

Premenstrual Syndrome and Premenstrual Dysphoric Disorder in Japanese Collegiate Athletes



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ABSTRACT

Study Objective: To determine the prevalence and impact of premenstrual syndrome (PMS) and premenstrual dysphoric disorder (PMDD) in Japanese collegiate athletes, with a focus on their disruption of athletic performance.

Design: Cross-sectional study.

Setting: A university in Osaka, the largest city in western Japan.

Participants: 232 female collegiate athletes.

Main Outcome Measures: Premenstrual symptoms and social activities.

Results: The prevalence of each premenstrual symptom was high. The prevalence of moderate to severe PMS and PMDD was 8.6% and 2.9%, respectively, the same as in general high school students. The athletic performance of 44.3% of athletes was found to suffer in a game or in practice. "Elite athletes" (OR 8.63, 95% CI: 1.22-120.0), "Difficulty concentrating" (OR 3.15, 95% CI: 1.05-10.6), and "Fatigue or lack of energy" (OR 5.92, 95% CI: 1.32-34.5) increased the risk of poor athletic performance.

Conclusions: This study showed that premenstrual symptoms affect not only the daily activities but also the athletic performance of collegiate athletes.

Key Words: PMS, PMDD, Collegiate athlete, Athletic performance

Introduction

Premenstrual syndrome (PMS) is a constellation of mood, behavioral, and physical symptoms that are limited to the late luteal phase of the menstrual cycle.¹ Epidemiologic surveys have shown that the frequency of premenstrual symptoms is high (80%-90%)² and that in about 5% of women, the symptoms are so severe that they interfere with personal or social relationships or work, and in many cases they require pharmacologic treatment.³ Such severe PMS is classified as premenstrual dysphoric disorder (PMDD).⁴ Previously we have reported that PMS and PMDD are common menstrual problems not only in adults but also in adolescents and should be treated as carefully as dysmenorrhea.⁵

The causes of PMS and PMDD have been suggested to include hormonal changes, neurotransmitters, diet, stress, and lifestyle.⁶ Many studies have suggested that exercise could be a treatment for PMS,^{7,8} but these findings are limited to the association between PMS and lack of exercise. No study to date has looked at this association scientifically, but that it has been suggested as a causal association.⁸

In the past 40 years, female athletic participation has increased, particularly at high school and collegiate

levels.⁹ In spite of the numerous benefits of exercise, health problems unique to female athletes in intensive training, known as the female athlete triad, have been identified.¹⁰ The triad includes a spectrum of health problems related to energy availability, menstrual function, and bone mineral density, as defined by the American College of Sports Medicine (ACSM).¹¹ The female athlete triad was first identified in 1992 by ACSM, and a significant amount of research about the triad at high school and collegiate levels was performed.⁹ Regarding menstrual dysfunction, most of the studies were concerned with menstrual irregularity, including primary amenorrhea, secondary amenorrhea, and were lacking in data about PMS and PMDD.

Many reports have documented that the premenstrual phase is associated with decreased performance,^{12,13} but there are few reports about PMS/PMDD in athletes. A previous report demonstrated that premenstrual symptoms caused marked negative mood swings in menstruating female athletes, but the data were limited to the moods evaluated in the profile of mood states (POMS) questionnaire.¹⁴ The aim of this study was to investigate the prevalence and impact of PMS and PMDD in Japanese collegiate athletes, with a focus on athletic performance.

Methods

The study was carried out in accordance with the principles outlined in the Declaration of Helsinki. Our institutional review board at Kinki University approved the study.

The authors indicate no conflicts of interest.

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Study Population

A school-based cross-sectional survey was conducted in November 2012 using a sample of 232 Japanese female collegiate athletes at Kinki University in Osaka, the largest city in west Japan. All subjects belonged to authorized university clubs, which all have a high ranking in Japanese university sport. All subjects were undergoing intensive training. We recruited female collegiate athletes who had regular menstrual cycles (22–35 days) and were able to provide informed consent. No one in these subjects had a prior diagnosis of psychological disorder.

Questionnaire

We used the Premenstrual Symptoms Questionnaire (PSQ), which was developed in our previous study,¹⁵ to screen for premenstrual symptoms. The PSQ translates DSM-IV criteria into a rating scale with degrees of severity described in Japanese and is essentially identical to the Premenstrual Symptoms Screening Tool.¹⁶ The PSQ asked, “Within the last 3 months have you experienced the following premenstrual symptoms starting during the week before menses and remitting a few days after the onset of menses?” The premenstrual symptoms listed on the PSQ are “Depressed mood,” “Anxiety or tension,” “Tearful,” “Anger or irritability,” “Decreased interest in work, home or social activities,” “Difficulty concentrating,” “Fatigue or lack of energy,” “Overeating or food cravings,” “Insomnia or hypersomnia,” “Feeling overwhelmed,” and “Physical symptoms such as tender breasts, feeling of bloating, headache, joint or muscle pain, weight gain.” The PSQ also asked whether such premenstrual symptoms interfered with “Work efficiency or productivity, home responsibilities,” “Social life activities” or “Relationships with coworkers or family.” The PSQ asked the athletes to rate the severity of premenstrual symptoms as “not at all,” “mild,” “moderate” or “severe.” We divided athletes with premenstrual symptoms into 3 groups: “PMDD,” “moderate to severe PMS,” and “no/mild PMS” according to the criteria reported previously.^{15,16} In addition to the PSQ, we asked whether such premenstrual symptoms interfered with “Athletic performance in training or competition.” This additional question also asked the athletes to rate the severity as “not at all,” “mild,” “moderate” or “severe.” We further collected additional information about their age, type of sports, participation in national or international competition, regular player or not, coffee-drinking habit, craving for salty food, craving for sweet food, and severity of dysmenorrhea. Athletes were grouped into 6 groups: ball games, track, swimming, fighting sports, archery, and other sports. The other sports group consisted of yacht racing, triathlon, and equestrian sports. We asked the athletes about their severity of pain during menses with the categories of “not at all,” “mild,” “moderate,” and “severe.”

Statistical Analyses

Statistical analysis was performed using JMP 10.0.2 (SAS, Cary, NC). Data are expressed as the means \pm S.D. Statistical significance was set at $P < .05$.

Table 1

Characteristics of Study Participants (N = 174)

Characteristics	n (%)			
Type of sports				
Ball games	44 (25.3)			
Track	12 (6.9)			
Swimming	20 (11.5)			
Fighting sports	59 (33.9)			
Archery	20 (11.5)			
Others	19 (10.9)			
Participation in national or international competition	93 (53.4)			
Regular players	81 (46.6)			
Elite athletes	116 (66.7)			
Craving for salty food	96 (55.2)			
Craving for sweet food	144 (82.8)			
Coffee-drinking habit	69 (39.7)			
Dysmenorrhea	Not at all	Mild	Moderate	Severe
	22 (12.6)	62 (35.6)	64 (36.8)	26 (14.9)

Results

A total of 212 female athletes completed the questionnaire. Thirty-eight were excluded from the analysis because of incomplete data; therefore, we analyzed the data of 174 athletes aged 18 to 23 (average 20.2 ± 1.12 (SD)).

Characteristics of the study sample are presented in Table 1. Considering that half of the subjects participate in national or international competitions, all of these clubs have a high ranking in Japanese university sport. We further divided the group of “elite athletes” into those who

Table 2

Prevalence of Premenstrual Symptoms and Interference With Work, Usual activities, or Relationships With Degrees of Severity (N = 174)

Symptoms	Not at all	Mild	Moderate	Severe
Premenstrual symptoms				
Depressed mood, n (%)	81 (46.6)	51 (29.3)	37 (21.3)	5 (2.9)
Anxiety or tension, n (%)	35 (20.1)	64 (36.8)	60 (34.5)	15 (8.6)
Tearful, n (%)	90 (51.7)	45 (25.9)	28 (16.1)	11 (6.3)
Anger or irritability, n (%)	46 (26.4)	70 (40.2)	44 (25.3)	14 (8.0)
Decreased interest in work, home, or social activities, n (%)	91 (52.3)	60 (34.5)	18 (10.3)	5 (2.9)
Difficulty concentrating, n (%)	69 (39.7)	70 (40.2)	32 (18.4)	3 (1.7)
Fatigue or lack of energy, n (%)	49 (28.2)	75 (43.1)	39 (22.4)	11 (6.3)
Overeating or food cravings, n (%)	48 (27.6)	59 (33.9)	46 (26.4)	21 (12.1)
Insomnia or hypersomnia, n (%)	79 (45.4)	52 (29.9)	30 (17.2)	13 (7.5)
Feeling overwhelmed, n (%)	119 (68.4)	36 (20.7)	10 (5.7)	9 (5.2)
Physical symptoms, n (%)	50 (28.7)	67 (38.5)	44 (25.3)	13 (7.5)
Interference with work, usual activities, or relationships				
Work efficiency or productivity, home responsibilities, n (%)	90 (51.7)	60 (34.5)	22 (12.6)	2 (1.1)
Social activities, n (%)	141 (81.0)	22 (12.6)	7 (4.0)	4 (2.3)
Relationships with coworkers or family, n (%)	124 (71.3)	40 (23.0)	8 (4.6)	2 (1.1)
Athletic performance in training or competition, n (%)	97 (55.7)	55 (31.6)	14 (8.0)	8 (4.6)

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