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Adaptation of the Multiple Sclerosis Selfmanagement Scale to Turkish Society: Validity and Reliability Study

Multipl Skleroz Öz Yönetim Ölçeğinin Türk Toplumuna Uyarlanması: Geçerlik ve Güvenirlilik Çalışması

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Abstract

Background: Multiple Sclerosis (MS) is a chronic, autoimmune disease that causes physical and psychological damage and has a highly variable prognosis. It is very important to develop self-care skills apart from symptom treatment that causes individuals to become physically dependent.

Objectives: The study was planned and carried out methodologically to adapt the Multiple Sclerosis Self-Management Scale-Revised (MSSM-R) to Turkish society.

Methods: The study was conducted with individuals with multiple sclerosis who presented to the neurology clinic of a university hospital between July 2019 and May 2020. The validity and reliability of the MSSM-R were tested with 169 participants. Construct validity was examined using confirmatory factor analysis (AMOS), test-retest reliability through paired-sample t-tests and Pearson correlation analysis, and internal consistency using Cronbach's alpha. Item-level analyses were also performed.

Results: The validity of the MSSM-R was evaluated with language validity, construct validity Confirmatory factor analysis (CFA), and content validity. The reliability coefficient of the internal consistency analysis (Cronbach's Alpha) was found to be very high (.88). Item total correlation was examined, and no items were removed from the scale accordingly. The scale was administered to 30 patients at a two-week interval to evaluate test-retest reliability and time-dependent invariance.

Conclusion: The MSSM-R, which was adapted to Turkish society to evaluate the self-management of individuals with multiple sclerosis, is a valid and reliable tool. The Turkish-adapted MSSM-R is a valid and reliable tool and can be used in both clinical practice and research to support self-management interventions for individuals with multiple sclerosis.

Keywords: Multiple Sclerosis, Self-Management, Validity, Reliability

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Öz

Giriş: Multipl Skleroz (MS), fiziksel ve psikolojik hasara neden olan ve oldukça değişken prognoza sahip kronik, otoimmün bir hastalıktır. Bireylerin fiziksel olarak bağımlı hale gelmesine neden olan semptom tedavisi dışında öz bakım becerilerinin geliştirilmesi oldukça önemlidir.

Amaç: Araştırma Multipl Skleroz Öz Yönetim Ölçeği (MS-ÖYÖ) Türk toplumuna uyarlanması amacıyla metodolojik olarak planlandı ve uygulandı.

Yöntemler: Araştırma, Temmuz 2019-Mayıs 2020 tarihleri arasında bir üniversite hastanesinin nöroloji kliniğine başvuran multipl sklerozlu bireylerle gerçekleştirilmiştir. MSSM-R'nin geçerlik ve güvenilirliği 169 katılımcı ile test edilmiştir. Yapı geçerliliği doğrulayıcı faktör analizi (AMOS) ile incelenmiş, test-tekrar test güvenilirliği eşleştirilmiş örneklem t-testleri ve Pearson korelasyon analizi ile değerlendirilmiş ve iç tutarlılık Cronbach's alpha ile belirlenmiştir. Ayrıca madde analizleri de yapılmıştır.

Bulgular: MS-ÖYÖ geçerliği dil geçerliği, yapı geçerliği (DFA) ve kapsam geçerliği ile değerlendirilmiştir. Güvenirliğinde iç tutarlılık analizi (Cronbach's Alpha) .88 oldukça yüksek bulunmuştur, madde toplam korelasyonu incelenmiş ve herhangi bir maddenin ölçekten çıkarılmamasına karar verilmiştir ve zamana karşı değişmezliğin değerlendirilmesi için test tekrar test güvenilirliği için 30 hastaya iki hafta ara ile ölçek tekrar uygulanmıştır.

Sonuç: Multipl Sklerozlu bireylerin öz yönetimlerinin değerlendirmesi amacıyla Türk toplumuna uyarlanan MS-ÖYÖ geçerli ve güvenilir bir araçtır. Türkçeye uyarlanan MSSM-R, geçerli ve güvenilir bir araç olup, multipl sklerozlu bireylerin öz-yönetim müdahalelerini desteklemek için hem klinik uygulamada hem de araştırmalarda kullanılabilir.

Anahtar Sözcükler: Multipl Skleroz, Öz Yönetim, Geçerlik, Güvenirlik

INTRODUCTION

Multiple sclerosis (MS) is a debilitating central nervous system disorder that is progressive and chronic, usually beginning at age 20 to 40 years. According to valid reports, MS is the second leading cause of nontraumatic disability in young people (Khodaveisi et al., 2017). It is estimated that there are approximately 2.5 million individuals with MS in the world. There are around forty thousand individuals with MS in our country as well (Bayat et al., 2025). Some of the outcomes of MS include deterioration in functions such as motor movements, balance, speech, vision, and sexuality, and problems such as fatigue resulting from damage to the myelin sheath. The progressive type is without attacks, and symptoms increase over time (Keerthana et al., 2024). Depending on the level and nature of the dysfunctions experienced, individuals

may experience difficulties in maintaining their daily lives. Moreover, the disease affects other areas of life, such as working life, family life, relationships, and psychological health. Treatment of this disease, whose causes are not completely understood, focuses on preventing attacks or slowing down the progression rather than eliminating it (Birnbaum, 2017; Demirtepe-Saygılı, 2019). Individuals with MS experience disability, defined as a limitation or loss in the ability to perform an activity within the limits considered normal for an ordinary person. Depending on the level of disability, individuals with MS may experience difficulties doing routine housework, participate less in social activities, and face challenges in self-care (Heidari-Soureshjani et al., 2023; Russell et al., 2024).

Self-management is defined as an active process

for coping with disease through adherence to treatment and drug use, participation in medical decision-making, self-care, and maintenance of social relationships and emotional balance (Heidari-Soureshjani et al., 2023). Failure to perform self-care can lead to feelings of uselessness, decreased self-esteem, and social isolation (Bayat et al., 2025). Beyond symptom management, individuals with MS who become physically dependent need holistic healthcare that addresses all aspects of the problems experienced (Keerthana et al., 2024). It is crucial that the healthcare team, especially nurses, who play a key role in patient care, take appropriate initiatives. Nurses contribute significantly to symptom reduction by assessing patients' current condition, supporting self-management, promoting self-worth, positive thinking, and setting achievable goals (Russell et al., 2024).

This scale will contribute to the literature as it is the first scale to be used in the evaluation of the self-management of individuals with MS in our country. Therefore this study; It was methodologically planned and organized in order to adapt multiple sclerosis self-management performance to Turkish society.

MATERIALS AND METHODS

Study Design

This research is of methodological type.

Data Collection

The study was conducted with individuals with multiple sclerosis who presented to the neurology clinic of a university hospital between July 2019 and May 2020. The research data were collected online. The data was collected via Google form exchange, with individuals who responded completely to all samples. Before starting the study, the individuals were informed and their consent was obtained.

Participants and Setting

The population of the study consisted of patients who were diagnosed with multiple sclerosis and met the sample selection criteria. To conduct the validity and reliability study of the Multiple Sclerosis Self-Management Scale (MSSM), the sample included 169 patients, which was more than 5 times the number of items (24 items) on the scale. For test-retest reliability, the scale was administered to 30 patients at a two-week interval. When determining the number of samples in validity-reliability studies in the literature for the sample of the research, it is recommended to reach 5-10 times as many individuals as the number of items in the scale (Uğurlu, 2017).

According to the test-retest reliability analysis, the items of the test demonstrated high temporal consistency. The mean differences between the initial and repeated measurements were very small (e.g., for M1-T1, mean difference = 0.033), indicating no systematic differences between the test and retest administrations. The t-test results were not statistically significant (t values generally ± 1 , $p > .05$; e.g., M1-T1: $t = 1.000$, $p = .326$), supporting the stability of the measurements over time. When examining the correlation coefficients, a very high and statistically significant relationship was observed between the test and retest scores. Correlations ranged from 0.748 to 0.993, all of which were statistically significant ($p < .001$). The highest correlation was found for item M23-T23 ($r = 0.993$), and the lowest for M20-T20 ($r = 0.748$). These results indicate that the measurement tool has a high level of test-retest reliability and provides consistent results over time.

Research inclusion criteria; had a confirmed diagnosis of multiple sclerosis, were receiving medication therapy in the neurology clinic and presented to the outpatient clinic, had

no communication disorders, volunteered to participate in the study and were aged 18 or over were included in the study. Patients with severe psychological disorder and/or communication disorders were not included in the study.

Data Collection Instrument-Validity and Reliability Information

The Patient Information Form: This form was developed by the researchers following a review of the literature (Berhanu et al., 2023; Demirtepe Saygılı, 2019; Russell et al., 2024;). It consists of 5 items questioning the personal characteristics of the individuals.

The Multiple Sclerosis Self-Management Scale-Revised (MSSM-R): This 24-item scale was developed by Bishop and Frain in 2011 to evaluate the self-management of individuals with MS. The scale consists of 5 subscales, namely, healthcare provider relationship and communication (items 9, 12, 14, 16, 18, and 20) ($\alpha = 0.74$), treatment adherence/barriers (11, 15, 17, 21, 22, 23, and 24) ($\alpha = 0.80$), social/family support (6, 10, and 13) ($\alpha = 0.85$), MS awareness and knowledge (1, 2, 3, and 4) ($\alpha = 0.64$), and health maintenance behavior (5, 7, 8, and 19) ($\alpha = 0.88$). The scale uses a 5-point Likert-type scale with options 1. totally disagree, 2. somewhat disagree, 3. neither agree nor disagree, 4. somewhat agree, and 5. totally agree. While good internal consistency ($\alpha = 0.83$). Minimum and maximum scores range between 0 and 100. High scores show increased MS self-management. Items 21, 23, and 24 on the scale contain reverse expressions; therefore, the points of these items are reversed (Bishop et al., 2011).

Statistical Analysis

The construct validity of the scale was conducted with confirmatory factor analysis using the AMOS software package. Test-retest measurements

were performed with paired samples t-test and correlation analysis. The reliability of the scale was analyzed with Cronbach's Alpha, and an item level analysis was done for each item. The dependent variable of our research is Multiple sclerosis, and the independent variable is Multiple sclerosis self-management.

Ethical Aspect of the Research

For the validity and reliability study of the MSSM-R, first, the permission of the researchers who developed the scale was obtained. Also, the permission of the ethics committee of a university and the institution where the study would be conducted was obtained (24.04.2019/61).

RESULTS

Validity of the MSSM

Language validity

The language validity process of the MSSM-R included the back-translation method. The scale was translated into Turkish by three people who had a good command of both English and Turkish languages. The appropriateness of each item of the scale translated into Turkish was examined by the researchers. Later, it was translated back into English by a translator. The translated items were compared to the items on the original scale, and inappropriate items were revised. The Turkish version of the translated scale and the English of the original scale were evaluated in terms of meaning, and language validity was achieved.

Content validity

A scale presentation form was created for the content validity index of MSSM-R (CVI), it was submitted to the opinions of 10 nurse academicians, and feedback was received from 8 academicians. To evaluate the consistency of the items and determine their intelligibility, the experts were asked to score each item between 1

and 4 points. In line with the feedback received from the experts, necessary corrections were made to the items, and the Turkish form of the scale was finalized. The CVI of the scale was .927, which is considerably high.

Construct validity

In the study, the most frequently used goodness of fit indices in studies in the literature was used. The goodness of fit index values for the

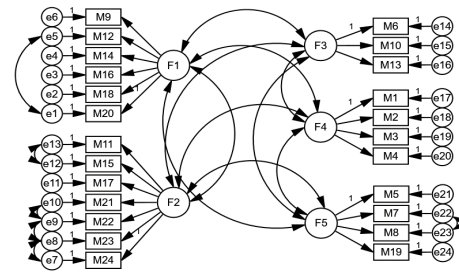


Figure 1. Diagram of Confirmatory Factor Analysis

Table 1. The goodness of fit index values for confirmatory factor analysis

Index	Normal value	Acceptable range	Value
χ^2/sd	<2	<5	2.05
GFI	>.95	>.90	.90
AGFI	>.95	>.90	.91
CFI	>.95	>.90	.90
RMSEA	<.05	<.08	.07
RMR	<.05	<.08	.05

χ^2/sd (Chi-Square/Degree of Freedom Ratio), GFI (Goodness of Fit Index), AGFI (Adjusted Goodness of Fit Index), CFI (Comparative Fit Index), RMSEA (Root Mean Square Error of Approximation), RMR (Root Mean Square Residual)

confirmatory factor analysis is given in Table 1.

Standardized factor loads, t values, and explanatory (R^2) values of the items are given in Table 2.

The reliability of the MSSM

Internal Consistency

A reliability analysis was conducted for the scale, and Cronbach's Alpha coefficient was found as .88.

Item total correlation

Item-total correlation values of the items on the scale varied between .40 and .72. The internal consistency coefficients (Cronbach's Alpha) obtained when the items were deleted one by one ranged between .87 and .88, and these values did not show much deviation from the overall internal consistency value of .88. As a result of the analysis of the items, no items were excluded from the scale (Table 3).

Test-retest reliability

In the study, the scale was administered to 30 people at a two-week interval to examine the inter-rater consistency. Test-retest reliability of the scale items was tested with paired samples t-test and correlation analysis. According to the results obtained, it was determined that the retest measurements did not show a significant difference but had a high correlation. According

Table 2. Factor loads

Items		Factors	β	Std. β	S. Error	t	p	R ²
M20	<---	F1	1.000	.717				.575
M18	<---	F1	.912	.723	.102	8.976	p<.001	.465
M16	<---	F1	.975	.782	.101	9.689	p<.001	.455
M14	<---	F1	1.218	.834	.118	10299	p<.001	.384
M12	<---	F1	1.168	.794	.142	8.246	p<.001	.558
M9	<---	F1	1.019	.720	.114	8.934	p<.001	.476
M24	<---	F2	1.000	.451				.487
M23	<---	F2	1.254	.556	.305	2.443	.015	.561
M22	<---	F2	.945	.541	.359	2.122	.030	.502
M21	<---	F2	.925	.488	.455	2.034	.042	.765
M17	<---	F2	2.433	.762	.772	-3.151	.002	.615
M15	<---	F2	3.060	.902	.971	-3.153	.002	.487
M11	<---	F2	2.108	.698	.690	-3.056	.002	.814
M6	<---	F3	1.000	.784				.581
M10	<---	F3	1.006	.874	.084	11.914	p<.001	.566
M13	<---	F3	.847	.708	.090	9.425	p<.001	.522
M1	<---	F4	1.000	.749				.517
M2	<---	F4	.867	.558	.130	6.653	p<.001	.539
M3	<---	F4	1.007	.690	.123	8.192	p<.001	.518
M4	<---	F4	1.043	.747	.118	8.803	p<.001	.631
M5	<---	F5	1.000	.620				.695
M7	<---	F5	.872	.566	.150	5.830	p<.001	.612
M8	<---	F5	.865	.515	.160	5.392	p<.001	.523
M19	<---	F5	1.265	.758	.178	7.098	p<.001	.513

to this finding, the items on the scale showed internal consistency according to the responses received.

DISCUSSION

The back-translation method was employed for the language validity of the scale. The Turkish version of the translated scale and the English of the original scale were evaluated in terms of meaning, and language validity was achieved.

Content validity means that a measurement tool is free from the effects of factors. It is conducted in order to evaluate whether the overall scale and sub-dimensions measure the intended domains and express different concepts. Expert opinion is consulted to calculate the content validity. The qualifications and number of experts (between 5 and 40) are of great importance in obtaining

objective results in content validity calculations (Yeşilyurt and Çapraz, 2018). The feedback of 8 academicians was received for the content validity index of the MSSM-R (CVI). CVI was calculated by dividing the number of experts who gave 3 or 4 points to each item on the scale to the total number of experts, and it was decided that the content of the Turkish form of the scale was appropriate. The CVI of the scale was found to be .92, which is higher than the generally accepted standard level (.80 and above). Experts reached a consensus on all items on the scale.

Confirmatory factor analysis (CFA) was employed to evaluate the construct validity of MSSM. CFA is a type of structural equation model (SEM) that can measure the relationship between observed variables and latent variables (Tang, et al., 2024). It explains the result

Table 3. Item analysis

	Scale score when the item is deleted	Variance when the item is deleted	item total correlation	Cronbach's alpha when the item is deleted
M1	87.04	264.397	.580	.881
M2	87.40	267.028	.424	.884
M3	87.15	264.405	.524	.882
M4	87.04	263.290	.581	.881
M5	87.34	263.405	.507	.882
M6	87.41	255.816	.641	.878
M7	87.53	265.191	.489	.883
M8	87.68	265.695	.430	.884
M9	87.63	257.436	.646	.878
M10	87.32	255.481	.728	.877
M11	86.95	262.795	.640	.880
M12	87.47	256.715	.636	.879
M13	87.51	259.275	.604	.880
M14	87.36	255.754	.664	.878
M15	87.12	262.907	.559	.881
M16	87.09	258.301	.720	.877
M17	86.99	263.827	.573	.881
M18	87.14	262.170	.605	.880
M19	87.51	258.180	.612	.879
M20	87.24	259.816	.597	.879
M21	88.18	280.766	.457	.884
M22	88.25	276.212	.511	.882
M23	88.98	284.387	.533	.885
M24	88.98	290.089	.409	.886

obtained from the scale and what this result is related to. It is about how accurately the scale items measure the targeted properties. In scale adaptation studies, the factor structure of the scale is compared with the factor structure of the original scale, and similarities and differences are evaluated. In adapting a scale to another language, it is expected that the factor structure of the scale does not change much. CFA allows the evaluation of fit indices showing model and data fit (Francis, et al., 2024). In the study, the most frequently used goodness of fit indices in studies in the literature was used. The fit index values obtained in the study showed that the data obtained from the model and the sample had a fairly good fit. The results of the analysis indicated that the fit statistics calculated with

the confirmatory factor analysis were consistent with the previously determined factor structure of the scale at an acceptable range.

When the standardized coefficients were examined, it was determined that the factor loads were high, the standard error values were low, and that the t values were significant. These results confirmed the construct validity relating to the previously determined factor structure.

Reliability analysis was conducted to determine the internal consistency of the scale. The reliability analysis shows whether the items on the scale are consistent with each other and with the overall scale. It also determines whether individuals understand the expressions on the scale in the same way. Reliability is the consistency between participants' responses

to scale items (Buyukozturk, 2024). In the literature, the reliability (internal consistency) of a scale is commonly determined with the Cronbach's Alpha coefficient (Ozdamar, 2017). In our study, the reliability analysis of the scale was conducted, and Cronbach's Alpha coefficient was found to be .88, proving the scale is quite reliable.

The item-total correlation was used to assess the consistency of each item with the overall scale. This analysis indicates how well each item reflects the construct measured by the total score (Kalaycı, 2017). Responses to the items are expected to have a positive correlation with items and the overall scale. This shows that the participants understand the statements correctly and give objective answers. When the correlation coefficient of an item on a scale with the item total is 0.3 or above, this indicates a high discriminating power (Buyukozturk, 2024). The high correlation of each item with the overall scale score shows the consistency of the measuring tool. The correlation coefficient is determined by "r", and its values vary between 0 and 1. The closer the correlation value approaches 1(±1.00), the higher the reliability is (Tekeş and Hasta, 2015). As a result of the evaluation of the item analysis, no items were removed from the scale.

Test-retest reliability is performed to evaluate the time-dependent invariance of the test. In other words, the process of administering a test to the same group after a certain period of time is a method used to determine the reliability of the related test (Ozdamar, 2017). To administer the retest, there must be at least two and at most four weeks between the first and second measurements. Test-retest reliability is recommended to be administered to at least 30 people. In our study, the scale was administered to 30 individuals at a 2-week interval to examine

inter-rater consistency. Test-retest reliability of scale items was tested with paired samples t-test and correlation analysis. According to the results obtained, it was determined that the retest measurements did not show a significant difference and had a high correlation.

Limitations

The limitation of this study is that it is difficult to reach the sufficient number of samples.

IMPLICATIONS FOR PRACTICE

The MSSM, which is originally in English and was adapted to Turkish society, was consistent with its original form in terms of having 24 items and 5 subscales. This scale is a highly valid and reliable tool in evaluating the self-management of individuals with multiple sclerosis in Turkish society.

Conflicts of Interest

No potential conflicts of interest were declared by the authors.

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Author Contributions

Concept: NE, ATT, Design: NE, ATT, Supervising: NE, Financing and equipment: NE, ATT, Data collection and entry: NE, ATT, Analysis and interpretation: NE, ATT, Literature search: NE, ATT, Writing: NE, Critical review: NE.

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