

Comparison of Prevalence of Premenstrual Syndrome in Athlete and Non-Athlete Students

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Abstract

Exercise training suggested as an effective therapy for premenstrual syndrome (PMS). The aim of this study was to assess and compare the PMS symptoms between exerciser and non-exerciser female students. A total of 360 none obese female students aged 18-26 years were studied: 177 subjects were regular exercisers, while 207 were normal sedentary controls. The presence of premenstrual symptoms was determined by Moos Menstrual Distress Questionnaire (MDQ). PMS occurred in 61.76% and 41% of non-athletes and athletes, respectively. In exerciser group, 68 (41%) girls had PMS that 42 (61.76%) diagnosed as having mild PMS, 19 (27.94%) as moderate and 7 (10.29%) as severe. Whereas, 21 (12.57%) girls were diagnosed as having PMDD. In sedentary group, 133 (59%) girls had PMS that 53 (39.66%) diagnosed as having mild PMS, 55 (41.8%) as moderate and 25 (18.54%) as severe and 19 (15.7%) girls were diagnosed as having PMDD. Therefore, regular exercise training can be suggested as a non-pharmacological treatment to manage PMS and PMDD symptoms in women.

Keywords

Regular Exercise, Premenstrual Syndrome, Prevalence

1. Introduction

Epidemiologic surveys have estimated that as many as 75% of women of reproductive age experience some symptoms attributed to the premenstrual phase of the menstrual cycle [1]. More than 100 physical and psychologic symptoms have been reported to occur premenstrually [2]. These symptoms are often classified by the generic term of premenstrual syndrome (PMS), which is listed in the International Statistical Classification of Diseases (ICD-10) under disorders of the genitourinary system. The symptoms included are menstrual migraine, menstrual molimen, and premenstrual tension not otherwise specified [3]. Approximately 3% to 8% of women in this age group report much more severe premenstrual symptoms of irritability, tension, dysphoria, and lability of mood, which seriously interfere with their lifestyle and relationships [1, 4-6].

The etiology of PMS is largely unknown, but the current consensus seems to be that normal ovarian function (rather than hormone imbalance) is the cyclical trigger for premenstrual related biochemical events within the central nervous system and other target organs [7]. Evidence of the heritability of premenstrual symptoms [8] and the elimination

of premenstrual complaints with suppression of ovarian cyclicity [9] or surgical menopause [10,11] primarily underscore that PMS are biologic phenomena (as opposed to psychologic or psychosocial events). However, most women are able to manage these symptoms. A wide range of therapeutic interventions has been tested in the treatment of premenstrual symptoms including diet, yoga, massage, exercise, faith healing, hypnosis, Chinese herbs, acupuncture, chiropractic, meditation, homeopathy, and vitamins/supplements [12,13]. For women who do not meet criteria for PMS or other physical and psychologic disorders, conservative treatments are appropriate and non-pharmacologic management should be encouraged. There is a variety of well-studied non-pharmacologic treatment options for the milder and more severe premenstrual syndromes. Most women are able to manage these symptoms through lifestyle changes such as recommended dietary changes and Regular exercise [14]. Exercise as an approach to treatment of specific conditions is often overlooked in the practice of conventional medicine. In the case of PMS Kull (2002) indicated that physically active women experienced better mental health and less depression and they had better general health status than inactive women [15]. Furthermore,

Stoddard et al. (2007) showed exercising women had lower Pain symptoms and had lower peak E1G levels than did sedentary women and 24 weeks of moderate exercise training program in sedentary women reduced the global PD symptom score, including the Water Retention and Pain scales, and reduced pregnanediol glucuronide and peak E1G levels [16]. Gannon et al. (1989) found that the length of time women had been exercising correlated significantly with lower levels of menstrual symptoms [17]. Keyes (1985) reported lower levels of anxiety in women who exercised regularly compared with non-exercisers [18], while

Research has been done on PMS in many countries but very few studies have been reported on the experience of Iranian women. This study was conducted to find out the frequency of PMS in young college girls and to assess the severity of emotional, physical and behavioral symptoms in physically active students compared to inactive and sedentary ones.

2. Methods and Materials

The study was conducted at the Alzahra University, Tehran, Iran from 15th April to 15th June 2009. Sample size was 384, calculated by using standard statistical formula. 384 none obese female students aged 18-26 years, lived in University's dormitory, participated in this study. A total of 177 students indicated that they were regular exercisers and remains ($n=207$) considered as non-exercisers in sedentary group. All of the patients had regular menstrual cycles of 23-35 days. The presence of spontaneous ovulatory cycles was confirmed by history and a plasma Progesterone assay during the luteal phase. None of the patients had any psychiatric disorder as determined by the Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. None of the subjects had used any hormonal drug during the 3 months before the study. All subjects were nonsmokers. None of the subjects was pregnant. Married subjects used non-hormonal contraception methods. Participants were in good general health as determined by medical history, physical examination, and complete blood chemistry. At the first visit, a questionnaire asking about age, time of menarche, marriage status, cycle length, duration of bleeding in a menstrual cycle, weight, and height, was handed over to the women. The presence of premenstrual symptoms was determined and confirmed by 29 itemed shortened premenstrual assessment form based on Moos Menstrual Distress Questionnaire (MDQ) [19]. Symptoms studied were physical, psychological and behavioral. Each symptom was rated whether it does not exist, barely noticeable, inhibits activities or alters life. The ratings were prospectively completed for two cycles. The days of the period and the days on which the symptoms caused any dysfunction were studied separately. The last menstruation was compared with first week of follicular phase, beginning on day two of the same cycle. Numbers of the symptoms present were noted on each day of luteal phase starting from day 14 of the same cycle, assuming total cycle length to be

28 days. It was also asked in the questionnaire if symptoms were relieved with onset of menstruation. Questionnaire was discussed, consent taken and given to students to be filled prospectively over two cycles. Inclusion criteria were unmarried girls of Alzahra University, who had regular menstrual period for last 6 months. Married girls, known case of any psychological or medical disorder, as thyroid disease and girls with irregular cycle in the last 6 months were excluded. An ICD-10 symptom checklist for PMS was used to identify girls with PMS. The ICD-criteria for PMS includes seven symptoms: minor psychological discomfort, bloating or weight gain, breast tenderness, muscular tension, aches and pains, poor concentration and changes in appetite. Only one of these symptoms is required for diagnosis. Symptoms must be restricted to luteal phase of the menstrual cycle and cease with commencement of menstrual flow. DSM-IV criteria was used by the American Psychiatric Association to diagnose premenstrual syndrome which is called premenstrual dysphoric disorder (PMDD) which is characterized by the presence of at least five symptoms (one of which must be affective) that occur in the late luteal phase, are not a luteal exacerbation of an existing psychiatric condition, that significantly interferes with social activities or relationships with others. Symptoms are depressed mood, anxiety and tension, fluctuating moods, anger and irritability, decreased interest, poor concentration, lethargy and fatigue, change in appetite, feeling overwhelmed and out of control. Physical symptoms include breast tenderness and weight gain. Further division in mild, moderate and severe PMS was done according to criteria given by Sternfeld [20].

Results were reported as percentile and mean \pm SD. Statistical analysis was conducted by Student's *t* test, Chi-square, Fisher's exact and Mann-Whitney U test as appropriate. A *P* value of < 0.05 was considered statistically significant.

3. Results

Among 384 girls, 360 returned the questionnaires completed in all respects (athlete group= 167, non- athlete group= 193) and 226 (63%) girls were subsequently diagnosed as having PMS according to ICD-10 criteria. Among those 167 in athlete group, 68 (41%) girls had PMS (Figures 1) that 42 (61.76%) diagnosed as having mild PMS, 19 (27.94%) as moderate and 7 (10.29%) as severe (Figures 2). Whereas, 21 (12.57%) girls were diagnosed as having PMDD according to DSM-IV criteria (Figures 1). In non-athlete group, 133 (59%) girls had PMS that 53 (39.66%) diagnosed as having mild PMS, 55 (41.8%) as moderate and 25 (18.54%) as severe (Figures 2) and 19 (15.7%) girls were diagnosed as having PMDD according to DSM-IV criteria (Figures 1). Details of symptom severity of PMS and PMDD in exerciser and sedentary groups are given in Tables 1 and 2. The frequencies of symptoms in both groups are shown in Table 3.

Furthermore, there were significant differences between two groups for breast tenderness ($P=0.000$), fatigue

($P=0.002$), abdominal bloating ($P=0.009$), headache ($P=0.006$), Nausea ($P=0.039$), binge eating ($P=0.038$), confusion ($P=0.000$), anxiety ($P=0.003$), angered easily ($P=0.021$), depression ($P=0.000$) and Disinterest in life ($P=0.000$).

4. Discussion

Results suggest that girls who exercise regularly experience significantly lower levels of negative physical, psychological and behavioral symptoms related to PMS and PMDD than non-athletes. Therefore, our results support the literature suggesting that regular exercise attenuates negative mood states [15-18]. However, the higher values of prevalence of PMS and premenstrual symptoms in our study are assumed to be due to higher degrees of education and corresponding activities. Recent studies showed that perceived stress in daily life influences the occurrence of PMS [17,21]. Some women are more vulnerable to stress than others and are more likely to be victims of PMS [22]. Deuster et al observed that PMS was 3.7 times more common in women with perceived stress than in those with no stress [21]. Moreover, Gannon and colleagues found that chronic stress accounted for a significant amount of variance in premenstrual syndrome [17]. According to the biopsychosocial model, predisposition to PMS is realized as a consequence of biological and genetic influences by which attitudes, beliefs, coping styles and social forces interact to stress women [23]. These findings suggest the need for intervention strategies to cope with stress as they may prove to be effective in ameliorating luteal phase symptoms. On the other hand, A review of published data on premenstrual syndrome has shown that retrospective, self-report studies [13-19] generally show a much higher prevalence of the condition than in prospective studies linking specific symptoms with the menstrual cycle [24].

Maximum fluctuation in hormones occurs during the premenstrual/menstrual phases [25] and premenstrual symptoms are related to hormone levels [26], which, in turn, may be dependent on endorphin functioning [27]. Accordingly, Fremont and Craighead suggested that exercise may produce increased levels of endorphins which influence mood [28]. Raised endorphin levels have been associated with significant reductions in depression [29]. However, Farrell et al. found that endorphins activated by exercise had no effect on mood alterations [30]. Psychological explanations for mood improvement in exercisers have been the subject of several reviews [31-33]. Cognitive-behavioral theory proposes that cognitive distortions and repeated intrusive thoughts are major components of depression [34]. Exercise may act as a distraction from intrusive thoughts, and allow positive thoughts to surface, decreasing depression in the short-term [35]. Another possible explanation is that exercise improves body image and self-efficacy which impact on self-concept and self-esteem [31-33]. The increased social contact offered by exercise group may be particularly relevant. Kirkcaldy and Shephard [33] suggested

that women desire and derive greater benefit from social interaction than men.

Consequently, the finding of significant differences in menstrual cycle moods and symptoms between groups is all the more impressive, and suggests that there is a beneficial impact of physical exercise on menstrual cycle symptomatology and moods.

Table 1. Premenstrual symptoms in PMS (%).

Groups Symptoms	Athlete	Non-athlete
<i>Psychological symptoms</i>		
Angered easily	13.3	33.3
Anxiety	51.6	77.3
Confused	33.3	50
Depressed	26.7	43.3
Guilt	30	46.7
Hopeless Feeling	32.9	44.4
Irritability	20	16.7
Loneliness	23.9	54.4
Low self esteem	22.7	42
Moodiness	36.4	42.2
Stressful feeling	39.8	66
Disinterest in life	26.1	56.6
<i>Physical symptoms</i>		
Abdominal floating	33.3	53.3
Absent mindedness	38.4	51.2
Back pain	53.3	50
Binge eating	34.6	40
Breast tenderness	80	33.3
Constipation	6.7	6.7
Edema	11.2	14.6
Fainting, Vertigo	20	23.3
General body discomfort	32	51
Insomnia	40	43.5
Weight gain	31.8	43.2
Headache	21	31.7
Fatigue	26.7	64.3
Nausea	20	10
<i>Behavioral symptoms</i>		
Prone to violent out burst	23.9	36.4
Abstinence from work	9.76	23.15
Personality change	31.8	50

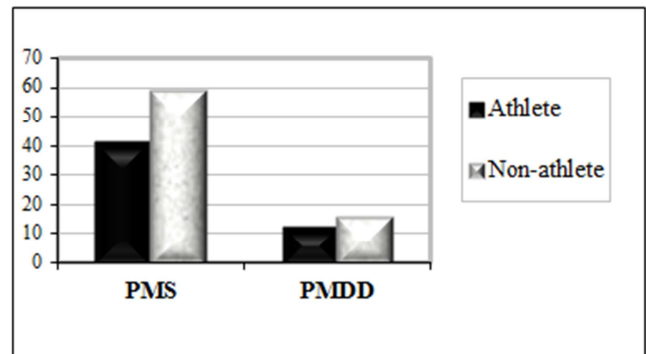


Figure 1. Frequency of PMS and PMDD in athlete group compared to non-athlete group.

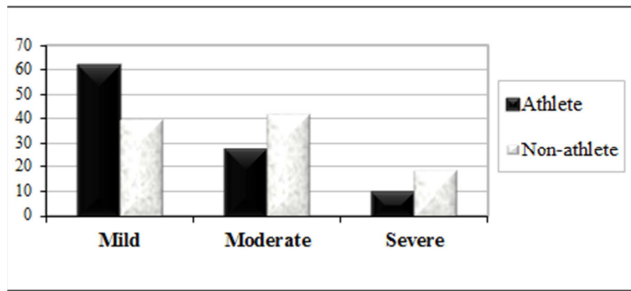


Figure 2. Frequency of mild, moderate and severe PMS in athlete group compared to non-athlete group.

Table 2. Premenstrual symptoms in PMMD (%).

Groups Symptoms	Athlete	Non-athlete
Psychological symptoms		
Angered easily	11.9	38.1
Anxiety	33.3	50
Disinterest in life	26.2	28.6
Confused	23.8	45.5
Depressed	26.2	47.6
Guilt	26.2	45.2
Hopeless Feeling	29	35.7
Irritability	31	38.1
Loneliness	27.7	40.5
Low self esteem	26.2	31
Moodiness	35.7	28.6
Stressed out feeling	33.3	47.6
Disinterest in life		
Physical symptoms		
Abdominal floating	31	23.8
Absent mindedness	19	26.2
Back pain	23.8	23.8
Binge eating	19	21.4
Breast tenderness	8.4	16.7
Constipation	14.3	11.9
Edema	4.8	2.4
Fainting, Vertigo	7.1	19
General body discomfort	31	45.2
Insomnia	16.7	21.4
Weight gain	9.5	33.3
Headache	16.7	21.4
Fatigue	30.6	38.1
Nausea	33.3	39.9
Behavioral symptoms		
Prone to violent out burst	16.7	31
Abstinence from work	26.2	57.2
Personality change	40.5	62.1

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