Effects of Sexual Dysfunction, Fatigue, and Depression on the Quality of Life of Women with Multiple Sclerosis

Selin Akıncioglu[1], Nurgul Gungor Tavsanlı[2], Hatice Mavioglu[3]

[1]Manisa Celal Bayar University Health Science Institute, Manisa, Turkey
[2]Manisa Celal Bayar University Faculty of Health Science, Department of Midwifery, Division of Internal Medicine Nursing, Manisa, Turkey
[3]Manisa Celal Bayar University Faculty of Medicine, Department of Neurology, Manisa, Turkey

Abstract

Objective: This study aimed to assess the effects of sexual dysfunction, fatigue, and depression of women with multiple sclerosis (MS) on their quality of life (QoL).

Materials and Methods: The study included 30 women with MS, and 60 healthy women who presented to the outpatient clinics of Hafsa Sultan Hospital, Celal Bayar University, with simple complaints without a chronic disease. The sociodemographic form, fatigue severity scale (FSS), Arizona sexual experiences scale (ASES), Beck Depression scale (BDS), and Health-Related QoL Short Form-36 (SF-36) were administered to the patients with MS and patients in the control group. While patients with MS were assigned to the experimental group, other patients were assigned to the control group.

Results: In both groups, the mean age of the patients was 34 (minimum=24, maximum=40) years. A significant statistical difference was found between the two groups in terms of the mean scores they obtained from the FSS (p<0.05). In our study, the mean scores of the participants in the experimental and control groups obtained from the overall BDS were 16.00±7.96 and 2.10±2.62, respectively. Of the participants in the experimental group, 9 experienced moderate depression and 2 had severe depression. Of the participants, 29 women in the experimental group and 10 women in the control group had sexual dysfunction. In terms of the mean scores they obtained from the ASES, a significant difference was found between the participants in the experimental and control groups (p<0.01).

Conclusion: Women with MS had higher levels of fatigue, sexual dysfunction, and depression than did the healthy controls, which explains the decrease in their QoL. The comparison of the participants in both groups in terms of their QoL revealed that the women with MS had a lower level of QoL than did the women in the control group.

Keywords: Multiple sclerosis, fatigue, depression, sexual dysfunction, quality of life

Introduction

Multiple sclerosis (MS) is a disease in which multiple demyelination plaques involving the central nervous system develop focally and diffusely and is characterized with remission and exacerbations. It is 1.5 times more common in women (1). Neuropathic complications, depression, fatigue, sexual dysfunction (SD), and cognitive changes in MS affect the quality of life (QoL) of patients with MS (2).

The incidence rate of at least one of the SD symptoms in MS is approximately 84% in men and 85% in women, and the most common SD symptoms are decreased sexual demand, sexual desire problems, decrease in orgasm, or inability to have orgasms (3,4). In patients with MS, SD is classified into three groups: (1) primary SD, which is considered a direct result of MS, (2) secondary SD, which is caused by other symptoms of MS that reduce sexual function, and (3) tertiary SD, which influences sexual life in relation to psychological, emotional, social, and cultural factors (5). Sexual problems are not comfortably talked about in our society. Nurses can attempt to identify and prevent sexual problems. Thus, nurses should consider patients' sexual habits in the pre-disease period to determine sexual problems and thus assess whether there is a problem

Akıncıoğlu et al. Sexual Dysfunction and QoL in MS

Journal of Multiple Sclerosis Research 2022;2(1):13-19

and if they receive medical treatment for their problems. Nurses can investigate the causes of patients' sexual problems, plan appropriate interventions, and provide them guidance to solve the problems (6).

Psychiatric disorders are frequently observed in the course of MS disease. One of the highly common psychiatric problems in patients with MS is depression (7). General causes of depression are as follows: cognitive, mental, and functional impairments noticed by patients with insight (catastrophic anxiety), insufficient assessment of stimuli from the environment, inability to overcome events, social losses, loneliness, or problems associated with physical diseases that accompany dementia (8).

MS has adverse effects on the QoL of patients and their families and affects young people mostly. Because MS is more common in young people, it causes loss of productivity, decrease in QoL, and a serious burden. In studies that compared the relationship between QoL and health in patients with MS and patients with other chronic medical-neurological diseases, the QoL scores were lower in the former group than those in the latter group (9). In addition to medical treatment, training and counseling services play an important role in controlling the disease. Midwives and nurses, who are responsible for the physical, cognitive, and mental wellbeing of patients, can help improve the QoL in patients through training and counseling services they provide to patients (10). Studies have suggested that SD, fatigue, and depression are the most important factors that negatively affect the QoL in patients with MS (9,10).

SD, fatigue, and depression, which are among the irreversible problems of women with MS, negatively affect their QoL (11). Therefore, detecting SD problems in the routine follow-ups of women with MS, making measurements to evaluate fatigue, depression, and QoL, and using them in clinical settings will generate positive changes on the disease course in women with MS.

In this study, we aimed to determine the effects of SD, fatigue, and depression on the QoL of women with MS. Therefore, by comparing the SD, fatigue, depression, and QoL of women with MS with those of healthy women, the problems of women with MS will be more clearly identified.

Materials and Methods

This cross-sectional and case-control study included 60 healthy women and 30 women diagnosed with MS according to McDonald's diagnostic criteria and monitored in the neurology clinic of a medical center in the west of Turkey between April 1, 2015, and September 30, 2015.

Female outpatients with MS who underwent treatment during the first 6 months of 2015 in the neurology clinic of a medical center were monitored. The simple random sampling method was used for sample selection.

The control group consisted of 60 volunteer women who presented to the outpatient clinics of the internal diseases department of a university hospital between April 1, 2015, and September 30, 2015, had similar characteristics (such as age, educational level, marital status, working status, and health insurance), met the inclusion criteria, did not have a neurological disease, gave informed consent, and had simple complaints but no chronic diseases. The participants were informed about the aim of the study and further assessments before they were invited to take part in the study. Of them, those who accepted to participate in the study were evaluated in terms of their suitability for the study and inclusion criteria.

Data Collection

In this study, the sociodemographic form, Arizona sexual experiences scale (ASES), fatigue severity scale (FSS), Beck Depression scale (BDS), and Health-Related QoL Short Form-36 (SF-36) were used to collect the study data. The participants spend 30-35 min to the fill in the forms.

Sociodemographic Form: The form was used to question the characteristics of the participants such as age, sex, bodyweight, height, education level, marital status, number of children, social insurance, working status, MS history, disease type, and whether they had undergone physiotherapy and rehabilitation therapy. Then, the obtained data were recorded (1-11).

ASES: This scale, which was developed to quickly and easily scan and detect the problems patients experience in their sexual life, consists of five items. Responses given to the items are rated on a six-point Likert-type scale. The ASES has two separate forms for women and men (2,12). Of the participants, those whose ASES scores were ≥11 were considered highly likely to have SD. The increase in the score is directly associated with the severity of the pathology (or "the higher the score is the more severe the pathology is") (2).

FSS: The FSS includes nine items. The maximum possible score to be obtained from each item is seven: the higher the score, the higher the fatigue level. The scale is used to question the state of fatigue in the last 1 month, including the day it is filled in. The participants scored each item on a scale ranging from 1 (strongly disagree) to 7 (strongly agree). The lowest and highest possible scores to be obtained from the overall scale are 9 and 63, respectively. The sum of the mean scores of the nine items yields the overall FSS score: the higher the mean score, the greater the severity of fatigue. Patients whose FSS score is <4 are considered "not fatigued," and patients with a fatigue intensity scale score of >4 are considered "fatigued" (3).

BDS: It is a self-report scale developed to assess emotional, cognitive, somatic, and motivational components of depression. The scale consists of 21 items: two items are allocated to emotions, 11 items to cognitive functions, 2 items to behaviors, 5 items to bodily symptoms, and 1 item to

Journal of Multiple Sclerosis Research 2022;2(1):13-19

Akıncıoğlu et al. Sexual Dysfunction and QoL in MS

interpersonal symptoms. The minimum and maximum possible scores are 0 and 3 for each item, and 0 and 63 for the overall BDS, respectively. The scores 0-9 refer to minimal depression or absence of depression; 10-18, mild depression; 19-29, moderate depression; and 30-63, severe depression (3,4,5).

SF-36: This scale was developed by Ware and Sherbourne (6), consists of 36 items, and provides extensive measurement of eight dimensions. The responder must take into account the last 4 weeks while replying the questions. The score is calculated not for the overall scale but for each dimension separately, ranging from 0 to 100: 0 refers to bad health, whereas 100 refers to good health (7).

Expanded Disability Status Scale (EDSS): The EDSS is frequently used to evaluate a neurological disorder together with disability, based on the interview between the patient with MS and physician, and the neurological examination of the patient. It consists of 20 steps between 0 and 10, where 0 is normal and 10 means death due to MS. The EDSS steps are determined with a neurological examination. A numerical increase in EDSS indicates a bad MS course. The EDSS rating relies on the ambulation status and the neurological examination of the eight functional systems (FS) (8,9).

Statistical Analysis

In the data analysis, the SPSS 15.00 for Windows software was used. The Kolmogorov-Smirnov test was used to identify whether the data were normally distributed. The independent samples t-test, correlation analysis, and chi-square tests were used for the comparison of the two groups. The p value <0.050 was considered significant at a confidence interval of 95. A correlation coefficient of 0.00-0.30 indicates negligible correlation; 0.30-0.50, low positive/negative correlation; 0.50-0.70, moderate positive/negative correlation; 0.70-0.90, high positive/negative correlation; and 0.90-1.00, very high positive/negative correlation (3,7).

Ethical Considerations

This study was conducted in the neurology clinic of a medical center. The study was approved by the Ethical Commission of University of Health Sciences Turkey, Faculty of Medicine was obtained (decision number: 140, date: 25.03.2015).

Results

No significant difference was found between the participants in the experimental and control groups in terms of their sociodemographic characteristics, such as education, marital status, working status, and social insurance (p<0.01) (Table 1).

Of the participants with MS, 90% (n=27) had relapsing-remitting multiple sclerosis (RRMS) which manifests itself with attacks, 10% (n=3) had SPMS, 6.70% (n=2) had a family history of MS, and 93.30% (n=28) had no family history of MS. The minimum

and maximum scores that the participants obtained from the EDSS were 0 and 7, respectively, whereas their mean EDSS score was ≤3.0, which indicated that they had sufficient physical capacity to perform their usual activities and roles of daily living (8,9) (Table 2).

The mean ASES scores were 19.53±5.46 and 8.28±3.21 in the experimental group and control group, respectively. In this study, 29 women in the experimental group and 10 women in the control group scored ≥11 points from the ASES. While 29 women in the experimental group were sexually dysfunctional, 10 women in the control group had SD. According to their ASES scores, a significant difference was found between the experimental and control groups (p<0.01) (Table 3).

While an FSS of <4 indicate that the person is not fatigued, an FSS score of ≥4 indicates a fatigued state. In our study, the FSS score of 27 participants in the experimental group and 4 in the control was ≥4, which indicated that they suffered from fatigue. A significant difference was found between the two groups with regard to their FSS scores (p<0.01) (Table 3).

In our study, the mean overall BDS scores of the participants in the experimental and control groups were 16.00±7.96 and 2.10±2.62, respectively. Of the women in the experimental group, 6 had depression or minimal depression, 13 (43.30%) had mild depression, 9 (30.00%) had moderate depression, and 2 (6.70%) had severe depression. In the control group, 58 women were not depressed or were minimally depressed. A significant difference was found between the two groups in terms of their BDS scores (p<0.05) (Table 3).

The comparison of the experimental and control groups in terms of their mean SF-36 QoL scores revealed that the control group obtained higher scores from the physical function n(t=-7.01, p<0.01), role difficulty (t=-8.60, p<0.01), general health (t=-8.49, p<0,01), energy vitality (t=-10.94, p≤0.01), social function (t=-12.02, p<0.01), role difficulty emotional (t=-5.53, p<0.01), and mental health (t=-6.16, p<0.01) sub-dimensions of the SF-36 than did the experimental group. As for the pain sub-dimension, the experimental group obtained significantly higher scores than did the control group (t=44.53, p<0.01) (Table 4).

In the women with MS, a moderately significant correlation was noted between the mean scores that they obtained from the overall ASES and the physical function sub-dimension of the SF 36 (rs=-0.37*, p<0.043). A weak relationship was noted between the mean overall ASES scores and score regarding role difficulties (rs=-0.041, p=0.830), pain (rs=-0.239, p<0.203), general health (rs=-0.182, p<0.336), energy (rs=0.152, p=0.422), and social function (rs=0.152, p=0.422), and average significant relationship (p>0.05) with the emotional (rs=0.351, p=0.057) and mental health (rs=-0.327, p=0.077) sub-dimensions of the SF-36 (Table 5).

Akıncıoğlu et al. Sexual Dysfunction and QoL in MS

Journal of Multiple Sclerosis Research 2022;2(1):13-19

Table 1. Participants' sociodemographic characteristics		Case group		Control group			
Sociodemographic characteristics		N	%	N	%	x²	p
Age group	<34 age	9	30	20	33.3	11,377	0.00
	>35 age	21	70	40	66.7		
Educational level	Writer-reader	1	3.30	2	3.30	35,600	0.00
	Primer school	14	46.70	28	46.70		
	High school	6	20.00	12	20.00		
	University	9	30.00	18	30.00		
Marital status	Married	30	100	60	100	34,844	0.00
	Single	0	0	0	0		
Work status	Working	7	23.30	10	16.70	34,844	0.00
	Not working	23	76.70	50	83.30		
Health insurance	Yes	28	93.30	59	98.30	78,400	0.00
	No	2	6.70	1	1.70		

*Chi-square test

As the SD scores of the women with MS decreased, their mean score for the physical function sub-dimension of the SF-36 increased, which was an expected outcome (Table 5).

A weak relationship was found between the mean scores that they obtained from the overall FSS and those from the role difficulties (rs=-0.022, p=0.908), physical function (rs=-0.201, p=0.288), pain (rs=-0.145, p=0.444), energy (rs=-0.249, p=0.185), social function (rs=-0.191, p=0.313), and mental health (rs=-0.190, p=0.314), and average insignificant relationship (p>0.05) with the general health (p=0.352, rs=-0.176) and emotional (rs=0.351, p=0.057) sub-dimensions of the SF-36 (Table 5).

In women with MS, a negative average relationship was found between the mean scores that they obtained from the overall BDS and the pain sub-dimension of the SF-36 (rs=-0.393*, p=0.032). As depression scores increased in women with MS, their score for the pain sub-dimension of the QoL decreased. Depression experienced by women with MS increased their pain tolerance and caused them to feel more pain (Table 5).

A weak relationship was note dbetween the mean scores that they obtained from the overall BDSS and from the physical function(rs=-0.074, p=0.698), role difficulty (rs=-0.241, p=0.200), general health (rs=-0.239, p=0.204), social function (rs=-0.035, p=0.852), and emotional (rs=0.160, p=0.398) and moderate insignificant relationship (p>0.05) with energy (rs=-0.258, p=0.168) and mental health (rs=-0.282, p=0.131) sub-dimensions of the SF-36 (Table 5).

Discussion

The RRMS rate was 82% in the study of Bertado et al. (10), 85.4% in the study of Sorgun and Yücesan (11), and 69.8% in the study of Nazari et al. (12). Disabilities in patients with MS may have a significant negative effect on their QoL, fatigue, and sexual

Table 2. EDSS scores and MS types of patients with MS		N	%
MS types	RRMS	27	90.00
	SPMS	3	10.00
History of MS in their family	Yes	2	6.70
	No	28	93.30
EDSS scores		N	%
0		9	30.0
1.5		2	6.70
2.0		4	13.30
2.5		1	3.30
3.0		5	16.70
4.0		2	6.70
5.0		1	3.30
5.5		1	3.30
6.0		4	13.30
7.0		1	3.30

EDSS: Expanded disability status scale, MS: Multiple sclerosis

function. Disabilities in patients with MS have been investigated in several studies. In studies conducted by Arpacı et al. (13) and Solaro et al. (14), the level of disability assessed by the EDSS score was 2.8 and 3.3, respectively. In our study, the mean EDSS score was similar to those determined in the aforementioned studies (10-14).

SD, which is a common problem in patients with MS, is often overlooked because people refrain from talking about it (15). In their study conducted in 137 patients with MS, Lew-Starowicz and Rola (16) reported that only 2.2% of the physicians questioned sexual functions of the patients. SD is observed in

Journal of Multiple Sclerosis Research 2022;2(1):13-19

Akıncıoğlu et al. Sexual Dysfunction and QoL in MS

Table 3. Comparison of ASES, FSS total scores, and BDS scores of the case and control groups

ASES total scores	Case groups		Control groups		Total		t	p	x²
	N	%	N	%	N	%			
≤10	1	3.30	50	83.30	51	56.70	-12.28	0.00*	26.3**
≥11	29	96.70	10	16.70	39	43.30			

FSS total scores	Case groups		Control groups		Total		t	p	x²
	N	%	N	%	N	%			
≤3.9	3	10.00	56	93.30	59	65.60	-13.78	0.00*	61.50**
≥4.0	27	30.00	4	6.70	31	34.40			

BDI scores	Case groups		Control groups		Total		p	x²
	N	%	N	%	N	%		
0-9 none/minimal depression	6	20.00	58	96.70	64	71.10	0.00	57.73**
10-18 mild depression	13*	43.30*	2	3.30	15	16.70		
19-29 moderate depression	9*	30.00*	0	0.00	9	10.00		
30-63 severe depression	2	6.70	0	0.00	2	2.20		

*Independent sample T **Chi-square test

ASES: Arizona sexual experiences scale, FSS: Fatigue severity scale, BDS: Beck depression scale, BDI: Beck depression inventory

Table 4. Comparison of SF-36 sub-domain scores of the case and control groups

SF-36 sub-domains scores	Group	N	Mean	SD	T	p
Physical function	Case	30	57.66	27.02	-7.01	0.00*
	Control	60	93.08	20.00		
Role difficulty	Case	30	34.16	36.83	-8.60	0.00*
	Control	60	92.50	26.56		
Pain	Case	30	87.33	8.27	44.53	0.00*
	Control	60	2.66	8.60		
General health	Case	30	34.00	6.94	-8.49	0.00*
	Control	60	51.73	10.30		
Energy vitality	Case	30	34.33	6.39	-10.94	0.00*
	Control	60	62.25	13.19		
Social function	Case	30	29.16	15.85	-12.02	0.00*
	Control	60	61.45	9.57		
Role difficulty emotional	Case	30	36.66	36.46	-5.53	0.00*
	Control	60	65.00	11.35		
Mental health	Case	30	52.00	5.84	-6.16	0.00*
	Control	60	65.73	11.46		

*Independent Sample T, SD: Standard deviation

30-80% of the patients with MS and has a strong negative effect on the QoL (16,17). Questioning SD in patients with MS can improve their QoL (18). Education and counseling to patients can help solve hidden problems such as SD and improve their QoL (19). In several studies, SD is a widespread problem in women with MS (20,21). The findings of these studies are consistent with those of our study. In Marita's study, patients with MS had sexual problems more than did healthy people (22). Although fatigue is a widespread symptom in patients with MS, it is often overlooked or undervalued because of its subjective nature. Its treatment is rather complex. Fatigue is more common in patients with MS than in healthy adults or in individuals with other diseases and affects their activities of daily living, causing loss of energy and motivation (23,24). Members of a health team should motivate individuals with MS to manage fatigue, maintain good relationships with other people, organize life, and use their energy correctly (25).

MS is a neurological disorder in which psychiatric symptoms such as depression are frequently observed (25). Depression is more widespread in patients with MS than it is in patients with other chronic neurological disorders. Many factors such

Akıncıoğlu et al. Sexual Dysfunction and QoL in MS

Journal of Multiple Sclerosis Research 2022;2(1):13-19

as fatigue, sleep disorders, and movement limitation can affect depression in patients with MS (26). Therefore, although depression is frequently observed in patients with MS, it is difficult to recognize and diagnose it. MS has been reported to reduce the QoL by disrupting the emotional wellbeing of patients, affecting their social life (25,26). In 2005, the Goldman Consensus group stated that depression was an important factor in reducing the QoL along with cognitive impairment (27). In several studies, depression is reported as common in patients with MS and to affect their QoL (28,29). In the present study, the SF-36 QoL scale was used, and the QoL score was low in patients with MS suffering depression (28-30). In another study, Nourbakhsh et al. (30) assessed the QoL with SF-36 and found that QoL was negatively affected in patients with MS suffering depression (30). In our study, a significant relationship was noted between SF-36 QoL scale and depression level in women with MS. Domingo et al. (31) and Bartnik et al. (32) also reported a relationship between depression and SD (31,32). Factors such as depression and fatigue can decrease sexual desire, vaginal lubrication, and genital sensitivity (33). Usually, depression is neglected in the treatment process of patients with MS; thus, psychological problems of these people should be tackled through a multidisciplinary approach (34).

Study Limitations

The results are applicable only to those who presented to a neurology clinic for follow-up; thus, they cannot be generalized to all people with MS. A statistical limitation is that the study was conducted with 30 women with MS. Patients are admitted to the MS outpatient clinic in the hospital where the study was conducted once a week, and because only female patients were included in the study, it was conducted with 30 women with MS. Therefore, our sample does not represent people with all MS subtypes.

Conclusion

In this study, we investigated the effects of SD, fatigue, and depression on the QoL of women with MS and determined that people with MS had higher levels of fatigue, SD, and depression than did healthy controls, which may have decreased their QoL. We also determined that SD, fatigue, and depression affected the QoL in healthy women negatively, but less frequently than in women with MS. The comparison of the two groups revealed that the level of QoL was significantly lower in participants with MS than it was in participants in the control group.

Ethics

Ethics Committee Approval: This study was conducted in the neurology clinic of a medical center. The study was approved by the Ethical Commission of University of Health Sciences Turkey,

Table 5. Relationship between SF-36 sub-dimensions of MS patients and Arizona sexual lives scale, fatigue severity scale, and Beck depression scale scores

SF-36 Sub-fields	ASES	FSS	BDS
Physical function	**r_s=-0.372*** **p=0.043**	r_s=-0.201 p=0.288	r_s=-0.074 p=0.698
Role difficulty	r_s=-0.041 p=0.830	r_s=-0.022 p=0.908	r_s=-0.241 p=0.200
Pain	r_s=-0.239 p=0.203	r_s=-0.145 p=0.444	**r_s=-0.393*** **p=0.032**
General health	r_s=-0.182 p=0.336	p=0.352 r_s=-0.176	r_s=-0.239 p=0.204
Energy/vitality	r_s=0.152 p=0.422	r_s=-0.249 p=0.185	r_s=-0.258 p=0.168
Social function	r_s=-0.157 p=0.409	r_s=-0.191 p=0.313	r_s=-0.035 p=0.852
Emotional	r_s=0.351 p=0.057	r_s=0.351 p=0.057	r_s=0.160 p=0.398
Mental health	r_s=-0.327 p=0.077	r_s=-0.190 p=0.314	r_s=-0.282 p=0.131

*The correlation is significant at the p<0.05 level. MS: Multiple sclerosis ASES: Arizona sexual experiences scale, FSS: Fatigue severity scale, BDS: Beck depression scale, BDI: Beck depression inventory

Faculty of Medicine, was obtained (decision number: 140, date: 25.03.2015).

Informed Consent: Written consent was obtained from all participants.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: S.A., H.M., Concept: N.G.T., H.M., Design: S.A., N.G.T., H.M., Data Collection or Processing: S.A., N.G.T., H.M., Analysis or Interpretation: S.A., N.G.T., H.M., Literature Search: S.A., N.G.T., Writing: S.A.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Göksel Karatepe A, Kaya T, Günaydn R, Demirhan A, Ce P, Gedizlioğlu M. Quality of life in patients with multiple sclerosis: the impact of depression, fatigue, and disability. Int J Rehabil. Res 2011;34:290-298.

2. Soykan, A. The reliability and validity of Arizona Sexual Experiences Scale in Turkish ESRD patients undergoing hemodialysis. Int J Import Res 2004;16:531-534.

3. Armutlu K, Korkmaz NC, Keser I, Sumbuloglu V, Akbiyik DI, Guney Z, Karabudak R. The validity and reliability of the Fatigue Severity Scale in Turkish multiple sclerosis patients. Int J Rehabil Res 2007;30:81-85.

4. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. Arch Gen Psychiatry 1961;4:561-571.

Journal of Multiple Sclerosis Research 2022;2(1):13-19

Akıncıoğlu et al. Sexual Dysfunction and QoL in MS

5. Hisli Sahin N. The validity and reliability of Beck depression inventory for university students. Turkish Journal of Psychology 1989;7:3-13.

6. Ware JE Jr, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med Care 1992;30:473-483.

7. Koçyiğit H, Aydemir Ö, Güler F, Ölmez N, Memis A. Reliability and Validity of the Turkish Version of the Short Form-36 (SF36). İlaç ve Tedavi Dergisi 1999;12:102-106.

8. Kurtzke JF. Rating neurologic impairment in multiple sclerosis: an expanded disability status scale (EDSS). Neurology. 1983;33:1444-1452.

9. Özakbas S. Evaluation of Disability in Multiple Sclerosis. Archives of Neuropsychiatry 2008;45:6-9.

10. Bertado-Cortés B, Villamil-Osorio L, Carrera-Pineda R, Martínez-Cortés C, Guerrero-Cantera J. Clinical and demographic characteristics of patients with multiple sclerosis. Rev Med Inst Mex Seguro Soc 2016;54:S186-190.

11. Sorgun HM, Yücesan C. Headache and Functional System Involvement in Multiple Sclerosis. J Ankara Univ Fac Med 2011;64:81-85.

12. Nazari F, Shaygannejad V, Sichani MM, Mansourian M, Hajhashemi V. Sexual dysfunction in women with multiple sclerosis: prevalence and impact on quality of life. BMC Urol 2020;20:15.

13. Arpaci E, Unal EH, Gulpek D, Pınar CE, Turkoglu Akbay S, Gedizlioglu M, Mete L. Sexual Dysfunction in Multiple Sclerosis Patients. Jounal of Neurological Sciences 2011; 28:71-78.

14. Solaro C, Trabucco E, Signori A, Martinelli V, Radaelli M, Centonze D, Rossi S, Grasso MG, Clemenzi A, Bonavita S, D'Ambrosio A, Patti F, D'Amico E, Cruccu G, Truini A. Depressive symptoms correlate with disability and disease course in multiple sclerosis patients: an ıtalian multi-center study using the Beck depression inventory. PLoS One 2016;15;11:e0160261.

15. Kisic-Tepavcevic D, Pekmezovic T, Trajkovic G, Stojsavljevic N, Dujmovic I, Mesaros S, Drulovic J. Sexual dysfunction in multiple sclerosis: A 6-year follow-up study. J Neurol Sci. 2015;358:317-323.

16. Lew-Starowicz M, Rola R. Prevalence of sexual dysfunctions among women with multiple sclerosis. Sex Disabil 2013;31:141-153.

17. Schmidt EZ, Hofmann P, Niederwieser G, Kapfhammer HP, Bonelli RM. Sexuality in multiple sclerosis. J Neural Transm (Vienna). 2005;112:1201-1211.

18. Haliloglu S, İcagasıoglu H, Baklacıoglu HS, Yumusakhuylu Y, Atlıg RS, Demirhan E, Işık N. Relationship between functional status and quality of life in multiple sclerosis. Göztepe Tıp Dergisi 2009;24:129-133. Available from: https://jag.journalagent.com/medeniyet/pdfs/MEDJ_24_3_129_133.pdf

19. Lefebvre S, Simonin L. Improving the sexual QoL of people with multiple sclerosis. Rev Infirm 2016;222:21-23.

20. Silva RA, Olival GS, Stievano LP, Toller VB, Jordy SS, Eloi M, Tilbery CP. Validation and cross-cultural adaptation of sexual dysfunction modified scale in multiple sclerosis for Brazilian population. Arq Neuropsiquiatr 2015;73:681-687.

21. Terzi M, Kocamanoglu B, Güz H, Onara M, Sahin AR. Sexual dysfunction in multiple sclerosis patients. J. Exp. Clin. Med. 2009;26:81-85.

22. McCabe MP. Relationship functioning and sexuality among people with multiple sclerosis. J Sex Res 2002;39:302-309.

23. Kaya T, Karatepe GA, Demirhan A, Günaydın R, Gedizlioğlu M, Ortan P. Fatigue and Related Factors in Patients With Multiple Sclerosis. Journal of Neurological Sciences 2009;26:190-197.

24. Krupp LB. Fatigue in multiple sclerosis: definition, pathophysiology and treatment. CNS Drugs 2003;17:225-234.

25. Feinstein A, Magalhaes S, Richard JF, Audet B, Moore C. The link between multiple sclerosis and depression. Nat Rev Neurol 2014;10:507-517.

26. Brenner F, Piehl P. Fatigue and depression in multiple sclerosis: pharmacological and non- pharmacological interventions. Acta Neurol Scand 2016;134:47-54.

27. Ensari I, Motl RW, McAuley E, Mullen SP, Feinstein A. Patterns and predictors of naturally occurring change in depressive symptoms over a 30-month period in multiple sclerosis. Mult Scler 2014;20:602-609.

28. Mohammadi K, Rahnama P, Montazeri A. Prevalence and risk factors for depression in women with multiple sclerosis: a study from Iran. Ann Gen Psychiatry 2015;22:14-29.

29. Gumus H, Akpınar Z, Yılmaz H. The effects of multiple sclerosis on female sexuality: Controlled study. J Sex Med 2014;11:481-485.

30. Nourbakhsh B, Julian L, Waubant E. Fatigue and depression predict QoLin patients with early multiple sclerosis: a longitudinal study. Eur J Neurol. 2016;23:1482-1486.

31. Domingo S, Kinzy T, Thompson N, Gales S, Stone L, Sullivan A. Factors associated with sexual dysfunction in individuals with multiple sclerosis: implications for assessment and treatment. Int J MS Care 2018:20:191-197.

32. Bartnik P, Wielgoś A, Kacperczyk J, Pisarz K, Szymusik I, Podlecka-Piętowska A, Zakrzewska-Pniewska B, Wielgoś M. Sexual dysfunction in female patients with relapsing-remitting multiple sclerosis. Brain Behav 2017:7:e00699.

33. Hösl KM, Deutsch M, Wang R, Roy S, Winder K, Niklewski G, Lee D-H, Linker RA, Hilz MJ. Sexual dysfunction seems to trigger depression in female multiple sclerosis patients. Eur Neurol 2018:80:34-41.

34. Zavoreo I, Gržinčić T, Preksavec M, Madžar T, Bašić Kes V. Sexual dysfunction and incidence of depression in multiple sclerosis patients. Acta Clin Croat 2016:55:402-406.