Validity and reliability of the Iranian-developed version of the leisure questionnaire for people with multiple sclerosis: Psychometric properties

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Abstract

Background: An effective and reliable assessment tool is essential for evaluating the leisure activities of patients. The purpose of this study is to assess the validity and reliability of the Iranian-developed version of leisure questionnaire for people with multiple sclerosis (MS).

Methods: Psychometric methods were used to assess face, content, differential, and convergent validity, as well as test-retest reliability. The study used SPSS software to enter data and assessed content validity using descriptive characteristics and the intraclass correlation coefficient (ICC) based on ratings by experts. Independent t-tests and analysis of variance (ANOVA) were used to analyse the differential validity, while the Pearson test was used to analyse the convergent validity by comparing it with the Nottingham Leisure Questionnaire (NLQ). The study calculated the reliability of the questionnaire using the paired t-test and ICC.

Results: The subjects were 60 patients with MS. The content validity analysis showed a single measure validity coefficient of 0.158 and an average measure coefficient of 0.751, both of which were statistically significant. The results of the differential validity analysis for the entire questionnaire were also significant (t = -3.058, P = 0.003). Additionally, the convergent validity and reliability of the questionnaire were 0.92 and 0.82, respectively.

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Conclusion: The 50-item leisure questionnaire designed for patients with MS demonstrated good validity and reliability. Therefore, it can be used as an effective research tool for exploring the leisure activities of individuals with MS.

Introduction

Patients with multiple sclerosis (MS) often experience a decrease in work engagement as their disability progresses, resulting in increased amounts of leisure time. This leisure time can be harnessed to help alleviate common MS symptoms such as depression, stress, anxiety, and fatigue. The concept of leisure has been defined by various researchers over the years, with Hall (1923), a renowned occupational therapist, describing leisure as gaining peace in any way that pleases the individual. Hall contrasted leisure with idleness, noting that idleness can cause long-term detriment to the soul, weaken the body, and lead to increased resentment.[1] The first edition of the Uniform Terminology for Occupational Therapy introduced the concept of leisure/play, defining it as the selection, engagement, and participation in activities that provide amusement, relaxation, spontaneous enjoyment, and self-expression.[2]

Research has shown that leisure is commonly defined in terms of time, activity, and state of mind. However, many existing definitions tend to focus on the activity dimension of leisure, describing it as a form of entertainment and encompassing activities such as playing board games, knitting, watching television, and swimming. This definition, similar to those that refer to leisure in terms of time, conceptualizes leisure as an objective and observable behaviour.[3]

Activities and tasks can be classified according to specific definitions.[4] Leisure, as a distinct category of activities, is often considered alongside other categories such as work, self-care, compulsory activities, and family responsibilities. Researchers have employed this approach to leisure as an activity in numerous studies,[5-7] documenting the types of leisure activities individuals engage in, as well as the frequency of engagement and preferences for certain activities over others.

A review of previous literature reveals a range of leisure tools developed to evaluate recreational activities in healthy individuals[8-10] and the elderly.[11,12] Conversely, several researchers have designed specific leisure assessment tools for patients. For instance, the Nottingham Leisure Questionnaire (NLQ) was developed for patients

with stroke[13] but has also been utilized in other patient populations.[14] Other questionnaires designed for patients include the leisure participation scale for those with chronic fatigue[15] and the patient-specific leisure scale for individuals with rheumatoid arthritis,[16] both of which have been found to be valid and reliable. However, a search for reliable leisure measurement tools specifically for patients with MS did not yield any results. Therefore, the current study sought to validate and establish the reliability of a leisure questionnaire for individuals with MS. Furthermore, a search for leisure measurement tools specifically designed for individuals in Iranian culture[17] did not yield any relevant psychometric surveys for healthy individuals. Therefore, the present study aims to establish the validity and reliability of a leisure questionnaire specifically designed for individuals with MS.[18]

Materials and Methods

The present study employed a psychometric property method, and the statistical population consisted of patients with MS in Hamadan, Iran. The sample was selected using a convenience sampling technique. The inclusion criteria for patients during all stages of the study were a definitive diagnosis of MS, being over the age of 18, and the absence of any concomitant disease with MS, as determined by a neurologist. Additionally, patients were required to have the ability to speak and communicate in Persian effectively, as well as a willingness to participate in the study. Patients who expressed an unwillingness to continue participating at any stage of the research implementation were excluded from the study.

Estimated sample size based on the differential validity and the following values was calculated to be 59 subjects for each group, according to G*Power software:

$$\text{Significance } (\alpha) = 0.05, \text{ effect size } (d) = 0.5, \text{ power } (1 - \beta) = 0.85.$$

Prior to data collection, the research objectives and methods were thoroughly explained to the participants, and written consent was obtained as required. Questionnaires were used to collect data individually from patients with MS who had sought treatment at Sina Hospital, Imam Khomeini Clinic, and the Association of MS Patients in Hamadan during the year 2020.

The leisure questionnaire utilized in this study was developed by Hosseini et al. specifically for

patients with MS and tailored to Iranian culture. The questionnaire items were obtained through interviews with patients and using the classical method of psychometrics. The results of the questionnaire factor validation, both exploratory and confirmatory, revealed five distinct factors: difficult, social, spiritual/religious, outdoor-physical, and cultural-artistic activities.[8]

Study procedures and outcome measures: Comprehensive socio-demographic data of the participants were meticulously collected. Furthermore, the participants were then instructed to complete the leisure questionnaire. Subsequently, the participants diligently filled out the comparator scale as described below, adhering to the provided instructions.

To evaluate the leisure questionnaire, the authors formulated the following research questions: Are the leisure questionnaire items clear and easily understandable for patients? Are the items of leisure questionnaire relevant and appropriate for assessing leisure activities, as determined by the expert panel's opinion? Is there a moderate to strong correlation between the responses to leisure questionnaire items after a two-week interval? Does the questionnaire have the ability to distinguish between healthy and disabled individuals? Do the results of leisure questionnaire show a moderate to good correlation with other questionnaire, such as Nottingham Leisure Questionnaire, that assesses the level of leisure activity?

The NLQ is a 30-item questionnaire developed by Drummond et al.[13] It is scored based on a 3-point scale, with 0 representing "never", 1 representing "occasionally", and 2 representing "regularly". The validity and reliability coefficients of this instrument were found to be optimal for people with stroke. The test-retest reliability coefficient of the NLQ was assessed using kappa and was found to be excellent for 6 agreement items, good for 15 items, and acceptable for 9 items. Moreover, the score of this instrument displayed a positive and significant correlation with the Nottingham Extended Activities of Daily Living (EADL) Scale.[13]

Face validity assessment: After completing the leisure questionnaire, patients were invited to share their understanding of each question. The researcher then assessed whether their interpretation aligned with the intended purpose of the question, considering it as correctly understood by the patient. Next, the researchers

calculated and recorded the percentage of participants whose interpretations of a specific question deviated from its true purpose, referred to as the misunderstanding index. If the misunderstanding index for any item exceeded 20%, it would indicate the need for modifying the wording in the questionnaire.

Content validity assessment: After extracting questions from previous studies,[19,20] 16 experts with experience in various fields related to patients with MS, including medicine, physiotherapy, occupational therapy, social work, welfare and health, nursing, speech therapy, and neurology, were asked to rate the relevance of each question to the concept and factors of leisure using an 11-point scale (ranging from zero to 10). The data obtained from the experts were analysed using descriptive statistics and the intraclass correlation coefficient (ICC). Additionally, the expert panel members were requested to assess and rate each question using four Likert scales including 1: not relevant, 2: unable to assess relevance without item revision, 3: relevant but needing minor alteration, 4: very relevant. Then, the content validity index (CVI) was computed for each question by determining the fraction of experts who selected ratings 3 and 4 in relation to the total number of experts.[21]

Differential validity assessment: It was established by selecting a sample of 60 patients with MS (mean age = 35.37 ± 8.83 years, mean duration of diagnosis = 6.46 ± 5.51 years) and a sample of 60 healthy individuals (mean age = 34.22 ± 13.63 years) using a convenience sampling method. Table 1 displays the socio-demographic characteristics of the participants. The mean of the factors was compared using multivariate analysis of variance (MANOVA), while Student's t-test was utilized for the mean of the questionnaire total score. Characteristics of MS symptoms are presented in table 2.

Convergent validity assessment: It refers to the extent to which different measures used to assess the same general construct have strong correlations.[22] To examine convergent validity in this study, we evaluated the correlation between the research questionnaire and the NLQ. To evaluate convergent validity and the relationship between leisure components, Pearson correlation coefficient was used.

Reliability assessment: To assess the reliability of the questionnaire, the test-retest method was used. Specifically, 50 patients with MS completed

the leisure questionnaire.

Table 1. Socio-demographic characteristics of participants (n = 60)

Variable	Patients [n (%)]	Healthy people [n (%)]
Gender		
Women	52 (86.7)	44 (73.3)
Men	8 (13.3)	16 (26.7)
Education		
Illiterate	3 (5.0)	2 (3.3)
Under high school degree	3 (5.0)	4 (6.7)
High school graduate	27 (45.0)	16 (26.7)
Associate degree	18 (30.0)	3 (5.0)
Graduate	6 (10.0)	14 (23.3)
Postgraduate	3 (5.0)	21 (35.0)
Marital status		
Single	12 (20.0)	25 (14.7)
Married	40 (66.7)	33 (55.0)
Divorcee	6 (10.0)	-
Widow	2 (3.3)	2 (3.3)
Job status		
Employed	8 (13.3)	29 (48.3)
Unemployed	10 (16.7)	4 (6.7)
Retired	2 (3.3)	2 (3.3)
Housewives	36 (60.0)	11 (18.3)
Student	4 (6.7)	14 (23.3)

Two weeks later, the same patients were asked to complete the questionnaire once again. The reliability was calculated by performing a paired t-test and then using the ICC. Finally, the internal consistency of the whole questionnaire was measured using Cronbach's alpha.

Table 2. Characteristics of multiple sclerosis (MS) symptoms

Variable		n (%)
Type of MS	Relapsing remitting	31 (51.6)
	Secondary progressive	27 (45.0)
	Primary progressive	2 (3.4)
Disease duration (year)	< 1	2 (3.3)
	1-2	7 (11.7)
	2-3	5 (8.3)
	> 3	46 (76.7)

MS: Multiple sclerosis

The statistical analyses were conducted using SPSS software (version 21, IBM Corporation, Armonk, NY, USA) in all parts of study. The study protocol received approval from the Ethics Committee of Hamadan University of Medical Sciences (ethics code: IR.UMSHA.REC.1397.437).

Results

Face validity: The face validity of the questionnaire was assessed using the misunderstanding index. It was found that the misunderstanding index for each item was less than 20%. Additionally, participants took approximately 12 minutes on average to complete the questionnaire.

Content validity: The questionnaire used to describe the characteristics of the experts' ratings received a median score ranging from 7 to 10. Moreover, based on the experts' opinions, 50 questions scored a median score higher than 8, indicating a great degree of strength in terms of content and compliance with definitions.

The intraclass correlation was used to ensure the reliability of the raters. It measures the ratio of between-group variance to the total variance. If there is no variance between the components, the coefficient will be equal to one, indicating complete reliability between the ratings.

The single measure validity coefficient was found to be 0.158, indicating an average level of homogeneity in rater scores (lower bound: 0.099, upper bound: 0.249, P = 0.001). The average measure validity coefficient, which is akin to the Cronbach's alpha coefficient, uses the average of all ratings or scores as the unit of analysis. The value of this coefficient was 0.751 (lower bound: 0.637, upper bound: 0.841, P = 0.001), which was statistically significant, and suggests a good level of internal homogeneity among the raters in the present study.

In addition, in order to assess the content validity, the CVI was calculated for each question, and the CVI for all leisure questions exceeded the required threshold (CVI > 0.79).

Differential validity: To evaluate the differential validity, a comparison was made between the means of two groups: healthy individuals and patients with MS, obtained from the leisure questionnaire. Table 3 displays the results of this comparison.

The analysis of variance (ANOVA) model characteristics revealed that the multivariate F based on Wilks' lambda was equal to 2.83, which was statistically significant at the $P < 0.05$ level. The statistical characteristic for equality of variances of the two groups in the total score, as assessed by Levene's test, showed a value of 0.49, which was not statistically significant. Therefore, the conditions required for interpreting the t-test were met.

Mean and standard deviation (SD) estimates were calculated for each factor and the entire questionnaire for both healthy individuals and patients with MS.

Table 3. Summary of t-test and analysis of variance (ANOVA) in differential validity

Factor	Patients (mean ± SD)	Healthy people (mean ± SD)	F/f	P
Difficult	21.09 ± 5.74	24.68 ± 5.73	11.813	0.001
Social	21.38 ± 5.54	31.22 ± 5.77	7.533	0.007
Spiritual/religious	15.73 ± 3.67	16.33 ± 5.88	0.449	0.504
Outdoor-physical	15.35 ± 3.66	16.65 ± 2.94	4.597	0.034
Cultural-artistic	13.47 ± 3.61	13.49 ± 5.42	0.000	0.984
Total	94.02 ± 15.74	102.37 ± 14.13	-3.058	0.003

SD: Standard deviation

The analysis of means revealed that the difficult, social, and outdoor-physical factors showed significant differences between the two groups, while no significant differences were observed for the spiritual/religious and artistic/cultural factors. Furthermore, there was a significant difference in the mean of the entire questionnaire (t = -3.058, P = 0.003). In summary, the questionnaire used in this study was found to be effective in differentiating between the leisure activities of healthy individuals and patients with MS.

Convergent validity: The results indicated that the correlation between the total score of the developed questionnaire and the NLQ was 0.92, which indicates high convergent validity for the leisure questionnaire.

Reliability: The paired t-test was used to assess the test-retest reliability of the questionnaire, and the results showed a value of 0.826 for single measure validity (lower bound: 0.713, upper bound: 0.897, P = 0.001) and 0.905 for average measure validity (lower bound: 0.833, upper bound: 0.946, P = 0.001). Further analysis was conducted using the ICC test.

The single measure validity coefficient for the rater scores was found to be 0.826, which was statistically significant and indicated a good level of homogeneity. Similarly, the average measure validity coefficient, which is akin to the Cronbach's alpha coefficient, computed using the average of all ratings or scores was found to be 0.905. This coefficient was statistically significant and demonstrated an excellent level of internal homogeneity among the patient scores.

Discussion

The 50-item leisure questionnaire for patients with MS includes five factors: difficult, social, spiritual/religious, outdoor-physical, and cultural-artistic, with 14, 12, 8, 7, and 9 items, respectively. The items were scored based on a Likert scale. The content validity of the questionnaire was assessed, and the results indicated good content validity. In other words, the experts found the content of the items to be suitable for measuring the leisure activities of patients with MS.

The convergent validity of the total scores of the leisure questionnaire for patients with MS was established by examining its consistency with the NLQ. The results showed that the leisure questionnaire was able to assess the leisure activities of patients with MS effectively and consistently. Previous studies have also utilized the NLQ to assess the leisure of patients with MS.[23,24] The questionnaire was also assessed for its differential validity, which demonstrated its ability to differentiate patients with MS from healthy individuals. Specifically, the scores of healthy individuals differed significantly from those of patients with MS. However, the sub-scales for the spiritual/religious and cultural-artistic factors did not show significant differences between the two groups, indicating that the frequency of these leisure activities is similar between healthy individuals and patients with MS.

The good test-retest reliability of this questionnaire suggests that if the questionnaire is completed by individuals at the appropriate time interval, it can effectively detect changes in the number of leisure activities of patients with MS. The questionnaire is, therefore, considered reliable. The time required for patients with MS to complete the questionnaire in the present study was 15-20 minutes.

One limitation of this study is the possibility of response bias, which may have influenced the findings. Various studies have shown that specific biases related to gender, age, culture, and other factors can impact responses to items. Therefore, some patients may have reported their attitudes more or less accurately in the present study. Another limitation is that due to the nature of MS, the number of female participants was higher than male participants, which may limit the generalizability of these findings, particularly for men. Other limitations of study are small sample size, convenience sampling method, self-report

bias, and cultural specificity; therefore, caution should be exercised when applying these findings to the wider population.

To confirm the comprehensive use of this questionnaire in the future, further investigation of its psychometric properties in other groups of patients with neurological disorders such as stroke, concussion, spinal cord injuries, Parkinson's disease, amyotrophic lateral sclerosis (ALS), and chronic fatigue syndrome is necessary. This will provide additional evidence for the validity and reliability of the questionnaire and expand its potential applications beyond the MS population.

Conclusion

The leisure questionnaire for patients with MS has demonstrated acceptable levels of content validity, differential validity, convergent validity, and retest reliability. Therefore, it can be considered a useful tool for future research related to the leisure activities of patients with MS. Its use can help to further develop our understanding of the leisure experiences of this population and potentially inform the development of interventions aimed at improving their quality of life.

Conflict of Interests

The authors declare no conflict of interest in this study.

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