

Validity and Reliability Study of the Turkish Version of Multiple Sclerosis Self-Management Scale

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ABSTRACT

OBJECTIVE: This study aimed to establish the equivalence, reliability, and validity of the Multiple Sclerosis Self-Management Scale Turkish Version (MSSM-T). **METHODS:** This methodological study consisted of 240 multiple sclerosis (MS) patients who were followed in an outpatient clinic of a university hospital between October 2016 and April 2017. Data were collected using the demographic characteristics form and the 24-item MSSM-T. Language equivalence, content validity, and construct validity methods were used for the validity of the scale; internal consistency, item analysis, and test-retest methods were used for the reliability. Explanatory factor analysis was used for construct validity, and principal component analysis and varimax rotation were used in the analysis of factor structure. **RESULTS:** The item-total correlations for the Turkish version were found to be sufficient (between 0.238 and 0.674). The Cronbach α reliability coefficient was 0.85, indicating high reliability. The test-retest reliability coefficient was 0.84, indicating high consistency. The Turkish version was found to have 5 factors for the 24 items (F1, healthcare provider relationship/communication; F2, knowledge and information about MS; F3, treatment adherence/barriers; F4, maintaining health behavior; and F5, social/family support), which accounted for the 62.584% of the characteristics in question. **CONCLUSION:** The MSSM-T is valid and reliable in determining the self-management behaviors of patients with MS for Turkish patients.

Keywords: multiple sclerosis, reliability, self-management, validity

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Multiple sclerosis (MS) is a chronic autoimmune disease of the central nervous system. It affects approximately 400 000 people in the United States, with prevalence rates ranging from 1 to 2.5 million worldwide.¹ It is most commonly seen in young adults (aged 20–40 years) and presents with a range of physical and cognitive symptoms.² The prevalence of MS is higher in Northern Europe, America, and South Australia than in Asia and Africa; in addition, there was an increase in the prevalence of MS in other parts of the world, albeit with a low prevalence.³ Studies for the prevalence of MS in Turkey are still underway, with an estimated prevalence of more than 100 cases per 100 000.³

Currently, there is no cure for MS, and its treatment includes lifelong management of the disease and its symptoms.⁴ The presence and complexity of MS symptoms complicate the management of the disease, which becomes an exhausting task for individuals with MS. Therefore, individuals with MS need to develop skills to manage their daily activities on their own. Thus, self-management is considered a critical component of the care for MS patients.^{5,6}

Self-management is defined as a lifelong negotiation process that requires a continuous assessment of the individual's efforts and their impacts.⁷ This negotiation

process is influenced by internal and external factors such as stigmatization, self-assessment of capabilities, and access to external support and resources.^{4,7} In the presence of a chronic condition, effective self-management is considered an important means to improve the quality of life and the perceived control of the individual over the disease.⁸ Many self-management tasks are undertaken by individuals with MS to maximize their physical, social, and mental functions. Successful self-management of MS involves educating oneself about the condition, symptoms, and treatments; monitoring health status; making healthy lifestyle choices; setting short- and long-term self-management goals; managing psychological health; developing support networks; comprehensive planning; preventing fatigue; and coping with MS.^{9,10}

There are some instruments available that measure 1 or more aspects of self-management, often disease specific, such as the Confidence in Diabetes Self-Care Scale or the Nijmegen Clinical Screening Instrument for patients with chronic obstructive pulmonary disease. The Nijmegen Clinical Screening Instrument questionnaire measures disease-specific characteristics that determine health status. The Self-Management Ability Scale focuses on self-management ability of the older adults in relation to well-being.¹¹ It is important that such scales are disease specific and have features that should be considered in the self-management of the individual with this disease. Multiple sclerosis is one of these diseases. Recently, there has been an increase in the number of studies on self-management in MS patients, and the need for valid and reliable assessment tools has become increasingly evident with the increase in the self-management interventions and investigations in MS.^{12–14} Bishop and Frain^{13,14} have developed the Multiple Sclerosis Self-Management Scale (MSSM) to provide a comprehensive and psychometric assessment of self-management knowledge and behavior among adults with MS. This scale is currently the only measure that was developed specifically to address self-management among individuals with MS.

There is a significant number of people with MS in Turkey, and self-management plays an important role in coping with the disease and compliance with treatment. Currently, there is no assessment tool in the Turkish language to determine self-management specifically in patients with MS. Thus, this study aimed to investigate the validity and reliability of the MSSM in Turkish society and its applicability.

Methods

This study has a methodological survey design. The study included those who were given a diagnosis of MS for at least 1 month; were 18 years or older; had

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an Expanded Disability Status Scale score of 6.5 or less as assessed by a neurologist; were able to speak, read, and understand Turkish; and opted to join the study. It was aimed to reach 10 times the number of items, hence a total of 240 MS patients were recruited as the MSSM included 24 items.

The study was conducted between October 2016 and April 2017 with the MS patients in the outpatient clinic caring for MS patients at Ege University Hospital in İzmir, Turkey. The data were collected by using the demographic characteristics form, which includes age, sex, educational level, marital status, having children, duration of disease, type of disease, and the MSSM. The MSSM was developed by Bishop and Frain¹⁴ to provide a comprehensive and psychometric assessment of self-management knowledge and behavior among adults with MS. The reliability coefficient (Cronbach α) was 0.85 in the original study. The MSSM consists of 24 Likert-type items with responses as follows: disagree completely (1 point), somewhat disagree (2 points), neither agree nor disagree (3 points), somewhat agree (4 points), and agree completely (5 points).^{14,15}

Total score ranges between 0 and 100, and a higher score indicates a higher degree of self-management. The MSSM includes 5 subscales: healthcare provider relationship/communication (6 items: 9, 12, 14, 16, 18, and 20), treatment adherence/barriers (7 items: 11, 15, 17, and 21–24), social/family support (3 items: 6, 10, and 13), MS knowledge and information (4 items: 1–4), and health maintenance behavior (4 items: 5, 7, 9, and 19).¹⁶ Items 21, 23, and 24 are scored inversely. The total score is calculated with the following formula: $100 \times (\text{observed score} - \text{minimum score}) / (\text{maximum score} - \text{minimum score})$.¹⁴ Permission to use the MSSM was obtained from the authors. The local ethics committee of the university from nursing faculty approved the study; written permission was received from the hospital administration. The patients who participated in the study were informed about the purpose of the study and the data collection forms.

To evaluate the test-retest reliability of the scale, the scale was reapplied 2 weeks later with the same group of patients (N = 35). These patients were not included in the sample. The data were analyzed with

Statistical Product and Service Solutions (SPSS 25). Data are presented as frequency and percentage. Cronbach α coefficient was used for the reliability analyses; factor analysis was applied for validity analyses. Compliance with factor analysis was evaluated by Bartlett's sphericity test; adequacy of the sample size was evaluated by the Kaiser-Meyer-Olkin (KMO) method. The level of significance was set as $P < .05$ for all tests.

Results

Sociodemographic characteristics of the patients, psycholinguistic characteristics, scope/content validity, and reliability and validity analyses were presented in the following sections. The average age was 42.12 ± 10.75 years; the majority were women (70.4%), married (75%), with children (73.8%), given a diagnosis for more than 10 years (88.3%), and given a diagnosis of relapsing-remitting MS (94.6%). Table 1 presents the sociodemographic and disease-related characteristics of the participants.

TABLE 1. Demographic Characteristics and Clinical Features of the Participants

Demographic Characteristics	n	%
Sex		
Female	169	70.4
Male	71	29.6
Education level		
Primary	85	35.4
High	74	30.8
University	78	32.5
Postgraduate	3	1.3
Marital status		
Married	180	75.0
Single	60	25.0
Having children		
Yes	177	73.8
No	63	26.3
Disease Characteristics		
Disease duration		
<10 y	28	11.7
>10 y	212	88.3
Disease type		
RRMS	227	94.6
SPMS	13	5.4

Abbreviations: RRMS, relapsing-remitting multiple sclerosis; SPMS, secondary-progressive multiple sclerosis.

TABLE 2. Results of the Factor Analysis for MSSM-T

Factor	Varimax Rotation Sums of Squared Factor Loadings		
	Total	Explained Variance, %	Cumulative Variance, %
1	4.754	19.807	19.807
2	3.487	14.529	34.336
3	2.773	11.554	45.891
4	2.336	9.732	55.623
5	1.671	6.962	62.584

Abbreviation: MSSM-T, Multiple Sclerosis Self-Management Scale Turkish Version.

To investigate the psycholinguistic characteristics of the scale, the items were translated from English to Turkish by a group of 10 academic staff specialized in MS independently. The translations were combined, and the Turkish version of the MSSM (MSSM-T) was created. The scale was back-translated from Turkish to English by an independent linguist who had never seen the original scale. The reverse translation was compared with the statements in the original questionnaire, and the necessary corrections were done. The Turkish version of the scale was provided to a group of 10 faculty members who specialized in the evaluation of content validity. The content validity index (CVI) was used to evaluate expert opinions; the CVI was 0.86.

Explanatory factor analysis was used to examine the construct validity of the scale; varimax rotation was used to examine the factor structure. The findings are shown in Table 2 (see Supplemental Digital Content 1, available at <http://links.lww.com/JNN/A225>). The KMO and Bartlett's sphericity tests were applied before the analysis. The KMO value was 0.86, and the sphericity test result was $\chi^2 = 2958.9$ ($df = 0.276$, $P < .001$). Explanatory factor analysis with varimax rotation revealed that the scale had a 5-factor structure. The subscales of the MSSM-T with the 5-factor structure were as follows: F1, healthcare provider relationship/communication (6 items); F2, knowledge and information about MS (4 items); F3, treatment adherence/barriers (7 items); F4, maintaining health behavior (4 items); and F5, social/family support (3 items). Tukey's test of additivity was applied to obtain a total scale score by adding the item scores. The test produced a significance value of $P < .05$; therefore, the scale was suitable for getting a total scale score by adding item scores (see Supplemental Digital Content 2, available at <http://links.lww.com/JNN/A226>).

Reliability Analysis

The test-retest method was used to demonstrate the stability of the scale against time; Cronbach α coefficient and item analysis were used to measure internal consistency. For test-retest analysis, a group of 35 MS patients who met the inclusion criteria was administered the MSSM-T twice with 2-week intervals, and the data were analyzed. The reliability coefficient was 0.84 for the whole scale. In the analysis of individual items, the reliability coefficients varied between 0.61 and 0.99 (see Supplemental Digital Content 3, available at <http://links.lww.com/JNN/A227>).

According to the internal consistency analysis for the 24 items of the scale, the total reliability coefficient (Cronbach α) was 0.85; subscale reliability coefficients were $\alpha = 0.90$ for F1, $\alpha = 0.83$ for F2, $\alpha = 0.74$ for F3, $\alpha = 0.69$ for F4, and $\alpha = 0.70$ for F5. In the item analysis, the lowest Cronbach α value when the item was deleted was found to be 0.84 (see Supplemental Digital Content 4, available at <http://links.lww.com/JNN/A228>). None of the items had an item-total correlation coefficient (ITC) of less than 0.20; therefore, all 24 items were found to have high reliability.

Discussion

The validity and reliability of a measurement tool are indicators for its practicality. Validity is the ability of a measurement tool to measure the intended characteristic accurately and without being affected by confounding factors, and to serve the purpose for which it was developed. The scope/content validity and construct validity are mostly involved in the validity analyses.^{15,16}

For the content validity of the MSSM-T, first, it is necessary to examine the expression, content, scope, and suitability to the research area of the items in line with the opinions provided by the experts. As a result of these examinations, it is determined that the content validity of the scale is high enough to assess the subject in question. In this context, to determine the content validity, the scale is subjected to the evaluation by experts in the field and revised according to their evaluations. It is the criterion for the content validity of the scale that the experts agree on the intelligibility and applicability of the contents of the items in these evaluations.^{17,18} In the validation of the translation, the aim is to reach the Turkish equivalents of the expressions in the items of the scale. In the selection of the committee of experts who will translate the items, significant experience in the subject area is sought, as well as the ability to speak/understand both languages very well.¹⁹ In this context, a committee of 10 faculty members who were experienced in the study of MS translated the scale from English to Turkish to arrive

at the best suitable expressions. Then, the Turkish version was reverse-translated by a bilingual native English speaker, and the back-translated text was compared with the statements in the original questionnaire to make the necessary revisions. There was a high degree of similarity between the original version and the back-translation of the Turkish version.

The scale is restructured in line with the analyses and suggestions of the experts. Davis' technique was used for content validity, and a group of 10 faculty members specialized in the study of MS evaluated the ability of each item to measure the subject in question as (a) "appropriate," (b) "item needs minor revision," (c) "item needs major revision," and (d) "not appropriate." The CVI of each item is obtained by dividing the number of experts who marked (a) and (b) by the total number of experts in the committee; a CVI of 0.80 is used as the cutoff value instead of statistical analysis.²⁰ We found a CVI of 0.86 for the MSSM-T, which indicated a consensus in the committee concerning the content validity of the scale. Thus, the Turkish version was found to be appropriate to use in the Turkish population and represented the subject in question.

The construct validity is assessed through the factor analysis and defined as demonstrating the degree of accuracy for the indicators related to the theoretical structure to be measured. In factor analysis, the aim is to express a large number of items with fewer factors. The adequacy and consistency of the sample should be considered before testing the construct validity of a scale.^{21,22} The adequacy of the sample is determined by the KMO value, which indicates excellent sampling for factor analysis when between 0.90 and 1.00, very good sampling when between 0.80 and 0.89, adequate sampling when between 0.70 and 0.79, mediocre sampling when between 0.60 and 0.69, weak sampling when between 0.50 and 0.59, and inadequate sampling when less than 0.50.²³ In our study, the KMO value for the MSSM-T was 0.86, which indicates adequate sampling for factor analysis. Exploratory factor analysis yielded 5 factors: healthcare provider relationship/communication, knowledge and information about MS, treatment adherence/barriers, maintaining health behavior, and social/family support. The resulting 5-factor instrument was found to cover 62.58% of the characteristics to be measured. Analyses of the factor loadings of the scale indicate that the distribution of factor loadings among the 24 items was similar to that of the original scale, which suggests that the distribution of items among subscales was perceived similarly in the Turkish and English versions.

Factor loadings indicate the stability of factors. For a factor to be stable, it should consist of at least 3 items

and factor loading should be high. A factor loading should be at least 0.30.²⁴ Because the factor loadings for all of the 24 items were greater than 0.30, none was eliminated. Thus, the Turkish version can be said to have construct validity based on the results of factor analysis.

The second important feature of a measurement tool is reliability. The use of Cronbach α , which is a measure of the internal consistency of the items in the instrument, is recommended to examine the reliability of Likert-type scales. A Cronbach α value of close to 1 is required for an instrument to be considered sufficiently reliable; it is considered highly reliable for values between 0.80 and 1.00, quite reliable between 0.60 and 0.79, hardly reliable between 0.40 and 0.59, and not reliable for values lower than 0.40.²⁵ The Cronbach α value for the MSSM-T was 0.85, which indicated high reliability similar to the original version.¹⁴

An instrument's consistency over time is determined through the test-retest technique and indicates the correlation between the scores obtained by implementing the scale to a sample composed of the same individuals under the same conditions at 2 different times. This difference was evaluated with the intraclass correlation coefficient, which needs to be greater than 0.70 for the instrument to be considered to be consistent.²⁶ The intraclass correlation coefficient of the MSSM-T was 0.84, which was an acceptable and high reliability similar to another study of MSSM's reliability (0.83).⁵

In Likert-type scales, the correlation between scores from an item and the total score from the scale is evaluated with the ITC. Typically, items with an ITC of 0.20 or higher are considered to distinguish individuals well.²⁷ The reliability coefficients of the 24 items in the scale varied between 0.238 and 0.674, and the correlation between each item and the total score was statistically significant.

Conclusion

This study aimed to carry out the validity and reliability analyses of MSSM-T to facilitate its use in Turkey and found that the Turkish version was valid and reliable in determining self-management behaviors of patients with MS. We believe that the MSSM-T will serve as an important tool in future clinical and research studies of self-management behaviors.

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