



# The Effect of Sexual Counseling Based on the PLISSIT Model on Family Functioning and Sexual Quality of Life of Women with Multiple Sclerosis

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## Abstract

Sexual dysfunction is a common and significant issue for patients with multiple sclerosis (MS), adversely affecting their overall quality of life. Proper sexual counseling can be beneficial for these women. This study aimed to evaluate the impact of a counseling intervention based on the PLISSIT model on family functioning and sexual quality of life in women with MS. This interventional study was conducted in 2020 at the largest center for special diseases in southeast Iran. Sixty women with MS were selected through convenience sampling and randomly assigned to either an intervention group or a control group. The intervention group participated in four 90-minute individual counseling sessions based on the PLISSIT model over four weeks, while the control group received routine training. Data were collected using a demographic information form and questionnaires on family functioning and sexual quality of life, both before and after the intervention. Results showed no significant differences between the two groups in terms of family functioning and sexual quality of life scores before the intervention ( $p > 0.05$ ). However, after the intervention, the intervention group exhibited significant improvements in both family functioning and sexual quality of life scores ( $P < 0.0001$ ). Specifically, there was a notable increase in the mean scores for family functioning and sexual quality of life in the intervention group post-intervention ( $P = 0.001$  and  $P = 0.0001$ , respectively). In contrast, the control group showed no significant change in family functioning ( $P = 0.79$ ) and a significant decrease in sexual quality of life ( $P = 0.014$ ) during the second assessment. The results suggest that sexual counseling based on the PLISSIT model can effectively enhance family functioning and sexual quality of life in women with multiple sclerosis.

**Keywords** Multiple sclerosis · PLISSIT model · Sexual counseling · Family functioning · Sexual quality of life · Islamic Republic of Iran

## Introduction

Multiple Sclerosis (MS) is a chronic neurological disease that stands as a prominent contributor to neurological disability, primarily manifesting during the progressive stages of the condition [1, 2]. Approximately 400,000 individuals in the United States and 2.5 million globally are affected by MS [3]. Recent reports suggest that Iran has an estimated 40,000 MS patients, highlighting it, along with several other countries, as an area with a medium to high risk of MS [4, 5]. Specifically, the prevalence rate is notable, with 31.5 cases per 100,000 people in Kerman province, compared to 50.5 cases per 100,000 people in the entire city of Kerman [6].

MS is inherently unpredictable and exerts a debilitating impact on an individual's quality of life. It manifests during young adulthood, resulting in functional impairments often accompanied by psychological disturbances [7].

Sexuality is a multifaceted and intricate aspect of human life influenced by many biological and psychological factors [8]. Sexual dysfunction comprises a complex cluster of psychological, sexual, and personal, as well as relational, experiences, often manifesting as disturbances in sexual desire, arousal, orgasmic response, and dyspareunia [9]. This condition is a prevalent challenge for individuals with multiple sclerosis (MS) and constitutes a significant source of distress, profoundly impacting their overall quality of life. Sexual dysfunction can manifest at any stage of MS, with its prevalence ranging from 50 to 90% among individuals with MS across various studies [8, 10]. Additionally, it is noteworthy that the prevalence of sexual dysfunction among women with multiple sclerosis surpasses that observed in the general population or among healthy individuals [11].

There are various non-pharmacological treatments available such as lubrication, sex therapy tools, and counselling. lubricants are used for decreased lubrication. Sex therapy tools such as sensate focus are known to aid individuals and couples navigate sexual concerns while living with neurological conditions like MS [12]. Counseling, play a significant role in managing chronic diseases. Counseling provides patients with guidance to recognize and explore their issues, (including decreased sex drive, and tingling or numbness in the genital area, and face issues such as sexual arousal and orgasm problems, vaginal dryness, and erectile dysfunction) that may have previously been overlooked [8]. Counseling serves as a process that helps individuals effectively manage life crises or traumas, with a focus on maintaining healthy and intimate relationships with their partners [13, 14]. Sexual counseling involves a comprehensive process wherein individuals gain necessary information and knowledge about sexual issues. The assimilation of this information leads to a notable improvement in individuals' sexual function [14].

To facilitate appropriate and effective strategies for addressing sexual concerns and issues including diminished desire, arousal/erectile dysfunction, and orgasmic/ejaculatory dysfunction, various frameworks have been developed to assist healthcare providers [9]. One such model developed by Annon (1976), is PLISSIT model (Permission, Limited Information, Specific Suggestion, Intensive Therapy). The PLISSIT model is a sex therapy counseling model that can assist any practitioner in addressing women's sexual health concerns [15]. This model serves as a valuable guide for professional health caregivers to assess the sexual health needs of patients and provide necessary interventions and planning to address their problems in four distinct stages [16, 17].

It is widely acknowledged in the literature that family members can play a crucial role in coping with the challenges presented by MS. As a care unit, families have the potential to make a significant impact on addressing the needs of their members, providing emotional support, and assisting with physical care [18].

Family function encompasses the family's capacity to efficiently adapt to changes, manage conflicts, sustain cohesiveness among its members, establish and adhere to disciplinary structures, respect boundaries, and adhere to the rules and principles governing the family system, thereby safeguarding the overall family equilibrium. In certain instances, family function serves as a pillar for the psychological well-being of individuals. However, it can also give rise to specific behavioral challenges. The paramount importance of family function lies in its profound implications for individual and family well-being, with ripple effects that extend to the broader community [19].

MS is a chronic inflammatory and neurodegenerative disease, which not only affects physical functioning, but is also associated with cognitive impairments and great psychological distress. The combination of those symptoms may have negative consequences on the family functioning of patients with MS, with detrimental effects on marital relationships [20].

Sexual quality of life constitutes a vital facet of the overall quality of life [10, 21]. Sexual quality of life is a pivotal aspect in the realm of sexual and reproductive health. Comparable to overall quality of life, it encapsulates an individual's perception of their sexuality within the context of culture, expectations, standards, and priorities. This encompasses factors such as sexual attraction, interest, engagement in sexual activity, and comprehension of sexual performance [22].

Sexual health is frequently overlooked as a component of comprehensive patient care, primarily due to the inherent challenges of discussing sexual function and related emotional and sexual satisfaction, both for patients and healthcare providers. Unfortunately, the healthcare system within the country currently lacks a structured framework for screening and managing sexual issues. Despite the World Health Organization's urging to incorporate sexual health concerns into primary healthcare services, healthcare professionals in many regions frequently lack the requisite knowledge and skills to address such matters [16].

In this regard, Khakbazan et al. (2016) acknowledged the effect of counseling based on the PLISSIT model on the sexual function of women with multiple sclerosis, stating that implementing a sexual counseling program based on the PLISSIT model can help healthcare providers improve the sexual function of women with multiple sclerosis who are married [13].

Based on the mentioned issues, the high prevalence and importance of sexual disorders in women with MS, the existing gap in investigating and addressing this problem, and considering that one of the responsibilities of the health team is sexual counseling, the researcher decided to conduct a study to determine the effect of counseling based on the PLISSIT model on the family function and sexual quality of life of women with multiple sclerosis.

## Method

### Design

This study utilized an experimental design where both statisticians and patients were unaware of which data pertained to the intervention group or the control group.

### Sample

With a significance level ( $\alpha$ ) set at 0.05,  $z$ -alpha at 1.96, power at 0.80, and an effect size of 0.84, the study aims to detect a minimum difference of 0.01 score (calculated as the difference between the initial and subsequent scores) between the intervention and control groups. Drawing upon the methodology utilized by Khakbazan et al. (2016) and applying an appropriate formula, the sample size for each group was determined to be 28. However, to account for potential sample attrition within each group, the final sample size was set at 30 individuals for each group ( $N=60$ ) [13]. These participants were selected from patients with MS who were referred to the Special Diseases Center in southeastern Iran in 2020 and met the stipulated inclusion criteria. Inclusion criteria involved the following: Married women experiencing sexual problems, aged 18 to 45 years, possessing proficiency in the Persian language, having a confirmed diagnosis of multiple sclerosis by a qualified neurologist, and maintaining regular attendance in counseling sessions.

Exclusion Criteria encompassed failure to attend one of the counseling sessions, the occurrence of a stressful life event (e.g., death of a relative, divorce), pregnancy, breastfeeding, or expressing a desire for pregnancy, the presence of concurrent physical or mental illnesses, a history of surgical procedures in the genital or breast area, a resurgence of symptoms during the intervention that could potentially impact its efficacy, and self-reported addiction to drugs or alcohol.

### Instruments

Data collection instruments comprised a demographic information form, the Family Functioning Scale (FFS) and the Sexual Quality of Life- Female (SQOL-F).

### Demographic Information Form

This form encompassed patient data including age, educational background, duration of marriage, employment status, illness type, including primary progressive, relapsing-remitting, secondary progressive, and relapsing categories, medication regimen, illness duration, presence of concurrent physical and mental health conditions, and the frequency of disease relapses within the preceding year.

### Family Functioning Scale (FFS)

The Family Functioning Scale, developed by Tavitian et al. in 1987, is a 40-item instrument designed to assess various dimensions of overall family functioning. Respondents rate items on a 7-point Likert scale, in which ‘never’ is assigned a score of 1 and ‘always’ a score

of 7. The scale encompasses five distinct factors: positive family emotions, relationships, conflicts, concerns, and support and encouragement. The FFS demonstrates robust internal consistency, with reliability coefficients ranging from 0.90 for the positive family emotions subscale to 0.74 for the conflict subscale. The FFS yields scores ranging from 40 to 280. Scores within the range of 40 to 120 denote suboptimal family functioning, those between 120 and 160 signify moderate family functioning, and scores exceeding 160 indicate favorable family functioning [23]. In a study conducted by Hamidpour et al. in 2016, the questionnaire exhibited a high level of reliability in the Iranian context, with a Cronbach's alpha coefficient of 0.75, which holds statistical significance.

### **Sexual Quality of Life–Female (SQOL-F)**

This questionnaire was developed by Rosen et al. (2000) and comprises 18 questions. Each question employs a Likert scale, with responses ranging from 0 to 5. It is important to note that questions 1, 5, 9, 13, and 18 are subject to reverse scoring. The total score for the questionnaire spans from 0 to 90. The interpretation criterion is anchored in the mean score of the specific population under investigation. In practical terms, a score lower than the mean of the research population often signifies an inferior sexual quality of life. In contrast, a higher score typically suggests a superior sexual quality of life in women [21]. In a study by Maasoumi et al. 2013, the questionnaire demonstrated a Cronbach's alpha coefficient of 0.73 and an intraclass correlation coefficient of 0.88. Furthermore, the mean scores for the content validity index (CVI) and content validity ratio (CVR) were reported at 0.91 and 0.84, respectively [24]. In the Iranian context, as per a study by Mohammad and colleagues in 2017, the questionnaire exhibited a high level of reliability, with a Cronbach's alpha coefficient of 0.895 [21].

### **Ethical Consideration**

The present study adhered to the ethical guidelines. The ethics committee of Kerman University of Medical Sciences approved the research with the ethics code (IR.KMU.REC.1398.303). Before participation, the participants were duly informed about the research and provided written informed consent. The participants were guaranteed the confidentiality of their information and assured that it would only be used for research purposes. Moreover, the study participants were informed that they had the right to withdraw from the study at any point. These measures ensured that ethical considerations were duly addressed in the present study.

### **Data Collection**

The Ethics Committee of Kerman University of Medical Sciences was consulted prior to initiating the current task. The researcher then presented an introduction letter to the Center for Special Diseases.

The initial interview occurred in the amphitheater of the Center for Special Diseases in Kerman city. A detailed explanation of the study and its intervention methods was provided. Subsequently, eligible participants were selected through convenience sampling, and informed consent was obtained from the eligible participants. Patients were then divided

into two groups, intervention and control, using randomization. Patients completed questionnaires in two pre- and post-intervention sessions at the end of the fourth week.

## Intervention

In this study, participants in the intervention group received four counseling sessions based on the PLISSIT Model during four weeks, one 90-minute session per week, individually and face-to-face. The first author was under the supervision of a faculty member specialized in counseling for three months and could receive certificate regarding this type of intervention. One therapist (the first author) delivered all the sessions to all participants in the intervention group.

**Session One, Granting Patient Permission (P):** During this initial session, the primary focus was validating the patient's concerns, and establishing the appropriateness of addressing these concerns. One approach is to utilize specific "cue questions," like: "People with multiple sclerosis often have inquiries regarding how the condition may impact their sexual life. Do you have any questions you'd like to discuss with me?" The therapist created a supportive environment wherein patients were encouraged to maintain healthy sexual practices while fostering an open dialogue regarding issues impacting their sexual function. This critical step often alleviated patient anxiety and concerns [13]. As a result, all intervention group participants were allowed to openly discuss their sexual concerns during this session [25].

**Session Two, Offering Limited Information (LI):** In the second session, the focus shifted to providing the patient with limited yet essential information. This encompassed details regarding the anatomical and physiological aspects of sexual function, as well as information concerning multiple sclerosis (MS) and its potential effects on sexual function [13]. Within this context, the therapist offered restrained, factual information in response to questions or observations regarding sexual problems that were directly relevant to the patient's concerns [25].

**Session Three, Providing Specific Suggestions (SS):** During this session, the focus was on offering specific and tailored recommendations to address the individual patient's unique concerns. The therapist guided the participants in selecting alternative sexual positions and presented solutions to enhance the patient's sexual satisfaction. In essence, this stage was custom-tailored to assist participants in addressing their particular issues [13, 25]. Contrasted with earlier stages, executing the third step of the model requires the therapist to possess additional skills and knowledge. To offer pertinent suggestions, understanding the patient's specific complaint is crucial, often involving the gathering of a sexual history. Examples of such suggestions may encompass the utilization of lubricants, adopting lifestyle modifications, or adjusting medication. These recommendations are intended to directly assist the patient within a relatively brief timeframe [26].

**Session Four, Delivering Intensive Therapy (IT):** This stage typically involves referring the patient to specialized care, as it may be necessary for addressing complex sexual issues or problems that were not effectively resolved in earlier steps. For instance, referral to a sexologist or psychologist might be warranted in cases of relationship difficulties or sexual abuse. In this phase, the therapist identifies such scenarios and, when necessary, facilitates referrals to specialized professionals or experts in the field [25]. Throughout this period, it is important to highlight that individuals in the control group received routine education. This

education covered topics such as multiple sclerosis management and self-care techniques. Notably, patients in the control group did not receive any form of care or intervention specifically related to sexual issues. The intervention and control group participants were permitted to continue receiving their standard treatments for multiple sclerosis.

## Data Analysis

The gathered data were inputted into SPSS software version 18. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were employed to outline the demographic and background characteristics of the patients. The homogeneity of the two groups in terms of demographic variables was assessed using the chi-square test and independent samples t-test. Analysis of covariance (ANCOVA) was utilized to ascertain the disparity between the two groups concerning family functioning and sexual quality of life scores post-intervention, while controlling for pretest scores. In this study, statistical significance was set at  $P < 0.05$ .

## Results

### Descriptive Results

The findings of this study suggest that there were no significant differences between the two groups regarding demographic variables, as shown in Table 1.

Before data analysis, kurtosis and skewness were computed to assess the normality of the data about family functioning and sexual quality of life. The calculated values for kurtosis and skewness consistently fell within the range of +2 to -2. These results suggest that mean scores of family functioning and sexual quality of life conform to a normal distribution.

### Family Functioning

The results demonstrate that there is no significant difference in the mean scores of the family functioning scale between the two groups before the intervention ( $P=0.41$ ) (Table 2). The ANCOVA test demonstrated a significant difference in the family functioning scale scores between the two groups after the intervention. Specifically, the family functioning scale score in the intervention group was 2.10 points higher than that of the control group after the intervention ( $P=0.001$ ) (Table 3).

According to the findings, comparison of mean score of family functioning scale before and after counseling in the control group revealed no significant difference ( $P=0.79$ ), (Table 4). In contrast, within the intervention group, there is a significant increase in the mean score of family functioning scale after the intervention compared to before ( $P=0.001$ ) (Table 4).

As presented in Table 3, mean score of family functioning scale within the intervention group showed significant differences in two specific dimensions compared to the control group, respectively. Specifically, there is a significant increase in the dimensions of family concerns and family support within the intervention group. However, there were no significant changes in the other dimensions.

**Table 1** Demographic characteristics of women with multiple sclerosis

Variable	Intervention		Control		$\chi^2$	P
	N	%	N	%		
<b>Occupation</b>					0.001	1
employer	12	40	12	40		
homemaker	18	60	18	60		
<b>Education</b>					1.30	0.52
less educated	3	3.33	1	3.3		
middle/high school	16	53.3	19	63.3		
university	11	36.6	10	33.3		
<b>Disease Type</b>					0.35	0.83
relapsing-remitting	25	83.3	26	86.7		
primary progressive	3	10	3	10		
secondary progressive	2	6.7	1	3.3		
<b>Disease Onset Time</b>					0.001	1
1–5 years	10	33.3	10	33.3		
5–10 years	10	33.3	10	33.3		
10+ years	10	33.3	10	33.3		
<b>Relapse in Last Year</b>					27.0 (SD 87.0)	0.001*
none	14	46.7	16	53.3		
1–2 times	15	50	13	43.3		
more than 2 times	1	3.3	1	3.3		
<b>type of medication</b>					0.11	0.99
Interferon beta1	12	40	13	43.3		
Glatiramer acetate	2	6.7	2	6.7		
Fingolimod	7	23.3	6	20		
Dimethyl Fumarate	8	26.7	8	26.7		
Rituximab	1	3.3	1	3.3		
<b>Age</b>	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>	<b>t</b>	<b>P</b>
	35.03	5.30	35.70	5.70	0.46	0.64

**Table 2** Comparison of mean scores of family functioning and sexual quality of life between two groups before the intervention

Variable	Intervention		Control		Independent t-test	p
	Mean	SD	Mean	SD		
Family Functioning	148.56	11.91	150.80	8.64	0.83	0.41
Sexual Quality of Life	20.43	4.40	20.23	4.50	0.17	0.86

## Sexual Quality of Life

According to the findings, there is no significant difference in the mean scores of sexual quality of life scale between two groups before the intervention ( $P=0.86$ ), (Table 2). The ANCOVA test demonstrated a significant difference in the mean scores of sexual quality of life scale between the two groups after the intervention. Specifically, the score sexual quality of life scale in the intervention group was 47.63 points higher than that of the control group after the intervention ( $P=0.001$ ) (Table 5).



**Table 3** Comparison of family functioning dimensions scores in patients with multiple sclerosis after intervention using the ANCOVA test

family functioning Dimensions	Group	Mean ± SD	(C.195%) Mean Difference	F*	p
Positive family emotions	Control	4 ± 0.54	0.108	2.59	0.11
	Intervention	4 ± 09.52	(-0.02, 0.24)		
Family communication	Control	3.53 ± 0.45	0.05	1.13	0.29
	Intervention	3.56 ± 0.49	(-0.05, 0.17)		
Family conflicts	Control	3.27 ± 0.39	0.06	0.77	0.38
	Intervention	3.30 ± 0.46	(-0.07, 0.20)		
Family concerns	Control	3.98 ± 0.59	0.12 (0.01, 0.23)	5.19	0.026
	Intervention	3.85 ± 0.43			
Family support and encouragement	Control	4.16 ± 0.46	0.14 (0.02, 0.26)	6.22	0.010
	Intervention	4.15 ± 0.51			

\*The scores before intervention have been controlled

**Table 4** Comparison of family functioning and sexual quality of life before and after the intervention in each group

Variable	Time Group	Before		After		Paired t test	P
		Mean	SD	Mean	SD		
<b>family functioning</b>	Intervention	148.56	11.91	152.73	11.78	4.27	0.001
	Control	150.80	8.64	150.63	7.79	0.26	0.79
<b>sexual quality of life</b>	Intervention	20.43	4.40	60.56	2.47	4.78	0.001
	Control	20.23	4.50	13.93	3.42	2.49	0.014

**Table 5** Comparison of mean scores of family functioning and sexual quality of life in two groups after the intervention using the ANCOVA test

Variable	Group	Mean	SD	Mean difference	C.I 95%	F*	P
Family functioning	Control	150.63	7.79	2.10	1.78, 4.28	12.87	0.001
	Intervention	152.73	11.78				
Sexual quality of life	Control	13.93	3.42	47.63	39.85, 53.29	48.19	0.001
	Intervention	60.56	2.47				

\*The scores before intervention have been controlled

Result of paired t test showed significant decrease in the mean score of sexual quality of life in the control group after the intervention compared to before ( $P=0.014$ ), (Table 4). In contrast, the intervention group revealed a significant increase in the mean score of sexual quality of life, compared to the before ( $P<0.001$ ) (Table 4).

## Discussion

The results of this study demonstrated that patients with multiple sclerosis who received sexual counseling experienced improvements in sexual quality of life.

Azari Barzandig et al. (2020) examined the effect of counseling based on the Extended PLISSIT model on sexual dysfunction and quality of sexual life of married women with multiple sclerosis. Sexual counseling based on the EX-PLISSIT model in the intervention group was conducted during sessions lasting between 60 and 90 min. In contrast, the control group received routine care. Post-test questionnaires were completed by participants eight weeks after the intervention. The findings indicated that although sexual counseling based on EX-PLISSIT had a positive effect on decreasing sexual dysfunction, it could not improve the quality of sexual life of women suffering from MS [22]. It is crucial to recognize that the discrepancy between the study results above, and the current research may be attributed to several factors. Firstly, there is a variance in the timing of data collection after the intervention. In the Azari Barzandig study, data were collected eight weeks post-intervention, whereas in the present study, data collection took place four weeks post-intervention. Furthermore, the number of training sessions also differs between the two studies. In the Azari Barzandig study, the intervention group received counseling during a single session lasting 60 to 90 min, while in this study, the intervention group received four counseling sessions over the span of four weeks. Each session lasted 90 min and was conducted individually and face-to-face. Additionally, there's a difference in the counseling models utilized in the two studies. The PLISSIT model consists of four components: permission, limited information, specific suggestion, and intensive therapy. In contrast, the extended model (EX-PLISSIT) emphasizes permission-giving as a core feature across all stages, and techniques such as review and reflection are employed to enhance clients' self-awareness [22].

Kazemi et al. (2019) conducted a study to evaluate the impact of counseling utilizing the PLISSIT model on the sexual quality of life of married women with multiple sclerosis. In the experimental group, face-to-face counseling sessions were conducted weekly over four sessions, adhering to the PLISSIT model principles. Each session ranged between 45 and 75 min in duration. The control group did not receive any intervention. The findings revealed that at both the 2-week and 2-month follow-up assessments post-intervention, the overall level of sexual quality of life in the experimental group showed significant improvement compared to the control group [27]. Khakbazan et al. (2016) investigated the effect of sexual counseling based on the PLISSIT model on the sexual function of women with multiple sclerosis. This study involved the assessment of sexual function at three distinct time points: prior to the counseling intervention, at the 2-month mark, and at the 3-month follow-up. The results of the study revealed a statistically significant improvement in the mean total score of sexual function after the counseling intervention when compared to the baseline measurement [13]. The results of these studies are consistent with the findings of the present study.

The American Nurses Association recognized systematic assessment and data collection of each patient's health status, including assessing the patient's sexual health as one of the nursing functions. Despite the high prevalence of sexual dysfunction in patients with multiple sclerosis, approximately 63% of MS patients have not discussed their sexual relationships with their caregivers [11]. Sexual relationships are complex and multifaceted, encompassing physical, psychological, and emotional dimensions, all collectively contributing to an individual's overall well-being and quality of life [28].

In the field of sexual health, various frameworks exist to aid in obtaining a patient's sexual history, evaluating sexual function, and offering interventions for sexual guidance. These frameworks assist healthcare providers in implementing suitable and effective sup-

port strategies for addressing sexual concerns and issues [8, 29]. One commonly utilized method for addressing sexual dysfunction in women is the PLISSIT model [13]. The PLISSIT model stands out as the most widely employed framework for sexual evaluation and guidance. Initially developed to address the sexual needs of patients with chronic diseases, it has proven highly effective in counseling and sex therapy. Remarkably, approximately 80–90% of sexual concerns can be effectively tackled using the first three levels of this model. Moreover, compared to other counseling methods, the PLISSIT model has been acknowledged as a more practical and implementable framework [8].

The findings of this study also indicated that patients with multiple sclerosis who received sexual counseling witnessed enhancements in family functioning. While no similar studies specifically examining the impact of counseling based on the PLISSIT model on family functioning in patients with multiple sclerosis were found, the results align with some studies exploring the effects of problem-focused counseling on family functioning. This approach bears resemblance to the stages outlined in the PLISSIT model, which involve addressing sexual concerns, offering pertinent information, and fostering a supportive environment conducive to addressing individual needs [9].

MS leaves a sizable impact on the sexual relationships of married couples and disrupts the biological and psychological states of patients and their spouses. This highlights the higher burden on caregiver spouses of MS patients, leading to adverse psychological impacts on both the patient and the caregiver. In fact, with its typical progressing and relapsing nature, MS chronically affects family functioning and marital relationships [30].

Individuals' sexual behavior is deeply influenced by their beliefs, which in turn shape their marital and sexual relationships. The beliefs and thoughts held by couples determine the nature and intensity of their reactions. Often, individuals harbor a set of beliefs and thoughts, both real and imagined, regarding their roles and their partners' roles in marital and sexual life. Many of these beliefs (sexual conservatism, sexual desire and pleasure as a sin, age-related beliefs, beliefs related to body image, beliefs related to denying affection primacy, and belief in motherhood primacy) contribute to irrational expectations, leading to sexual dysfunction. Sexual counseling plays a pivotal role in dispelling these unhelpful beliefs, thereby fostering more realistic marital relationships and promoting positive social behaviors. By challenging irrational beliefs, sexual counseling can bring about a fresh perspective on sexual relations, ultimately enhancing sexual satisfaction. Through increased awareness of one's own dysfunctional sexual beliefs and the acquisition of accurate information and knowledge during counseling, individuals can correct these dysfunctional beliefs, leading to improved sexual satisfaction. The PLISSIT model, with its focus on dysfunctional sexual beliefs, has been shown to significantly reduce these beliefs and enhance sexual satisfaction in women [31].

The results indicated a decline in the sexual quality of life score among participants in the control group over time. This trend could potentially be attributed to the routine education provided to the control group, which lacked any information pertaining to sexual health. The routine education focused on topics related to multiple sclerosis management and self-care but did not include any content addressing sexual health concerns. This absence of sexual health education may have contributed to the observed decrease in sexual quality of life scores among participants in the control group.

## Strengths and Limitations

The use of the PLISSIT model for sexual counseling provided a structured framework for healthcare professionals, systematically addressing patient needs within a tailored framework and prescribing appropriate strategies over four distinct phases. However, convenience sampling can introduce biases and limitations that affect the generalizability and reliability of the results. Additionally, the short follow-up duration may compromise the validity of the study.

## Conclusion

The study results showed that counseling based on the PLISSIT model increased the family functioning and sexual quality of life of women with multiple sclerosis.

Most patients with multiple sclerosis are typically young women. Sexual concerns play a crucial role during this pivotal phase of life, significantly impacting overall quality of life. Despite the elevated prevalence of sexual dysfunction in this population, this issue has regrettably received limited attention. Given the importance of sexual dysfunction in these patients and the positive effects of counseling based on the PLISSIT model on family functioning and sexual quality of life, healthcare providers should pay more attention to this aspect of patients' lives, alongside other therapeutic interventions.

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**Author contributions** Batool Tirkari: Conceptualization, Methodology, Formal analysis, Writing–Original draft. Fatemeh Sohrabi: Supervision, Investigation, Review and Editing. Shila Salehi: Investigation, Writing – original draft. Sajjad Alizadeh: Writing – original draft, Writing – Review and Editing.

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## Declarations

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