

RESEARCH

Open Access



Depression, sexual dysfunction, life satisfaction and marriage satisfaction in women with multiple sclerosis

Tuba Aydın^{1,2} and Mehmet Emin Onger^{1,3*}

Abstract

Background: Marriage satisfaction is one of the factors that affects life satisfaction in healthy people and patients. In the current literature, it is found there is a positive correlation between marriage and life satisfaction. Many factors such as sexual dysfunction, depression and neurological disorders affect negatively marriage and life satisfactions. However, there is not enough research dealing with how multiple sclerosis (MS) affects women's marital and life satisfaction. This study aimed to examine marital satisfaction and life satisfaction of female patients with MS (pwMS) in relation to sexual dysfunction and depression. A total of 139 married women (MS Group: 81, Control Group: 58) were recruited in the study. Then both groups' participants were requested to fill the relevant documentary; Demographic Information Form, Marital Life Scale (MLS), Life Satisfaction Scale (LSS), Arizona Sexual Experiences Scale (ASEX), and Beck Depression Inventory (BDI).

Results: Regarding the percentages of the relevant parameters; it was examined that 60.96% of pwMS and 62.07% of control group have depression, respectively. In addition, 89.16% of pwMS and 86.21% of control group have sexual dysfunction, respectively. Furthermore, 55.52% of pwMS and 44.83% of control group have high life satisfaction, whereas 60.24% of pwMS and 56.90% of control group have high marriage satisfaction, respectively. There was a strong positive correlation between marriage satisfaction and life satisfaction ($p < 0.001$) and there was a weak negative correlation between marriage satisfaction and sexual dysfunction ($p < 0.001$). In addition, there were weak negative correlations between marriage satisfaction and depression level ($p < 0.001$) and between life satisfaction and sexual dysfunction ($p < 0.001$), respectively. Similarly, there was a weak negative correlation between life satisfaction and depression level ($p < 0.001$), whereas there was a weak positive correlation between depression level and sexual dysfunction ($p < 0.001$). Finally, while there was no significant difference in the marriage satisfaction and sexual dysfunction between the groups in points of life satisfaction and depression level ($p > 0.05$).

Conclusion: Sexual dysfunction and depression are important problems that affect women's marriage and life satisfaction. Sexual dysfunction is a common problem for women, regardless of MS.

Keywords: Multiple sclerosis, Marriage satisfaction, Life satisfaction, Depression, Sexual dysfunction

Background

There are many determinants of life satisfaction such as income, health status, and social factors. Marriage is also one of them [1]. The current literature shows that people with high marriage satisfaction have also high life satisfaction [2]. Health status also affects marriage satisfaction, especially in neurological disorders [3].

*Correspondence: mehmetemin.onger@gmail.com

³ Department of Histology and Embryology, Medical Faculty, Ondokuz Mayıs University, Samsun, Turkey

Full list of author information is available at the end of the article

Multiple sclerosis is one of these neurological disorders that demyelination and axonal loss are seen and its prevalence is higher in female than male [4]. Patients with MS (pwMS) have comorbidities such as depression, anxiety disorder, and sexual dysfunction. Prevalence of depression and anxiety in pwMS has increased compared to general population [5, 6] and this situation caused diminished quality of life [7]. In addition, 40–80% of pwMS has sexual dysfunction. For female pwMS, sexual dysfunction is a severe problem and it caused decreased quality of life and poor personal relationship [8].

MS can affect marriage satisfaction, negatively [9]. PwMS can have low or moderate level of marriage satisfaction [10, 11]. In addition, it is known that depression, anxiety disorder, and sexual dysfunction negatively affect people's marriage and life satisfaction [12–15]. They also affect the marriage and life satisfaction of pwMS. In previous research, it is found that pwMS have low marriage satisfaction and life satisfaction [5].

Aim of the work

The aim of the work was to examine marital satisfaction and life satisfaction of female pwMS in relation to sexual dysfunction and depression.

Methods

This study was conducted with 139 married women (MS Group: 81, Control group: 58). The sample size was calculated by power analysis in 0.80 the confidence level and 95% confidence interval. Demographic Information Form, Marital Life Scale (MLS), Life Satisfaction Scale (LSS), Arizona Sexual Experiences Scale (ASEX), and Beck Depression Inventory (BDI) were used to collect data. Women who diagnosed with MS, aged 18–65, and be a volunteer were recruited. Those who did not meet these criteria were not included in the study.

Concerning the statistical approach, according to the skewness and kurtosis results, the data showed normal distribution. In order to find correlation among scales, Pearson's correlation was done, whereas independent sample T-test was performed to compare the groups.

Marital life scale (MLS)

The scale is used to measure the general satisfaction level of the spouses from the marital relationship. It consists of 10 questions. It is a 5-point Likert-type scale. The lowest score is 10 and the highest score is 50 from the test. The cut-off point is determined by the mean of the group which is developed by E. Tezer [16].

Life satisfaction scale (LSS)

Diener, Emmons, Larsen, and Griffin developed this scale. Dağlı and Baysal have done the validity and

reliability studies of the Turkish version. It consists of 5 questions. It is a 5-point Likert-type scale. The cut-off point is determined by the mean of the group [17].

Arizona sexual experiences scale (ASEX)

The scale is used to examine the basic elements of sexual functioning. It consists of 5 questions. It is a 6-point Likert-type scale. Scores of 11 and above indicate sexual dysfunction. Soykan adapted the scale to the Turkish version in 2004 [18].

Beck depression inventory (BDI)

The scale consists of 21 questions. It is scored between 0–3. 0 is the lowest score and 63 is the highest score that can be obtained from the scale. The scores between 0–9 is show minimal depression, 10–16 show mild depression, 17–29 show moderate depression and 30–63 show severe depression. Hisli adapted the scale to the Turkish version [19].

Results

A total of 139 married women (MS Group: 81, Control group: 58) were recruited in the study. Demographic data (Table 1), frequency of the scales (Table 2), and the descriptive statistics (Table 3) were obtained. Pearson's correlation results and the independent sample T-test results are given as Table 4 and Tables 5, 6, respectively.

There was a strong positive correlation between marriage satisfaction and life satisfaction $r=0.62$ ($p<0.001$). While there were weak negative correlations between marriage satisfaction and sexual dysfunction $r=-0.32$ ($p<0.001$) and between marriage satisfaction and depression level $r=-0.44$ ($p<0.001$). Similarly, there were weak negative correlations between life satisfaction and sexual dysfunction $r=-0.34$ ($p<0.001$) and between life satisfaction and depression level $r=-0.50$ ($p<0.001$). Contrarily, there was a weak positive correlation between depression level and sexual dysfunction $r=0.27$ ($p<0.001$) (Table 3).

No significant difference was found between MS group ($M=38.42$, $SD=10.21$) and Control group ($M=37.38$, $SD=8.53$), $M=1.040$, 95% CI [- 2.21, 4.29], $t(137)=0.634$, $p>0.05$ in terms of marriage satisfaction. Life satisfaction of MS group ($M=17.10$, $SD=5.46$) was greater than Control group ($M=15.97$, $SD=4.46$), $M=1.13$, 95% CI [- 0.59, 2.86], $t(137)=1.30$, $p<0.001$. There was no significant difference between MS group ($M=16.44$, $SD=6.10$) and Control group ($M=15.72$, $SD=5.30$), $M=0.720$, 95% CI [- 1.25, 2.69], $t(137)=0.724$, $p>0.05$, in point of sexual dysfunction. Depression level of MS group ($M=15.84$, $SD=12.17$) was greater than Control group ($M=13.31$, $SD=8.41$), $M=2.53$, 95% CI [- 1.13, 6.19], $t(137)=1.37$, $p<0.001$.

Table 1 Demographic characteristics of participants

	Frequency	Percent	Valid percent	Cumulative percent
MS	81	58.3	58.3	58.3
Control	58	41.7	41.7	100.0
<i>Education status</i>				
Primary/secondary school	62	44.6	44.6	44.6
High school	26	18.7	18.7	63.3
Associate degree	7	5.0	5.0	68.3
Bachelor's degree	34	24.5	24.5	92.8
Master's degree	9	6.5	6.5	99.3
PhD	1	0.7	0.7	100.0
<i>Spouse' education status</i>				
Primary/secondary school	48	34.5	34.5	34.5
High school	37	26.6	26.6	61.2
Associate degree	11	7.9	7.9	69.1
Bachelor's degree	31	22.3	22.3	91.4
Master's degree	12	8.6	8.6	100.0
<i>Working condition</i>				
I'm working	41	29.5	29.5	29.5
I'm not working	95	68.3	68.3	97.8
Retired	3	2.2	2.2	100.0
<i>Spouse' working condition</i>				
I'm working	106	76.3	76.3	76.3
I'm not working	19	13.7	13.7	89.9
Retired	14	10.1	10.1	100.0
<i>Income</i>				
Less than 1000 TL	3	2.2	2.2	2.2
1001–3000	55	39.6	39.6	41.7
3001–5000	35	25.2	25.2	66.9
5001–7000	22	15.8	15.8	82.7
7001–9000	12	8.6	8.6	91.4
9001 and above	12	8.6	8.6	100.0
<i>Pre-marital dating period</i>				
Less than 1 year	60	43.2	43.2	43.2
1–3	41	29.5	29.5	72.7
4–6	16	11.5	11.5	84.2
More than 6 years	22	15.8	15.8	100.0
<i>Duration of marriage</i>				
Less than 1 year	10	7.2	7.2	7.2
1–5	21	15.1	15.1	22.3
6–10	17	12.2	12.2	34.5
11–15	29	20.9	20.9	55.4
16–20	17	12.2	12.2	67.6
21 and above	45	32.4	32.4	100.0
<i>Number of children</i>				
Valid				
0	16	11.5	11.5	11.5
1 child	36	25.9	25.9	37.4
2–3	82	59.0	59.0	96.4
4–5	5	3.6	3.6	100.0
Total	139	100.0	100.0	

Table 2 Frequency result of scales

		<i>Minimal</i>	<i>Mild</i>	<i>Moderate</i>	<i>Severe</i>	
Depression	MS	32 (39.02%)	15 (18.29%)	21 (25.60%)	14 (17.07%)	82
	Control	22 (37.93%)	20 (34.48%)	12 (20.69%)	4 (6.90%)	58
Sexual dysfunction		<i>No sexual dysfunction</i>	<i>Sexual dysfunction</i>			
	MS	9 (10.84%)	74(89.16%)	83		
	Control	8 (13.79%)	50 (86.21%)	58		
Life satisfaction		<i>Low</i>	<i>High</i>			
	MS	37 (44.58%)	46 (55.52%)	83		
	Control	32 (55.17%)	26 (44.83%)	58		
Marriage satisfaction		<i>Low</i>	<i>High</i>			
	MS	33 (39.76%)	50 (60.24%)	83		
	Control	25 (43.10%)	33 (56.90%)	58		
	Total	58	83	141		

Table 3 Descriptive statistics of scales

	N	Mean	Std. deviation	Skewness		Kurtosis	
				Statistic	Std. error	Statistic	Std. error
BDI	139	14.7842	10.79772	0.722	0.206	- 0.265	0.408
ASEX	139	16.1439	5.77546	0.439	0.206	0.131	0.408
MLS	139	37.9856	9.52418	- 0.862	0.206	0.127	0.408
LSS	139	16.6259	5.07947	- 0.117	0.206	- 0.885	0.408
Valid N (list-wise)	139						

Table 4 Correlations among scales

		MLS	ASEX	BDI	LSS
MLS	Pearson correlation	1	- 0.318**	- 0.444**	0.621**
	Sig. (2-tailed)		0.000	0.000	0.000
	N	139	139	139	139
ASEX	Pearson correlation	- 0.318**	1	0.268**	- 0.338**
	Sig. (2-tailed)	0.000		0.001	0.000
	N	139	139	139	139
BDI	Pearson correlation	- 0.444**	0.268**	1	- 0.497**
	Sig. (2-tailed)	0.000	0.001		0.000
	N	139	139	139	139
LSS	Pearson correlation	0.621**	- 0.338**	- 0.497**	1
	Sig. (2-tailed)	0.000	0.000	0.000	
	N	139	139	139	139

**Correlation is significant at the 0.01 level (2-tailed)

Table 5 Group statistics for ASEX, BDI, MLS, LSS

		Group	N	Mean	Std. deviation	Std. error mean
ASEX	MS	81	16.4444	6.10533	0.67837	
	Control	58	15.7241	5.30406	0.69646	
BDI	MS	81	15.8395	12.16805	1.35201	
	Control	58	13.3103	8.40678	1.10386	
MLS	MS	81	38.4198	10.20767	1.13419	
	Control	58	37.3793	8.52824	1.11981	
LSS	MS	81	17.0988	5.45574	0.60619	
	Control	58	15.9655	4.46415	0.58617	

satisfaction between the groups. As a result of the correlational analysis, we found that there was a strong positive correlation between marriage satisfaction and life satisfaction; and also a weak positive correlation between depression level and sexual dysfunction. Further, there was a weak negative correlation between marriage satisfaction and sexual dysfunction–depression level; and also between life satisfaction and sexual dysfunction–depression level.

Marriage satisfaction and life satisfaction play important roles in human well-being [20, 21]. The

Discussion

This research was conducted with 139 married women (MS Group: 81, Control group: 58). The main results of the study are that while there is no significant difference in sexual dysfunction and marriage satisfaction between married women with MS and control, there is a significant difference between depression level and life

Table 6 Independent samples test for ASEX

		Levene's test for equality of variances		t-Test for equality of means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
								Lower	Upper	
ASEX	Equal variances assumed	1.412	0.237	0.724	137	0.470	0.72031	0.99515	- 1.24753	2.68814
	Equal variances not assumed			0.741	131.882	0.460	0.72031	0.97223	- 1.20288	2.64350
BDI	Equal variances assumed	12.105	0.001	1.366	137	0.174	2.52916	1.85150	- 1.13206	6.19038
	Equal variances not assumed			1.449	136.854	0.150	2.52916	1.74540	- 0.92229	5.98061
MLS	Equal variances assumed	1.840	0.177	0.634	137	0.527	1.04044	1.64181	- 2.20612	4.28700
	Equal variances not assumed			0.653	133.689	0.515	1.04044	1.59385	- 2.11198	4.19287
LSS	Equal variances assumed	4.308	0.040	1.300	137	0.196	1.13325	0.87154	- 0.59015	2.85665
	Equal variances not assumed			1.344	134.503	0.181	1.13325	0.84325	- 0.53449	2.80099

relationship between them is being investigated. Current literature has shown that there is a strong relation between marriage satisfaction and life satisfaction [22, 23]. In our previous research, we found that this relation is also seen in pwMS [5]. The result of this study is in line with our previous study.

Many factors affect marriage satisfaction. Sexual problems are one of them. Recently emerging literature has revealed that sexual problems negatively affect marriage satisfaction in both healthy women and healthy men all over the world [24–26]. Also, it affects the marriage satisfaction of people who has a neurological disorder such as MS [5] and Parkinson's disease [27]. We found that there is a negative correlation between marriage satisfaction and sexual dysfunction as in previous research.

When the difference between groups in this study is examined, we found that there is no significant difference in sexual dysfunction and marriage satisfaction between married women with MS and healthy participants. In contrary, researchers [28] found that patients with MS have low marriage satisfaction and high sexual dysfunction than control groups. Other researchers found that both female and male pwMS have low marriage satisfaction than the control groups [10] and have high sexual dysfunction than control groups [29]. As pwMS, sexual problems are high among women all over the world [29, 30].

Regarding the depression, there is much research manifesting there is a negative relationship between depression and marriage satisfaction [13, 31]. When this situation is examined for MS patients, in our previous research, we found that there is a negative relationship between depression and marriage satisfaction

in pwMS [5]. The result of this research is in harmony with our previous research.

When the difference between the groups in this study is examined, we found that the MS group has a higher depression level than the control group. The current literature showed that depression in MS is seen generally higher than those of the general population [32] and other chronic diseases [33]. Researchers [10] found both female and male pwMS have higher depression levels than the control group. Our result is coherent with the current literature.

As we mentioned above, life satisfaction is an important factor for human health. It is known that MS negatively affects the quality of life of patients [5, 34, 35]. When compared to healthy people, pwMS have a low quality of life [36, 37]. However, in this research, we found that pwMS have high life satisfaction than the control group. The emergence of this situation can be explained by their tendency to look at life more positively depending on the disease.

Many factors affect the quality of life in pwMS. In this research, we focus on two of them: sexual dysfunction and depression. We found that there is a weak negative relationship between life satisfaction and sexual dysfunction–depression level. Researchers [38, 39] found that women with MS have low life satisfaction in relation to sexual dysfunction. Furthermore, it was also indicated in the literature that there is a negative correlation between life satisfaction and depression [40, 41] in addition to, a weak negative relationship between life satisfaction and sexual dysfunction–depression level in MS patients [5, 31]. We can say that our results are in line with the current literature. Lastly, we found that there is a weak positive relationship between depression and sexual dysfunction between

the groups. In the current literature, many studies support this result [42–45].

Unfortunately, the medical data about the duration of illness of MS, number of relapses and drug treatment were not collected in the study. Hence, the relationship among the medical data, marriage satisfaction and life satisfaction is unknown. This is the limitation of our study.

Conclusions

In the presence of sexual dysfunction and depression, both women with MS and healthy women have low marriage satisfaction and life satisfaction. More comprehensive studies are needed to find the causes of these problems and to develop new treatment methods.

Abbreviations

MS: Multiple sclerosis; pwMS: Patients with multiple sclerosis; MLS: Marital Life Scale; LSS: Life Satisfaction Scale; ASEX: Arizona Sexual Experiences Scale; BD: Beck Depression Inventory.

Acknowledgements

We thank to Prof. Dr. Murat Terzi for help in reaching participants.

Author contributions

TA: data collection and/or processing, analysis and/or interpretation, literature review, writer, critical review. MEO: conception, design, supervision, analysis and/or interpretation, writer, critical review. All authors read and approved the final manuscript.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Availability of data and materials

Not applicable.

Declarations

Ethics approval and consent to participate

Ethical approval was granted by Ondokuz Mayıs University Clinical Research Ethics Committee (OMU KAİK 2019/363) on May 29, 2019 (B.30.2.ODM.0.20.08/394-474). Written informed consent was obtained from all participants.

Consent for publication

Consent for publication was obtained from all participants.

Competing interests

The authors declare that they have no competing financial interests.

Author details

¹Department of Neuroscience, Health Sciences Institute, Ondokuz Mayıs University, Samsun, Turkey. ²Department of Psychology, Doctor of Philosophy, Faculty of Science and Technology, Bournemouth University, Bournemouth, UK. ³Department of Histology and Embryology, Medical Faculty, Ondokuz Mayıs University, Samsun, Turkey.

Received: 14 September 2021 Accepted: 23 May 2022

Published online: 11 June 2022

References

- Ngoo YT, Tan EC, Tey NP. Determinants of life satisfaction in Asia: a quantile regression approach. *J Happiness Stud.* 2021;22(2):907–26.
- Todorović J, Šnele MS, Pešić MH. The quality of marriage in function of satisfaction with life, satisfaction with work, depression and altruism. In: Pracana C, Wang M, editors. *Psychological applications and trends 2020*. Lisbon: y GIMA - Gestão de Imagem Empresarial, Lda; 2020. p. 26–30.
- Aydin T, Onger MÖ. Neurological disease and marriage. *Sakarya Med J.* 2020;10(4):705–10.
- Sparaco M, Bonavita S. The role of sex hormones in women with multiple sclerosis: from puberty to assisted reproductive techniques. *Front Neuroendocrinol.* 2021;60: 100889.
- Aydin T, Onger ME, Terzi M. Marriage and life satisfactions with sexual dysfunction in patients with multiple sclerosis. *Medicine.* 2021;10(3):976–81.
- Eid K, Torkildsen ØF, Aarseth J, Flemmen HØ, Holmøy T, Lorentzen ÅR, et al. Perinatal depression and anxiety in women with multiple sclerosis: a population-based cohort study. *Neurology.* 2021;96(23):e2789–800.
- Chan CK, Tian F, Pimentel Maldonado D, Mowry EM, Fitzgerald KC. Depression in multiple sclerosis across the adult lifespan. *Mult Scler.* 2021;27(11):1771–80.
- Sadeghpour S, Alizade SA. Sexual dysfunctions in women with multiple sclerosis. *International MS Congress of Iran; 2015 Nov 12–13; Sari, Iran.*
- Namvar H. The relationship between marital satisfaction of patients with multiple sclerosis (the patients' spouses) with the interpersonal dependency and personality type. *Am J Fam Ther.* 2021. <https://doi.org/10.1080/01926187.2021.1967221>.
- Ajilchi B, Oskoei AS, Kargar FR. Marital satisfaction and mental health in multiple sclerosis patients' and healthy individuals' accordance to sex. *Psychology.* 2013;4(11):845.
- Özen Ş, Karataş T, Polat Ü. Perceived social support, mental health, and marital satisfaction in multiple sclerosis patients. *Perspect Psychiatr Care.* 2021;57(4):1862–75.
- Zargarinejad F, Ahmadi M. The mediating role of sexual self-schema in the relationship of sexual functioning with sexual satisfaction in married female college students. *Iran J Psychiatry.* 2020;25(4):412–27.
- Özgüç S, Tanrıverdi D. Relations between depression level and conflict resolution styles, marital adjustments of patients with major depression and their spouses. *Arch Psychiatr Nurs.* 2018;32(3):337–42.
- Brunes A, Heir T. Visual impairment and depression: Age-specific prevalence, associations with vision loss, and relation to life satisfaction. *World J Psychiatry.* 2020;10(6):139.
- Lu Y, Fan S, Cui J, Yang Y, Song Y, Kang J, et al. The decline in sexual function, psychological disorders (anxiety and depression) and life satisfaction in older men: a cross-sectional study in a hospital-based population. *Andrologia.* 2020;52(5): e13559.
- Tezer E. Evlilik ilişkisinden sağlanan doyum: Evlilik yaşam ölçeği. *Türk Psikolojik Danışma ve Rehberlik Dergisi.* 1996;2(7):1–7.
- Dağlı A, Baysal N. Yaşam doyumu ölçeğinin Türkçe'ye uyarlanması: geçerlik ve güvenilirlik çalışması. *Elektronik Sosyal Bilimler Dergisi.* 2016. <https://doi.org/10.17755/esosder.263229>.
- Soykan A. The reliability and validity of Arizona sexual experiences scale in Turkish ESRD patients undergoing hemodialysis. *Int J Impot Res.* 2004;16(6):531–4.
- Hisli N. Beck depresyon envanterinin üniversite öğrencileri için geçerliliği, güvenilirliği (A reliability and validity study of Beck Depression Inventory in a university student sample). *J Psychol.* 1989;7:3–13.
- Margelisch K, Schneewind KA, Violette J, Perrig-Chiello P. Marital stability, satisfaction and well-being in old age: variability and continuity in long-term continuously married older persons. *Aging Ment Health.* 2017;21(4):389–98.
- Mosley-Johnson E, Garacci E, Wagner N, Mendez C, Williams JS, Egede LE. Assessing the relationship between adverse childhood experiences and life satisfaction, psychological well-being, and social well-being: United States Longitudinal Cohort 1995–2014. *Qual Life Res.* 2019;28(4):907–14.
- Kasapoğlu F, Yabanigül A. Marital satisfaction and life satisfaction: the mediating effect of spirituality. *Spirit Psychol Counseling.* 2018;3(2):177–95.
- Lee H, Kang HS, De Gagne JC. Life satisfaction of multicultural married couples: actor-partner interdependence model analysis. *Health Care Women Int.* 2021;42(1):1–13.

24. Lou WJ, Chen B, Zhu L, Han SM, Xu T, Lang JH, et al. Prevalence and factors associated with female sexual dysfunction in Beijing, China. *Chin Med J*. 2017;130(12):1389–94.
25. Khazaei M, Rostami R, Zaryabi A. The relationship between sexual dysfunctions and marital satisfaction in Iranian married students. *Procedia Soc*. 2011;30:783–5.
26. Tahan M, Saleem T, Moshtagh M, Fattahi P, Rahimi R. Psychoeducational Group Therapy for sexual function and marital satisfaction in Iranian couples with sexual dysfunction disorder. *Heliyon*. 2020;6(7): e04586.
27. Buhmann C, Dogac S, Vettorazzi E, Hidding U, Gerloff C, Jurgens TP. The impact of Parkinson disease on patients' sexuality and relationship. *J Neural Transm*. 2017;124(8):983–96.
28. Tajikmaeili A, Gilak HAM. Sexual functions and marital adjustment married woman with multiple sclerosis. *Res Psychol Health*. 2016;10(2):1–9.
29. McCabe MP. Relationship functioning and sexuality among people with multiple sclerosis. *J Sex Res*. 2002;39(4):302–9.
30. Merghati-Khoei E, Qaderi K, Amini L, Korte JE. Sexual problems among women with multiple sclerosis. *J Neurol Sci*. 2013;331(1–2):81–5.
31. Cao H, Zhou N, Fang X, Fine M. Marital well-being and depression in Chinese marriage: going beyond satisfaction and ruling out critical confounders. *J Fam Psychol*. 2017;31(6):775.
32. Patten SB, Marrie RA, Carta MG. Depression in multiple sclerosis. *Int Rev Psychiatry*. 2017;29(5):463–72.
33. Corallo F, Lo Buono V, Genovese R, Palmeri R, Di Cara M, Rifici C, et al. A complex relation between depression and multiple sclerosis: a descriptive review. *Ital J Neurol Sci*. 2019;40(8):1551–8.
34. Costa DC, Sá MJ, Calheiros JM. Social support network and quality of life in multiple sclerosis patients. *Arq Neuropsiquiatr*. 2017;75(5):267–71.
35. Beckmann Y, Türe S, Duman SU. Vitamin D deficiency and its association with fatigue and quality of life in multiple sclerosis patients. *EPMA J*. 2020;11(1):65–72.
36. Calandri E, Graziano F, Borghi M, Bonino S, Cattelino E. The role of identity motives on quality of life and depressive symptoms: a comparison between young adults with multiple sclerosis and healthy peers. *Front Psychol*. 2020;11:1–12.
37. McCabe MP, McKern S. Quality of life and multiple sclerosis: comparison between people with multiple sclerosis and people from the general population. *J Clin Psychol Med Settings*. 2002;9(4):287–95.
38. 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(1):1–10.
39. Zamani M, Tavoli A, Yazd Khasti B, Sedighimornani N, Zafar M. Sexual therapy for women with multiple sclerosis and its impact on quality of life. *Iran J Psychiatry*. 2017;12(1):58–65.
40. Marrie RA, Patten SB, Berrigan LI, Tremlett H, Wolfson C, Warren S, et al. Diagnoses of depression and anxiety versus current symptoms and quality of life in multiple sclerosis. *Int J MS Care*. 2018;20(2):76–84.
41. Yalachkov Y, Soydaş D, Bergmann J, Frisch S, Behrens M, Foerch C, et al. Determinants of quality of life in relapsing-remitting and progressive multiple sclerosis. *Mult Scler Relat Disord*. 2019;30:33–7.
42. Reddy RM, Saravanan RA, Praharaj SK, Thirunavukarasu M. Sexual dysfunction in women with depression: a hospital-based cross-sectional comparative study. *Indian J Psychol Med*. 2020;42(1):46–51.
43. Bhattacharyya R, Sanyal D, Bhattacharyya S, Chakraborty K, Neogi R, Banerjee BB. Depression, sexual dysfunction, and medical comorbidities in young adults having nicotine dependence. *Indian J Community Med*. 2020;45(3):295.
44. Dursun M, Besiroglu H, Tellioglu E, Saglam Y, Ortac M. Association between sexual dysfunction, sleep impairment and depression in women with fibromyalgia. *Sex Disabil*. 2020;38:261–9.
45. Sreelakshmy K, Velayudhan R, Kuriakose D, Nair R. Sexual dysfunction in females with depression: a cross-sectional study. *Trends Psychiatry Psychother*. 2017;39(2):106–9.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Submit your manuscript to a SpringerOpen® journal and benefit from:

- Convenient online submission
- Rigorous peer review
- Open access: articles freely available online
- High visibility within the field
- Retaining the copyright to your article

Submit your next manuscript at ► [springeropen.com](https://www.springeropen.com)
