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## Comparison of Nutritional Behaviors of Women with and Without PMS Working in Hospitals in Hamedan in 2015.

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### ABSTRACT

Premenstrual Syndrome (PMS) is a common issue that affects women and international statistics indicate that this syndrome is increasing. Nutrition and diet, health behaviors, lifestyle and stress are factors affecting the incidence of premenstrual syndrome. This study aims to compare nutrition in women with and without PMS working in hospitals in Hamedan in 2015. This descriptive-comparative study is carried out with convenience sampling on 116 20-45 year old women with PMS and 116 women without it working in all hospitals of Hamadan. Data are collected using demographic questionnaire, nutrition questionnaire, Beck Depression Inventory, provisional diagnosis of PMS questionnaire and PMS daily diagnostic questionnaire and are analyzed using SPSS-17 software, descriptive statistics and Mann-Whitney tests, independent T-test and chi-square. The arithmetic means of nutrition type in women with and without PMS was 66.32 and 79.83, respectively. Results obtained from data analysis showed that there was statistically significant difference between the two groups in terms of nutrition ( $P < 0.001$ ). Given the results, training and awareness are necessary for women and emphasis on modified diet is recommended as a non-medical option for prevention of PMS.

**Keywords:** Lifestyle; Premenstrual Syndromes.

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## BACKGROUND

PMS is one of the most common complaints of women of childbearing age [1-2] and involves a combination of mood, physical and behavioral disorders [3]. Symptoms of this syndrome start 7 to 10 days before menstrual period each month and disappear in the early days after menstruation [4]. Pregnancy and psychological and medical disorders including hyperthyroidism, hypothyroidism, migraine headaches, chronic fatigue, irritable bowel syndrome, Hyperprolactinemia, PCOS, endometriosis adrenal disorders, and lifestyle factors may have similar symptoms to PMS, which these conditions must be ruled out [5-6]. Women with PMS have low-quality life and the mentioned syndrome increases the use of health care and reduces work efficiency [7]. PMS occurs in 90% of women of childbearing age [8]. In the study conducted in Iran, the prevalence of PMS was 62% [5]. Conducted researches have shown positive effects of hormonal, nutritional, metabolic, biochemical and psychological factors and have indicated decreased serum levels of steroid hormones HIAA-5 (a metabolic serotonin) [9]. Different types of oral contraceptive pills, Spironolactone, exercise, physical Activity, relaxation techniques, nutrition, diet and training programs are also somewhat effective in reducing the severity of symptoms [10-12]. Lifestyle and environmental factors in 90-95% of cases can cause chronic diseases. Studies of World Health Organization on health behaviors in 35 countries showed that 60 percent of quality of life and health of people depends on their lifestyle and personal behavior. One of the goals of the World Health Organization until 2020 is to promote healthy lifestyles and to reduce harmful factors to people's health including inadequate physical activity, wrong nutrition, inappropriate personal relationships and the use of alcohol [13]. A healthy lifestyle is the first step to control and manage the symptoms of PMS [10]. Evidence suggests that lifestyle, eating habits and obesity in childhood and adulthood are risk factors for getting chronic diseases. Lifestyle encompasses various dimensions, some of which include nutrition, exercise, care, smoking, alcohol, illegal drugs, social support and stress management [8]. Lifestyle change is recommended for control and prevention of premenstrual syndrome. A study reported 52% reduction in symptoms of premenstrual syndrome with lifestyle changes in 80.2% of participants with no physical activity, excessive consumption of coffee, high body mass index (BMI), consumption of fast food and smoking<sup>14</sup>. Stress reduction, regular sleep, avoiding alcohol and smoking will reduce the symptoms [14-15].

Nutritional and metabolic factors may play a role in premenstrual syndrome. Using foods containing yolk and alcohol make the syndrome severe [8]. Some doctors recommend reducing the consumption of caffeine, salt and refined sugars and increasing intake of high-fiber foods to reduce the symptoms of premenstrual syndrome<sup>11,16</sup>. Eliminating caffeine and salty foods and reducing consumption of fat and protein, using low-fat milk and cream and using carbohydrates, regular exercise, consumption of fruits, vegetables and vitamins can reduce the symptoms of premenstrual syndrome [14-15,17]. A significant reduction in the symptoms of premenstrual syndrome is observed with receiving thiamine and riboflavin from food sources. No changes in symptoms of PMS have been reported due to receiving vitamin B6, B12, folic acid and niacin from supplements and food sources. Receiving Zinc from food is associated with a lower incidence of PMS while consuming foods containing potassium may increase it and for absorption of 1 mg vitamin B6 per day, symptoms will be reduced [18].

Given the high frequency of PMS, it can be prevented by identifying factors contributing to PMS and avoiding them.

### Objectives

Because of the lack of a comprehensive study in this regard, a study is conducted to compare the nutrition in women with and without PMS working in hospitals of Hamadan in 2015.

## PATIENTS AND METHODS

### Population of the Study and Location

This cross-sectional study was conducted on 116 women with and 116 women without PMS working in Hamadan Hospitals (Hamadan, Iran). After getting approval of the study from the Research Center of Hamadan University of Medical Sciences, this obtained permission was presented to the Heads of Hamadan Hospitals. Random sampling method was used, and subjects were selected among 20-45 years old PMS

patients with BMI of 19.8-26, having no night shifts, with regular menstrual periods of 21-35 days cycle and 3-10 days bleeding period, not using antidepressants, hormones and contraceptives in the past 3 months.

Participants were informed about the purpose and methods of the study and the interested women were invited to participate in this study. Furthermore, written consents were obtained from these individuals.

### Sample Size, Power, and Precision

Sample size was estimated using the following formula: 
$$n = \frac{(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2 (\sigma_1^2 + \sigma_2^2)}{(\mu_2 - \mu_1)^2} \sigma_1 = 4.1, \sigma_2 = 4.2$$
 With 95% confidence interval, a sample size of 116 participants was required.

### Ethical Consideration

Every ethical consideration was observed. Participants were informed about the purpose and methods of the study and the interested women were invited to participate in this study. Also, written informed consents were obtained from these subjects.

### Study Tools

Data collection tools included demographic details, Daily Symptom Record (DSR), Beck Depression Inventory (BDI), and diet questionnaires.

The participants filled out the Beck Depression Inventory (BDI). If they have taken a score in the range 1-10, they would enter the study. Then, they were given a provisional diagnosis of PMS questionnaire. The Daily Symptom Record (DSR) and demographic questionnaire were presented to who had 5 symptoms out of 11, and they were briefed about how to complete them. Research units recorded severity of daily symptoms with numbers 0 (no), 1 (mild), 2 (moderate) and 3 (severe). Then, mean severity of symptoms was calculated from 1 week prior to menstrual period to 3 days after the menstrual period. Symptoms such as headache, breast tenderness, acne, swelling, bloating and palpitations demonstrate severity of physical symptoms, and symptoms such as irritability, tension, sleep problems, mood swings, food cravings, wishing to be alone, depression, forgetfulness, anxiety, poor concentration, crying, suicide, decreased libido and fatigue show severity of psychological symptoms.

Written consent forms were taken from the participants. 145 people filled out and returned the symptom daily recording forms after 2 months. Based on this data, PMS was confirmed in 127 of them. Of these, 11 people refused to participate and 116 people entered the study.

Diet questionnaires were completed by a trained researcher through interviews. Diet questionnaires included 28 items. At first, the subjects studied the directions to answer the questions, which contained some explanations about different food groups and then answered the researcher's questions. Questions were about consumption of fruits, vegetables, meat, cereals, nuts and oilseeds, low-fat dairy, whole-grain bread, fish, the kind of oil including liquid oil, solid or animal fat, fast foods, white sauce, sausages, chicken wings, neck and skin, salty foods, potato chips and snacks, soda drinks, and fried foods. Answers to questions included a "daily", "weekly", "monthly" and "annual" food consumption as well as "never" option. The items about cereals, fruits, vegetables, meat and dairy were considered as positive and taking a higher score is associated with the higher consumption of such foods. Moreover, items including fat and sugar are considered as negative and a higher score represents their lower consumption. The frequency of food consumption was calculated in both groups. There were 16 items for positive diet and 12 items for negative diet. Total score was measured by considering from 4 points for daily to zero for never regarding the positive items and vice versa for the negative items. The score of zero to 33 indicated poor nutritional status, the score of 34 to 66 represented a moderately appropriate nutritional status and the score of 67 to 100 represented an appropriate nutritional status. In fact, the higher score reflected better nutritional status. Unhealthy behavior questionnaire was a researcher-made questionnaire with 8 items and 22 points. The scores were converted to 0-100, where 0-33, 34-66 and 67-100 respectively showed the low, moderate and the high risk behaviors.

Content validity was used to validate this questionnaire, and retest was used to determine its reliability. Pearson’s correlation coefficient was 0.82 for diet questionnaire, which its validity and reliability have been confirmed in various studies[19-21]. DSR and the PMS provisional diagnosis questionnaire are standardized worldwide, and their validity and reliability have been confirmed in previous studies [18,22] .

BDI is also a global standard questionnaire whose validity and reliability have been confirmed in various studies [23-24].

**Data analysis**

Data were analyzed with SPSS version 17 using T-test, Chi-square test and Mann-Whitney-U test. The t-test was used to compare age, weight, body mass index, menarche age, mean scores of type of food, mean scores of different groups of food on the food pyramid and mean scores of type of food between the 2 groups. Mann-Whitney-U test and the Chi-square test were used between the two groups and an  $\alpha = 0.05$  was considered as the level of statistical significance.

**RESULTS**

In order to control the confusing factors, both groups were well-matched in term of baseline data including age, body mass index (BMI), income, educational level, menarche age, marital status, and family history of PMS, and there was no statistically significant difference between the two groups (table 1). The results of the current study indicated a statistically significant difference in terms of nutritional status between patients with and without PMS (Table 2). The frequencies of consumption of food groups based on the Food Pyramid are shown in Table 2. As can be seen from this table, in all cases other than milk and cereal, there are significant differences between the 2 groups. Consumption of Fruits, vegetables, meat was significantly higher in healthy individuals than sufferers, but consumption of cereal, fats and sweets was higher in patients with PMS than healthy individuals. Frequencies of food consumption in the two groups are shown in Table 3. It is evident from this table that there were significant differences between the 2 groups in terms of the type of food. In the case of food, the consumption of bread without bran, white sauce, yogurt, fast food and nuts was significantly higher in healthy people than those with PMS.

**Table 1. Comparison of demographic characteristics between two groups <sup>a</sup>**

Variables	Premenstrual syndrome	Non Premenstrual syndrome	T	P value
<b>Age (years)</b>	36.79±7.36	36.79±7.36	T= 0.00	<b>P=1.00</b>
<b>BMI (kg/m<sup>2</sup>)</b>	24.66±4.07	14.09±4.92	T= -1.43	<b>0.16</b>
<b>Menarche age (years)</b>	13.97±2.42	14.38±1.23	T= -1.16	<b>0.25</b>
<b>Education</b>				
<High school	24.1%	24.1%	X <sup>2</sup> =0	<b>1</b>
>High school	75.9%	75.9%		
<b>Husband’s education</b>				
<High school	%34.8	%36.4	X <sup>2</sup> =0.1	<b>0.9</b>
>High school	%65.2	%63.6		
<b>Income ( Thousand Rials)</b>				
<1000000	%48.3	%44.8	X <sup>2</sup> =0.3	<b>0.96</b>
>1000000	%37.9	%37.9		
<b>Marital status</b>				
Single	% 20.7	%24.1	X <sup>2</sup> =0.2	<b>0.66</b>
married	%79.3	%75.9		

<sup>a</sup> Data are presents as mean ± SD or percent.

**Table 2. Comparison of mean scores of consumption of different food groups between two groups <sup>a</sup>**

groups	Premenstrual syndrome (N =116)	Non Premenstrual syndrome (N =116)	t	t-test
	mean±SD	mean±SD		
cereals	3.83±0.59	3.83±0.38	0.00	p = 0.10
fruits	2.55±1.14	3.38±0.97	4.20	p < 0.001
vegetables	2.72±0.87	3.41±0.85	4.28	p < 0.001
meat	3.69±0.46	3.38±1.04	2.07	p = 0.04
dairy	2.83±1.30	3.07±1.42	0.95	p = 0.34
Fats and sweets	3.07±1.26	1.03±1.28	8.58	p < 0.001

<sup>a</sup> Data are presented as mean ± SD

**Table 3. Comparison of mean scores of consumption of food diversity between two groups <sup>a</sup>**

groups	Premenstrual syndrome (N =116)	Non Premenstrual syndrome (N =116)	t	P Value <sup>b</sup>
	mean±SD	mean±SD		
Whole bread	3.48±0.97	3.79±0.40	2.23	p = 0.02
bread	2.79±1.22	3.07±1.21	1.21	p = 0.22
white sauce	2.02±1.25	3.48±1.04	6.74	p < 0.001
fast foods	1.93±0.83	2.79±1.33	4.17	p < 0.001
fish	2.38±0.61	2.10±1.25	1.50	p = 0.13
Cheese	3.79±0.40	3.76±0.43	0.44	p = 0.65
Yogurt	3.17±1.09	3.24±1.11	0.33	p = 0.73
Brains	2.24±0.90	1.59±1.17	3.37	p = 0.001
Liquid and solid frying oils	3.62±0.89	3.28±1.05	1.89	p = 0.06

<sup>a</sup> Data are presented as mean ± SD

<sup>b</sup> t-test

**DISCUSSION**

The analysis of the data showed a significant relationship between PMS and inappropriate diet (P < 0.001). The findings indicated that individuals with PMS had more inappropriate nutrition than healthy ones. Moreover, the results of this study showed insignificant differences in terms of diet, food groups and the type of food used among PMS patients and non-PMS individuals (P < 0.001), which represented the effect of diet on PMS, but no relationship was observed between PMS and unhealthy behaviors. The results of this study showed a statistically significant difference in terms of nutrition, food groups and food type used among people with PMS and healthy individuals that indicated the effect of diet on PMS. The results of previous studies also showed an association between diet and PMS [7] that are in line with the current study.

In the current study, consumption of fruits and vegetables was higher in healthy individuals than sufferers. In the study conducted by Sidhom et al., it was stated that lowering the intake of fruits and vegetables considerably increases PMS, which indicates the positive effect of fruits and vegetables on lowering PMS and this finding is in line with our findings [14]. In the current study, consumption of sweets was significantly higher in individuals with PMS than those without PMS. Some doctors suggest reduced consumption of caffeine, salt and refined sugars to reduce the symptoms of PMS[11-16]. Moreover, studies showed that excessive consumption of sweet foods such as cake and chocolate can also increase PMS. The prevalence of PMS among consumers of sweet foods was 88.5% and among people who used less sweet foods was 70.2%, which is consistent with our study [14]. In most women, a healthy lifestyle is enough to control symptoms of PMS. Some principles of a healthy lifestyle are outlined that include the following:

- Taking plenty of fluids (water or juices except cola, alcohol or other beverages containing caffeine) to reduce bloating, fluid retention, and other symptoms
- Eating frequent and small meals and avoiding overeating, intervals between meals should not be more than 3 hours.
- Eating vegetables and fruits and reducing or avoiding salt and sugar

- Consumption of vitamin B6, calcium, and magnesium [25]

In the current study, the use of fatty foods was higher in women with PMS, but there was no significant difference between the two groups. The consumption of milk was higher in healthy subjects than those with PMS, but there was no significant statistical difference between the 2 groups. In previous studies, it was stated that lowering the intake of foods rich in fat and protein and using low-fat milk and cream reduce the symptoms of PMS [14-15,26]. Diet may affect the production of prostaglandin and sex hormones. Low-fat diet decreases the amount of estrogen in premenopausal and postmenopausal ages [27]. Inhibition of Estrogen restricts ovarian activity, which may prevent the symptoms of PMS [28].

### **Strong points of the Study**

Considering high prevalence of PMS and the direct relationship between nutritional factors and PMS, modifying diet is recommended. Training and giving awareness is necessary for women and girls, especially about appropriate diet.

### **Limitations of the Study**

This study has been done on women working in Hamadan Hospitals that – maybe - cannot represent all of the women and the results cannot be generalized to all the women of the child-bearing age and dietary assessment is mostly based on self-reports.

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### **CONCLUSIONS**

Women comprise about half of the world's population and their health is very important. Given the prevalence of PMS, it is necessary to address this issue by understanding the factors that contribute to PMS to reduce its prevalence. According to the results of this study, the majority of women with PMS had a poor diet compared to healthy individuals. It is likely that by changing the type of diet, the prevalence of PMS may be reduced. Ultimately, emphasis on diet modification as a nonpharmacological option in reducing the severity of PMS symptoms is recommended and the importance of nutrition for girls and women become evident by this study.

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