Short Communication

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Comparison of Anthropometric and Conicity Indicators in Students with Premenstrual Syndrome

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ABSTRACT

BACKGROUND AND OBJECTIVE: Body composition and body fat are important in the prevention of chronic diseases in people with premenstrual syndrome. This study was performed to compare the anthropometric and conicity indexes in PMS and healthy people.

METHODS: This cross-sectional study was performed on 92 dormitory students living in Mazandaran University of Medical Sciences over 18 years of age in two groups with premenstrual syndrome and healthy subjects. Anthropometric and conicity parameters were measured and compared in two groups.

FINDINGS: In this study, 46 (54.8%) patients in the PMS group with an average age of 22.02±1.51 years and 38 (45.2%) in the healthy group with an average age of 21.34±2.32 that there was no significant difference between the two groups in the test (p=0.08). In the PMS group, this disorder was significantly different from that of the healthy group (p=0.0001), and the anger and allergies and anthropometric indices were significantly higher in students with menstrual syndrome than in healthy subjects (see The order of p=0.003, p=0.007, p=0.001, p= 0.02, p= 0.01, p= 0.001), but the two groups did not have a significant difference in terms of conicity.

CONCLUSION: The results of this study showed that subjects with premenstrual syndrome group had higher anthropometric indices than healthy subjects. But they do not differ in terms of conicity.

KEY WORDS: *Premenstrual Syndrome, Students, Conisity, Body Composition*.

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Introduction

Premenstrual syndrome is a psychiatric and neuroendocrine disorder characterized by periodic recurrence of physical, psychological and behavioral symptoms (1).

Symptoms appear after ovulation, and its symptoms are divided into two parts: psychological and physical and it is as a cyclic phenomenon, psychological and physical disturbances and behavioral changes during the luteal phase of the menstrual cycle (2-4). Hypotheses about the cause of this disease include increased levels of estrogen and decreased progesterone levels, changes in estrogen/progesterone ratio, vitamin B6, B1, A deficiency and minerals such as magnesium, calcium, and prolactin secretion and abnormalities of prostaglandins (5, 6).

Despite these studies, there was a significant relationship between body mass index and menstrual disorders. It seems physical activity and diet patterns and lifestyle and body mass associated with this disorder and various studies have emphasized the association between sexual hormonal disorders and the probability of this syndrome outbreak (4,7,8). Adipose tissue plays a very important role in the metabolism of sexual hormones and can even cause sexual hormones disorder (4).

Increased fat mass, especially abdominal fat mass associated with hyperandrogenism and hyperinsulinism and sexual hormonal disorders, causes premenstrual syndrome (4, 9, 10). Some studies have shown that women with premenstrual syndrome (PMS) have a higher body mass index (BMI) (11, 12). However, the positive effects of abdominal obesity are known to be one of the most important factors in the disease. The Conicity Index is the hypothesis of fat accumulation around the abdomen, which is something like a dual cone (ie, two cones that lie on the base of one on the other), people who have fewer fats in the central zone, they look like a cylinder.

Considering the role of obesity in the development of cardiovascular disease, diabetes and metabolic disorders are thought to be a conicity indicator, which is a marker of obesity and body fat distribution, and considers most of the central obesity in relation to general obesity, which can be associated with metabolic disorders (9).

However, the role of this marker in PMS is not known. Therefore, this study was conducted to compare the BMI and conicity indices in two groups of healthy students and students with premenstrual syndrome.

Methods

This case-control study was carried out on 92 female students of Mazandaran University of Medical Sciences, after approval by the Ethics Committee of Mazandaran University of Medical Sciences at IR.MAZUMS.REC.95.1808 in spring 1396. Sample size was calculated using (p) PMS prevalence in Iran (10) and (d) accuracy of estimation. Sample size with 95% confidence and minimum loss of at least 25% of 92 individuals were determined. Accordingly, 47 patients were divided into two groups of healthy and PMS patients.

The criteria for entering the study include age over 18 years old, lack of specific disease (diabetes, kidney disorders, cardiovascular disease, metabolic syndrome, cancer, etc.), not having genital disease, and people with physical and psychological stress in three recent months, events such as death of family member or surgery, physical illness or drug use, history of mental illness, having regular exercise, any specific treatments for PMS, inappropriate completion of questionnaires, poor collaboration, and dieting were excluded from the study. In this research, the general information questionnaire and PMS diagnostic questionnaire and anthropometric questionnaire (11) were used. The questionnaire questions were completed by the researcher and using the asking from participants. Height, weight, body mass index (BMI), and waist circumference and hip circumference of the participants were determined. Body mass index (BMI) of individuals was also obtained using the formula below.

$$\mathrm{BMI} = \frac{\mathrm{weight(kg)}}{\mathrm{height(m)}^2}$$

Waist to Hip Ratio (WHR) was calculated by waist circumference divided to hip circumference (WHtR: Waist to Height Ratio) and by dividing the waist circumference to height. The general information questionnaire and the conicity index, which is a marker for central obesity, has also been obtained in the following way: its range from 1 (one full cylinder) to 1.73 (two cones connected from the base), increasing the rate of this index means the greater accumulation of fat in the center of the body, in fact 1.73 for this index, indicating the highest accumulation of fat in the central region of the abdomen (12).

$$\frac{\text{Waist Circumference (m)}}{0.109\sqrt{\frac{\text{Hight(m)}}{\text{Weight (Kg)}}}}$$

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Data were analyzed by SPSS software version 18. The Kolmogorov-Smirnov test was used to normalize the data and T-test was used to compare the mean of quantitative variables between the two groups of healthy and those with PMS and the Chi-square test was used to compare the nominal or grouped variables and $p<0.05$ was considered significant.

Results

In this study, 8 people refused to continue their cooperation for personal reasons. Thus, 84 subjects participated in the study, in which 46 (54.8%) people were in the group with PMS and 38 (45.2%) people were in the healthy group. The mean age of the participants in the syndrome group was 22.02±5.11 and in the healthy group was 21.34±2.32 years, which showed no significant difference between the two groups. Regarding the educational level in the syndrome group, 21 (45.7%) people were undergraduate, 11 (13.9%) people were masters and 14 (30.4%) people were e PhD, and in the healthy group 27 people were undergraduate (71.1%), 5 (13.2%) people were masters and 6 (15.8%) people had doctorate, but there was no significant difference between the two groups in terms of educational level. Patients with premenstrual syndrome have a significant difference in relation to the history of this disorder and allergies in their relatives (using the questionnaire) in comparison with the healthy group (p=0.0001 and p=0.003, respectively) (Table 1) Anthropometric (BMI) indices in PMS group were significantly higher than healthy group (Table 2).

Table1. Comparison of demographic and menstrual data in PMS and healthy students

Demographic information and menstruation		PMS(N=46) N(%)	Healthy(N=38) N(%)	Total N(%)	P-value
Nationality	Kurd	1(2.2)	2(5.3)	3(3.5)	0.21
	Fars	45(97.8)	34(89.4)	79(94.1)	
	Others	0(0)	2(5.3)	2(2.4)	
Marital status	Married	10(21.7)	8(21.1)	18(21.4)	0.93
	Single	36(78.3)	30(78.9)	66(78.6)	
History of PMS in first degree relatives	Yes	25(54.3)	4(10.5)	29(34.5)	0.0001
	No	21(45.7)	34(89.5)	55(65.5)	
Food allergy or seasonal	Yes	45(97.8)	8(21.1)	53(63.1)	0.003
	No	1(2.2)	30(78.9)	31(37)	
Pregnant and lactating	Yes	0(0)	1(2.6)	1(2.1)	0.26
	No	46(100)	37(97.4)	83(98.8)	
Amount of bleeding (day and pad replacement)	Medium	35(76.1)	33(86.8)	68(80.9)	0.38
	Intense	11(23.9)	5913.20	16(19.1)	
History of infection	Yes	6(13)	3(7.9)	9(10.7)	0.44
	No	40(87)	35(92.1)	75(89.3)	

Table2. Comparison of BMI and conicity indices, duration of bleeding and duration of menstruation in two groups with PMS and healthy

Variable	PMS (N=46) Mean±SD	Healthy (N=38) Mean±SD	P-value
Weight (kg)	68.53±7.59	64.21±6.51	0.007
Height (cm)	159.951±5.22	162.68±6.63	0.035
Body mass index (kg/m 2)	26.2±2.17	24.2±1.21	0.0001
Waist (cm)	99.28±11.45	93.05±12.64	0.02
Hip circumference (cm)	106.48±13.58	104.61±13.51	0.53
Waist to Caribbean (WHR)	0.935±0.098	0.89±0.027	0.01
Waist to height (WHtR)	0.62±0.06	0.57±0.06	0.001
(Conicity)	1.39±0.16	1.36±0.14	0.4
Bleeding period (day)	46.43	29.32	0.0001
Menstrual period (day)	6.04	6.39	0.047

Independent t-test and significance level was p<0.05

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Discussion

This study showed that BMI and weight in PMS patients were higher than healthy subjects. In a study by Masho et al., the probability of PMS in obese women was 2.9 times higher than that of underweight (13). Bertone-Johnson et al. also found that the risk of PMS increased with increasing weight (14).

The results of these investigations were in line with our findings, because BMI and weight are a factor associated with PMS (15), while Jafarirad et al. study showed that people with PMS had less weight and hip circumference than healthy people however these findings are inconsistent with our research results, which in their study, attributed underweight to the symptoms of PMS, while those who participated in the study had a normal body mass (16).

Perhaps one of the reasons for increasing BMI in people with PMS is the presence of signs of stress, anxiety, depression and immobility (10,11,17). These factors can cause overweight and obesity (18). In agreement with the results of this study, Tolossa et al showed that there is no significant relationship between BMI, WHR and WHTR (19).

This study showed that there is a significant relationship between waist and BMI with PMS and study by Mohammadi et al. showed that there is a direct correlation between waists WHR, WHR, WHTR with PMS (10). Weight gain, and especially the increase in body fat in the central areas, disrupts the balance of sexual hormones in the body, including androgens, estrogen and sexually transmitted hormone-associated globulins (SHBGs).

Changes in (SHBG) result in changes in the secretion of androgens and estrogens in the target tissue. Obesity increases estrogen production in relation to body weight and body fat (9, 20). In fact, due to the role of ovarian steroids in the progression of PMS, abdominal fat and obesity are considered as important contributors to PMS (19). Althoughin many studies, there has been a relation between PMS and obesity and increased BMI, however, some studies conducted on PMS revealed the association between PMS and amphetometric indices (10,11,19, 21).

A study by Flegal et al showed that PMS symptoms are more common in obese women, which is consistent with our research results (22). However, Masho et al indicated that there is no significant difference in body fat between healthy people and PMS patients. This finding is inconsistent with our findings (13). The findings of this study showed that patients with premenstrual syndrome disorder had significantly higher waist circumference and waist to hip ratio than healthy subjects, which was consistent with studies of Mohammadi et al. and Kondo et al. (10, 23).

In fact, the association of sexual hormones and fat mass in women has been shown in many studies (11, 14, 16, 24-26). In the present study, the conicity index, indicating central obesity and distribution of fat in the body, did not differ significantly between the two groups (22-24).

The Conisity Index has recently been proposed to examine the status of central obesity, some of which have reported its value higher than the waist circumference index, but Kim et al. showed that BMI is more valuable than Conisity for predicting cardiovascular disease (25).

In the present study, the results showed no significant difference in Conisity in both healthy individuals and individuals with PMS, despite significant weight and waist circumference between the two groups.

This indicator is more likely to be a sign of central obesity and body fat distribution, and focuses on more central obesity than general obesity, which our research found was not different in patients with PMS than in healthy subjects in terms of central obesity. While general obesity reported by body mass index is significantly higher in patients with PMS than in healthy subjects. Other findings of this study showed that there was no statistically significant difference between different ethnic groups in Kurd and Fars and other ethnic groups in terms of the presence of this disorder. This study was consistent with Tabarroki et al., Jafarirad et al. (16, 26).

Also, people with PMS in this study were suffering from food and seasonal allergies. This difference was statistically significant compared to the healthy group, consistent with the findings of Nittner-Marszalska et al. (27). In fact, fluctuations in pre-menopausal sexual hormones are responsible for the deterioration of many premenstrual symptoms, including inflammation, autoimmune conditions, allergies, menstrual periods and asthma symptoms (Premenstrual Asthma) (28).

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From the limitations of the study, we can mention the low volume of samples examined and the lack of direct evaluation of fat and without fat by impedance techniques. We suggest that these weaknesses be resolved in future studies.

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References

1. Azhari S, Karimi Nik Chatrodi A, Atarzadeh Hosseini SR, Mazloom SR. Officacy of group aerobic exercise program on the intensity of premenstrual syndrome. Iran J Obstet Gyneocol Infertil. 2005; 8(2):119-28. [In Persian]. Available at: https://www.sid.ir/En/Journal/ViewPaper.aspx?ID=59690

2.Berek JS, Novak E. Berek and Novak's gynecology, 14th ed. Lippincott Williams & Wilkins; 2007.

3.Sadock BJ, Kaplan SV. Sadock's comprehensive textbook of psychiatry,8th ed. Lippincott Williams & Wilkins; 2000.

4.Rad M, Sabzevary MT, Dehnavi ZM. Factors associated with premenstrual syndrome in female high school students. Journal of Education and Health Promotion. 2018;7:64.

5.Mohebbi Dehnavi Z, Jafarnejad F, Mojahedy M, Shakeri M, Sardar M. The relationship between temperament warm and cold with symptoms of premenstrual syndrome. Iran J Obstet Gynecol Infertil. 2016; 18(179): 17-24. [In Persian]

6.Mohebbi Dehnavi Z, Torkmannejad Sabzevari M, Rastaghi S, Rad M. The relationship between premenstrual syndrome and type of temperament in high school students. Iran J Obstet Gynecol Infertil. 2017;20(5):15–23. [In Persian]

7.Small CM, Manatunga AK, Marcus M. Validity of self-reported menstrual cycle length. Ann Epidemiol. 2007; 17(3):163-70.

8.Jukic AM, Weinberg CR, Wilcox AJ, McConnaughey DR, Hornsby P, Baird DD. Accuracy of reporting of menstrual cycle length. Am J Epidemiol. 2008;167(3):25-33. .

9.Andrade MD, Freitas MCPd, Sakumoto AM, Pappiani C, Andrade SCd, Vieira VL, et al. Association of the conicity index with diabetes and hypertension in Brazilian women. Arch Endocrinol Metab. 2016;60(5):436-42.

10.Mohammadi V, Shidfar F, Keshtkar Aghababaee S, Parisa Mokhtari, Mohammadi R, Gohari MR. The relationship of anthropometric indices with PMS and it's severity in female students of Tehran University of Medical Sciences. Razi J Med Sci. 2013; 20(109):87-94. [In Persian]

11.Nuckols CC. Diagnostic and statistical manual of mental disorder 5th ed. Am Psychiatric Pub; 2013.

12.Bose K, Mascie-Taylor CG. Conicity index and waisthip ratio and their relationship with total cholesterol and blood pressure in middle – aged European and migrant Pakistani men. Ann Hum Biol. 1998; 25(1); 6-11.

13.Masho SW, Adera T, South-Paul J. Obesity as a risk factor for premenstrual syndrome. J Psychosom Obstet Gynaecol. 2005; 26(1):33-9.

14.Bertone-Johnson ER, Hankinson SE, Willett WC, Johnson SR, Manson JE. Adiposity and the development of premenstrual syndrome. J Womens Health. 2010; 19(11):1955-62.

15.Koushkie Jahromi M. Premenstrual Syndrome in Adolescents and Body Composition. Int J Anat Appl Physiol. 2016; 2(2e):1-2.

16.Jafarirad S, Rasaie N, Darabi F. Comparison of Anthropometric Indices and Lifestyle Factors between Healthy University Students and those Affected by Premenstrual Syndrome. Jundishapur Sci Med J 2016;15(2):217-27.

17.Sherly G, Siva V, Rama C. Prevalence of menstrual irregularities in correlation with body fat among students of selected colleges in a district of Tamil Nadu, India. Nat J Physiol Pharm Pharmacol. 2017;7(7):740.

18. Abbasi S, Tufail A, Kalyar J, Ahsan NA. Pre menstrual syndrome in undergraduate medical students: Hostellers versus day-scholars. J Surg Pak Int. 2015;20:3.

19.Tolossa FW, Bekele ML. Prevalence, impacts and medical managements of premenstrual syndrome among female students: Cross-sectional study in college of health sciences, Mekelle University, Mekelle, Northern Ethiopia. BMC Womens Health. 2014;14:52.

20.Pitanga FJG, Lessa I. Sensibilidade e especificidade do índice de conicidade como discriminador do risco coronariano de adultosem Salvador, Brasil. Rev Bras Epidemiol. 2004;7(3):259-69.

21.Cunha P, Soares R. O estabelecimento de pontos de corte no Índice de Conicidade, como proposta de um indicador antropométrico simples, para avaliação da obesidade e estimativa do risco coronariano elevado no Exército Brasileiro. 2011. xv,141 f. [Tese (Saúde Pública)]. Rio de Janeiro: Escola Nacional de Saúde Pública Sergio Arouca; 2011.

[DOR: 20.1001.1.15614107.1398.21.1.54.9]
[DOI: 10.22088/jbums.21.1.357]

22.Flegal KM, Shepherd JA, Looker AC, Graubard BI, Borrud LG, Ogden CL, et al. Comparisons of percentage body fat, body mass index, waist circumference, and waist-stature ratio in adults. Am J Clin Nutr. 2009;89(2):500-8.
23.Kondo T, Abe M, Ueyama J, Kimata A, Yamamoto K, Hori Y. Use of waist circumference and ultrasonographic assessment of abdominal fat distribution in predicting metabolic risk factors in healthy Japanese adults. J Physiol Anthropol. 2009;28(1):7-14.
24.Valdez R. A simple model-based index of abdominal adiposity. J Clin Epidemiol. 1991;44:955-56.
25.Kim KS, Owen WL, Williiams D, Adams-Campbell LL. A comparison between BMI and Conicity index on predicting coronary heart disease: the Framingham Heart study. Ann Epidemiol 2000; 10(7); 424-31.
26.Tabarroki Sh, Kargarnovin Z, Amiri Z, Tabarroki E, Ozgoli G. Influence of premenstrual syndrome on energy and nutrient intake. Adv Nurs Midwifery, Shahid Beheshti Univ Med Sci. 2012;22(75):37-44.[In Persian].
27.Nittner-Marszalska M, Dor-Wojnarowska A, Wolańczyk-Mędrala A, Rosner-Tenerowicz A, Zimmer M, Dobek J, et al. Studying allergic inflammation and spirometry over menstrual cycles in well-controlled asthmatic women: Changes in progesterone and estradiol affect neither FENO levels nor lung function. Nitric Oxide. 2018;75:95-100.
28.Graziottin A, Serafini A. Perimenstrual asthma: from pathophysiology to treatment strategies. Multidiscip Respir Med. 2016;11(1):30.

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