized assessment tools for caregivers are categorized into general instruments applicable across various caregiver populations and those tailored to caregivers of specific patient groups. The Coping with MS Caregiving Inventory (CMSCI) is designed specifically for caregivers of people with MS [6]. However, several questionnaires for assessing coping strategies can be used by caregivers, including the Coping Strategies Inventory [7] and the Coping Orientation to Problems Experienced Inventory (Brief-COPE) [8], which are widely used. Furthermore, multiple questionnaires assess the pressure and burden experienced by caregivers of patients with neurologic conditions. The Zarit Caregiver Burden Interview [9] and the Caregiver Burden Inventory are among the most widely used instruments [10].

The CMSCI is a self-report questionnaire that measures coping strategies among caregivers in response to the challenges of caring for people with MS [6]. The chief characteristic of the CMSCI is its multidimensional assessment of caregivers' coping in response to a specific stressor within a defined group. Joshi explored the utility of this scale, examined the outcomes of each subscale, and demonstrated their correlation with caregivers' health status [11].

Given the importance of caregivers' health as essential members of the treatment team, recognizing their practical and adaptive strategies can indicate their level of acceptance of the patient and the disease. Addressing caregivers' challenges may ultimately facilitate the rehabilitation of people with MS and improve the quality of care. Therefore, making a Persian version of the CMSCI available to assess coping mechanisms among caregivers of people with MS may contribute to improving caregivers' health status and enhancing the rehabilitation process for people with MS. Accordingly, given the need to examine caregiving coping strategies, this study aimed to translate and evaluate the psychometric properties of the CMSCI among Iranian caregivers of individuals with MS.

Methods

Study Design

The present study was a methodological study and was approved by the Ethics Committee of Iran University of Medical Sciences (IR.IUMS.REC.1399.825).

Procedure

The validity and reliability of the CMSCI were assessed through several stages, including translation, face validity, content validity, and test–retest reliability.

In the first stage, after obtaining official permission from the developer via email to translate and psychometrically evaluate the questionnaire, the instrument was translated using the International Quality of Life Assessment (IQOLA) protocol [12]. Two native Persian translators with academic backgrounds in English language education independently translated the questionnaire from English into Persian, with an emphasis on identifying appropriate lexical, phrasal, and terminological equivalents in the source text. Following this stage, one of the two translated versions was selected during a meeting with the research team.

To evaluate the quality of the final translation, the questionnaire was reviewed by another pair of translators (translators 3 and 4). These translators rated all items and instructions using a 100-point visual scale to assess translation quality, with an average score above 90 indicating good translation quality. This version was subsequently provided to two additional translators (translators 5 and 6) for backward translation. Finally, the English and Persian versions were reviewed and compared by experts and professors of occupational therapy.

In the subsequent stage, the Persian version of the questionnaire was sent to 10 expert occupational therapists (OTs) to assess its face and content validity. The results were discussed in a dedicated session attended by the research team and expert professors to evaluate item clarity, translation quality, relevance to the intended construct, and the cultural appropriateness of the wording for Iranian contexts. Additionally, the Persian version was shared with 10 caregivers of people with MS to obtain feedback on the comprehensibility of the items. Content validity was assessed using the content validity index (CVI) and the content validity ratio (CVR), based on evaluations by 10 expert OTs [13]. Finally, the finalized version of the questionnaire was prepared.

To assess reliability, caregivers of people with MS completed the questionnaire twice with a 10-day interval between administrations. This interval was selected because caregivers' coping strategies were expected to remain stable during this period.

Participants

A total of 170 caregivers of people with MS were recruited from Alborz MS Society between May 23, 2019, and August 1, 2021. The first author (MM) contacted caregivers by telephone using information obtained from the MS Society database. During a face-to-face meeting, the first author (MM) explained the study objectives and procedures, and informed consent was obtained. The sample size was determined using a ratio of five caregivers per questionnaire item [14].

The caregivers included in this study were required to meet the following criteria:1- be family members or primary caregivers of people with MS, 2- provide care without payment. 3- have a minimum of six months' experience in caregiving for people with MS, providing at least four hours of care daily, 4- possess proficient oral communication, speaking, reading, and writing abilities in Persian. 5- be aged between 18 and 65 years.

People with MS whose caregivers participated in this study were required to meet the following criteria: 1) A confirmed diagnosis of MS by a neurologist using McDonald's criteria, and 2) Be aged between 18 and 65 years.

Caregivers of patients with non-MS neurological diseases were excluded.

The exclusion criteria for caregivers were: 1- presence of severe psychological disorders, and 2- failure to cooperate with the research at any stage.

Measures

Caregivers' demographic information was recorded using demographic questionnaires. Caregiver data included age, sex, duration of caregiving, and education level, whereas for people with MS, data collected included age and MS type. Information on patients' Expanded Disability Status Scale (EDSS) scores was categorized according to previous studies. The scores were classified into three categories: 0–1 as category A, 1.5–4.5 as category B, and 5–9.5 as category C [15,16].

The Coping with Multiple Sclerosis Caregiving Inventory (CMSCI), developed by Pakenham in 2002, comprises 34 items across five subscales that assess coping strategies used by caregivers over the past month. Items are presented in an open-ended question format. The subscales include avoidance (11 items), practical assistance (7 items), supportive engagement (6 items), criticism and coercion (5 items), and positive reframing (5 items). Each item is scored on a scale from 0 to 4 (0 = never, 1 = seldom, 2 = sometimes, 3 = often, 4 = usually), and the score for each subscale is calculated separately. Subscale scores are obtained by summing the item scores and dividing by the number of items in that subscale. The CMSCI is self-administered by caregivers and can be completed in less than ten minutes. Its validity and reliability have been reported as favorable, and its translation, validity, and reliability in Iranian populations have also been demonstrated as satisfactory [6].

Data Analysis

To describe the study variables and the problems reported by caregivers, descriptive statistics, including means (SDs) and frequencies (percentages), were used. Differences in caregiver stress by reported problems were assessed using a one-way analysis of variance (ANOVA). The correlation between test and retest scores was determined using the intraclass correlation coefficient (ICC). An ICC value above 0.75 indicates good stability of the instrument, which is considered statistically significant at $p < 0.05$ [17]. Data analysis was performed using IBM SPSS Statistics for Windows, version 26, and statistical significance was set at $p < 0.05$.

Results

Translation and Cultural Adaptation

After the completion of the Persian version of the questionnaire by translators 1 and 2, an expert panel was convened. Given CMSCI's self-report nature, the panel emphasized the need to identify appropriate equivalents for conceptual terms. For example, it was decided not to translate the term "respite service" directly into Persian, as there is no culturally intelligible equivalent in Iran; instead, it was adapted to "taking a rest."

The term *coping* is defined as a continuous cognitive and behavioral effort that fluctuates over time, aimed at managing internal and external demands that exceed an individual's resources. Since there is no direct equivalent for this term in Persian, the panel members and translators selected the closest possible term to represent the original concept. To ensure that the concepts in the source material were accurately conveyed, the author of the questionnaire was consulted. While maintaining attention to cultural compatibility with the Persian context, the author's approval was ultimately obtained.

Participants

Table 1 presents the participants' demographics (N = 170). The mean (SD) age of the caregivers in this study was 42.3 (11.1) years. The mean (SD) age of the people with MS under the caregivers' care was 38.6 (9.2) years. Data on caregivers' responses to the main problem question of the CMSCI are reported in Table 2.

Face and Content Validity

The results indicate that the impact score for all items in the questionnaire exceeded 1.5, and no items were eliminated. Furthermore, 95% of occupational therapists rated the CMSCI as having acceptable face validity. The content validity ratio (CVR) was 0.95, exceeding the acceptable threshold, and the average content validity index (CVI) was 0.97, which falls within an acceptable range [14]. The results of the content validity assessment for each item are reported in Table 3.

Reliability

The internal consistency of the questionnaire was assessed using Cronbach's alpha and was found to be 0.751, indicating an acceptable level of reliability. The intraclass correlation coefficient (ICC) for the test-retest comparison was 0.828, indicating good stability, reliability, and reproducibility of the questionnaire.

Table 1: Demographic Characters of Caregivers

Demographics	Mean±SD or NO. (%)
Age(y)	
Caregivers	**42.3±11.1**
Sex (Female/Male)	**81(47.6)/89(52.4)**
Marital status(married/single)	**140(82.6)/30(17.6)**
Education	
Not educated	**6(3.5)**
Elementary and high school	**30(17.7)**
Diploma to bachelor' s degree	**122(71.8)**
Master and higher degree	**12(7.1)**
Caregiving duration	
Less than 6 months	**16(9.4)**
11-6 month	**10(5.9)**
1-3 years	**29(17.1)**
3-5 years	**26(15.3)**
More than 5 years	**89(57.8)**
EDSS	
A=0-1	**8(4.7)**
B=1.5-4.5	**93(54.7)**
C=5-9.5	**69(40.6)**

SD= standard deviation, NO= number, Y= year

Table 2: Answers to Main Problem Question

Problem	N.(%)
MS symptoms	45(26.4)
Financial strain	36(21.1)
Patient' s preoccupations	36(21.1)
Disease and drug management	21 (12.3)
Caregiver' s leisure disruption	8 (4.7)
Caregiver' s health complications	2 (1.1)
Household management	2 (1.1)
No problem	6 (3.5)
Reluctant to respond	14(8.2)

N= number

Table3: CVR and CVI Results for each Item

Item	CVR	CVR
1	0.81	0.80
2	0.81	1
3	1	1
4	1	1
5	0.81	1
6	0.63	1
7	0.81	1
8	1	1

Item	CVR	CVR
9	1	1
10	1	1
11	0.81	1
12	1	1
13	1	1
14	1	1
5	1	1
16	1	1
17	1	1
18	1	1
19	1	1
20	1	0.80
21	1	1
22	1	1
23	1	1
24	1	1
25	1	1
26	1	1
27	1	1
28	1	1
29	1	1
30	1	1
31	1	1
32	1	1
33	0.81	0.80
34	0.81	0.80

CVR= content validity ratio, CVI= content validity index

Discussion

The purpose of the present study was to examine the Persian edition of the CMSCI, including its validity and reliability, which is theoretically consistent with the occupational adaptation model in occupational therapy. To date, no Persian version has been developed for evaluating coping in caregivers of people with MS. In this study, the CMSCI was assessed for face validity, content validity, and reliability. The results indicate that the Persian edition of the CMSCI demonstrates acceptable validity and reliability.

The CMSCI was originally published in English and has undergone psychometric testing, but it has not yet been evaluated in other languages. During the translation process, in accordance with World Health Organization guidelines for avoiding direct translation and favoring conceptual and functional equivalence, certain terms—such as *Respite Service*—were adapted to “taking a rest,” and the closest semantic equivalent was selected for *coping*.

To quantitatively assess face validity using the impact score, the questionnaire was distributed to ten occupational therapists specializing in physical disorders and ten caregivers of people with MS. Items were rated on a scale from 1 (makes no difference at all) to 5 (absolutely important). All items received an impact score higher than 1.5, and none were omitted. In the development study, participants rated the relevance of each coping measure on a 7-point scale (1 = irrelevant, 7 = completely relevant) for MS caregiving. The average score was 6.1 (SD = 1.13), indicating excellent content validity.

The minimum acceptable CVR for all items in the questionnaire was 0.62. The results indicate that the CVR for all items exceeded this threshold. The minimum acceptable CVI value for each item is 0.8 [18]. The results show that the CVI for all items in the questionnaire exceeded 0.8, and all items met the required content validity score as assessed by experienced occupational therapists.

Two methods—internal consistency and stability—were employed to assess the questionnaire's reliability. Internal consistency was measured using Cronbach’s alpha. Considering 0.7 as the acceptable threshold [19], the Cronbach’s alpha for this questionnaire was 0.751. This result aligns with the findings reported for the English version of the CMSCI [6]. It should be noted that this value is influenced by the number of items and the correlations among them; specifically, low positive correlations between items and variance can affect Cronbach’s alpha, as the number of items can either increase or decrease the coefficient depending on the type of correlation between items.

The correlation between test and retest, used to evaluate stability, was calculated using the intraclass correlation coefficient (ICC). The ICC emphasizes the stability, reliability, and reproducibility of the questionnaire; an ICC value above 0.75 is considered desirable and statistically significant ($p < 0.05$) [17]. Considering the results of the present study and the acceptable internal consistency, the test–retest reliability of the CMSCI can be regarded as satisfactory.

Limitation

There are several limitations in the current study. First, factor analysis was not conducted; a larger sample size would have been required for this analysis. Second, caregivers of people with MS often had limited availability, restricting our ability to recruit participants more extensively. Future research should include factor or Rasch analysis of the CMSCI to establish its dimensionality. Additionally, no other language versions of the CMSCI were available for comparison of validity and reliability. This study represents the initial examination of CMSCI validity and reliability in a language other than English.

Given the vital role of caregivers in the rehabilitation of people with MS, understanding and recognizing the coping strategies they employ using a Persian version of the CMSCI, and incorporating rehabilitation program components that support caregiver well-being—such as stress management training and counseling services—can substantially enhance the effectiveness of rehabilitation and the overall well-being of both caregivers and patients. For example, the use of positive coping strategies, such as seeking information about MS, can improve caregivers' mental health and resilience, thereby enhancing their ability to provide effective care. Conversely, caregivers who rely on avoidance or denial may experience higher levels of stress, anxiety, and depression, which can impair their caregiving abilities and negatively affect the rehabilitation process.

Adopting these strategies by caregivers can directly influence people with MS. Caregivers who employ positive coping strategies are more likely to encourage and assist patients in adhering to their rehabilitation programs, leading to better health outcomes and providing stronger emotional support, which is essential for patients' motivation and participation in rehabilitation activities. However, ongoing research is needed to identify the most effective coping strategies for caregivers and to understand how these strategies impact long-term rehabilitation outcomes.

Conclusion

This study was conducted to evaluate the psychometric properties of the Persian version of the CMSCI among caregivers of people with MS. The results indicate that the Persian version of the CMSCI is a valid and reliable instrument with strong psychometric properties. This version provides a convenient method for assessing coping strategies in caregivers of people with MS and represents a useful tool in clinical settings. Recognizing and supporting caregivers' coping strategies can contribute to more effective rehabilitation outcomes for people with MS. Achieving this requires a comprehensive approach that addresses the physical, emotional, and educational needs of both caregivers and patients.

Author Contributions

F.M. and A.H. developed the Protocol/project and wrote the main manuscript text. H.S. and L.L. analyzed the data and prepared the figure and tables. M.M. collected data and managed the data analysis. All authors reviewed the manuscript.

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