Original Study

Menstrual Cycle and the Prevalence of Premenstrual Syndrome/ Premenstrual Dysphoric Disorder in Adolescent Athletes

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A B S T R A C T

Study Objective: The purpose of this study was to assess the menstrual cycle, menstrual disorders and premenstrual syndrome/premenstrual dysphoric disorder (PMS/PMDD) in girls and young women participating in competitive sports. The impact of PMS/PMDD symptoms on the quality of life was also analyzed.
Design: The prospective study encompassed 125 girls and young women with the aim to determine the presence of menstrual disorders and the prevalence of PMS/PMDD.
Participants: The studied group was composed of 75 female athletes aged 16 to 22 years. The control group included 50 healthy girls and young women who did not practice competitive sports.
Setting: The studied athletes and the controls prospectively evaluated their 2 consecutive menstrual cycles by using a questionnaire.
Interventions: The research tools were a purpose-built questionnaire, a daily log of PMS symptoms according to the American College of Obstetricians and Gynecologists' guidelines, and a daily log of PMDD symptoms based on the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition,* diagnostic criteria.
Main Outcome Measures: To determine the impact of competitive sports on the menstrual cycle, menstrual disorders, and the prevalence of PMS/PMDD in girls and young women.
Results: Intensive physical exercise delayed menarche. PMDD was diagnosed in 8% and PMS in 42.4% of all respondents. The prevalence of PMDD did not differ significantly between the groups (9.33% versus 6.00%). PMS was significantly more frequent among athletes than among controls (49.33% versus 32%, $P = .045$). The prevalence of PMS correlated significantly with mean age ($P = .00001$) and age at menarche ($P = .03$) in athletes. PMS was more frequent in older athletes and in girls with older age at menarche.
Conclusion: Competitive sports, older mean age, older age at menarche, length of sporting career, and intensity of training are conducive to PMS. The prevalence of PMS increases with the duration and intensification of competitive exercises.
Key Words: Adolescent athlete, Menstrual cycle, Premenstrual syndrome, Premenstrual dysphoric disorder

Introduction

With the increase in the number of women participating in increasingly varied sport disciplines, the health-related consequences of sports activities have been questioned. Studies on the impact of physical exercise on female athletes unanimously emphasize the presence of menstrual cycle disorders in a considerable percentage of women practicing various sport disciplines. To date, most research into the prevalence of menorrhagia and secondary amenorrhea has focused on long-distance runners, marathon runners, gymnasts, swimmers, and ballet dancers. Depending on the author, sports discipline, and sports level, the reported prevalence of menstrual irregularities in athletes is between 6% and 79%.[1]

Much research has been conducted to assess the prevalence of premenstrual disorders and to confirm the occurrence of premenstrual syndrome (PMS) in cross-sectional studies and selected clinical cases. The prevalence of PMS and premenstrual dysphoric disorder (PMDD) may differ significantly depending on the diagnostic method (prospective/retrospective) and the diagnostic criteria. Epidemiologic studies suggest that 3% to 8% of women of reproductive age meet PMDD criteria.[2,3] In addition, research shows that 15% to 20% of women meet risk criteria for PMDD or PMS susceptibility. Irritability remains the most frequent and common symptom of PMS. The number and intensity of emotional PMS symptoms decrease with age and with the use of oral hormonal contraceptives. PMS symptoms also correlate positively with individual susceptibility and Latino origins or white race.[2,3]

Aim of the Current Work

The aim of this research project was to assess the menstrual cycle, menstrual disorders, and PMS/PMDD in girls and young women practicing competitive sports. The impact of PMS/PMDD symptoms on the quality of life of female athletes was also analyzed.

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Materials and Methods

Study Population

The prospective study encompassed a population of 125 girls and young women aged 16 to 22 years. The studied group was composed of 75 girls and young women who participated in competitive sports. The study inclusion criteria were informed consent for study participation; menstruation for at least 2 years; absence of systemic diseases, including endocrinologic disorders; and absence of depressive, anxiety, or personality disorders.

The athletes (middle- and long-distance runners) were recruited to the study from sports clubs and sports schools. Their endurance was trained with the use of 2 methods (continuous and intermittent), the intensity of exercise was light or moderate and the exercise duration varied.

The practice of competitive sports was understood as a membership in a sports club, participation in championships, an elevated intensity of training depending on the discipline (a minimum of 4 training sessions of 2 hours per week), presence of the competitive aspect, and preparation for competitions.

The control group was composed of 50 healthy girls and young women who did not practice competitive sports. The subjects were recruited randomly from the regional state secondary schools and universities. The inclusion criteria were the same as for the athletes. All the participants regularly attended obligatory physical education classes scheduled at school/university.

Study participation was entirely voluntary. Prior consent was obtained from all participants or, if underage, from their parents or legal custodians. The research program was approved by the Bioethical Commission of the Medical University of Silesia in Katowice, Poland.

Methods

The research tool was a questionnaire designed to provide the general characteristics of the group: sociodemographic features, family history, course of the menstrual cycle, obstetric and gynecologic history, gynecologic diseases, the practiced sports discipline, training duration and intensity, lifestyle, diet, use of stimulants, present health, use of medications, and the presence of PMS and PMDD symptoms. Additionally, the participants were asked to complete a daily log of PMS symptoms. The log was designed according to the recommendations of the American College of Obstetricians and Gynecologists (ACOG) following the diagnostic criteria for PMS according to the tenth revision of the *International Classification of Diseases* (ICD-10).

To generalize and confirm the presence of various types of PMS and PMDD, the Premenstrual Symptoms Screening Tool (PSST) was used. The tool confirmed the earlier absence of PMS and PMDD in women without clinical signs in both groups. The PSST differentiated PMS and PMDD into mild, moderate, and severe.[4–6]

PMS Diagnostic Criteria

According to ACOG and the ICD-10, PMS is diagnosed in the presence of at least 1 of the following emotional and physical symptoms: breast swelling and tenderness, fatigue, bloating, lack of energy, appetite changes, sleep problems, headache, impulsivity, mood lability, depressed mood, anxiety, agitation, social friction, feeling of "loss of control," decreased concentration, and irritability. The symptom(s) must be present during the 5 days before menstruation in each of 2 consecutive menstrual cycles (prospective) and must be relieved within 4 days from the onset of menses, with no recurrence of the symptoms until at least day 13 of the cycle. The symptoms must be present before the preovulation phase, in the absence of pharmacologic therapy, hormone ingestion, or drug or alcohol abuse combined with socioeconomic impairment or dysfunction.[2,4,5]

PMDD Diagnostic Criteria

According to the American Psychiatric Association criteria in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV), PMDD is diagnosed if 5 or more of the following symptoms are present: depressed mood or dysphoria, anxiety or tension, affective lability, irritability, decreased interest in usual activities, concentration difficulties, marked lack of energy, marked change in appetite, overeating or food cravings, hypersomnia or insomnia, feeling overwhelmed, and other physical symptoms such as breast tenderness or bloating. Additionally, the symptoms must include at least 1 of the following: depressed mood or dysphoria, anxiety or tension, affective lability, or irritability. The symptoms must occur during the week before menstruation and remit a few days after the onset of menses, be absent in the week post menses, impair functioning at work or school, and impair usual activities or relationships, and cannot merely be an exacerbation of another disorder. These symptoms must be confirmed by the patients' prospective daily ratings of symptoms for 2 menstrual cycles. PMDD is confirmed if during the week before menstruation at least 1 of the 4 core symptoms (depressed mood, anxiety or tension, affective lability, anger or irritability) is reported as severe and at least 4 additional symptoms (for a total of 5) are reported as moderate to severe and are absent in the week post menses.[5,6]

Statistical Analysis

The obtained results were analyzed statistically with the use of Statistica 9.0 computer software. Descriptive statistics were used to describe the general characteristics of the studied population. The results were compared by using the Mann–Whitney *U* test and the Kruskal–Wallis test. Classification was assessed with use of the 2-tailed Fisher's exact test, χ^2 test with Yates' correction, and logistic regression analysis. The value of $P < .05$ was considered statistically significant.