ORIGINAL RESEARCH

Association of menopausal symptoms and menopausal quality of life with premenstrual syndrome

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Abstract

Background

Premenstrual symptoms at reproductive age resemble menopausal symptoms and have symptomatic commonalities. We hypothesized that women with previous premenstrual syndrome may be more prone to develop menopausal symptoms and aimed to investigate the association of menopausal symptoms and menopausal quality of life with premenstrual symptoms.

Methods

The study included 120 postmenopausal women. We evaluated the current menopausal symptoms with menopause rating scale (MRS) and quality of life with menopause-specific quality of life scale (MSQoL), previous premenstrual symptoms with premenstrual syndrome scale (PMSS) retrospectively and compared the associations statistically.

Results

According to retrospective PMSS, participants were divided into two groups; with and without premenstrual syndrome (PMS). PMS group included 29 (24.2%) participants and 91 (75.8%) participants were in group without PMS. Sociodemographic characteristics of groups were similar. Somatic and psychological symptoms were higher in MRS of PMS group. Evaluating the MSQoL; psychosocial and physical symptoms were impaired in the PMS group. Vasomotor, urogenital and sexual symptoms were similar in both groups.

Conclusion

Premenstrual and menopausal symptoms were related in terms of somatic, and psychosocial symptoms but not in vasomotor, urogenital, and sexual symptoms. It seems that women with previous premenstrual symptoms are more likely to develop menopausal symptoms in some ways. However, a prospective longitudinal study may be needed for more conclusive results.

Keywords: premenstrual syndrome; premenstrual dysphoric disorder; menopausal symptoms; quality of life.

Introduction

Premenstrual syndrome (PMS) can be defined as a condition in which women have physical, behavioral, and psychological symptoms that cause disturbance in the luteal phase of each menstrual cycle. PMS affects women throughout their reproductive life and severe premenstrual symptoms can significantly impair their quality of life and working capacity[1]. 80% of females experience mild symptoms of PMS, and 20% may have moderate to severe symptoms. Severe symptoms are identified as premenstrual dysphoric disorder (PMDD) and are found in 2–8% of women. PMDD is characterized by symptoms of depression, anxiety, and mood changes and is defined as a type of depressive disorder in the DSM-5[2,3].

In addition, menopause is an inevitable part of every woman's life; about 3 out of 4 women experience some problems during menopause. The most common menopausal symptoms reported are; hot flashes, night sweats, fatigue, decreased libido, and mood changes such as depression, irritability, and emotional responsibility. Other possible complaints are; memory impairment, lack of concentration, insomnia, and musculoskeletal complaints[4].

A majority of women experience premenstrual symptoms, menopausal symptoms, or both and physical and psychological symptoms of both situations show similarity[1].

The mechanisms explaining the premenstrual and menopausal symptoms are not well known yet, but the onset of symptoms is associated with ovarian hormone levels. Estrogen and progesterone levels change significantly, especially during the menstrual cycle, pregnancy, postpartum, and perimenopause. It has been hypothesized that these women have a high sensitivity to hormonal changes and are therefore more prone than others to experience psychological or physical problems at different reproductive stages[5,6]. Changes in neuroendocrine transmitters in the central nervous system seem to affect these periods and alterations in the autonomic nervous system are also known to have a role on these different clinical processes[7]. There are studies in the literature demonstrating that these periods affect each other. However, studies made to find a link between premenstrual and postmenopausal symptoms have reported inconclusive results[5,6,8].

While there are many studies in the literature that evaluate the characteristics of both periods separately and compare them with various physical and psychiatric conditions, there are few studies comparing both periods with each

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other. In line with our search, only a few studies examined the relationship between premenstrual syndrome and menopausal symptoms[5,8].

We aimed to evaluate post-menopausal women to find a relationship between current menopausal symptoms, menopausal quality of life and previous premenstrual symptoms and to find whether the presence of premenstrual symptoms at reproductive age is associated with the current menopausal situation.

Methods

Setting

Postmenopausal women who applied to the gynecology and obstetrics outpatient clinic of our hospital over 1 year and agreed to participate in the study were included. Women who have not menstruated for at least 1 year were included in the study. Exclusion criteria included women aged 75 and over years and those who could not read and answer the scales or did not agree to participate.

The sample size of the study consisted of 120 postmenopausal women. A sociodemographic information form prepared by the researcher was recorded by asking the participants and the Menopausal Rating Scale (MRS), Menopause specific quality of life scale (MSQoL), and the Premenstrual Syndrome Scale (PMSS) in relation to past periods were self-applied.

Sociodemographic characteristics and the relationship between past premenstrual symptoms and current menopausal symptoms and menopausal quality of life were evaluated.

The study protocol was accepted by the ethical committee of our university (2020-10/31). A written informed consent form was signed by all participants prior to data collection.

Measures

Sociodemographic Data Form

It was prepared by the researcher on the basis of literature information, including women's age, marital status, educational status, employment status, smoking-alcohol use, number of pregnancies, gynecological history, systemic diseases, drugs used, menopausal characteristics, and psychiatric history. It consists of 21 questions, 9 of open-ended and 12 of are closed-ended.

Premenstrual Syndrome Scale (PMSS)

It is a 44-item five-point Likert-type scale (Never, Rarely, Sometimes, Often, Continuously) measuring the severity of premenstrual symptoms. The implementation of PMSS is done by evaluating the person retrospectively, taking into account the "being within the period one week before the period". The lowest score that can be obtained from the scale is 44, and the highest score is 220. It recommends evaluating the results of the PMSS in terms of the presence of PMS, according to the condition that the total and subscale scores exceed 50% (110 points) of the highest possible score. Turkish validity and reliability study was conducted by Gencdogan[9,10].

Menopause Rating Scale (MRS)

The Menopause Rating Scale was developed to measure the severity of menopausal symptoms and their effect on the quality of life. In the Likert-type scale, which consists of a total of 11 items including menopausal complaints, for each item; 0: None, 1: Mild, 2: Moderate, 3: Severe, and 4: Very severe. The total score of the scale is calculated based on the scores given for each item. While the minimum score that can be taken from the scale is "0", the maximum score is "44". The 11-item scale including menopausal complaints consists of 3 sub-dimensions. Somatic complaints sub-dimension (items 1, 2, 3, and 11), psychological complaints sub-dimension (items 4, 5, 6, and 7) and urogenital complaints sub-dimension (items 8, 9, and 10)[11,12].

Menopausal-Specific Quality of Life Scale (MSQoL)

It was developed to create a life quality scale specific to menopausal health status, with psychometric properties based on women's experiences. Each sub-domain score is listed from 1 to 8 in MSQoL. The scale consists of four domains: vasomotor, psycho-social, physical, and sexual[13].

Statistical Analysis

The data were evaluated using the SPSS 21.0 statistical package program. One-Sample Test was used to examine the suitability of numerical variables to normal distribution.

In the comparison of normally distributed quantitative variables between women with and without PMS, a multivariate linear regression analysis was performed to predict MSQoL variables using the categorical data PMS and MRS total score variables. In the study, $p<0.05$ was statistically significant. In order to determine which statistical analysis was to be used, it was first determined whether the completed data displayed normal distribution, identified through the kurtosis skewness coefficient, the Kolmogorov-Smirnov test, and graphic analysis. Student's t-test for comparison of normally distributed quantitative variables between women with and without PMS. The Chi-square test was used for the comparison of categorical data.

The numerical variables were provided as average±standard deviation, and the categorical variables were provided as frequency and percentages after the descriptive analysis was carried out, in order to examine the socio-demographic characteristics of the participants. Statistical inference is based on 95% confidence intervals (CIs), and the significance level was set at 0.05.

Correlation analysis for variables with normal distribution was performed using the Pearson test. A Spearman correlation analysis was performed for variables that did not show a normal distribution. A linear regression analysis was performed to predict the MSQoL and MRS total score variables using the PMSS total scores. Binary regression analysis was performed to asses the association of menopausal and PMS symptoms.

Results

The PMSS results according to the previous premenstrual symptoms of 120 participants were evaluated and those with a score above the cut-off point of 110 were grouped as with PMS, and those with a score below the cut-off score of 110 were grouped as without PMS. The group with PMS consisted of 29 (24.2%) participants and the mean age was 54.2 ± 8.1 years. The group without PMS consisted of 91 (75.8%) participants and the mean age was 53.5 ± 6.5 years. There was no significant difference between the two groups according to their other sociodemographic characteristics and smoking-alcohol use, the number of pregnancies, gynecological history, systemic diseases, drugs used, psychiatric diagnosis and treatment history ($p>0.05$ in all). Menopausal characteristics were also asked and menopause duration, seeking a doctor for menopause and hormonal replacement treatment, natural or sugical menopause

initiation were not different between the groups (p>0.05 in all).

To evaluate the menopausal symptoms and menopausal life quality; MRS and MSQoL scales were used. Cronbach α coefficients of the PMSS, MRS and MSQoL scales were 0.973, 0.780 and 0.927 respectively. The mean PMSS total score was 78.05±35.9, the mean MRS total score was 18.21±8.62, and the mean MSQoL score was 61.11±33.

MRS subscores and MSQoL subscores of the two groups were compared and according to the MRS sub-scale scores; somatic and psychological symptoms sub-scores and total scores were significantly higher in the with PMS group, but urogenital symptoms did not differ between the groups. According to the MSQoL assessment of groups; psychosocial and physical symptoms sub-scores, and total scores were significantly impaired in the with PMS group, but vasomotor and sexual symptoms were not different between the groups. The relation of MRS and MSQoL sub-scores of the with PMS and without PMS groups was illustrated in Table 1.

Symptoms of depressive mood, depressive thoughts, anxiety, and irritability in PMSS were classified as psychological symptoms (PMSS-Psy) and pain, appetite changes, fatigue, sleep changes, and swelling were classified as somatic symptoms (PMSS-Som). According to this clssification; sub-scores of MRS and MSQoL were compared to PMSS sub-scores. MRS somatic symptoms and urogenital symptoms were correlated significantly with both somatic and psychological symptoms of PMSS in most symptoms and in total, but MRS psychological symptoms were associated moderately with somatic and psychological symptoms of PMSS. In comparison with MSQoL; psychosocial and physical symptoms of MSQoL were correlated significantly with both somatic and psychological symptoms of PMSS in most symptoms and in total when vasomotor and symptoms were correlated moderately. Interestingly sexual symptoms of MSQoL were not correlated with any symptoms of PMSS. The correlation of PMSS sub-scores with MRS and MSQoL sub-scores was illustrated in Table 2.

The correlation between the PMSS total scores and the MRS total scores (r=436**, p<.01) and the correlation between the PMSS total scores and the MSQoL total scores (r=436**, p<.01) were shown in Figure 1.

Binary regression analysis was performed to asses the association of menopausal and PMS symptoms.

Table 1. Relation of MRS and MSQoL sub-scores of groups

Relation of MRS and MSQoL sub-scores of groups					
Subscale total scores	With PMS (N=29)	Without PMS (N=91)	p	t	Effect size
MRS somatic	8.82 ± 2.81	6.68 ± 3.38	.003	3.085	0.69
MRS	10.31 ± 3.10	5.60 ± 4.08	.000	5.698	1.29
MRS urogenital	4.86 ± 3.10	4.08 ± 3.22	.258	1.137	0.24
MRS Total	24.00 ± 6.63	16.37 ± 8.39	.000	4.463	1.00
MSQoL vasomotor	10.24 ± 5.85	8.51 ± 6.27	.193	1.309	0.28
MSQoL	21.79 ± 10.06	9.23 ±9.13	.000	6.279	1.30
MSQoL Physically	47.89 ± 17.20	29.37 ±17.75	.000	4.917	1.05
MSQoL Sexual	7.06 ± 6.18	5.47 ± 6.44	.243	1.173	0.25
MSQoL Total	87.00 ± 29.88	52.68 ±30.55	.000	0.973	1.13

PMS: Premenstrual Syndrome **MRS**: Menopause Rating Scale **MSQoL**: Menopause Specific Quality of Life Scale

Effect size=Cohen's d (0.2-small. 0.5-medium and 0.8-large effect size)

Table 2. The correlation of PMSS sub-scores with MRS and MSQoL scores

MRS and MSQoL sub-scores		PMSS sub-scores											
		Depressive mood	Anxiety	Fatigue	Irritability	Depressive thoughts	Pain	Appetite changes	Sleep changes	Swelling	Psychological Total	Somatic Total	PMSS TOTAL
MRS somatic	r	.468***	.448**	.456**	.427***	.437***	.307**		.403**		.495***	.386**	.481**
MRS psychological	r	.180*			.212*				.205*				
MRS urogenital	r	.330***	.319**	.246*	.346***	.290***	.349**		.249*		.356***	.287*	.349**
MRS Total	r	.432***	.399**	.385**	.430***	.370***	.352**		.377**		.452***	.342**	.436**
MSQoL vasomotor	r	.179*	.186*							.238**	.198*		.198*
MSQoL psychosocial	r	.485***	.404**	.396**	.386***	.448***	.228*		.281*	.208*	.482***	.360**	.465**
MSQoL Physically	r	.446***	.395**	.444**	.373***	.396***	.359**		.314**		.448***	.377**	.451**
MSQoL Sexual	r												
MSQoL Total	r	.463***	.393**	.432**	.397***	.406***	.325**		.308**	.183*	.462***	.383**	.462**

PMSS: Premenstrual Syndrome Scale **MRS**: Menopause Rating Scale MSQoL: Menopause Specific Quality of Life Scale

(*p<0.05, **p<0.01, ***p<0.001)

In Model 1; MRS and MSQoL total scores were found to significantly predict the presence of PMS symptoms (respectively p=0.046 and p=0.026*). In the Model 2; analysis was also applied for sociodemographic characteristics of the women and it was determined that low education and high school and above education levels did not predict the PMS symptoms, while the secondary education level significantly predicted the presence of PMS symptoms (p=0.034*). The values of the regression coefficients and their statistical significance obtained by 'Enter logistical regression method' were included in Table 3.

Linear regression analysis was applied to evaluate the effect of somatic and psychological symptoms of PMS on menopausal symptoms and menopausal quality of life, and it was found that both somatic and psychological symptoms significantly predicted menopausal symptoms and menopausal quality of life. The linear regression models for MRS levels according to PMSS-Psy and PMSS-Som and for MSQoL levels according to PMSS-Psy and PMSS-Som were illustrated in Table 4.

Discussion

In our study; we investigated the presence of premenstrual symptoms at reproductive age in a group of postmenopausal women. Our primary aim was to detail whether menopausal symptoms have a relationship with previous premenstrual symptoms.

Premenstrual symptoms were common in our study population of postmenopausal women (24.2%) and were consistent with the prevalence of PMS in the

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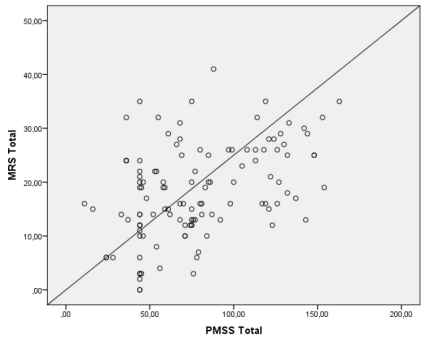
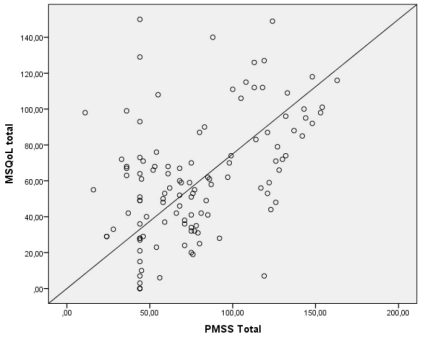


Relationship between the total Premenstrual Syndrome Scale scores and the overall Menopause Rating Scale scores (dotted lines indicate the 95% confidence interval). Pearson Correlation chart r=436***, p<.001



Relationship between the total Premenstrual Syndrome Scale scores and the overall Menopause Specific Quality of Life Scale scores (dotted lines indicate the 95% confidence interval). Pearson Correlation chart r=462***, p<.001

Figure 1. Correlations of the total PMSS scores with the overall MRS scores and the overall MSQoL scores

Table 3. Binary logistic model of the association of menopausal symptoms, menopausal quality of life and PMS symptoms.

Model 1		Coefficient estimate	S.E.	Wald	95% C.I.for EXP(B)		OR	p
					Lower	Upper		
	MRSTotal	.046	.042	1.231	.965	1.136	1.047	.046
	MSQoLTotal	.026	.010	6.330	1.006	1.048	1.027	.026*
	Constant	-3.877	.772	25.191			.000	.021*
Diagnostics								
	(LR) Chi-square	24.826						.000***
	Hosmer & Lemeshow test	6.203						.625
Model 2								
	MRSTotal	.048	.042	1.299	.966	1.140	1.049	.254
	MSQoLTotal	.030	.011	7.606	1.009	1.053	1.030	.006**
	Education status			5.215				.074
	Education status(1)	1.735	.819	4.484	1.138	28.245	5.669	.034*
	Education status(2)	.722	.748	.931	.475	8.915	2.058	.335
	Marital status	1.145	1.132	1.022	.342	28.890	3.141	.312
	Constant	-6.175	1.563	15.610			.002	.000***
Diagnostics								
	(LR) Chi-square	31.647						.000***
	Hosmer & Lemeshow test	8.980						.344

* p < .05;** p <.01. ;*** p <.001

Model 1;N=120, CRC:78.0 R2=0.282(Nagelkerke) PMS/nonPMS=.030. MSQoLTotal+1.735.education

general population in the literature[2]. The comparison of menopausal complaints of women with and without a history of PMS in the present study resulted that those with a history of PMS being more likely to experience somatic complaints, physical complaints, psychological complaints, and worse quality of life than women without a history of PMS.

Our data reveal a finding that a history of premenstrual symptoms is related to somatic, physical, and psychological menopausal complaints and worsened menopause-specific quality of life (MSQoL) in menopause. These findings were in line with some previous studies showing an association between a history of PMS and menopausal symptoms[5,14]. In the PMS group, the quality of life seemed worsened especially in terms of physical and psychosocial symptoms, but not in terms of vasomotor symptoms similar to the results of another previous study[6].

Contrary to expectations, these relationships did not differ according to sociodemographic variables that were significantly associated with both PMS and menopausal symptoms, and were consistent with results of another study reporting that menopausal symptoms were not affected by sociodemographic variables[6] but different from some others showing a relationship between sociodemographic variables and menopausal symptoms[4,15]. Similar to some sub-types of depressive disorders, as in an old-defined depression sub-type endogenous depression, it can be thought that PMS/PMDD and menopausal symptoms may occur, regardless of sociodemographic variables, and biological factors may be more effective than other factors[16].

Participants with PMS history were likely to report psychological and psychosocial complaints in both menopausal scales. Some studies have reported that women with a history of PMS, were more likely to report mood symptoms around menopause[17]. It is known that estradiol (E2) variability has been associated with menopausal symptoms. E2 fluctuations in the transition to menopause are associated with depressive mood and a highly characteristic E2 pattern, which changes with age, and significantly predicts psychological and somatic complaints[18,19]. One mechanism that has been suggested to contribute to premenstrual symptoms is a deficiency or abnormal functioning of neurotransmitters in the central nervous system, such as serotonin and γ aminobutyric acid[20].

Table 4.Linear regression models for MRS levels and MSQoL levels according to PMSS-Psy and PMSS-Som

		B	Std. Error	Beta	t	p	Zero-order	Partial	Tolerance	VIF
	*(Constant)	11.282	1.885		5.986	.000				
1	PMSPSY	.170	.047	.452	3.586	.000	.453	.317	.436	2.296
	PMSSOM	.001	.071	.002	.018	.985	.342	.002	.436	2.296
	**(Constant)	30.508	7.330		4.162	.000		0.292		
1	PMSPSY	.599	.184	.410	3.248	.002	.466		.434	2.303
	PMSSOM	.166	.278	.075	.597	.552	.383	.056	.434	2.303

Gonadal hormone levels or their fluctuations during the menstrual cycle, and abnormal functioning of neurotransmitters at menopause may explain the occurrence of various premenstrual symptoms[21,22] and contribute to a reduced MSQoL at menopause. In a study, the relationship between steroid hormone levels and menopausal symptom severity was evaluated and it was demonstrated that the severity of psychological, urogenital and total MRS scores were related to low progesterone and high testosterone levels[23]. Somatic and physical complaints were also significant in those with a history of PMS. Especially deterioration in the quality of life may be associated with these symptoms. Changes in autonomic nervous system regulation have been associated with both premenstrual symptoms and the transition to menopause[20,21]. Mood changes, sleep disturbances, and symptoms such as weakness and fatigue are conditions that most affect the quality of life and known to be affected by the autonomic nervous system[7]. One of the factors affecting menopausal symptoms and quality of life is metabolic syndrome (MetS), and particularly results of some studies showing the relationship between MetS and menopausal symptoms determine this situation. In one of these studies; it was shown that menopausal symptoms such as sleep problems, depressive symptoms and bladder problems were more common in those with MetS, and vasomotor symptoms were also partially affected by MetS[24]. In another study; hyprelipidemia was correlated with severe somatic symptoms and low Bone Mineral Density (BMD) levels that both conditions are factors that significantly affect quality of life[25].

Considering the existence of studies showing the relationship between PMS and MetS[26], it can be thought that these common aspects may play a role in the effect of the presence of PMS on menopausal symptoms and menopausal life quality.

One of the aspects expected to be particularly affected and may affect the quality of life during menopause is sexual functions. While the decrease in estrogen production directly affects sexual function, a decrease in libido may be expected[27]. There are many studies sharing data on sexual dysfunction in the climacteric period[28,29]. Other symptoms of menopause and sexual symptoms were positively correlated in these studies. In our study, scores related to sexual problems were low in both groups and there was no significant difference between the groups. Our data showing that women with PMS history, may be vulnerable to hormonal fluctuations during menopause, showed different results from previous studies on this subject. This situation can be interpreted as the participants' unwillingness to share their sexual problems and their cultural disapproval. Our results on this subject were also consistent with the data of another study that some of the participants evaluated sexual intercourse in the postmenopausal period as shameful-inappropriate or unnecessary[28]. It may also mean a very important problem, which means 'no sex, no problem'.

A good understanding of premenstrual disorders is important for managing menopause. It is also true that managing PMS needs to understanding the mechanisms and management of menopause. For many women, premenstrual syndrome and natural menopause seem to be close to each other[30]. Maybe in the future according to many biological evidences, a mood disorder subtype just valid for the female sex might be defined and a diagnosis may arise as menopausal syndrome/ menopausal dysphoric disorder just as premenstrual syndrome/dysphoric disorder.

Limitations of the study

Our study has some limitations. First, we did not make a proper psychiatric examination of the participants. But the fact that there is no difference between the groups in the history of psychiatric diagnosis may enable the independent evaluation of other symptoms. Also, it may be thought that a prospective assessment of premenstrual symptoms would be more representative because of the memorizing difficulty. However, because premenstrual symptoms are often very disturbing, women can easily remember them. Furthermore, several international statements agree that premenstrual symptoms can be reliably evaluated retrospectively when a representative research tool such as PMSS is used[21].

Secondly, it can be assumed that we are evaluating individual premenstrual symptoms rather than addressing clinical diagnoses (PMS/PMDD). Women are diagnosed with PMS when their symptoms are strong and significantly impair work capacity or social life. Only women with the most severe premenstrual symptoms are diagnosed with PMDD[29,31].

Evaluating the effect of symptoms on the quality of life of the women is a strength of our study. Because the fact that a condition affects the quality of life and functionality of the person for a disorder is an important criterion according to the diagnostic category.

Conclusion

Menopausal symptoms and premenstrual symptoms are related in terms of physical and psychosocial symptoms. Considering premenstrual syndrome and its severe form premenstrual dysphoric disorder is a chronic condition that occurs during every menstrual period and may continue and become chronic after menopause. This continuity may be partially deformed and the mild form may turn into menopausal syndrome and the severe form into menopausal dysphoric disorder. However, long-term and prospective longitudinal studies on larger populations may provide more evidence.

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