

Reliability and validity of the Turkish version of myasthenia gravis-quality of life questionnaire-15 item

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Background/aim: The myasthenia gravis-quality of life questionnaire 15 item (MG-QOL15) is a validated, short, and easy to use disease-specific quality of life (QOL) tool in myasthenia gravis. Other than Turkish, a lot of versions of the MG-QOL15 have been used in different languages in different cultures. Therefore, the aim of this study was to translate and construct a validated and adapted Turkish version of the MG-QOL15 [MG-QOL15(T)].

Materials and methods: After translation, back-translation, and comparison of the 2 English versions of the MG-QOL15, it was tested by 22 monolingual healthy individuals and then 23 patients with clinically stable MG. Afterwards, 11 voluntary patients out of these 23 patients were interviewed for a second time. During the second interview, the MG-QOL15(T) and the 36-item short-form health survey (Turkish version) were administered simultaneously.

Results: The MG-QOL15(T) was found to have high internal consistency (1st and 2nd evaluation Cronbach's alphas were 0.958 and 0.928, respectively), test-retest reliability, and concurrent validity. The MG-QOL15(T) was negatively correlated with physical functioning, general health, vitality, and social functioning domains and with the physical and mental composite scores of the SF-36.

Conclusion: The MG-QOL15(T) is accepted to be a valid, reliable, valuable tool for measuring disease-specific QOL in Turkish patients with MG.

Key words: Myasthenia gravis, quality of life, questionnaire

1. Introduction

Myasthenia gravis (MG) is a chronic autoimmune disease that is generally treatable. It results in fatigue and fluctuating muscle weakness. Although some patients experience remission of variable duration, most experience a stable disease course characterized by muscle weakness that worsens with exertion and attenuates with rest. The residual myasthenic symptoms may negatively affect patients' perceived health-related quality of life (QOL) (1,2). The report of the QOL by the patients may influence therapeutic decisions and enable a better understanding of his/her demands, paving the way for optimal clinical support (3).

When the quality of life questionnaire is specific it could detect items relevant to the disease more easily. The myasthenia gravis-quality of life questionnaire 15-item scale (MG-QOL15) is one such questionnaire. It originated

from a list of 60 items covering specific features of health related-QOL in MG. It is a validated, short, useful, and easy to use tool for evaluating health related QOL that can inform the physician of the patient's perception of MG-related dysfunction (4,5).

To date, there has been no Turkish disease specific quality of life instrument validated for use in evaluating Turkish patients with MG. This study aimed to translate and construct a validated and adapted Turkish version of the MG-QOL15 [MG-QOL15(T)].

2. Materials and methods

2.1. Patients

The inclusion criteria for patients were as follows; (1) a diagnosis of ocular or generalized MG, based on a clinical examination and supported by the presence of acetylcholine receptor antibodies (AChRAb), a positive neostigmine test,

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and/or neurophysiologic evidence of a neuromuscular junction disorder (abnormal repetitive nerve stimulation or abnormal single-fiber electromyography studies), and (2) unchanged therapy during the 6 months preceding the study.

At the time of the study, there were 23 registered physically and cognitively intact patients with clinically stable MG in the outpatient clinic of the hospital of the Medical Faculty of Bülent Ecevit University who fulfilled the above-mentioned criteria. All of them were included in the study and given the MG-QOL15(T). Afterwards, for the evaluation of the test-retest reliability and validity, all of them were phoned and asked to come for a second evaluation, but only 11 of them volunteered to come on the scheduled day (15 days after the first interview). Therefore, the scores of 23 patients in the first interview were taken into consideration for the evaluation of the first internal consistency. As for the evaluation of test-retest reliability and construct validity the scores of the second interview of 11 patients were analyzed.

The study was reviewed and approved by the Bülent Ecevit University Clinical (No. 2012/03-15) and İstanbul Medipol University (No. 2015/03-136) noninterventional clinical research review boards. In addition, a written informed consent was obtained from each patient.

Clinical severity and classification were determined by the MG composite score (6,7) and the MG Foundation of America (MGFA) clinical classification (8), respectively.

2.2. The adaptation procedure

The original MG-QOL15 has 15 items. Each item is scored from 0 to 4 according to its frequency, scoring a maximum of 60. The higher the score, the worse is the perceived quality of life by the patient (4). In this study, at all stages of the adaptation, conceptual translation was considered more important than linguistic translation. Four associate professors from different fields of medicine who were fluent in English produced independent translations of the original MG-QOL15. Then they met as a group to agree on the translations that most adequately reflected the concept expressed by the English items. Next, this revised version was back-translated into English by a freelance translator (notarized)/interpreter. Finally, a bilingual English teacher (who was born and raised in Australia and has Turkish parents) compared the original English questionnaire with the revised-translated version, and any discrepancies were corrected in the Turkish text to maintain the original meaning. Then, for the second step of adaptation, the Turkish items were tested by 22 monolingual healthy individuals (8 elementary education level, 6 high school level, 5 college education level, 3 university level). This procedure ensured that the level of language used in the questionnaire would be appropriate for potential respondents. Every item other than item 10 was easily understood and answered correctly. Instead of

scoring item 10, some participants wrote “I don’t know driving” or left it unanswered: These answers were taken as incorrect. Finally, after the agreement of all members regarding the equivalence of the final Turkish version to the original English version, this final Turkish version [MG-QOL15(T)] was used in the testing phase (Figure). For the third step in the adaptation, the MG-QOL15(T) and MG composite were administered to 23 patients with clinically stable MG.

2.3. Assessing reliability and construct validity

The above-mentioned 23 patients’ scores of MG-QOL15(T) were used in the evaluation of internal consistency of MG-QOL15(T). Item 10 of the MG-QOL15(T) was answered incorrectly by 12 patients.

Then 11 out of above-mentioned 23 patients who volunteered to participate in the second part of the study were interviewed twice, with a 2-week interval between the assessments, which is considered a necessary time interval, as suggested by other studies in Turkey (9). This period is long enough for patients not to remember their answers to questions and short enough for no change in the severity and classification of MG that could affect the answers and impair test-retest reliability. The patients’ condition and treatment procedures did not change at all in this period. During this second interview, the MG-composite, MG-QOL15(T), and the Turkish version of the Medical Outcomes Study 36-item short-form health survey (SF-36), which was validated in a group of patients with rheumatoid disorders in 1999 (10) and then in 419 Turkish cancer patients in 2005 (11), were administered. Item 10 of the MG-QOL15(T) was answered incorrectly by 6 patients. The SF-36 measures 8 domains that represent 8 general health dimensions: physical functioning, role functioning-physical, bodily pain, general health, vitality, social functioning, role functioning-emotional, and mental health. The first 4 domains are physical and the last 4 are mental. Two composite scores are available to summarize these scales: the physical composite score and the mental composite score.

The same interviewer conducted both the MG-QOL15 (T) and the SF-36 interviews and the MG composite with all patients in all sessions.

In the validation studies, item-specific internal consistency (in 23 and 11 patients, in the 1st and 2nd evaluation, respectively), test-retest reliability (in 11 patients), and construct validity (in 11 patients) of the MG-QOL15(T) were tested.

The “internal consistency” of an instrument is an estimate of the degree to which its constituent items are interrelated. Cronbach’s alpha coefficient is generally employed and coefficients can range from 0 to 1. “Test-retest reliability” is an estimate of the degree of random measurement error produced by the instrument. It is

Adı Soyadı:

Tarih:

Lütfen, aşağıdaki seçeneklerden sizin için doğru olanı işaretleyiniz (Son 1 Ay için)

	0	1	2	3	4
	Hiç	Az	Orta	Fazla	Çok fazla
1. Rahatsızlığım beni sınırlendiriyor.					
2. Gözlerimi kullanmakta zorlanıyorum.					
3. Yemede-içmede zorlanıyorum.					
4. Rahatsızlığımdan dolayı sosyal aktivitelerimi sınırladım.					
5. Rahatsızlığım hobilerimden ve eğlenceden zevk almamı engelliyor.					
6. Ailemin ihtiyaçlarını karşılamakta zorlanıyorum.					
7. Planlarımı rahatsızlığımı dikkate alarak yapmalıyım.					
8. Mesleki becerilerim ve işyerindeki durumum kötü etkilendi.					
9. Konuşmakta zorlanıyorum.					
10. Araba kullanırken zorlanıyorum.					
11. Rahatsızlığımdan dolayı moralim bozuk.					
12. Yürümekte zorlanıyorum.					
13. Sokakta, çarşıda, pazarda dolaşmakta zorlanıyorum.					
14. Rahatsızlığımdan dolayı kendimi kapana kısılmış hissediyorum.					
15. Kişisel bakımımı (banyo yapmakta, traş olmakta, vs) sağlamakta zorlanıyorum.					

Myasthenia Gravis Quality-of-Life
 “MG-QOL15”
 Burns TM ve ark. Muscle and Nerve 2008

Toplam MG-QOL15(T) skoru

Figure. The MG-QOL15(T) questionnaire.

assessed by comparing instrument scores at 2 time points, given that there has been no change in condition between administrations. “Construct validity” is generally assessed by comparing scores on the instrument with those obtained from a measure assessing a related construct (9). This property was assessed by comparing MG-QOL15(T) with the Turkish version of the SF-36.

2.4. Statistical analysis

Incorrect answers obtained from the MG-QOL(T) questionnaire on item 10 were scored as 0 [although this issue will be solved in the new version of MG-QOL15 until

then it is recommended to be scored as ‘0’ by the original makers of the instrument (*see footnote)]. Descriptive measurements of the numerical values included the mean and standard deviation (SD). Categorical variables are presented as count and percent frequency. The Shapiro–Wilk test was used to assess the normality of the numerical variables such as age and total scores. The internal consistency of the quality of life scale was investigated with Cronbach’s alpha (CA) in the first and second evaluation, separately. In addition, test–retest reliability was investigated by using intraclass correlation (ICC) between

* The investigators of the MG-QOL15 are in the process of modifying their scale so that the driving item is a broader item, focusing on “independence” for activities beyond driving. They have studied rewording. The future, modified scale (not yet submitted for publication, but studied) will address this concern. However, both scales (the existing and future) are validated, both in past studies and in future, to-be-published scales. This does not invalidate our work. In the future, we will decide whether to study the future scale in more detail.

the first and second measurement of each item and total scores. Furthermore, simple Spearman's rank correlation coefficient was used for the validity of the quality of life scale. The statistical significance was considered as a P value of less than 0.05. All computations were made using PASW Statistics 18.0 [SPSS (Hong Kong) Ltd, Rm 1804, 18/F, Westlands Centre, Westlands Road, Quarry Bay, Hong Kong, China].

3. Results

To produce meaningful and easily understandable Turkish expressions, it was necessary to change the structure and words used in some of the English items. These changes reflected the differences in grammar between the 2 languages. Furthermore, some items, such as “*public places*”, are not common expressions for Turkish speakers. Thus, “*public places*” was translated as “*street, market, bazaar*” (Table 1).

In the first evaluation 12 out of 23 patients were female, and the average age (\pm SD) was 55.8 (\pm 12.8) years, ranging from 18 to 85. MG composite scores obtained were between 0 and 24 (with a mean \pm SD of 6.9 \pm 6.9). MG composite scores and MG-QOL15(T) total scores were not different

between sexes ($P = 0.667$ and $P = 0.469$, respectively). Four out of 23 patients were class I and 19 patients were Class II according to MGFA clinical classification. MG duration (\pm SD) was 56.9 months, ranging from 6 to 264 months.

In the second evaluation, 8 out of the 11 patients were female, and the average age (\pm SD) was 56 (\pm 17.1) years, ranging from 18 to 85 years. MG composite scores obtained were between 0 and 21 (with a mean \pm SD of 5.7 \pm 5.5). All of the patients were Class II according to the MGFA clinical classification.

Distribution of the components of the MG-QOL15(T), internal consistency of the 1st (in 23 patients) and 2nd (in 11 patients) tests, and test–retest reliability (in 11 patients) are shown in Tables 2 and 3. In the first evaluation, the highest mean score was observed in item 7 (mean = 1.74 \pm 1.32) and, in the second evaluation, the highest mean score was observed in item 11 (mean = 1.73 \pm 1.27). The internal consistency was high in the Turkish version ($CA_{\text{first (n=23)}} = 0.958$ and $CA_{\text{second (n=11)}} = 0.928$). Although a decrease in the number of patients caused a decrease in CA in the second evaluation, it was still found to be statistically significant ($P < 0.001$). In Table 3, changes in CA values whenever one of the items was removed are shown. In both evaluations,

Table 1. Changes made because of the differences in grammar of the 2 languages.

Original items		Changes made while translating into English
	Please indicate how true each statement has been (over the past 4 weeks)	Please, from the choices below, mark the accurate one for you (for the last month)
	0: Not at all, 1: A little bit, 2: Somewhat, 3: Quite a bit, 4: Very much	0: Never, 1: Rarely, 2: Sometimes, 3: Often, 4: Usually
1.	I am frustrated by my condition	My condition is making me angry
2.	I have trouble using my eyes	I have difficulty using my eyes
3.	I have trouble eating	I have difficulty eating/drinking
4.	I have limited my social activity because of my condition	I have limited my social activities because of my condition
5.	My condition limits my ability to enjoy hobbies and fun activities	My condition prevents me from enjoying my hobbies and having fun
6.	I have trouble meeting the needs of my family	I am having difficulty meeting the needs of my family
7.	I have to make plans around my condition	I should make my plans taking my condition into consideration
8.	My occupational skills and job status have been negatively affected	My professional skills and my work situation have been badly affected
9.	I have difficulty speaking	I am having difficulty speaking
10.	I have trouble driving	I have difficulty driving
11.	I am depressed about my condition	I am depressed because of my condition
12.	I have trouble walking	I am having difficulty walking
13.	I have trouble getting around public places because of MG	I am having difficulty walking around in the street, market, bazaar
14.	I feel overwhelmed by my condition	I feel trapped because of my condition
15.	I have trouble performing my personal grooming needs	I am having difficulty tending to my personal needs (taking a bath, shaving, etc.)
	Total MG-QOL15 score	Total MG-QOL15 score

Table 2. Descriptive values of the components of the MG-QOL15(T) in the first and second evaluation of MG patients.

Original items	First evaluation (n = 23 patients)						Second evaluation (after 2 weeks, n = 11 patients)					
	0%	1%	2%	3%	4%	Mean ± standard deviation	0%	1%	2%	3%	4%	Mean ± standard deviation
1. I am frustrated by my condition	21.7	21.7	26.1	26.1	4.3	1.70 ± 1.22	18.2	18.2	54.5	0	9.1	1.64 ± 1.12
2. I have trouble using my eyes	34.8	13.0	21.7	17.4	13.0	1.61 ± 1.47	27.3	18.2	36.4	0	18.2	1.64 ± 1.43
3. I have trouble eating	60.9	17.4	8.7	13.0	0	0.74 ± 1.10	54.5	18.2	2.7.3	0	0	0.73 ± 0.91
4. I have limited my social activity because of my condition	52.2	0	21.7	17.4	8.7	1.3 ± 1.49	54.5	18.2	18.2	9.1	0	0.82 ± 1.08
5. My condition limits my ability to enjoy hobbies and fun activities	52.2	13.0	8.7	13.0	13.0	1.22 ± 1.54	40	20	20	0	20	1.40 ± 1.57
6. I have trouble meeting the needs of my family	47.8	13.0	17.4	13.0	8.7	1.22 ± 1.41	36.4	27.3	18.2	0	18.2	1.36 ± 1.50
7. I have to make plans around my condition	26.1	13.0	30.4	21.7	8.7	1.74 ± 1.32	10	60	10	10	10	1.50 ± 1.17
8. My occupational skills and job status have been negatively affected	42.9	14.3	19.0	9.5	14.3	1.38 ± 1.50	55.6	22.2	22.2	0	0	0.67 ± 0.86
9. I have difficulty speaking	52.2	30.4	8.7	4.3	4.3	0.78 ± 1.08	63.6	18.2	0	18.2	0	0.73 ± 1.19
10. I have trouble driving	73.9	13.0	13.0	0	0	0.39 ± 0.72	81.8	9.1	9.1	0	0	0.27 ± 0.65
11. I am depressed about my condition	34.8	17.4	8.7	26.1	13.0	1.65 ± 1.53	9.1	45.5	27.3	0	18.2	1.73 ± 1.27
12. I have trouble walking	34.8	13.0	13.0	30.4	8.7	1.65 ± 1.46	45.1	9.1	27.3	9.1	9.1	1.27 ± 1.42
13. I have trouble getting around public places because of MG	27.3	22.7	13.6	27.3	9.1	1.68 ± 1.39	54.5	18.2	18.2	9.1	0	0.82 ± 1.08
14. I feel overwhelmed by my condition	56.5	4.3	13.0	17.4	8.7	1.17 ± 1.50	45.5	27.3	9.1	0	18.2	1.18 ± 1.54
15. I have trouble performing my personal grooming needs	47.8	26.1	13.0	8.7	4.3	0.96 ± 1.18	72.7	18.2	0	0	9.1	0.55 ± 1.21
Total score						19.0 ± 15.67						15.91 ± 12.28

it is observed that in the measurement of CA values during the one-by-one removal of items, there was no significant difference in internal consistency, and all the values were above 0.90.

In the test–retest reliability analysis, which tested repeatability of the MG-QOL15(T), ICC scores ranged between 0.391 and 0.970: The scores for items 1, 2, 4, 6, 10, 11, 12, 13, 14, and 15, and the total MG-QOL15(T) score were significantly higher ($P < 0.05$). ICC of the total MG-QOL15(T) was 0.882 ($P = 0.001$). The lowest ICC values were observed only for questions 3, 5, 7, 8, and 9 (Table 3).

The MG-QOL15(T) total scores were compared with the domain and summary scores of the SF-36. The MG-QOL15(T) was negatively correlated with the physical functioning ($P = 0.001$; $r = -0.841$), general health ($P = 0.005$; $r = -0.778$), vitality ($P = 0.005$; $r = -0.771$), and social functioning ($P = 0.001$; $r = -0.833$) domains and with the physical and mental composite scores ($P = 0.005$; $r = -0.779$ and $P = 0.007$; $r = -0.753$, respectively) of the SF-36 (supplemental data). Age and sex did not affect the MG composite, SF-36, or MG-QOL15(T) scores. Furthermore, MG composite scores were positively

correlated with the MG-QOL15(T) scores ($P = 0.006$; $r = 0.555$) (Supplemental data).

4. Discussion

The MG-QOL15(T) was well understood and accepted by the patients. The MG-QOL15(T) was found to be a reliable and valid questionnaire for Turkish patients with MG. It generally had high internal consistency in both evaluations and test–retest reliability. The scores of 10 questions and the total score of the MG-QOL15(T) were found to have a high ICC upon repeating the test 2 weeks apart, suggesting that the MG-QOL15(T) had a test–retest reliability. Although MG-QOL15(T) was found to be a reliable test, we did not know the reasons for the low scores in 5 items. We could only speculate that it could be due to the long period [2 weeks instead of 2 days as was applied in some of the earlier Japanese studies (12)]. Patients might not remember, or the low correlation between the 2 tests could be due to the nature of MG itself, because the persistent experience of weakness could be perceived differently during time, or the variation may be due to the time in the day (morning/ afternoon) that the tests

Table 3. Distribution of the internal consistency of the 1st and 2nd tests, and test–retest reliability in MG patients.

Original items	*Cronbach's alpha if item deleted in first evaluation (n = 23)	*Cronbach's alpha if item deleted in second evaluation (n = 11)	ICC between first and second evaluation	P value for ICC
1. I am frustrated by my condition	0.955	0.930	0.790	0.008
2. I have trouble using my eyes	0.954	0.925	0.799	0.007
3. I have trouble eating	0.959	0.925	0.577	0.087
4. I have limited my social activity because of my condition	0.952	0.923	0.733	0.020
5. My condition limits my ability to enjoy hobbies and fun activities	0.953	0.915	0.516	0.125
6. I have trouble meeting the needs of my family	0.952	0.923	0.774	0.011
7. I have to make plans around my condition	0.957	0.926	0.479	0.150
8. My occupational skills and job status have been negatively affected	0.953	0.920	0.518	0.123
9. I have difficulty speaking	0.957	0.919	0.391	0.214
10. I have trouble driving	0.962	0.934	0.725	0.022
11. I am depressed about my condition	0.953	0.920	0.712	0.026
12. I have trouble walking	0.958	0.919	0.970	< 0.0001
13. I have trouble getting around public places because of MG	0.954	0.921	0.899	< 0.0001
14. I feel overwhelmed by my condition	0.952	0.918	0.856	0.002
15. I have trouble performing my personal grooming needs	0.954	0.917	0.898	< 0.0001
Total score	0.958	0.928	0.882	0.001

ICC: Intraclass correlation. * values for the remaining questions with the relevant question omitted. Note: P values presented were for testing the null hypothesis that there is "no correlation", which means that if the P value of the given question was less than 0.05, pre- and posttest results of that question was not significantly different.

applied. Furthermore, in our patients, although they are given the instruction as "during the last month" they could have marked some items according to the last few hours, days, or the last week. Even if the MG-QOL15(T) is found to be a reliable valid questionnaire, in order to identify the exact reason for this problem multiple large groups of MG patients should be enrolled in another study, in which the MG-QOL15(T) questionnaire should be given 2 days apart and 2 weeks apart and at similar times of the day, and the ICC compared between the 1st and 2nd interviews and the 1st and 3rd interviews.

It was shown that the MG-QOL15(T) also had a good concurrent validity. In this study, the MG-QOL15(T) score was found to be correlated with physical functioning, general health, vitality, social functioning domains, and the physical and the mental composite scores of the SF-36, which concurs with the study examining the original MG-QOL15 (4). This means that the higher the MG-QOL15(T) score (for example, more symptoms and incapacity, which causes worse QOL), the worse the perception of general health status, vitality, and physical and social functioning

by the patient. Furthermore, the higher the MG-QOL15(T) score, the worse is the mental composite score of SF-36. Other than the original study, the physical and mental aspects of health-related QOL questionnaires were also found to be affected in MG (2,3,12,13). On top of all this, other than this negative correlation between the MG-QOL15(T) score and the above-mentioned domains of the SF-36, score 0 (not at all) was rarely chosen for items 1 and 7 in both evaluations, and 11 in the second evaluation (i.e. those items reflecting the psychological, social, and occupational domains (5), which were also in accordance with the above-mentioned facts.

Apart from disease severity, other disease-related factors, such as depression, anxiety, drug treatment, and the number of myasthenic crises may influence QOL in MG (3). However, this was outside the scope of this study.

The pros of this study were that the CA value was high in the 11 patients and higher in the 23 patients. Furthermore, ICC and r values were found to be very high for the selected group of MG patients. The main limitation of our study was the small sample size. The cultural adaptation studies of

MG-QOL15 in different cultures were conducted with 10 (monocenter) to 327 patients (multicenter) (3,12). Because this study was monocenter and conducted in a small city university hospital, involving only clinically stable voluntary patients, we could not enlarge our sample size. However, small sample size generally causes statistically insignificant results, which was not observed in this study. In our study, CA values were found to be high not only in 23 patients but also in 11 patients. From this point of view, it could be assumed that statistically significant results in 11 patients in test-retest reliability and validity evaluations could indicate statistically significant results with larger groups. Therefore, it is clearly warranted that the MG-QOL15 (T) should be repeated and validated in larger populations.

In conclusion, we created a Turkish version of the MG-QOL15 and evaluated its validity and reliability. The MG-QOL15(T) functions as a valid, reliable, valuable

tool for measuring disease-specific health related-QOL in Turkish patients with MG. It can be considered a reliable tool to evaluate the physical, psychological, and social well-being of Turkish patients with MG. This instrument could provide additional assistance in clinical evaluations of Turkish patients with MG and could be used in research studies of QOL in MG. We recommend that our findings be repeated in a multicenter or any other large prospective cohorts of clinically stable MG patients.

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Supplemental data. Bivariate correlations for demographic. Myasthenia gravis composite. Turkish version of myasthenia gravis quality of life 15-item scale and 8 domains and physical and mental composite scores of the Turkish version of the Medical Outcomes Study 36-item short-form health survey (SF-36).

		MG com	MG-QOL15(T)	SF-36									
				PF	RP	BP	GH	VT	SF	RE	MH	PCS	MCS
Age	r	0.238	0.037	- 0.339	- 0.385	- 0.051	- 0.009	- 0.237	- 0.333	- 0.138	0.083	- 0.349	- 0.198
	P	0.273	0.866	0.308	0.242	0.882	0.979	0.482	0.317	0.686	0.808	0.293	0.560
	N	23	23	11	11	11	11	11	11	11	11	11	11
MG com	r		0.555	- 0.726	- 0.487	- 0.284	- 0.413	- 0.305	- 0.472	- 0.676	0.005	- 0.639	- 0.227
	P		0.006	0.011	0.129	0.397	0.207	0.361	0.142	0.022	0.989	0.034	0.501
	N		23	11	11	11	11	11	11	11	11	11	11
MG-QOL15(T)	r			- 0.841	- 0.551	- 0.441	- 0.778	- 0.771	- 0.833	- 0.485	- 0.556	- 0.779	- 0.753
	P			0.001	0.079	0.175	0.005	0.005	0.001	0.131	0.076	0.005	0.007
	N			11	11	11	11	11	11	11	11	11	11
PF	r				0.505	0.581	0.830	0.732	0.730	0.605	0.443	0.878	0.604
	P				0.113	0.061	0.002	0.010	0.011	0.049	0.172	0.000	0.049
	N				11	11	11	11	11	11	11	11	11
RP	r					- 0.024	0.353	0.372	0.629	0.795	0.213	0.604	0.624
	P					0.943	0.287	0.260	0.038	0.003	0.529	0.049	0.040
	N					11	11	11	11	11	11	11	11
BP	r						0.505	0.232	0.310	- 0.145	0.428	0.741	0.154
	P						0.113	0.492	0.353	0.671	0.190	0.009	0.652
	N						11	11	11	11	11	11	11
GH	r							0.758	0.651	0.529	0.762	0.656	0.749
	P							0.007	0.030	0.095	0.006	0.028	0.008
	N							11	11	11	11	11	11
VT	r								0.809	0.494	0.620	0.521	0.818
	P								0.003	0.122	0.042	0.100	0.002
	N								11	11	11	11	11
SF	r									0.579	0.622	0.693	0.867
	P									0.062	0.041	0.018	0.001
	N									11	11	11	11
RE	r										0.265	0.433	0.618
	P										0.431	0.183	0.043
	N										11	11	11
MH	r											0.379	0.817
	P											0.250	0.002
	N											11	11
PCS	r												0.506
	P												0.113
	N												11

MG com: Myasthenia gravis composite, MG-QOL15(T): The Turkish version of myasthenia gravis quality of life 15-item scale, SF-36: The Turkish version of the Medical Outcomes Study 36-item short-form health survey (SF-36), PF: Physical functioning, RP: Role functioning physical, BP: Bodily pain, GH: General health, VT: Vitality, SF: Social functioning, RE: Role functioning emotional, MH: Mental health, PCS: Physical composite score, MCS: Mental composite score