Original Article

Sexual Function in Women with Early-Stage Multiple Sclerosis: A Cross-Sectional Study

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Abstract
Background: Multiple Sclerosis is a progressive neurological disorder that may lead to varying degrees of physical disability. Sexual dysfunction is frequently reported among women with Multiple Sclerosis, even in the early stages of the disease, and may negatively affect overall quality of life. However, evidence focusing specifically on sexual function in the early stage of the disease remains limited.
Objective: This study aimed to investigate the effects of early-stage Multiple Sclerosis on sexual function and disability levels among women.
Methodology: This comparative descriptive study included 80 women diagnosed with Multiple Sclerosis. Data were collected through face-to-face interviews using a Participant Information Form, the Expanded Disability Status Scale (EDSS), and the Female Sexual Function Index (FSFI).
Results: The mean EDSS score of women with Multiple Sclerosis was 2.73±0.41, and the mean FSFI score was 20.49±8.93. A total of 68.8% of the participants scored below the FSFI cut-off value (<26.55), indicating sexual dysfunction. Women with EDSS scores ≥2 had significantly lower FSFI scores compared to those with lower disability levels ($p<0.001$). In regression analysis, sexual dysfunction was significantly associated with the number of Multiple Sclerosis attacks ($\beta=0.345$, $p<0.001$) and EDSS score ($\beta=-0.634$, $p<0.001$).
Conclusion: Sexual dysfunction appears to be common even in the early stages of Multiple Sclerosis. Disease-related factors such as attack frequency and physical disability may play an important role in women's sexual functioning.

Keywords: Disability, multiple sclerosis, sexuality, sexual dysfunction, women

Introduction

Multiple Sclerosis (MS) is a chronic inflammatory disease of the central nervous system characterized by demyelination and neurodegeneration. The disease may lead to a wide range of physical, emotional, cognitive, and social impairments that substantially affect individuals' quality of life (Dissiz et al., 2013). Globally, approximately 2.3 million people are living with MS, and the prevalence among young adults in Turkey is estimated to range from 0.4 to 1 per 1000 individuals (Walton et al., 2020;

Ozturk et al., 2017). Because the disease commonly affects individuals during their most productive and sexually active years, its impact extends beyond physical disability to include psychosocial and sexual health problems.

Although MS is a chronic, progressive autoimmune disease, it does not directly damage the sexual organs. Sexual symptoms arise when brain or spinal cord regions involved in sexual function are affected (Zivadinov et al., 2003; Gumus et al., 2014). Recent evidence also indicates that sexual dysfunction (SD) in MS may stem from psychological factors, concerns about bladder or bowel incontinence, and medication side effects. Thus, MS-related SD is considered a multifactorial condition involving anatomical, physiological, biological, medical, and psychological components (Kessler et al., 2009).

Despite its high prevalence, sexual dysfunction remains an under-recognized and often neglected aspect of MS care. Many individuals with MS hesitate to discuss sexual concerns with healthcare professionals due to embarrassment, stigma, or the perception that sexual issues are of secondary importance compared with physical symptoms (Kisic-Tepavcevic et al., 2015; Zecca et al., 2016; Brucker et al., 2017; Khan et al., 2018). As a result, sexual problems frequently remain untreated and may further deteriorate emotional well-being and relationship satisfaction. Sexual difficulties experienced by women with MS may include decreased sexual desire, reduced genital sensation, vaginal dryness, difficulties in arousal, and dyspareunia (Borello-France et al., 2004; Schmidt et al., 2005). In addition, psychosocial factors such as reduced self-esteem, altered body image, and relationship problems may exacerbate these difficulties (Kisic-Tepavcevic et al., 2015; Khan et al., 2018). These challenges highlight the importance of addressing sexual health as a component of comprehensive and holistic care for individuals living with MS (Guo et al., 2012).

Although sexual dysfunction has been widely reported among individuals with Multiple Sclerosis, most existing studies have focused on patients with moderate or advanced levels of disability. Evidence specifically addressing sexual function in women during the early stages of the disease remains limited. Identifying sexual health problems at an early stage is important for preventing further deterioration in quality of life and for supporting comprehensive care. Therefore, this study aimed to examine the association between disability level and sexual function in women with early-stage Multiple Sclerosis using the Expanded Disability Status Scale (EDSS).

Research Questions:

- What is the level of sexual function among women with early-stage Multiple Sclerosis?

- Does sexual function differ according to disability level (EDSS score) in women with Multiple Sclerosis?

- Which disease-related factors (e.g., number of MS attacks and disability level) affect sexual function in women with Multiple Sclerosis?

Methods

Type of Study: This study has a descriptive and comparative design.

Population and Sample: The study population consisted of all women diagnosed with Multiple Sclerosis who attended the Neurology Demyelinating Diseases Multiple Sclerosis Outpatient Clinic at Kayseri City Hospital between March 1 and October 30, 2023, totaling 107 individuals. The required sample size was calculated using G*Power 3.1 software. With a significance level of $\alpha = 0.05$, power $(1-\beta) = 0.80$, and an anticipated medium effect size ($f^2 = 0.15$),

the minimum required sample size was estimated to be 68 participants (Cohen, 1988). Considering potential dropouts, a total of 80 women were recruited, ensuring sufficient statistical power for the study analyses. The study sample included 80 women who met the inclusion criteria: being sexually active, having no diagnosed psychiatric disorder, possessing sufficient cognitive ability to complete the data collection instruments, and providing informed consent. Nineteen women who were not sexually active, five who declined to participate, and three with severe psychotic symptoms were excluded from the study.

Data collection: Data were collected using a participant information form, the Expanded Disability Status Scale (EDSS), and the Female Sexual Function Index (FSFI). All interviews were conducted face-to-face in a private room to ensure confidentiality and lasted approximately 15–20 minutes.

***Participant Information Form*:** This form included questions about socio-demographic characteristics such as women's age, education, employment and economic status, and the type of disease related to MS, its duration, and hospital stay.

Expanded Disability Status Scale (EDSS): Kurtzke (1983) developed this scale to evaluate disability in MS. The total score is obtained by scoring each neurological function in MS, including pyramidal, cerebral, brainstem, sensory, bowel/bladder, visual, cerebral/mental and other, and by questioning the patient's mobility. The score on the scale ranges from "0" (no symptoms) to "10" (death due to MS), with a score of 4.5 indicating that the patient is fully mobile and a score of 5 and above indicating difficulty in performing daily activities (Kurtzke, 1983).

Female Sexual Function Index (FSFI): The FSFI was developed by Rosen et al. (2000) to assess women's sexual functioning over the previous four weeks, and its Turkish validity and reliability were established by Aygin-Aslan (2005). The instrument includes six domains—desire, arousal, lubrication, orgasm, satisfaction, and pain—across 19 items. Total scores range from 2 to 36, with values below 26.55 indicating sexual dysfunction (Rosen et al., 2000; Aygin and Aslan, 2005). In this study, the Cronbach's alpha coefficient was found to be 0.93.

Statistical analysis: The data obtained in the study were analyzed using SPSS (Statistical Package for the Social Sciences) version 25.0. The normality of the data distribution was assessed using the Shapiro–Wilk and Kolmogorov–Smirnov tests**.** In the evaluation of the data, descriptive statistical methods (number, percentage, mean, standard deviation) were used, and Student's t-test for independent groups was applied to compare variables with a normal distribution. Multiple linear regression analysis was performed to determine the factors affecting sexual function in women with Multiple Sclerosis. A p-value of <0.05 was considered statistically significant in all analyses.

Ethical approval: Ethics approval (No. 2023/799) and a research permit (No. 2023/413) were obtained from the Ethics Committee of Kayseri City Hospital. Participants were informed according to the Declaration of Helsinki and provided written and verbal consent via an "Informed Consent Form."

Results

The participants' mean age was 35.91 ± 12.33 years (range: 21–56), with a mean disease duration of 68.65 ± 19.68 months, 1.19 ± 0.40 hospitalizations, and 3.05 ± 0.60 MS-related attacks. In terms of educational level, the majority of the women (67.5%) had ≥8 years of education; 57.7% were unemployed, and a similar proportion (57.7%) reported that their income was equal to their expenses.

When disease-related characteristics were evaluated, the distribution of MS duration was similar between groups (<36 months: 48.8%; ≥36 months: 51.2). Regarding MS type, the highest proportion was primary-progressive (45.0%). In terms of the number of attacks, 53.8% of the participants had experienced fewer than two attacks. The majority of the participants (80.4%) had two or fewer hospitalizations, and according to EDSS scores, 62.5% of the women had scores above 2. In terms of sexual function, 68.8% of the participants had FSFI scores below the cutoff value of 26.55, indicating a risk of sexual dysfunction (Table 1).

Table 1. Descriptive characteristics of the participants (n=80)

Age	**n**	**%**
<35 years	38	47.5
≥35 years	42	52.5
Education		
<8 years	26	32.5
≥8 years	54	67.5
Employment		
Employed	37	46.3
Unemployed	43	57.7
Income Level		
Income less than expenses	37	46.3
Income equal to expenses	43	57.7
MS Duration		
<36 months	36	48.8
≥36 months	44	51.2
Type of MS		
Benign	15	18.8
Relapsing remitting	13	16.3
Primary-progressive	36	45.0
Secondary-progressive	16	20.0

Number of Attacks		
≤2	43	53.8
>2	37	46.2
Number of hospitalizations (n=51)		
≤2	41	80.4
>2	10	19.6
EDSS Scores		
<2	30	37.5
≥2	50	62.5
FSFI Scores		
<26.55	55	68.8
≥26.55	25	31.2

MS: Multiple Sclerosis, EDSS: Expanded Disability Status Scale

In the study, the mean EDSS score for women with MS was 2.73 ± 1.41, and the mean total FSFI score was 20.49 ± 8.93. Based on the FSFI cutoff point, it was determined that 68.8% of the women scored below 26.55, indicating a possible sexual dysfunction (Table 2). When the FSFI subscales were examined, the mean scores were 3.55 ± 1.44 for desire, 3.68 ± 1.75 for arousal, 3.38 ± 1.67 for lubrication, 3.55 ± 1.71 for orgasm, 3.53 ± 2.00 for satisfaction, and 2.80 ± 1.31 for pain (Table 2).

Table 2. Participants' EDSS mean scores and FSFI sub-dimension mean scores (n=80)

FSFI Subdimensions	$\overline{X}$	±SD	Min.	Max.
Desire	3.55	1.44	1.2	6.0
Arousal	3.68	1.75	0	6.0
Lubrication	3.38	1.67	0	6.0
Orgasm	3.55	1.71	0	6.0
Satisfaction	3.53	2.00	0.8	6.0
Pain	2.80	1.31	0	6.0
FSFI Total Score	20.49	8.93	2.0	36.0

EDSS Total Score	2.73	1.41	0	10.0
FSFI Total Score	***(≤26.55)***	***(%68.8, FSD)***		

EDSS: Expanded Disability Status Scale, FSFI: Female Sexual Function Index, FSD: Female Sexual Dysfunction.

Upon comparing the FSFI scores of women diagnosed with MS by MS-related characteristics, no significant difference was identified between the groups in terms of other characteristics except for the EDSS score, while women with EDSS scores of two and above scored lower on the FSFI (Table 3, p<0.001).The multivariate analysis found 36% of the variance in SD among women with MS to be related to the number of MS attacks (Beta=0.345, p<0.001) and the EDSS score (Beta=-0.634, p<0.001), which were revealed as determinants of SD in women diagnosed with MS (Table 3).

Table 3. Distribution of FSFI score average according to MS related variables (n=80)

Variables **Test Value / p**		$\overline{X}$ **±SD**	
MS Related Features			**FSFI**
MS Duration (years)	<3 years (n:36)	20.73±9.45	t=0.230
	≥3 years (n:44)	20.27±8.51	p=0.819
MS Type	Primary-progressive (n:36)	19.52±6.40	t=-0.920
	Other (n:44)	21.29±10.57	p=0.360
Number of MS Attacks	≤2 (n:43)	18.18±10.52	t=-1.528
	>2 (n:37)	21.48±8.03	p=0.131
EDSS Score	<2 (n:30)	26.40±6.30	**t=5.306**
	≥2 (n:50)	16.95±8.42	**p=0.000**

EDSS: Expanded Disability Status Scale, FSFI: Female Sexual Function Index, *t:* Student's t-test

Effect of independent variables on FSFI total score of women with MS

Independent variables	**Unstandardized Coefficients**	**Standardized Coefficients**	**t**	**p**	**95% Confidence Interval**

	B	SE	ß			Lower	Higher
Constant	-1.267	5.806		-0.218	0.828	-11.831	10.297
Number of MS Attacks	0.511	0.133	0.345	3.844	**0.000**	0.246	0.776
EDSS score	-2.344	0.361	-0.634	-6.437	**0.000**	-3.064	-1.624

* Dependent Variable = FSFI, *R=0.754; R^2=0.601; F=15.780; p=0.000; Durbin Watson Value=1.109, EDSS: Expanded Disability Status Scale*

Discussion

Multiple Sclerosis is a chronic disease with a variable clinical course. Patients with few attacks, no significant sequelae, and an EDSS score ≤3 fifteen years post-diagnosis are considered to have benign MS (Turkish Neurological Society Multiple Sclerosis Diagnosis and Treatment Guidelines, 2018). Most participants in this study had progressive MS; however, their EDSS scores indicated no difficulties in daily activities. This may be attributed to their younger age, shorter disease duration, and low number of attacks. Consistent with these findings, studies from Germany and Turkey have also shown a relationship between disease duration and EDSS scores (Petek Balci et al., 2023; Ellenberg et al., 2020).

The Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5) defines SD as one or more impairments in the domains of sexual function, such as sexual desire, arousal, orgasm, and resolution, and a significant level of subjective distress caused by these impairments (Schmidt et al., 2005; Guo et al., 2012). A meta-analysis study involving women with MS showed that women experienced SD at rates ranging from 27% to 95% (Azimi et al.,2019). Another study investigating the relationship between active bladder and SD in women with MS found that 74% of women had sexual dysfunction (Lee, 2022). The study conducted by Gümüş et al. in Turkey determined that women with MS had considerably lower mean FSFI scores than women without MS (Gumus et al., 2014). A considerably high rate of SD among women diagnosed with MS in this study draws attention. Likewise, the findings are parallel to studies conducted with women with MS in different countries around the world. Accordingly, it can be stated that MS is a severe health problem that impacts women's sexual lives.

Studies have confirmed that SD in patients with MS usually occurs at the later stages of the disease or intensifies according to the disease course (Dissiz et al., 2013; Zivadinov et al., 2003; Zorzon et al., 2001). The present study determined that the risk of SD increased with an increase in the EDSS score, indicating disability, and the increased number of attacks due to the disease in women diagnosed with MS, and no risk

for the disease duration was identified. The study by Terzi et al. found no significant relationship between SD and the disease duration (Terzi et al., 2009). The study results were found to be similar to the results of other studies, and it is thought that the participants' young age and the relatively shorter duration of the disease may have reduced the possibility of SD.

It is stressed that the most important factor that limits the sexual function of women with MS is the EDSS scores indicating disability in MS, i.e. limitations in physical movement (Dissiz et al., 2013; Zivadinov et al., 2003). Some studies have reported no relationship between disability scores and sexual dysfunction (Zivadinov et al., 2003). Almost half of the women diagnosed with MS in this study had primary-progressive type MS. None of the participants had advanced autonomic system disorders, lower extremity dysfunction, or known psychiatric problems. The EDSS scores and the number of attacks were the only factors affecting the FSFI scores of the participants in this study. Hence it was thought that SD in more than half of the participants could develop due to the impacts of the disease on the central nervous system or the adaptation problems experienced by patients. Studies have also examined the types of SD in women with MS (Borello et al., 2004; Schmidt et al., 2005; Lee, 2022; Terzi et al., 2009; Demirkiran et al., 2006). A study determined that women with MS experienced a decrease in orgasm capacity between 24% and 58%, a decrease in sexual interest between 29% and 86%, a decrease in genital sensation between 43% and 62%, a decrease in vaginal lubrication between 12% and 40%, and dyspareunia between 6% and 40% (Borello et al., 2004). Two separate studies reported that women with MS experienced problems with lubrication, sexual arousal, and orgasm (Fragala et al., 2015; Ozen and Polat, 2022). Another study by Demirkiran et al. stated that the majority (80.5%) of 51 women with MS who displayed different clinical courses had a decrease in libido (Terzi et al., 2009). Despite the young age of the participants in this study, the low mean score they received from the pain domain of the FSFI demonstrated that dyspareunia was relatively more prominent among these women.

Conclusions: Although most participants in the current study had progressive MS, they had very few limitations in performing activities of daily living due to their young age, relatively short disease durations, and low number of attacks. On the contrary, although these women were at the early stages of the disease, they had quite a high rate of sexual dysfunction, and dyspareunia was the prominent problem. The number of attacks and limitations in physical activity due to the disease were determined as factors affecting women's sexual functions in the study. Based on the study results, it can be recommended that women diagnosed with MS have their sexual functions evaluated during their treatment and care from the early stages of the disease, and if possible, their sexual functions be maintained by preventing or minimizing attacks and supporting their physical activities.

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