

Validity and Reliability of the Greek Version of the Multiple Sclerosis International Quality-of-Life Questionnaire

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Background and Purpose There are no data regarding psychometrically validated, health-related quality-of-life instruments designed specifically for patients with multiple sclerosis (MS) in Greece. Recently, the MS International Quality-of-Life questionnaire (MusiQoL), a multidimensional, self-administered questionnaire, which is available in 14 languages (including Greek), has been validated using a large international sample. We investigated the validity and reliability of the Greek version of the MusiQoL.

Methods Consecutive patients with different types and severities of MS were recruited from two tertiary-care centers in Greece. All patients completed the MusiQoL, the Short-Form-36 quality-of-life questionnaire (SF-36), and a symptom checklist at baseline and 21±7 days (mean±SD) later. Data regarding sociodemographic status, MS history, and functional outcome were also collected prospectively. Construct validity, internal consistency, reproducibility, and external consistency were tested.

Results A total of 92 patients was evaluated. The construct validity was confirmed in terms of satisfactory item-internal consistency correlations and scaling success (87.5-100%) of item-discriminant validity. The dimensions of the MusiQoL exhibited high internal consistency (Cronbach's alpha: 0.63-0.96), and reproducibility was satisfactory (intraclass correlation coefficients: 0.69-0.99). External validity testing indicated that the MusiQoL correlated significantly with all SF-36 dimension scores (Spearman's correlation: 0.43-0.76).

Conclusions The Greek version of the MusiQoL appears to be a valid and reliable instrument for measuring quality of life in Greek MS patients. **J Clin Neurol 2009;5:173-177**

Key Words epilepsy, quality of life, questionnaire, Greece.

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Introduction

Multiple sclerosis (MS) is a chronic progressive disease with multiple neurological and psychological impairments that lead to disability and require ongoing care.¹ The goal of evidence-based medicine in the treatment of conditions such as MS, which produce morbidity but have a minimal impact on mortality, is arguably to reduce the impact of the disease on patients' lives and to ensure that any interventions do in fact improve their quality of life. These goals can only be achieved with input from the patients themselves. There is clear evidence that MS has a significant negative impact on health-related quality of life (HRQoL).^{2,3} The purpose of incorporating routine HRQoL data into clinical practice is to provide a com-

prehensive assessment of a patient's health status from his or her perspective. However, the major challenge in developing an HRQoL questionnaire is to ensure that the subject's perceptions are accurately taken into account.⁴

Whilst the measured HRQoL is considered an important outcome in population health assessments evaluating treatments and managing care,⁵ there are virtually no data regarding psychometrically validated HRQoL instruments designed specifically for patients with MS in Greece. Recently, the MS International Quality of Life questionnaire (MusiQoL), a multi-dimensional, self-administered questionnaire that is available in 14 languages (including Greek), has been validated using a large international sample.⁶ During this validation process, 1,992 patients were recruited from neurological de-

partments in 15 countries, including Greece. The validity and reliability of the Greek (translated) version of the MusiQoL were thus evaluated in this study using a sample of patients recruited from Greek tertiary-care centers.

Methods

Study population

The patients enrolled in the MusiQoL validation study comprised a group of in- and outpatients who were being followed up in an international multicenter study. The patients were recruited between January 2004 and February 2005 from neurological departments in 15 countries, including Greece. Two tertiary-care Greek university centers participated in this study (one in Athens, one in Thessaloniki). The details of this study have been presented elsewhere.¹ MS was diagnosed according to Poser⁷ or MacDonald criteria.⁸ The study was conducted in accordance with the Helsinki Declaration of Human Rights and all included patients gave their informed consent to participate. The main inclusion criteria were 1) MS diagnosed at least 6 months previously, 2) age >18 years, 3) provision of signed informed consent, and 4) Greek being the native language. The main exclusion criteria were 1) a diagnosis other than MS, 2) a history of dementia, 3) currently suffering from a severe relapse, 4) inability to fill in the questionnaire unaided, and 5) withdrawal of consent.

Patient evaluation

All patients were evaluated at inclusion and then retested 21±7 days (mean±SD) later. The self-administered survey materials (completed by the patients) included the MusiQoL and the Short-Form 36 (SF-36),⁹ which is the most widely used general HRQoL scale in MS. The MusiQoL was completed during both the baseline and follow-up assessments.

Two experienced MS neurologists^{10,11} collected sociodemographic data and clinical history both related and unrelated to MS and its treatment. The neurologists also rated the following: Poser classification (mandatory), McDonald Classification (optional), the Expanded Disability Status Scale (EDSS),¹² the Kurtzke Functional Systems (KFS),¹³ the Ambulation Index for MS,¹⁴ the Folstein Mini-Mental State Examination,¹⁵ and a Clinical Global Impression of Severity (CGI).¹⁶ The CGI questionnaire was coded as mild, moderate, or severe. At retest, patients completed the same questionnaire and one additional item assessing changes in their health status. The neurologists collected data on current care and again rated the EDSS, KFS, and CGI. They also compared the patient's health status with that reported at inclusion (i.e., baseline), and ranked it as worsened, remained stable, or improved. Finally, at retest all patients self-reported whether there

was any evolution (e.g., no evolution, improvement, or deterioration) in their clinical status.

Statistical analyses

Detailed statistical analyses testing the MusiQoL for internal structural validity, internal consistency, unidimensionality, reproducibility, and external validity have been described elsewhere.⁶ In brief, item-internal consistency (IIC) was assessed by correlating each item with its scale, which was corrected for overlap (correlation of ≥0.4 recommended for supporting IIC). Item-discriminant validity (IDV) was assessed by determining the extent to which items correlate more strongly with the dimensions they are hypothesized to represent than with the other dimensions. The internal consistency reliability of each potential dimension scale was assessed by Cronbach's alpha coefficient (alpha coefficient of at least 0.7 expected for each scale). The unidimensionality of each dimension was assessed using Rasch analyses. The scalability of each of the dimension scales was assessed by the pattern of item goodness-of-fit statistics (INFIT); INFIT values ranging between 0.7 and 1.2 ensure that all items of the scale tend to measure the same concept. Reproducibility was assessed as the test-retest reliability using intraclass correlation coefficients between the two successive assessments. To explore external validity, relationships were investigated between specific potential dimensions of the MusiQoL (e.g., symptoms and psychological well-being) and other instruments such as the SF-36, and corresponding Spearman's correlation coefficients (*r*) were computed. Data analyses were performed using SPSS 11.0, MAP-R, LISREL, and WINSTEP software.⁶

Results

A total of 92 subjects was recruited from the two Greek tertiary-care centers. The baseline characteristics of the study population are presented in Table 1. All patients had clinically defined MS according to Poser criteria, and almost 80% of them had the relapsing-remitting clinical form. None of the patients had a clinically isolated syndrome according to the MS classification.

The MusiQoL comprised 31 items describing the following 9 dimensions:

- 1) Activities of daily living (ADL), comprising eight items and accounting for 81.9% of the variance.
- 2) Physical well-being (PWB), comprising four items and accounting for 9.1% of the variance.
- 3) Symptoms, comprising three items and accounting for 3.5% of the variance.
- 4) Relationships with friends, comprising four items and accounting for 2.4% of the variance.

5) Relationships with family, comprising three items and accounting for 1.6% of the variance.

6) Relationship with health-care system, comprising three items and accounting for 0.3% of the variance.

7) Sentimental and sexual life, comprising two items and accounting for 0.7% of the variance.

8) Coping, comprising two items and accounting for 0.5% of the variance.

9) Rejection, comprising two items and accounting for 0% of the variance.

The construct validity was confirmed in terms of satisfactory IIC (Table 2) correlations and the scaling success of IDV (Table 2). The IIC correlations ranged between 0.42 and 0.86 (with the exception of trait “being satisfied with your treatments”, for which the IIC correlation was 0.31) and IDV ranged from 87.5% to 100%. The Loevinger coefficient (*H*) analyses confirmed the unidimensionality of each dimension (*H* range: 0.41-0.88)(Table 3).

Dimensions of the MusiQoL showed high internal consistency, with Cronbach’s alpha coefficients ranging from 0.63

Table 1. Baseline characteristics of the study population (n=192)

Variable	Value
Gender (n, %)	
Male	60 (65%)
Female	32 (35%)
Age (mean±SD, years)	40.2±13.9
Poser classification (n, %)	
Clinically defined MS	92 (100%)
Laboratory defined MS	0 (0%)
Clinically probable MS	0 (0%)
Clinical form (n, %)	
Relapsing-remitting	74 (80.4%)
Secondary progressive	16 (17.4%)
Primary progressive	2 (2.2%)
Clinically isolated syndrome	0 (0%)

MS: multiple sclerosis.

Table 2. Dimension scale characteristics

Dimension (n of items)	IIC (min-max)	IDV (min-max)	IDV (%)	MV (%)	Floor (%)	Ceiling (%)
ADL (8)	0.62-0.86	-0.11-0.63	100.0	3.3	3.3	3.3
PWB (4)	0.62-0.73	-0.03-0.53	100.0	0	1.1	2.2
RFr (3)	0.55-0.72	-0.18-0.35	100.0	14.1	2.2	5.4
SPT (4)	0.42-0.67	-0.03-0.43	96.9	2.2	0.0	25.0
RF (3)	0.54-0.70	-0.08-0.34	100.0	4.3	1.1	28.3
RHCS (3)	0.31-0.45	-0.07-0.63	87.5	4.3	0.0	25.0
SSL (2)	0.84	-0.01-0.31	100.0	14.1	6.5	17.4
COP (2)	0.86	0.17-0.54	100.0	7.6	15.2	8.7
REJ (2)	0.86	0.17-0.65	100.0	19.6	4.3	31.5

ADL: activities of daily living, PWB: physical well-being, RFr: relationships with friends, SPT: symptoms, RF: relationships with family, RHCS: relationship with health-care system, SSL: sentimental and sexual life, COP: coping, REJ: rejection, IIC: item-internal consistency, IDV: item-discriminant validity, MV: percentage of missing values, Floor: floor effect, Ceiling: ceiling effect.

to 0.96 (Table 4). Reproducibility was defined with regard to stable patients between test and retest according to either the answer of the patient or the assessment made by the physician using CGI. Overall, the reproducibility was satisfactory with intraclass correlation coefficients ranging from 0.69 to 0.99 and from 0.72 to 0.99 for patients’ answers and physi-

Table 3. Unidimensionality of each dimension

Dimension (n of items)	<i>H</i>	INFIT
ADL (8)	0.74	0.80-1.27
PWB (4)	0.66	0.79-1.16
RFr (3)	0.67	0.76-1.27
SPT (4)	0.50	0.74-1.36
RF (3)	0.52	0.72-1.24
RHCS (3)	0.41	0.84-1.16
SSL (2)	0.88	0.95-0.99
COP (2)	0.78	0.97-0.99
REJ (2)	0.83	0.97

INFIT: pattern of item of goodness-of-fit statistics, *H*: Loevinger coefficient, ADL: activities of daily living, PWB: physical well-being, RFr: relationships with friends, SPT: symptoms, RF: relationships with family, RHCS: relationship with health-care system, SSL: sentimental and sexual life, COP: coping, REJ: rejection.

Table 4. Internal consistency of each dimension

Dimension (n of items)	Cronbach’s α
ADL (8)	0.95
PWB (4)	0.86
RFr (3)	0.83
SPT (4)	0.78
RF (3)	0.73
RHCS (3)	0.63
SSL (2)	0.92
COP (2)	0.86
REJ (2)	0.89

Cronbach’s α : Cronbach’s alpha coefficient. ADL: activities of daily living, PWB: physical well-being, RFr: relationships with friends, SPT: symptoms, RF: relationships with family, RHCS: relationship with health-care system, SSL: sentimental and sexual life, COP: coping, REJ: rejection.

ans' assessments, respectively (Table 5). External validity testing indicated that the MusiQoL correlated significantly but moderately with all SF-36 dimension scores (Spearman's correlation coefficient range: 0.43-0.76)(Table 6). Finally, ADL scores correlated strongly with SF-36 dimensions describing physical domains [physical functioning ($r=0.85$) and vitality ($r=0.69$)]. PWB also correlated strongly with the SF-36 mental-health dimension covering psychological issues ($r=0.68$).

Discussion

Our analyses demonstrated the construct validity, internal consistency, reproducibility, and external validity of the Greek

Table 5. Reproducibility of each dimension assessed by test-retest intraclass correlation coefficients (ICCs) by both patients (stability defined as no change in general health according to the answer of the patients) and physicians (stability defined as no change in the Clinical Global Impression of Severity)

Dimension (n of items)	Patient ICC	Physician ICC
ADL (8)	0.99	0.98
PWB (4)	0.89	0.87
RFr (3)	0.91	0.89
SPT (4)	0.69	0.72
RF (3)	0.75	0.78
RHCS (3)	0.98	0.98
SSL (2)	0.94	0.96
COP (2)	0.92	0.93
REJ (2)	0.92	0.87
Index	0.99	0.99

Index: Ambulation Index for MS.

ADL: activities of daily living, PWB: physical well-being, RFr: relationships with friends, SPT: symptoms, RF: relationships with family, RHCS: relationship with health-care system, SSL: sentimental and sexual life, COP: coping, REJ: rejection, MS: multiple sclerosis.

version of the MusiQoL. This study confirmed the process of validation of the MusiQoL version translated into the Greek language and underscores its potential utility as an outcome measure in the clinical-trial setting. None of the previously available HRQoL instruments has been formally translated or validated in Greek patients with MS.

Despite HRQoL questionnaires having become an important outcome parameter in the population health assessment of neurological disorders, very few HRQoL instruments have undergone a formal process of validation in the Greek language.^{17,18} To the best of our knowledge no HRQoL questionnaire has been previously validated in MS patients in Greece. Our results for the construct validity, internal consistency, and reproducibility of the MusiQoL were similar to those of international patient samples. They are also in line with previous differential item functioning analyses that have yielded satisfactory results across countries.⁶ The present findings, in combination with those of the initial validation report,⁶ thus indicate a major strength of the MusiQoL; that is, the simultaneous process of validation in different countries around the world. Finally, they confirm that interviews with patients with MS contribute significantly to understanding patients with this condition,^{19,20} and underline the importance of translating and validating HRQoL instruments in a patient's native language in order to take into account national and ethnical disparities related to quality-of-life evaluations.^{21,22}

The following limitations of the present study need to be acknowledged:

- 1) The sample was relatively small ($n=92$) and not predetermined. However, our analyses demonstrating the validity and reproducibility of the MusiQoL in this limited number of patients underscore the robustness of this instrument.
- 2) Since no patients with clinically isolated syndrome and

Table 6. Spearman's correlations between MS International Quality-of-Life questionnaire (MusiQoL) and Short-Form 36 (SF-36) scores

MusiQoL	SF-36							
	PF	SF	RP	RE	MH	V	BP	GH
ADL (8)	0.85	0.74	0.77	0.61	0.46	0.69	0.32	0.48
PWB (4)	0.15	0.38	0.29	0.43	0.68	0.47	0.39	0.52
RFr (3)	0.02	0.14	0.07	0.07	0.27	0.21	0.07	0.19
SPT (4)	0.23	0.34	0.34	0.50	0.40	0.36	0.37	0.21
RF (3)	-0.03	0.13	0.10	0.19	0.42	0.47	0.26	0.37
RHCS (3)	0.44	0.45	0.49	0.44	0.42	0.47	0.26	0.37
SSL (2)	0.24	0.40	0.33	0.34	0.38	0.34	0.15	0.33
COP (2)	-0.01	0.31	0.24	0.35	0.56	0.31	0.17	0.31
REJ (2)	0.55	0.63	0.63	0.53	0.49	0.56	0.19	0.44
Index	0.43	0.69	0.66	0.73	0.76	0.70	0.17	0.49

Index: Ambulation Index for MS.

PF: physical functioning, SF: social functioning, RF: role, physical, RE: role, emotional, MH: mental health, V: vitality, BP: bodily pain, GH: general health, ADL: activities of daily living, PWB: physical well-being, RFr: relationships with friends, SPT: symptoms, RF: relationships with family, RHCS: relationship with health-care system, SSL: sentimental and sexual life, COP: coping, REJ: rejection, MS: multiple sclerosis.

only two patients with primary progressive MS were included in the present cohort, the potential applicability of the MusiQoL in these specific subgroups cannot be inferred on the basis of the present results.

3) The present study performed a retrospective analysis of prospectively collected data. Further research is required to test the strengths and weaknesses of the Greek version of the MusiQoL in a prospective fashion using a larger and more balanced (in terms of clinical subtypes of MS) sample. Indeed, our group plans to perform a prospective, independent study involving additional academic centers from Greece to evaluate the acceptability and compatibility of the Greek version of the MusiQoL in the clinical-practice setting. During that study we also plan to implement the MusiQoL in follow-up evaluations to explore and confirm its sensitivity to changes and to evaluate its potential applicability as a prognostic tool.

4) For the external validation of the MusiQoL we used the SF-36 questionnaire, which has not previously been validated in Greek patients with MS.

5) Testing of the external validity of the MusiQoL scores showed significant but moderate correlations with those of the SF-36. Although the former results are encouraging, further external validation studies utilizing some of the other available HRQoL instruments in MS^{23,24} may be needed to explore the external validity of the MusiQoL in a more robust fashion.

In conclusion, our findings indicate that the Greek version of the MusiQoL is a valid and reliable instrument with which to evaluate quality of life in Greek patients with MS. In the absence of any other validated HRQoL questionnaire in the Greek language, the MusiQoL appears to be a promising tool that can be readily applied as an outcome measure for evaluating treatment or managing care in Greek patients with MS.

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