Quality of life assessment among multiple sclerosis patients in Saudi Arabia

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ABSTRACT

الأهداف: قياس مدى جودة الحياة (QoL) بين مرضى التصلب اللويحي في المملكة العربية السعودية.

الطريقة: أجريت دراسة مقطعية لقياس جودة الحياة QoL علىمرضى التصلب اللويحي خلال الفترة من نوفمبر 2016م إلى مايو 2017م. وتم جمع المرضى من مستشفيات مركزية في 5 مناطق. تم جمع البيانات السريرية والديموغرافية، وكذلك معلومات عن الحالة الصحية للمرضى باستخدام الاستبيان الذاتي (SF-36) الذي يقيس مدى جودة الحياة. تم استخدام استبيان مراحل المرض المحددة عن طريق المرضى (PDDS) لقياس العجز. تم تحليل البيانات باستخدام الإحصاء الوصفي، واختبار Mann–Whitney ، واختبار Kruskal Wallis، ومعامل Spearman's.

النتائج: من بين 598 من مرضى التصلب اللويحي، كان 384 (64.2%) من الإناث. وكانت النسبة المتوسطة للذكور أعلى منها بالنسبة للإناث في جميع المقاييس الفرعية ل SF-36. وكان متوسط العمر 32.4 سنة (الانحراف المعياري = 8.4). وكان متوسط مدة المرض 6.5 سنوات. كان لدى المرضى أدنى الدرجات في مقياس الحركة والمشاعر (متوسط= 42.6، الانحراف المعياري = 43.3). وجدت علاقة سلبية ذات أهمية إحصائية ما بين استبيان مراحل المرض المحددة عن طريق المرضى(PDDS)وجميع المقاييس الفرعية ل SF-36. مقياس جودة الحياة (SF-36 QoL) لمرضى التصلب العصبي المتعدد يختلف بأهمية إحصائية على حسب الخصائص الديموغرافية عند مستوى دلالة أقل من 0.05.

الخاتمة: خلصت هذه الدراسة إلى أن مرضى التصلب اللويحي لديهم درجة منخفضة في مقياس جودة الحياة (SF-36 QoL)، ويحتاجون إلى مزيد من الاهتمام، والعمل على إنشاء سجل وطني للوصول إلى جميع مرضى التصلب اللويحي والمساعدة على معرفة واكتشاف العوامل التي تؤثر على جودة حياتهم بشكل شامل.

Objectives: To determine the quality of life (QoL) among multiple sclerosis (MS) patients in Kingdom of Saudi Arabia.

Methods: A cross-sectional study was carried out to assess the QoL of MS patients during the period from November 2016 to May 2017. Patients were recruited from tertiary hospitals in 5 regions in the kingdom. Clinical and demographic data were collected and information on patients' health status using the self-report SF-36 questionnaire to assess QoL. The Patient Determined Disease Steps (PDDS) was used to measure disability. Data were analyzed using descriptive statistics, the Mann–Whitney test, the Kruskal Wallis test and Spearman's coefficient correlation.

Results: From the 598 MS patients studied, 384 (64.2%) were female. The mean score for males was higher than females in all SF-36 QoL subscales. The mean age was 32.4 years (SD=8.4). The mean duration of illness was 6.5 years. Patients had the lowest scores in role motioning/emotional scale (mean=42.6, SD=43.3). The PDDS was negatively correlated with all SF-36 QoL subscales. Self Report-36 QoL for MS patients differed significantly through demographic characteristics at a level of significance of 0.05.

Conclusions: Multiple Sclerosis patients have a low QoL score and need more comprehensive management by their treating physicians. Further development of the registration will provide access to the entire population of MS patients and help comprehensively analyze the factors that affect the quality of their lives.

Neurosciences 2018; Vol. 23 (2): 140-147
doi: 10.17712/nsj.2018.2.20170335

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Received 17th July 2017. Accepted 6th December 2017.

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Multiple sclerosis (MS) is a chronic, inflammatory demyelinating disease of the central nervous system that represents one of the major causes of neurological disability in young people, impairing their quality of life during their productive life.[1] Multiple sclerosis is increasingly recognized as a disease with modifiable lifestyle components that influence the development and progression.[2] It is a complex disease with different signs and symptoms. These signs and symptoms depend on the extent and location of the nerve damage. The disease pattern is mixed and punctuated by periodic attacks with partial recovery exhibited between the attacks.[3] The Multiple Sclerosis International Federation Report estimates that the number of patients with MS has increased from 30 per 100,000 to 33 per 100,000 between 2008 and 2013. Multiple Sclerosis is a progressive disease without a cure. Patients with MS live with this disease, and it negatively influences their social, economic and emotional well-being.[4] Multiple Sclerosis is a disease with an unidentified etiology. However, several factors have been implicated in either triggering the disease or modulating its subsequent course.[5,6] Quality of life is an important parameter that needs to be considered when evaluating the experience and outcome of patients receiving healthcare. This is especially the case for patients with long-term chronic diseases, since a complete cure from their illness is often impossible. The Quality of life of MS patients has been ascertained by several studies in different countries and nations. A self-reported quality of life assessment can give a comprehensive reflection of the patients' disability and the impact of the disease, guide physicians for proper care, and reflect treatment efficacy. Declining quality of life might be considered a predictor of disease progression.[7] One of the generic questionnaires frequently used for MS is the Medical Outcome Study Short Form-36 (SF-36).[8] Quality of life is a major consideration for people with MS, and needs to be measured in clinical studies.[8,9] A few studies have investigated the quality of life among MS patients in Egypt, Lebanon, and Iran, whose results stressed the importance of performing comprehensive assessment for MS patients taking into account their quality of life.[7,10-12] The aim of this study is to assess the quality of life in patients with MS in Saudi Arabia.

Disclosure. Authors have no conflict of interests, and the work was not supported or funded by any drug company.

Methods. This cross-sectional study has been conducted during the period from November 2016 to May 2017. Out of a total of 763 Saudi patients aged 15-60 years, with a definitive diagnosis of MS for at least one year who were registered at tertiary care hospitals in Saudi Arabia, 598 (78.4%) agreed to participate in this study.

Patients were recruited from outpatient clinics of all tertiary hospitals in the 5 regions of Saudi Arabia. Patients were diagnosed according to the 2005 revised McDonald criteria.[13]

The ethical approval for conducting this study was obtained from Head of Research Ethics Committee (HA-06-B-001) in King Khalid University (REC# 2016-08-23). The informed consent of participants was obtained prior to their participation in this study.

We considered the quality of life of each participant, with MS as the dependent variable, and the following as independent variables: Socio-demographic variables (gender, age, area of residence, educational level and marital status), clinical variables (disease duration, age at disease onset, associated comorbidity, number of admissions, number of attacks in last 2 years, and medications used now), and SF-36 quality of life variables.

The severity of the illness was measured using the Patient Determined Disease Steps (PDDS), a 9-item patient-administered measure of MS-related disability.[14] Its content validity is indicated by consistency of the items with the Expanded Disability Status Scale (EDSS).[15] The PDDS scores ranged from 0 to 8, and can be used to categorize participants into 3 groups according to the level of disability: a score of 0 to 2 indicates mild disability, represented by sensory symptoms but no limitations in walking; a score of 3 to 5 indicates moderate disability, represented by symptoms that interfere with daily activities, especially walking, and the need for a cane; and a score of 6 to 8 indicates severe disability, represented by the need for bilateral support, the use of a wheelchair, or being bedridden.[16]

All patients completed a demographic form and the SF-36 questionnaire (RAND 36-item Health Survey version 1.0) to investigate the quality of life. The SF-36 is a universal self-reported questionnaire used to evaluate the effect of medical treatment on quality of life, comprised of 36 items, which measure 8 subscales of the quality of life (physical functioning (PF), role limitations due to physical health (RP), role limitations due to emotional problems (RE), energy/fatigue (EF), emotional well-being (EW), social functioning (SF), body pain (BP), and general health (GH)), and a single item that provides an indication of perceived change

in health.[17,18] Item scores were calculated according to standard procedures, yielding score values of 0 to 100 in every subscale, with the higher scores indicating a better quality of life. This questionnaire has proved to be a reliable and valid measure of health-related quality of life. A validated Arabic version has been used in Saudi Arabia since 1997.[19]

The Statistical Package for the Social Science (SPSS) software version 21 (IBM Corp., Armonk, NY, USA) was used for the statistical analysis of the data in this study. Descriptive statistics were used to summarize the basic features of the collected data. Group differences were assessed using the t-test, which compares the mean values of independent samples. When the 2 variances were not equal, we used the nonparametric Mann–Whitney test and Kruskal Wallis test. Spearman's coefficient correlation was used to examine the relationship between 2 quantitative variables. In all tests, $p \leq 0.05$ was considered statistically significant.

Table 1 - Clinical characteristics of study patients with multiple sclerosis (N=598).

Variables	n	(%)
Gender		
Male	214	(35.8)
Female	384	(64.2)
Marital status		
Single	250	(41.8)
Married	310	(51.8)
Divorced	36	(6)
Widower	2	(0.4)
Education level		
Illiterate	4	(0.7)
Primary	12	(2)
Intermediate	28	(4.7)
Secondary	140	(23.4)
University	378	(63.2)
Postgraduate	36	(6)
Regions		
Southern	170	(28.4)
Middle	150	(25.1)
East	114	(19.1)
North	28	(4.7)
West	136	(22.7)
Age (years), mean±SD [range]	32.4±8.4	[15-60]
At disease onset, mean±SD [range]	26.9±7.6	[13-56]
Disease duration (years), mean±SD	6.5±4.7	
Number of admission, mean±SD	1.4±1.7	
Number of attacks during last 2 years), mean±SD [range]	1.4±1.9	[0-14]
Drug used now (n=558)		
Interferon beta-1b (Betaferon)	146	(26.2)
Interferon beta-1a (Rebif)	114	(20.5)
Interferon beta-1a (Avonex)	100	(17.9)
Teriflunomide (Aubagio)	20	(3.6)
Dimethyl fumarate (Tecfidera)	18	(3.2)
Fingolimod (Gilenya)	108	(19.3)
Natalizumab (Tysabri)	46	(8.2)
Rituximab (Rituxan)	4	(0.7)
Alemtuzumab (Lemetrada)	2	(0.5)

Table 2 - Frequency of comorbid conditions in multiple sclerosis patients.

Chronic diseases	Frequency	Percent (%)
No comorbidity	444	(74.2)
Associated chronic diseases	154	(25.8)
Diabetes mellitus	39	(6.5)
Hypertension	32	(5.3)
Asthma	28	(4.7)
Headache / migraine	27	(4.5)
Depression	26	(4.3)
Thyroid disease	18	(3.0)
Anti-phospholipid syndrome	6	(1.0)
Systemic lupus erythematosus	5	(0.8)
Sjogren syndrome	2	(0.3)

Results. Of the 598 MS patients participated, 384 (64.2%) were female and 214 (35.8%) were male. Three hundred and ten (51.8%) were married and 250 (41.8%) were single. The mean age was 32.4±8.4 years old, with a range from 15-60 years old. As for educational level, 378 (63.2%) had a bachelor's degree and 184 (30.8%) had a secondary school diploma or less. One hundred and seventy patients (28.4%) lived in the southern area (Asir region), 150 (25.1%) lived in the middle area, 114 (19.1%) lived in the eastern area, 136 (22.7%) lived in the western area and only 28 (4.7%) lived in the northern area. Regarding the clinical characteristics of MS patients, the mean age at disease onset was 26.9±7.6 years. The mean duration of illness was 6.5 years; the mean number of admissions was 1.4±1.7; and the mean number of attacks during last 2 years was 1.4±1.9 (**Table 1**). The most commonly used drug was Interferon beta-1b (Betaferon), with 146 (26.2%) of all participants using it, and 114 (20.5%) using Interferon beta-1a (Rebif).

Table 2 shows that 25.8% of MS patients had associated chronic diseases, mainly diabetes (6.5%), hypertension (5.3%), bronchial asthma (4.7%), headache/migraine (4.5%) and depression (4.3%), while 5 cases had systemic lupus erythematosus (0.8%) and 2 cases had Sjogren syndrome (0.3%).

Table 3 - Spearmen correlation between PDDS and QOL subscales.

	PF	RP	RE	EF	EW	SF	BP	GH
Mean	58.6	45.0	42.6	45.6	46.2	61.9	65.7	55.4
SD	28.8	41.2	43.3	20.2	18.2	25.8	24.7	17.3
R	-0.640	-0.505	-0.253	-0.501	-0.244	-0.523	-0.475	-0.518
P-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

PF - Physical functioning, RP - Role limitations due to physical health,
RE - Role limitations due to emotional problems, EF - Energy/fatigue, EW - Emotional well-being,
SF - Social functioning, BP - Body pain, GH - General health, PDDS -Patient Determined Disease Steps ,
QOL - quality of life.

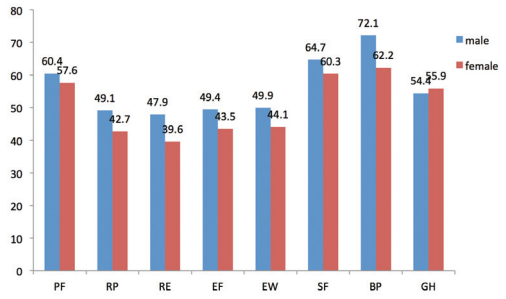

Figure 1 - Shows the SF-36 domain scores for male and female multiple sclerosis patients.

Table 3 summarizes the mean scores of the 8 subscales of the SF-36 quality of life questionnaire and its correlation to PDDS. The mean and standard deviation are presented in the second and third rows. The patients had high scores on the body pain scale (BP) 65.7±24.7 and on the social functioning scale (SF) 61.9±25.8, and low scores on the role limitations due to emotional problems scale (RE) 42.6±43.3. The PDDS was negatively correlated with all SF-36 quality of life subscales, with a moderate correlation with physical functioning (PF) (r=–0.640, p=0.000), a moderate correlation with role limitations due to physical health (RP)(r=–0.505, p=0.000), a weak correlation with role limitations due to emotional problems scale (RE) (r=–0.253, p=0.000), a moderate correlation with energy/fatigue (EF) (r=–0.501, p=0.000), a weak correlation with emotional well-being (EW) (r=–0.244, p=0.000), a moderate correlation with social functioning (SF) (r=–0.523, p=0.000), a moderate correlation with pain (BP) (r=–0.475, p=0.000) and a moderate correlation with general health (GH) (r=–0.518, p=0.000).

Figure 1 shows that the mean score for males is higher than the mean score for females in all SF-36 quality of life subscales except the general health (GH). By comparing males and females in the different dimensions using the Mann–Whitney U Test, it was found that there is a statistically significant difference between them in the role limitations due to emotional problems scale (RE) (p=0.013), energy/fatigue scale (EF) (p=0.002), emotional well-being scale (EW) (p=0.001), social functioning scale (SF) (p=0.039) and pain scale (BP) (p=0.000). There was no statistical difference in physical functioning (PF), role limitations due to physical health (RP) and general health (GH).

Table 4 summarizes the assessment of scores as they relate to marital status. It shows that scores of single patients (whether male or female) were higher than those of married or divorced patients for all measurements except the role limitations due to emotional problems scale (RE). In total, the difference between the groups was statistically significant, with the exception of the role limitations due to emotional problems scale (RE) and the emotional well-being scale (EW).

Table 5 shows the scores of the SF-36 subscales according to educational level. Patients with a high level of education (for instance, secondary level or above) scored higher in every measurement than those who had the lowest level of education. This observation applies for both male and female patients. In total, differences according to educational level were statistically significant, with the exception of the emotional well-being scale (EW).

Table 6 shows that female MS patients had higher associated comorbidity (116, 30.2%) than male MS patients (38, 17.6%). All mean SF-36 subscale scores for MS patients who do not have associated comorbidity were consistently higher than the those for patients with associated comorbidity. The differences in mean scores were statistically significant regarding body pain among male patients (p=0.033), while among female patients all differences were statistically significant.

Discussion. A few studies have discussed the quality of life of MS patients in Arab countries, although there have been cultural differences between them.[7,8,20] The evaluation of the quality of life of MS

Table 4 - Differences in SF-36 subscale scores by marital status.

	Single		Married		Divorced		
Subscales	Mean	SD	Mean	SD	Mean	SD	*P*-value
Males							
PF	64.3	31.1	57.8	29.4	51.7	27.0	0.001
RP	56.5	40.7	44.0	41.3	33.3	34.2	0.001
RE	46.4	42.2	47.7	44.4	77.8	34.4	0.000
EF	51.7	21.3	47.9	19.5	41.7	11.3	0.116
EW	49.0	17.4	50.8	15.4	45.3	14.9	0.231
SF	67.9	25.2	62.3	25.7	54.2	17.1	0.119
BP	78.7	20.7	66.2	22.6	78.3	20.2	0.002
GH	57.5	18.9	52.6	15.9	43.3	18.1	0.089
Females							
PF	63.4	26.8	54.0	28.1	50.6	28.7	0.000
RP	50.6	38.5	35.8	41.3	45.3	46.0	0.004
RE	42.2	42.5	36.4	42.7	45.8	47.7	0.123
EF	48.2	18.3	40.7	20.8	36.9	17.4	0.282
EW	46.4	18.9	43.0	18.8	40.0	18.7	0.186
SF	63.3	24.5	58.2	26.4	55.5	29.8	0.008
BP	64.4	22.1	60.6	26.8	58.8	28.6	0.003
GH	58.9	17.0	53.2	16.9	57.2	18.4	0.002
Total							
PF	63.8	28.4	55.4	28.6	49.4	28.3	0.000
RP	52.8	39.3	38.9	41.4	43.1	45.4	0.000
RE	43.7	42.4	40.6	43.6	50	48.2	0.464
EF	49.5	19.5	43.4	20.6	38.1	16.9	0.000
EW	47.4	18.4	45.9	18	40.9	18.6	0.187
SF	65.2	24.8	60	26.1	55.1	28.7	0.014
BP	69.8	22.6	62.9	25.4	62.4	28.8	0.006
GH	58.4	17.7	53	16.5	54.4	19.2	0.004

PF - Physical functioning, RP - Role limitations due to physical health, RE - Role limitations due to emotional problems, EF - Energy/fatigue, EW - Emotional well-being, SF - Social functioning, BP - Body pain, GH - General health.

patients has become one of the most crucial elements of the diagnostic process, and minimizing the effects of MS on everyday functioning is a significant aim of treatment. In Saudi Arabia, no previous attempts have been made to evaluate the quality of life of MS patients. The validation of instruments used to evaluate quality of life with regard to the cultural conditions of a given country is extremely important for the interpretation and comparison of results with those from countries with geographical or cultural differences. This discrepancy is caused by numerous specific factors, including limited access to treatment, lack of certified MS training for health professionals, lack of specialist clinics, limited access to work for the disabled, their low socio-economic status and a lack of palliative care. Furthermore, since the course and evolution of MS among Saudi patients may differ from those of patients in other countries, perceptions of the disease and disability may also differ among Saudi patients from those of patients in other countries.[21]

The patients with PDSS<3 (mild disability) had better scores in all SF-36 subscales, compared with other subjects. The same result has been found in other studies. One study indicated that patients in Italy whose EDSS was 3.0 had significantly better scores in all SF-36 subscales compared with other subjects.[22] In a study of 526 patients from 12 countries with an EDSS<7.0, Baumstarck et al[23] showed a correlation between deterioration in motor function and a decrease in quality of life. However, these correlations pertain only to physical functioning, as evaluated by both the SF-36 and the specific Multiple Sclerosis International Quality of Life questionnaires.

Our study showed low quality of life domains for Saudi MS patients, and these results were similar to previous studies.[7,10,11] The mean scores in Lebanon were higher than in our study.[11,12] We have a slight difference in all SF-36 quality of life subscales, compared to previous studies that used the SF-36 as a health-status measurement and assessed the quality of life in Western MS patients reported significantly lower scores in almost all subscales of the SF-36.[7]

The quality of life of our MS patients was consistently lower among females than males in almost all SF-36 subscales. This probably resulted from increased disability over the course of the disease and the appearance of new MS symptoms, or an onset of other age-related comorbidities.

The relationship between gender and quality of life in patients with MS has been reported in several studies. Being a female was reported as significantly associated with poorer quality of life.[24-26]

The relationship between the dimensions of SF-36 and sociodemographic information is an important finding, as such instruments could be used in therapeutic evaluations.[27] Our results indicate that many dimensions of SF-36 depend on gender, education and marital status.

Results of this study showed that female MS patients had higher associated comorbidity (30.2%) than male MS patients (17.6%). Moreover, MS patients with comorbidity had consistently lower mean SF-36 scores. Male patients with comorbidity had significantly lower mean score regarding body pain subscale than those with no comorbidity, while females with comorbidity had significantly lower mean scores in all SF-36 subscales.

These finding are in agreement with those of Warren e al[28], who reported that MS patients with comorbidity

Table 5 - Differences in SF-36 subscale scores by educational level.

Education level		PF	RP	RE	EF	EW	SF	BP	GH
Males									
Intermediate	Mean	26.3	12.5	8.3	41.3	43.0	59.4	58.8	55.0
	SD	21.2	23.1	15.4	16.6	20.4	28.9	9.4	21.0
Secondary	Mean	67.1	44.1	47.1	44.1	47.5	62.5	68.4	52.4
	SD	26.2	42.2	43.5	20.5	15.7	26.8	19.6	21.1
University	Mean	59.3	49.4	47.1	50.3	50.2	63.9	71.8	53.9
	SD	30.8	40.8	43.2	20.3	16.3	25.2	23.3	16.6
Postgraduate	Mean	80.0	83.3	88.9	57.5	56.7	81.3	92.9	66.7
	SD	14.5	28.9	26.0	16.4	12.9	18.1	8.6	10.3
P-value		0.001	0.001	0.000	0.116	0.231	0.119	0.002	0.089
Females									
Illiterate	Mean	37.5	12.5	0.0	47.5	32.0	62.5	38.8	50.0
	SD	26.0	14.4	0.0	26.0	13.9	14.4	21.7	11.5
Primary	Mean	49.2	37.5	38.9	40.0	42.0	52.1	56.3	48.3
	SD	31.8	47.1	46.8	35.3	19.0	24.3	34.0	22.1
Intermediate	Mean	33.0	32.5	50.0	39.0	52.4	50.0	51.0	51.0
	SD	29.1	36.4	46.5	16.2	15.0	38.0	31.9	16.0
Secondary	Mean	54.0	34.4	32.7	40.6	42.0	55.0	57.5	52.2
	SD	26.8	39.1	39.3	18.9	17.9	24.3	22.7	14.5
University	Mean	62.2	45.9	41.9	44.9	44.9	62.6	65.0	57.7
	SD	25.8	40.4	43.5	18.9	19.1	24.9	23.1	16.8
Postgraduate	Mean	59.2	66.7	47.2	48.3	43.0	71.9	71.0	65.0
	SD	36.3	48.2	49.1	25.0	22.9	27.6	35.2	25.1
P-value		0.000	0.004	0.123	0.282	0.186	0.008	0.003	0.002
Total									
Illiterate	Mean	37.5	12.5	0.0	47.5	32.0	62.5	38.8	50.0
	SD	26.0	14.4	0.0	26.0	13.9	14.4	21.7	11.5
Primary	Mean	49.2	37.5	38.9	40.0	42.0	52.1	56.3	48.3
	SD	31.8	47.1	46.8	35.3	19.0	24.3	34.0	22.1
Intermediate	Mean	31.1	26.8	38.1	39.6	49.7	52.9	53.3	52.1
	SD	26.9	34.0	44.2	16.0	16.8	35.4	27.5	17.3
Secondary	Mean	57.1	36.8	36.2	41.4	43.3	57.0	60.3	52.2
	SD	27.1	39.9	40.7	19.3	17.5	25.0	22.4	16.3
University	Mean	61.0	47.4	44.1	47.2	47.2	63.4	68.0	56.1
	SD	28.0	40.5	43.4	19.6	18.1	24.9	23.4	16.8
Postgraduate	Mean	66.1	72.2	61.1	51.4	47.6	75.2	78.4	65.6
	SD	32.1	43.0	46.8	22.7	21.0	24.9	30.7	21.2
P-value		0.000	0.000	0.021	0.016	0.127	0.001	0.000	0.002

PF - Physical functioning, RP - Role limitations due to physical health,
RE - Role limitations due to emotional problems, EF - Energy/fatigue, EW - Emotional well-being,
SF - Social functioning, BP - Body pain, GH - General health, SD - standard deviation.

had a lower mean health related quality of life than those without a comorbidity. Moreover, Berrigan et al[29] attributed the lower quality of life among MS patients with comorbidity to the general effects of increased disability and depression, as well as the specific effects of physical comorbidities. In particular, interventions that reduce disability are expected to yield the most substantial improvement in quality of life.

Moreover, Magyar[30] found that comorbidity, especially autoimmune diseases, is higher among female than male MS patients. The significantly lower mean scores in all SF-36 subscales among females with comorbidity than those without comorbidity may be explained by the fact that female MS patients are usually predisposed to a higher frequency of relapses, which is further worsened by associated comorbidities.[31]

Table 6 - Differences in SF-36 subscale scores by associated comorbidity.

Associated comorbidity		PF	RP	RE	EF	EW	SF	BP	GH
Males									
Absent (n=176)	Mean	62.1	50.6	47.7	50.0	49.3	64.9	73.4	55.4
	SD	29.0	41.9	44.2	20.6	16.0	26.1	21.6	18.0
Present (n=38)	Mean	52.6	42.1	49.1	46.6	52.6	62.5	64.9	50.0
	SD	34.4	37.7	40.1	17.9	17.1	22.1	25.6	14.2
P-value		0.121	0.224	0.849	0.344	0.248	0.596	0.033	0.084
Females									
Absent (n=268)	Mean	59.7	49.1	44.0	45.7	46.3	63.5	65.7	58.2
	SD	28.9	42.0	42.9	19.3	17.5	24.7	24.6	16.8
Present (n=116)	Mean	52.6	28.0	29.3	38.2	39.2	52.2	53.5	50.7
	SD	25.2	34.9	41.7	20.5	21.0	27.2	24.4	17.2
P-value		0.015	<0.001	0.002	0.001	0.002	<0.001	<0.001	<0.001
Total									
Absent (n=444)	Mean	60.7	49.6	45.3	47.4	47.4	63.9	68.6	57.0
	SD	28.9	41.9	43.3	19.9	17.0	25.3	23.8	17.4
Present (n=154)	Mean	52.6	31.5	34.2	40.2	42.4	54.5	56.0	50.5
	SD	27.6	36.0	42.1	20.3	20.9	26.6	25.4	16.6
P-value		0.002	<0.001	0.005	<0.001	0.008	<0.001	<0.001	<0.001

PF - Physical functioning, RP - Role limitations due to physical health,
RE - Role limitations due to emotional problems, EF - Energy/fatigue, EW - Emotional well-being,
SF - Social functioning, BP - Body pain, GH - General health.

The current study has several limitations. A larger sample size is needed, and results should be restricted to a group of mildly disabled MS patients to eliminate the well-known effect of disability on quality of life. This cohort of patients did not represent multiple psychosocial factors.

This study concluded that MS patients have low quality of life scores. Therefore, these patients need more comprehensive management by their treating physicians. Further development of the registration will provide access to the entire population of MS patients and help comprehensively analyze the factors that affect the quality of their lives. Self-evaluation indicated a significant reduction of quality of life compared to the overall population, and it was decreased mainly in relation to the level of disability caused by the disease. More in-depth studies are required in different areas of Saudi Arabia to further assess quality of life for MS patients.

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Clinical Practice Guidelines

Clinical Practice Guidelines must include a short abstract. There should be an Introduction section addressing the objective in producing the guideline, what the guideline is about and who will benefit from the guideline. It should describe the population, conditions, health care setting and clinical management/diagnostic test. Authors should adequately describe the methods used to collect and analyze evidence, recommendations and validation. If it is adapted, authors should include the source, how, and why it is adapted? The guidelines should include not more than 50 references, 2-4 illustrations/tables, and an algorithm.