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ORIGINAL PAPER

# The Influence of Ex-PLISSIT (Extended Permission, Limited Information, Specific Suggestions, Intensive Therapy) Model on Intimacy and Sexuality of Married Women with Multiple Sclerosis

**Fatemeh Daneshfar[1] · Zahra Behboodi-Moghadam[1] · Zohreh Khakbazan[1] · Seyed Massood Nabavi[2] · Nahid Dehghan Nayeri[3] · Sogand Ghasemzadeh[4] · Ali Montazeri[5]**

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**Abstract** This study was planned to assess the effect of using Ex-PLISSIT (Extended Permission, Limited Information, Specific Suggestion, and Intensive Therapy) model on sexuality and intimacy of married women who suffer from Multiple Sclerosis (MS). The volunteer women who had definite MS and sexual dysfunction (SD), EDSS score <7 and aged between 20 and 50 years were randomized as experimental group ($n = 60$) and control group ($n = 60$). Fatigue severity Scale was used to evaluate women's fatigue.

✉ Zahra Behboodi-Moghadam
behboodi@tums.ac.ir

Fatemeh Daneshfar
daneshfar1987@yahoo.com

Zohreh Khakbazan
khakbaza@tums.ac.ir

Seyed Massood Nabavi
seyedmassoodnabavi@gmail.com

Nahid Dehghan Nayeri
nahid.nayeri@gmail.com

Sogand Ghasemzadeh
s_gh_psy@yahoo.com

Ali Montazeri
montazeri@acecr.ac.ir

1 School of Nursing and Midwifery, Tehran University of Medical Sciences, Tohid Square, East Nosrat St, Tehran, Iran

2 Neurology Group, Department of Regenerative Biomedicine, Cell Science Research Center, Royan Institute for Stem Cell Biology and Technology, ACECR, Tehran, Iran

3 Department of Nursing Management, Nursing and Midwifery Care Research Center, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran

4 Faculty of Psychology, Tehran University, Tehran, Iran

5 Health Metrics Research Centre, Iranian Institute for Health Sciences Research, ACECR, Tehran, Iran

Sexual counseling based on Ex-PLISSIT model (four 60–100 min weekly sessions) were applied for experimental group. Sexual function was assessed before intervention, 8 and 12 weeks after intervention by using Multiple Sclerosis Sexuality and Intimacy Questionnaire-19. Depending on the type of data, descriptive statistics in the form of relative and absolute frequency distribution tables, Chi square test (for demographic variables), repeated measures ANOVA, and single and paired $t$ test were used and SPSS software version 16 was used for data analysis. There was a statistically significant decrease in SD score when data were compared through 3 stages of evaluation in experimental group ($P < 0.05$). No statistical difference has been considered in control group about secondary and tertiary SD. According to this study, using Ex-PLISSIT model for sexual counseling, is effective in addressing SD of married women with MS.

**Keywords** Ex-PLISSIT model · Married women · Multiple sclerosis · Sexuality and intimacy · Iran

## Introduction

The educational vacuum in the care and treatment of MS women motivated the author, considering one of the responsibilities of the midwives which is sex education, to take a positive step towards using an effective and special program to improve the sexual function of these women.

Currently, more than 2.3 million people worldwide and more than 400 thousand people in the United States and about 50,000 people in Iran suffer from MS. This disease affects women almost three times more frequently than men, and the age of onset is typically between 20 and 40 years old [1]. As a result, women of childbearing age are most vulnerable to this disease [2]. Sexual dysfunction (SD) is a common problem for people with MS, and is also one of the major causes of distress in these patients, and tremendously affects the quality of their life [3–6]. SD can occur at any stage of MS and its prevalence varies from 50 to 90% [3, 7]. The sexual problems are the direct consequence of the destruction of nerve and mental reactions to the disease [3, 8].

One of the classifications of SD in patients with MS is the division into primary, secondary, and tertiary types, as proposed by Iverson and Foley [6, 7]. Primary disorder refers to physiological issues that directly point to demyelization of the spinal cord or brain lesions [7]. Following these neurological changes, the patients experience 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. Secondary disorder is caused by changes in the non-sexual parts of the body in patients with MS which directly affect the sexual response and are related to symptoms of MS that appear following disruption of nervous system pathways. These common symptoms include fatigue, weakness, lack of coordination, difficulty moving, urine and stool incontinence, side effects of MS medications, discomfort in the non-genital areas, and cognitive problems. Tertiary SD is related to psychological, social, and cultural issues which may affect the sexual function and include negative perceptions about the body or body image, feeling less attractive, low self-confidence, feeling of being sexually rejected, sense of dependence, difficulties in establishing a relationship with a sexual partner, depression, and anger [6, 10]. An important issue that should be considered in the study of SD in patients with

MS is the relationship between this disorder and the gender of the affected individuals as women report SD more than men. Although the symptoms of secondary sexual function are the most common complaints among women and men, women experience symptoms of secondary sexual function more than men [3]. In order to evaluate the clinical course of MS and the etiology of SD, after a two-year follow-up of MS patients, the number of patients with SD did not change but the magnitude and number of symptoms significantly increased [9].

Although sexual activity affects important aspects of the people's lives, sexual problems in MS patients have been poorly investigated [3, 7].

Today, clinical research indicates that combinations of different treatments are much more useful than single therapies. As non-medication therapy is very important in chronic disorders, the use of counseling methods can also be beneficial as patients are advised to understand their problems and analyze them after identifying unknown issues [11].

Numerous frameworks are available for sexual advice that can help health service providers to implement appropriate and effective support strategies for intervention in the cases of sexual concerns and problems [12]. The PLISSIT model, first described by Annon, is the most widely used model in the sexual evaluation and advice [13, 14]. The model, from the beginning, was developed for evaluation and elimination of existing needs regarding SD of patients with chronic diseases, and is suggested to be used by psychologists, physicians, urologists, gynecologists, and midwives [15–17]. Its first two levels can be used for all health care professionals [15]. This method is useful for counseling and sex therapy, and approximately 80–90% of sexual concerns can be addressed using the first three levels of this model [18].

Four levels of intervention are [19–21]:

*Permission (P)* "giving permission" to the persons to preserve correct sexual traditions to keep sexually active and encouraging the patient to discuss problems which affect their sexual function negatively. Limited Information (LI): offering "limited information" about anatomical and physiological aspects of the sexual function and providing correct information related to their chronic disease and its side effects on their sexuality. *Specific Suggestions (SS)* giving specific suggestions for specific patient or her partner's concerns. Intensive Therapy (IT): in a few cases who there are complex underlying causes for their sexual problems intensive therapy will be needed when their problems could not be resolved in the first 3 steps (such as intrapersonal conflicts or psychological problems).

The extended PLISSIT model, or Ex-PLISSIT, is the result of the expansion of the original model with the difference that it believes Permission-giving plays a significant role at all stages of implementation of the model, so each item including Limited Information, Specific Suggestion, and Intensive Therapy is supported by Permission-giving. For this reason, every step of the Ex-PLISSIT model in its core includes Permission-giving. In the PLISSIT model, Intensive Therapy is considered when the intervention has not been effective through the last three levels, while in the Ex-PLISSIT model, Intensive Therapy may be requested at any stage. Another characteristic of the PLISSIT model, which has been expanded in the Ex-PLISSIT, is a progressively comprehensive learning cycle including providing feedback and re-review, and discussion about interpretations to spread knowledge and self-awareness [20].

The use of teaching programs based of the PLISSIT model to improve the sexual function of the women who have undergone abdominal hysterectomy, showed an

improvement in the sexual function of these women in comparison with the control group, and the control group experienced more disorders in their sexual functioning [22].

Despite all efforts to improve the quality of life of MS patients in Iran, the use of effective interventions to improve their sexual function, has not been adequately considered by physicians and authorities. Considering the fact that most sexual function disorders in MS patients are due to uncomplicated and curable factors, it is necessary to pay more attention to this aspect of the patients' lives who are mostly young and middle age women at the peak of their sexual activity.

## Method

### Study Participants

This interventional study, which included an intervention and a control group, was conducted during June 2014 to January 2016 to examine the influence of the Extended PLISSIT model or the Ex- PLISSIT on intimacy and sexuality of married women with multiple sclerosis (MS). After obtaining permission from the Ethics Committee of Tehran University of Medical Sciences and acquiring counseling skills based on the Ex-PLISSIT model, the first author visited Iran's MS Society in Tehran and selected the participants after obtaining authorization from the authorities. Because of the cultural limitation regarding sexual activities of single people, the participants were selected among married women (being married for at least one year) with MS who were members of the MS society and volunteered to participate in the study. The inclusion criterion was a confirmed diagnosis of MS by a neurologist based on the McDonald's criteria. To conduct sampling, Multiple Sclerosis Intimacy and Sexuality Questionaire-19 (MSISQ-19) was given to literate 20–50 years old women with no history of drug or alcohol abuse and no history of chronic diseases (a part from MS) to determine their score of sexual function disorder in each of the three levels (primary, secondary, and tertiary SD). Patients who had a disorder in their sexual function in each level were enrolled and a demographic information questionnaire and an informed consent form was completed and signed by them. The patients' disabilities were determined using the Expanded Disability Score (EDSS) by a neurologist, and the severity of their depression and fatigue was calculated using the Fatigue Severity Scale (FSS) and Beck Depression Inventory.

The exclusion criteria of this study were EDSS score greater than 7 (a person sitting in a wheelchair), MS relapse during the last month, pregnancy, and receiving any treatment for SD, but the use of antidepressants was not an exclusion criterion. Assuming 50% affected people in this study ($P0 = 0.5$) and expecting a reduction to $P1 = 0.25$, and considering a sentiment of 95% and a test power of 80%, 58 participants were calculated in each group. In this study, 120 patients were randomly assigned to two groups (60 women for each groups). For random allocation of the participants, two cards (A: intervention group and B: control group), were placed at the disposal of the participants to choose randomly. Informed consent was obtained from all participants.

### Intervention

The content and framework of the consultation sessions were developed by the authors based on the general principles of the Ex-PLISSIT model. Finally, four weekly 60- to

100-minute individual (one-to-one) sex counseling sessions were carried out by the first author who was a trained midwife.

During the first consultation session and in the Limited Information step, information about the main causes of SD in patients with MS and the impact of the disease on primary, secondary, and tertiary disorders of sexual function were obtained by the midwife. Informative and educational booklet that contained information about the MS process and its impact on the sexual function and anatomy and physiology of the female sexual organ, were given to patients.

During the first, second, and third counseling session, the priorities and needs of each individual to improve her sexual performance, with regards to the issues raised by her and the researcher's examination, were identified and Intensive Therapy was applied whenever needed. Specific Suggestions were designed based on each person's sexual problems; for example, the use of water-soluble lubricant for those who had problems of sexual pain or lubrication, teaching suitable positions for those who had orgasm problem, had a positional problem during the sexual intercourse due to limited movements caused by MS, or the women who had problems with their sex drive as a result of MS or medications.

During counseling sessions, women were encouraged to improve their communication with their spouses and talk about their concerns and worries with them. They were also asked to study the booklet with their spouses in order to expand their knowledge about the disease and its impact on the sexual function. Scientific images and pictures were also used during the session to help them to better understand the problem. If it was recognized that a participant needed a specialist physician to improve her sexual function, Intensive Therapy was carried out. During the study, 10 patients were referred to their neurologists (regarding medication and treatment process), and 4 patients were referred to the psychologist while they all continued to participate in the study.

The Permission step was considered in all counseling sessions, and the individuals were allowed to talk about their concerns and issues in the consultation process. The consultation process was guided by providing feedback and review, exchange views and discussion about learned issues, and parties' understanding during the consultation.

In the fourth session, in addition to summing up the first three sessions and reviewing the positive and negative aspects of the consultation process, all the questions and possible ambiguities were answered and the follow-up sessions were scheduled. Follow-up phone calls were also made to monitor the patient's condition and their sexual activity with their partners, and to answer their questions. A contact number was provided by the researcher to answer the participants' questions.

During the intervention period, the participants who were in the control group and received only routine services of Iran's MS Society (subventions for the MS patients for buying drugs, free neurological visits, …) were assured that they could participate in the counseling sessions free of charge after the end of the study (12 weeks after the intervention).

## Instruments and Data Collection

The data of this study were collected through four separate questionnaires:

1. A questionnaire about demographic information, sexual activity, and characteristics of the disease, that contained questions related to socio-demographic characteristics and obstetric history (12 questions) including the patient's and her husband's age and educational level, her employment status (housewife, self-employed, employed,

retired), spouse's job (unemployed, self-employed, employed, retired), economic status (very good, normal, weak), type and duration of marriage, number of pregnancies, number of children, and the current method of contraception. Sexual activity questions (5 questions) included access to a private resting place, the partner's desire for sex (the average number of intercourses per month), and information about the disease (5 questions) included disease duration, age of onset of multiple sclerosis, type and duration of drug administration, and the EDSS score. The participants' level of fatigue and depression was also reported in the questionnaire.

2. Multiple Sclerosis Intimacy and Sexuality Questionaire-19 (MSISQ-19) included 19 (5 option) questions. The questionnaire categorized the sexual problems of women with MS into three levels as: primary (questions numbers 12, 16–19), secondary (questions numbers 1–6, 8, 10, 11) and tertiary (questions numbers 7, 9, 13–15) SD. For each patient, 4 scores, including the scores of the three levels and a total score which was the sum of the three scores of the three levels, were calculated [23]. The MSISQ-19 was designed in 2000 by Foley and his colleagues, and its reliability has been confirmed in several studies [6, 24–26]. The reliability of the questionnaires (Persian version of the questionnaires) was examined by Mohammadi and her colleagues, and was approved by them [27]. The validity of this tool, after translation, was approved by Merghati-Khoi et al. [28] using the content validity approach.
3. The Fatigue Severity Scale or FSS: This scale consists of nine items, and is a visual analogous scale that evaluates the fatigue concept. It quickly measures the personal perception of the fatigue in people with multiple sclerosis. The resulting score corresponds perfectly with the intensity of fatigue [29]. The FSS was designed by Krupp and her colleagues to assess the severity of fatigue in people with multiple sclerosis and lupus, and has been investigated psychometrically [30–33].
   The FSS score ranges from 1 to 7 for each person. In the present study, a fatigue score below 2.8 indicated mild fatigue, a score between 2.8 and 5.1 showed average fatigue, and a score greater than 5.1 was considered severe fatigue [34]. The validity and reliability of the Persian version of this questionnaire have been confirmed in many studies [35, 36].
4. The Beck Depression Inventory (BDI) is a self-reporting 21-item questionnaire that was designed by Beck to assess the symptoms of depression. The purpose of this questionnaire is to assess the severity of depression, and it acts as a diagnostic tool for depression. According to the authors' suggestion, a score below 10 indicates low depression or lack of depression, a score of 10–18 indicates mild to moderate depression, a score between 19 and 29 indicates moderate depression, and a score between 29 and 63 is considered a sign of severe depression [37, 38]. The validity of the Persian version of the questionnaire to assess the severity of depression in patients with MS has been reported in several studies [39].

## Data Analysis

Finally, information about sexual function in both groups was collected between 8 and 12 weeks after the intervention. To analyze the findings, depending on the type of data, descriptive statistics in the form of relative and absolute frequency distribution tables, Chi square test (for demographic variables), repeated measures ANOVA, and single and paired t-test were used. SPSS software version 16 was used for data analysis.

## Results

When all sociodemographic, obstetric, and clinical characteristics of the patients which were recognized as factors affecting the sexual function of MS patients were compared, no statistically significant difference was seen between two groups ($P > 0.05$) (Tables 1 and 2).

After the intervention, the patients' sexual function was assessed by the MSISQ-19 twice (8 and 12 weeks after the intervention) and the scores were compared during these three points. Data analysis showed no significant difference in terms of primary, secondary, and tertiary SD of the patients in the two groups before the intervention but significant changes occurred in these scores in the experimental group during the intervention. There was no difference in the control group when comparing pre- and post-intervention data (Tables 3, 4 and 5).

As for the primary SD, there was a significant difference in the experimental group after the intervention. In the control group, a significant decrease in this score was seen after 8 weeks but there was no significant change in the score of the patients' primary SD in the control group after 12 weeks when it was compared with the first score of the patients in this group (Table 3).

When the score of secondary SD was analyzed, a significant decrease was seen in the experimental group but there was no difference in the control group when comparing the pre- and post-intervention data (Table 4).

Comparison of the scores of tertiary SD during three times of assessment in patients in the experimental group showed a significant change after utilizing the Ex-PLISSIT model. The control group experienced no statistically significant decrease (Table 5).

The specific characters of each type of SD (primary, secondary and tertiary) and their changes during the study were assessed to know which specific variable had the most changes or not (Table 6).

## Discussion

The overall purpose of this study was to examine the effect of the extended PLISSIT version or the Ex-PLISSIT on the intimacy and sexuality of the married women with MS and SD who were members of Iran's MS Society. In this study, the information about a group of demographic and obstetric variables, and clinical features associated with the disease (which have been considered as factors affecting the sexual function of MS patients in several studies) were collected, and an attempt was made to examine all participants in the study by these variables if the women in two groups were homogenous for these variables or not. In this way, the participants would be in a similar situation with regards to the effect of these factors on the result of the study. The results of reviewing demographic variables, obstetric history, and general information of the disease in both groups showed no significant difference between the two groups ($P > 0.05$), and the two groups were similar in terms of these variables (Tables 1 and 2).

The results showed a significant difference in the primary, secondary and tertiary level of sexual function disorder in the intervention group before the intervention, and 8 and 12 weeks after the intervention. However, the results did not show a significant difference in the disorder level of the control group ($P > 0.05$). This finding reflects the positive impact of the intervention (sexual counseling using the Ex-PLISSIT model) on the SD of

**Table 1** Qualitative characteristics of women and their husbands in experimental group and control group

| Variable | Number/percentage | | *P* value |
|---|---|---|---|
| | Experimental group ($n = 60$) | Control group ($n = 60$) | |
| Woman's educational level | | | 0.289* |
| Less than secondary education | 11 (18.3) | 18 (30) | |
| Secondary school education | 20 (33.3) | 17 (28.4) | |
| University | 29 (48.4) | 25 (41.6) | |
| Husband's educational level | | | 0.099* |
| Less than secondary education | 14 (23.3) | 13 (21.6) | |
| Secondary school education | 20 (33.3) | 19 (31.6) | |
| University | 26 (43.4) | 28 (46.8) | |
| Woman's job | | | 0.494* |
| Housewife | 37 (61.8) | 38 (63.4) | |
| Employed | 19 (31.6) | 19 (31.6) | |
| Retired | 4 (6.6) | 3 (5) | |
| Spouse's job | | | 0.638* |
| Unemployed | 5 (8.3) | 6 (10) | |
| Employed | 49 (81.7) | 46 (76.7) | |
| Retired | 6 (10) | 8 (13.3) | |
| Economic status | | | 0.061* |
| Very good | 12 (20) | 9 (15) | |
| Normal | 33 (55) | 29 (48.4) | |
| Weak | 15 (25) | 22 (36.6) | |
| Method of contraception | | | 0.083* |
| $OCP_s$ (Oral contraception pills) | 4 (6.6) | 3 (5) | |
| DMPA (Depo-medroxy progesteron acetate) | 3 (5) | 2 (3.5) | |
| Vasectomy | 4 (6.6) | 5 (8.3) | |
| TL (Tubectomy) | 5 (8.3) | 6 (10) | |
| Condom | 12 (20) | 14 (23.3) | |
| IUD (Intra uterine devices) | 4 (6.6) | 4 (6.6) | |
| None of them | 28 (46.6) | 26 (43.3) | |
| Access to a private resting place | | | 0.113* |
| Yes | 45 (75) | 47 (78.4) | |
| No | 15 (25) | 13 (21.6) | |

* Chi square test

the women in the intervention group, in each of the three levels of primary, secondary, and tertiary SD (Tables 3, 4 and 5).

These finding are in line with the results of similar studies. Khakbazan et al. used the PLISSIT model as a framework for sexual counseling of women who suffered from MS and were sexually active. Sexual function of the participants was assessed by "Female Sexual Function Index" or FSFI. The mean total FSFI score of the women in the

**Table 2** Quantitative characteristics of women and their husbands in experimental group and control group

| Variable | Mean ± SD/percentage | | *P* value |
|---|---|---|---|
| | Experimental group | Control group | |
| Woman's age (year) | 541/5 ± 77/34 | 075/ ± 842/37 | 0.069** |
| Husband's age (year) | 840/6 ± 07/39 | 030/10 ± 67/42 | 0.099** |
| Marriage duration (year) | 745/7 ± 67/11 | 959/7 ± 80/13 | 0.391** |
| Number of pregnancy | 294/1 ± 6/1 | 331/1 ± 65/1 | 0.957** |
| Number of alive children | 895/0 ± 09/1 | 253/1 ± 56/1 | 0.250** |
| Partner's desire for sex (the average number of sex per month) | 224/6 ± 93/10 | 206/5 ± 89/10 | 0.265** |
| Average frequency of sexual relations with spouse during a month | 364/4 ± 05/7 | 679/3 ± 69/6 | 0.881** |
| Disease duration (year) | 113/4 ± 44/6 | 977/4 ± 22/6 | 0.659** |
| Age of onset of multiple sclerosis | 380/7 ± 35/28 | 879/7 ± 20/31 | 0.320** |
| Length of drugs administration | 444/3 ± 60/3 | 293/2 ± 56/3 | 0.230** |
| Fatigue severity scale (FSS) | 131/1 ± 876/4 | 148/1 ± 807/4 | 0.959** |
| Expanded disability status scale (EDSS) | 327/1 ± 2 | 136/1 ± 07/2 | 0.570** |
| Depression severity (BDI) | 254/7 ± 617/26 | 817/7 ± 566/27 | 0.051** |

** Independent-samples *t* test

**Table 3** The distribution of statistical indicators on primary sexual dysfunction in groups

| Primary sexual dysfunction | Group | | Test's result |
|---|---|---|---|
| | Experimental ($n = 60$) | Control ($n = 60$) | |
| Time | | | $F_{\text{Time}}$ (1.629, 192.251) = 124.933 $P < 0.001$ |
| Before the intervention | 15/05 ± 0/49 | 13/43 ± 0/53 | |
| 8 weeks after intervention | 12/43 ± 0/41 | 13/00 ± 0/46 | |
| 12 weeks after intervention | 12/52 ± 0/39 | 13/00 ± 0/45 | |
| Test's result | $F_{\text{group}}$ (1,118) = 0.088 $P = 0.767$ | | $F_{\text{group*Time}}$ (1.629, 192.251) = 63.354 $P < 0.001$ |
| Post hoc Test's result according to groups | | | |
| Before and 8 weeks after intervention | $P < 0.001$ | $P = 0.028$ | |
| Before and 12 weeks after intervention | $P < 0.001$ | $P = 0.053$ | |
| 8 weeks and 12 weeks after intervention | $P > 0.999$ | $P > 0.999$ | |

experimental group improved 2 and 3 months after the intervention when it was compared with the FSFI score before the intervention. Because the FSFI cannot assess the different types of SD in MS patients (primary, secondary, and tertiary), this study could not evaluate different aspects of the sexual function in these women [19].

**Table 4** The distribution of statistical indicators on secondary sexual dysfunction in groups

| Secondary sexual dysfunction | Group | | Test's result |
|---|---|---|---|
| | Experimental ($n = 60$) | Control ($n = 60$) | |
| Time | | | $F_{Time}$ (1.849, 218.232) = 11.265 $P < 0.001$ |
| Before the intervention | 19/73 ± 0/84 | 20/57 ± 0/70 | |
| 8 weeks after intervention | 18/87 ± 0/73 | 20/28 ± 0/65 | |
| 12 weeks after intervention | 19/07 ± 0/73 | 20/53 ± 0/64 | |
| Test's result | $F_{group}$ (1,118) = 1.521 $P = 0.220$ | | $F_{group*Time}$ (1.849, 218.232) = 4.159 $P = 0.019$ |
| Post hoc test's result according to groups | | | |
| Before and 8 weeks after intervention | $P < 0.001$ | $P = 0.382$ | |
| Before and 12 weeks after intervention | $P = 0.001$ | $P > 0.999$ | |
| 8 weeks and 12 weeks after intervention | $P = 0.520$ | $P = 0.268$ | |

**Table 5** The distribution of statistical indicators on tertiary sexual dysfunction in groups

| Tertiary sexual dysfunction | Group | | Test's result |
|---|---|---|---|
| | Experimental ($n = 60$) | Control ($n = 60$) | |
| Time | | | $F_{Time}$ (1.724, 203.483) = 23.663 $P < 0.001$ |
| Before the intervention | 11/77 ± 0/57 | 10/57 ± 0/45 | |
| 8 weeks after intervention | 10/67 ± 0/67 | 10/52 ± 0/43 | |
| 12 weeks after intervention | 10/65 ± 0/48 | 10/72 ± 0/45 | |
| Test's result | $F_{group}$ (1,118) = 0.413 $P = 0.522$ | | $F_{group*Time}$ (28.450, 203.483) = 28.450 $P < 0.001$ |
| Post hoc test's result according to groups | | | |
| Before and 8 weeks after intervention | $P < 0.001$ | $P > 0.999$ | |
| Before and 12 weeks after intervention | $P < 0.001$ | $P = 0.133$ | |
| 8 weeks and 12 weeks after intervention | $P > 0.999$ | $P = 0.843$ | |

In a study by Farnam et al. regarding the effect of the PLISSIT and group health model on the women's sexual problems in Tehran, the results showed the positive effect of the model on sexual problems of the women through improving their sexual function and decreasing their sexual distress [40].

Nho also examined the effect of a sexual health improvement program based on the PLISSIT model on women with gynecological cancers and their partners, and concluded that implementation of these programs over four 90-min sessions could have a positive effect on the sexual function and intimacy of the couple, and could lead to female sexual distress reduction and increased hope in their partners [41].

In a study by Rostamkhani to determine the effect of counseling on sexual function in women with SD based on the PLISSIT model, the mean FSFI score 2 and 4 weeks after the

**Table 6** The distribution of statistical indicators on different items of sexual dysfunction according to the MSISQ-19 in groups

| Domain/items | Group | Before intervention | 8 weeks after intervention | 12 weeks after intervention | Repeated Measurement |
|---|---|---|---|---|---|
| Primary sexual dysfunction | | | | | |
| 12. Less feeling or numbness in genitals* | Intervention | 2.018 ± 1.32 | 2.17 ± 1.23 | 2.17 ± 1.30 | $P = 0.84$ |
| | Control | 1.87 ± 1.03 | 1.78 ± 0.94 | 1.82 ± 0.93 | $P = 0.13$ |
| 16. Lack of sexual interest or desire | Intervention | 2.98 ± 1.43 | 2.38 ± 1.07 | 2.45 ± 1.04 | $P = 0.001$ |
| | Control | 2.88 ± 1.18 | 2.80 ± 1.11 | 2.78 ± 1.07 | $P = 0.15$ |
| 17. Less intense or pleasurable orgasms or climaxes | Intervention | 3.47 ± 1.39 | 2.78 ± 1.05 | 2.75 ± 1.06 | $P = 0.001$ |
| | Control | 3.12 ± 1.26 | 3.12 ± 1.26 | 3.02 ± 1.17 | $P = 0.18$ |
| 18. Take too long to orgasms or climaxes | Intervention | 3.78 ± 1.30 | 3.00 ± 1.05 | 2.95 ± 1.09 | $P = 0.001$ |
| | Control | 3.23 ± 1.18 | 3.07 ± 1.07 | 3.08 ± 1.07 | $P = 0.008$ |
| 19. Inadequate vaginal wetness or lubrication | Intervention | 2.63 ± 1.10 | 2.10 ± 0.81 | 2.20 ± 0.86 | $P = 0.001$ |
| | Control | 2.33 ± 1.20 | 2.33 ± 1.13 | 2.30 ± 1.07 | $P = 0.75$ |
| Secondary sexual dysfunction | | | | | |
| 1. Muscle tightness or spasms in arms, legs or body | Intervention | 2.33 ± 1.25 | 2.20 ± 1.08 | 2.22 ± 1.13 | $P = 0.06$ |
| | Control | 2.62 ± 1.02 | 2.58 ± 1.03 | 2.62 ± 0.97 | $P = 0.75$ |
| 2. Bladder or urinary symptoms | Intervention | 1.93 ± 1.30 | 1.85 ± 1.16 | 1.88 ± 1.22 | $P = 0.25$ |
| | Control | 2.12 ± 1.18 | 2.07 ± 1.13 | 2.05 ± 1.08 | $P = 0.86$ |
| 3. Bowel symptoms | Intervention | 1.33 ± 0.85 | 1.37 ± 0.78 | 1.45 ± 0.81 | $P = 0.05$ |
| | Control | 1.57 ± 0.90 | 1.60 ± 0.88 | 1.65 ± 0.89 | $P = 0.20$ |
| 4. Feeling of dependency because of MS | Intervention | 2.02 ± 1.28 | 2.02 ± 1.17 | 2.08 ± 1.19 | $P = 0.41$ |
| | Control | 2.22 ± 1.26 | 2.22 ± 1.10 | 2.27 ± 1.10 | $P = 0.61$ |
| 5. Tremors or shaking in hands or body | Intervention | 1.93 ± 1.24 | 1.88 ± 1.18 | 1.88 ± 1.13 | $P = 0.48$ |
| | Control | 1.80 ± 1.02 | 1.82 ± 0.94 | 1.80 ± 0.95 | $P = 0.89$ |
| 6. Pain, burning or discomfort in body | Intervention | 2.55 ± 1.18 | 2.40 ± 1.01 | 2.30 ± 1.01 | $P = 0.001$ |
| | Control | 2.85 ± 0.89 | 2.78 ± 0.88 | 2.85 ± 0.91 | $P = 0.37$ |
| 8. Problems in moving the body during sexual activity | Intervention | 2.27 ± 1.23 | 1.93 ± 0.97 | 2.00 ± 0.99 | $P = 0.001$ |
| | Control | 2.03 ± 1.07 | 2.08 ± 1.04 | 2.07 ± 1.03 | $P = 0.55$ |
| 10. Problems with concentration, memory or thinking | Intervention | 2.68 ± 1.33 | 2.60 ± 1.29 | 2.65 ± 1.30 | $P = 0.23$ |
| | Control | 2.58 ± 1.06 | 2.43 ± 1.01 | 2.50 ± 1.00 | $P = 0.05$ |
| 11. Exacerbation or significant worsening of MS | Intervention | 2.68 ± 1.50 | 2.62 ± 1.43 | 2.60 ± 1.45 | $P = 0.15$ |
| | Control | 2.78 ± 1.04 | 2.70 ± 1.04 | 2.73 ± 1.02 | $P = 0.18$ |
| Tertiary sexual dysfunction | | | | | |
| 7. Feeling that the body is less attractive | Intervention | 2.55 ± 1.46 | 2.35 ± 1.24 | 2.45 ± 1.25 | $P = 0.01$ |
| | Control | 2.17 ± 1.15 | 2.13 ± 1.09 | 2.17 ± 1.12 | $P = 0.55$ |
| 9. Feeling less feminine due to MS | Intervention | 2.08 ± 1.33 | 1.98 ± 1.11 | 1.90 ± 1.16 | $P = 0.01$ |
| | Control | 2.38 ± 1.23 | 2.30 ± 1.18 | 2.37 ± 1.20 | $P = 0.18$ |
| 13. Fear of being rejected sexually because of MS | Intervention | 2.12 ± 1.35 | 1.97 ± 1.13 | 1.95 ± 1.17 | $P = 0.008$ |
| | Control | 1.90 ± 1.03 | 1.98 ± 1.06 | 2.00 ± 1.04 | $P = 0.15$ |

**Table 6** continued

| Domain/items | Group | Before intervention | 8 weeks after intervention | 12 weeks after intervention | Repeated Measurement |
|---|---|---|---|---|---|
| 14. Worries about sexually satisfying the partner | Intervention | 2.93 ± 1.41 | 2.43 ± 1.07 | 2.45 ± 1.06 | $P = 0.001$ |
| | Control | 2.33 ± 1.03 | 2.33 ± 1.02 | 2.37 ± 1.00 | $P = 0.65$ |
| 15. Feeling less confident about the sexuality due MS | Intervention | 2.08 ± 1.36 | 1.93 ± 1.16 | 1.90 ± 1.11 | $P = 0.003$ |
| | Control | 1.78 ± 0.90 | 1.77 ± 0.90 | 1.82 ± 0.89 | $P = 0.62$ |

* Number of the related question in MSISQ-19 questionaire

intervention in the first session compared to the score before the intervention was significantly different [42]. Tutuncu and Yildiz evaluated the effect of sex education on the sexual function of the women who had undergone total abdominal hysterectomy based on the PLISSIT model in four stages (two times before the surgery and then 3 and 6 months after the surgery) using the FSFI. Comparison of the mean FSFI score showed that the patients' score before the surgery or when surgery was not indicated was similar in the two groups. If there were clinical symptoms indicating surgery, a reduced mean FSFI score was observed in both groups. In both phases of the follow-up after the surgery, the FSFI score was higher in the intervention group compared with the control group, and the women in the intervention group were more successful in dealing with their sexual problems related to their surgery [22].

The results of a study by Chun also showed the positive effect of the PLISSIT model on the sexual function of the women with gynecological cancers, as the implementation of this intervention increased the mean FSFI score in the intervention group as compared with the control group [43]. Ayaz and Kubilay evaluated the effect of the PLISSIT model on solving sexual problems of the patients with ostomy. Following the intervention during 8 house visits, the sexual performance of the women was assessed before and six weeks after the intervention using the Golombok-Rust Inventory of Marital State, and the results of intervention showed that the intervention could improve the sexual function of the women [44].

To specify that which particular domain of the tertiary SD had the most changes during the study, all 19 items of MSISQ-19 were assessed in groups. Data analysis showed that sexual counseling based on Ex-PLISSIT model caused a significant change in all domains of primary SD except less feeling or numbness in genitals. It shows that despite the "specific suggestions" like using lubricant gels could relieve some parts of primary SD, the intervention could not improve this aspect of physical changes due to MS.

About the secondary SD, there were no significant differences in MS negative effects on muscle, bladder and bowel or mental aspects after the intervention. It is a logical conclusion because this type of MS complications need remittent drug and rehabilitation therapy. Nevertheless sexual counseling could improve some of the special domains of secondary SD like feeling of dependency, problems in moving the body during the sex and exacerbation or significant worsening of MS. This findings can be attributed to" Specific Suggestions" that were given to the women such as: using new sexual positions which are more usable according to their mobility limitations, having sex dates with their partners in the most suitable times based on their vitality.

The positive impact of the intervention on all domains of tertiary SD can be justified as an affirmative conclusion to the psychological parts of sexual counseling and beneficial

information about the disease and it's current complications on women's sexual self-confidence and satisfaction or their self- steam and communication with their husbands and offering helpful solutions for these problems. Sexual counseling based on Ex-PLISSIT model could help the women to regain their desirable sexual and emotional relationship with their partner.

The results of the statistical analysis of the three levels of SD in the control group showed a significant difference in the score of primary SD before and 8 weeks after the intervention, indicating a decrease in the intensity of SD 8 weeks after the intervention. No significant difference was detected on the suparticipants' score before and 12 weeks after the intervention, and also after 8 and 12 weeks. In the case of secondary and tertiary dysfunction, those in the control group did not show any significant statistical difference in any stage of the study, and no improvement was detected in the severity of SD over time (Tables 3, 4 and 5).

Among studies on sexual function in women with chronic illnesses or gynecological surgery that were reviewed in this study, the sexual function of the women in the control group did not change in the studies conducted by Khakbazan et al., Chun, Tutuncu and Yildiz, and Nho. Only Ayaz and Kubilay reported a decrease in the sexual function of the women with ostomy in the control group in the 6 weeks follow-up after the intervention when compared with before the intervention, and the authors attributed this finding to the negative impact of sexual concerns and some physical and mental problems related to ostomy [22, 41, 42, 44].

Zorzon concluded that deterioration of the sexual function in people with MS does not increase over time, but the intensity of the existing SD in individuals may increase [9].

The fact that there were no differences in groups related to demographics and clinical variables was a strength of the study and indicates the effectiveness of the randomization.

There were 120 participants in this study and this was a positive point comparing with similar studies.

About the participants, because of the large sample size and cultural limitations it was not possible to use couple sexual counselling. It can be done by a smaller sample size of other studies in future.

Evaluating of the impact of clinical factors of MS such as EDSS, fatigue, depression, etc. on sexual function of the groups have not been emphasized as a goal of this study. But several variables that were regarded as sociodemographic and clinical factors which can affect on sexual function in these women can be an important object for further studies.

## Conclusion

According to the findings of this study regarding the positive impact of sexual counseling based on the Ex-PLISSIT model, which is the method of choice for obstetricians, gynecologists, midwives, and all health care providers, this model can be used as a routine method of sexual counseling for women with MS who suffer from SD.

Towardly conclusions of the intervention on major domains of primary SD and some alterable variables of secondary SD showed that sexual counseling could play a beneficial role in improvement of sexual function of women with MS despite the physical complications of MS were resolute. Substantial effect of the Ex-PLISSIT model on tertiary sexual dysfunction's specific characters was an affirmation for great impact of this model on psychological and mental aspects of sexual function in these women.

These are convincer arguments for participating of health providers specially midwifes to utilize their ability and knowledge in sexual counseling to play an affective role on improving MS patient's treatment.

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**Compliance with Ethical Standards**

**Conflict of interest** The authors are declare that they have no conflict of interest.

**Ethical Approval** All procedures performed in this study were in accordance with the ethical standards of the Ethics Committee of Tehran University of Medical Sciences and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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