

# Psychological situations of Turkish female athletes in premenstrual period

## Authors' Contribution:

- A** Study Design
- B** Data Collection
- C** Statistical Analysis
- D** Manuscript Preparation
- E** Funds Collection

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## Abstract

### Background & Study Aim:

In the last 20 years female participation in sports increased due the passage of particular act. According to this law the discrimination against female athletes in sports was relatively decreased. Aim of this study was the menstrual situations of Turkish female team athletes and individual athletes in premenstrual syndrome period.

### Material & Methods:

After a New Scale for Premenstrual Syndrome was conducted to the sample of the study, some significant results were gained. The menstrual situations of individual female athletes who deal with wrestling, judo, and taekwondo branches were assessed. In this study team athletes were 120 females and individual athletes were 146 females in total 266 females. The survey was conducted to these athletes. Frequency distributions were noticed according to gathered data for two or more variables and chi square and independent sample t test were applied to some of the items. Significance level was set at 5%.

### Results:

It is seen that depressive affectivity, anxiety, exhaustion, anger, pain, appetite changes and timidity which are the conditions of premenstrual syndrome differed in a significant way in team athletes than in individual athletes. There is significant difference between the branches and the effect of participation to competition to performance in menstrual period.

### Conclusions:

The responsibility of competitive in team sports was shared by all team athletes. In individual sports, athletes must cope with psychological and physical stresses of competitive by herself. Therefore, the findings of this study suggest that individual athletes maybe confronted with the psychological stresses during match and training.

### Key words:

menstrual cycle • team sport • individual sports • emotional symptoms • physical and psychological stresses

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## BACKGROUND

From a gynaecologic perspective, the most significant has been disruption of the normal menstrual cycle, manifesting as delayed puberty, oligomenorrhea, and amenorrhea. In 1980, this menstrual dysfunction in female athletes was associated with eating disorders and weight suppression [1,2]. In 1992, the concept of Female Athlete Triad was introduced to describe these three interrelated problems of amenorrhea, disordered eating, and osteoporosis seen in female athletes. In addition to menstrual

disturbances, challenges faced by the female athlete include performance considerations when choosing contraception, and sport-related breast injury and irritation. This article reviews and updates the gynaecologic problems encountered in young female athletes [3].

That physical, cognitive, affective, and behavioural symptoms occur cyclically during the luteal phase of the menstrual cycle is defined as premenstrual syndrome (PMS). These symptoms revolve quickly at within a few days of the onset of menstruation [4]. The normal menstrual

cycle produces low serum levels of estrogen and progesterone in the early follicular phase: (day 1–6), estrogen is elevated in the late follicular phase: (day 7–14), and progesterone is elevated during the luteal phase: (day 15–28) while estrogen remains elevated and slowly returns to baseline levels [5,6]. Many unique parameters of medical care in female athletes relate to the menstrual cycle. The American College of Obstetrics and Gynaecology (ACOG) published the diagnostic ten criteria for PMS. It was considered if at least one of the 6 affective and one of the 4 somatic symptoms was reported five days prior to the onset of menses in the three prior menstrual cycles and ceased within 4 days of onset of menses [9]. Menstrual-related disorders, including amenorrhea, oligomenorrhea, delayed menarche, luteal phase deficiency, and anovulation, are often associated with intense training, low body weight, low body fat, poor nutrition, decreased caloric intake, an immature hypothalamic-pituitary-gonadal/adrenal axis, and elevated levels of circulating glucocorticoids from stress and exercise. In addition, leptin, a hormone made by the fat cell, is postulated to be the link between body fat percentages or nutritional status and menstrual cycle irregularity, via feedback mechanisms on the hypothalamus [8,9]. Irregular menses and anovulation more frequently occur in athletes (up to 60%) compared with non-athletes [10] with the percentage of those affected being sport dependent. Irregular menses are reported in up to 20% of casual runners and 50% of elite runners and professional dancers [11].

One of the menstrual disorders is PMS. PMS is a cluster of physical and emotional symptoms which appear on a regular basis before the onset of menstrual bleeding. Symptoms include bloating, breast pain, ankle swelling, a sense of increase in body weight, irritability, and aggressiveness, depression, lethargy, and food cravings. Although the true prevalence of PMS is unknown, approximately 75% of women complain of some premenstrual symptoms [12]. Criteria for the diagnosis of PMS have recently been developed, and when these criteria are used, 3% to 8% of women are diagnosed as having PMS [13,14]. Women with severe symptoms report that PMS interferes with their daily functioning, be it in personal, social, or activities. To elucidate underlying factors contributing to this syndrome, numerous studies have been conducted. Because many of the observed symptoms appear to be centrally mediated, neuroendocrine links have been sought. However, no specific abnormality or defect has yet been identified. In an effort to develop effective treatment approaches, investigators have also examined the influence of various socioeconomic and lifestyle factors. Behavioural and social factors have included use of medications, smoking, alcohol and caffeine intake, dietary patterns, oral contraceptive use, affective state, marital status, and education [12,13,15,16].

The energy and nutrient balance is one of the important environmental factors associated with menstrual dysfunction in the female athlete

Many athletes become highly concerned with their body composition and follow strict dieting and intense training, which often leads to negative caloric balance and energy deficiency, compromising the energy availability for the reproductive system's function [17,18]. In addition to this situation, it is argued that PMS researches intensify on subjects, who are about medical point of view, female athletes are relatively less than mentioned area. For that reason this study will be a critical research in this field and it hoped to fill in a big gap about female athletes. This study aimed the psychological situations of Turkish female team athletes and individual athletes in PMS period.

## MATERIAL AND METHODS

### Subjects

The menstrual situations of individual female athletes who deal with basketball, volleyball, wrestling, judo, taekwondo branches were assessed. In this study team athletes were 120 (age:  $21.74 \pm 4.1$  years, height:  $163.2 \pm 6.2$  cm, body weight:  $64.3 \pm 7.1$  kg) and individual athletes were 146 (age:  $21.22 \pm 3.1$  years, height:  $164.1 \pm 5.3$  cm, body weight:  $65.1 \pm 6.3$  kg) in total 266. The survey was conducted to subjects during the National Champions of Turkish in 2008. All subjects competed in the National Championships of Turkey which Turkish athletes at national and international levels participate.

### Gathering and analysing of the data

The demographic information and menstrual conditions of the athletes were gathered by a 35 item survey. In order to determine the PMS conditions 44 item and 5 degree Likert type survey was conducted. Frequency distributions were noticed according to gathered data for two or more variables and chi square and independent sample t test were applied to some of the items. Significance level was set at 5%. SPSS 16.0 statistical package programme was used in order to evaluate the findings.

### Data collection instruments

In this study, a new scale for PMS was used [19]. The aim of this questionnaire is validity, reliability and factor structure of a new Scale for PMS that measures premenstrual symptoms. In the preparation of the items of the scale, a test of 44 items and a scale of five likert type were developed taking DSM-III and DSMIV-R as the base. Validity of the test similar scale was application

**Table 1.** The subjects' physical characteristics (Mean  $\pm$ SD).

	Age (years)	Height (cm)	Weight (kg)	Experience in sport (years)
Team athletes (n=120)	21.74 $\pm$ 4.1	163.2 $\pm$ 6.2	64.3 $\pm$ 7.1	9.8 $\pm$ 4.1
Individual athletes (n=146)	21.22 $\pm$ 3.1	164.1 $\pm$ 5.3	65.1 $\pm$ 6.3	11.2 $\pm$ 5.7

**Table 2.** Comparison of branches and the effect of participation to competition to performance in menstrual period.

Branches		The effect of participation to competition to performance in menstrual period			Total
		Positive	Negative	No Effect	
Team	N	38	40	42	120
	%	31.7%	33.3%	35.0%	100.0%
Individual	N	17	58	71	146
	%	11.6%	39.7%	48.6%	100.0%
Total	N	55	98	113	266
	%	20.7%	36.8%	42.5%	100.0%

$\chi^2=16.38$ ;  $sd=2$ ;  $P=0.00$ .

**Table 3.** Comparison of branches and medication for premenstrual problems.

Branches		Medication for premenstrual problems		Total
		Yes	No	
Team	N	41	79	120
	%	34.2%	65.8%	100.0%
Individual	N	32	114	146
	%	21.9%	78.1%	100.0%
Total	N	73	193	266
	%	27.4%	72.6%	100.0%

$\chi^2=4.96$ ;  $sd=1$ ;  $P=0.02$ .

together with Premenstrual Assessment Form (PAF). Reliability of the test was evaluated test-re test method. Premenstrual Assessment Form and similar scale reliability correlation was 0.71, one-month interval test-retest correlation was 0.87, item-total score correlation was 0.35–0.78 ( $p<0.01$ ), and Cronbach's Alfa Coefficients was 0.75. In factor analysis, 9 factors were determined to explain that the variance was 71%. Significant differences were determined among three clusters with K-Means Cluster analysis ( $p<0.01$ ).

## RESULTS

As it is presented in Table 1 120 of the team athletes' average age is 21.74, their height is 163.2 cm, their weight is 64.3 kg and their experience in sport is 9.8 in average whereas 146 of the individual athletes' average age is 21.22, their height is 163.2 cm, their weight

is 65.1 kg and their experience in sport is 11.2 years in average.

When Table 2 is examined the effect of participation to competition to performance in menstrual period has mostly no effect for team athletes with 35% while positive effect is 31.7% and negative effect is 33.3%. By the way the effect of participation to competition to performance in menstrual period has mostly no effect for individual athletes with 42.5% while positive effect is 20.7% and negative effect is 36.8%.

When branches examined in medication for premenstrual problems; 65.8% of team athletes said no while 34.2% of them said yes for medication during this period. Again branches were examined and the results are as follows in Table 3; 78.1% of team athletes said no while 21.9% of them said yes for medication during this period.

**Table 4.** Comparison of branches medication for menstrual problems.

Branches		Branches medication for menstrual problems		Total
		Yes	No	
Team	N	53	67	120
	%	44.2%	55.8%	100.0%
Individual	N	46	100	146
	%	31.5%	68.5%	100.0%
Total	N	99	167	266
	%	37.2%	62.8%	100.0%

$\chi^2=4.51$ ;  $sd=1$ ;  $P=0.03$ .

**Table 5.** Comparison of branches and willingness for competition in menstrual period.

Branches		Willingness for competition in menstrual period		Total
		Not negative	Increasing performance	
Team	N	25	32	57
	%	43.9%	56.1%	100.0%
Individual	N	27	14	41
	%	65.9%	34.1%	100.0%
Total	N	52	46	98
	%	53.1%	46.9%	100.0%

$\chi^2=4.63$ ;  $sd=1$ ;  $P=0.03$ .

**Table 6.** Comparison of branches and unwillingness for competition in menstrual period.

Branches		Unwillingness for Competition in Menstrual Period				Total
		Negative	Pain	Fear for appearance	Decrease in Performance	
Team	N	51	9	–	3	62
	%	81.05	14.3%	–	4.8%	100.0%
Individual	N	79	7	9	10	105
	%	75.2%	6.7%	8.6%	9.5%	100.0%
Total	N	130	16	9	13	168
	%	77.4%	9.5%	5.4%	7.7%	100.0%

$\chi^2=9.12$ ;  $sd=3$ ;  $P=0.02$ .

When branches examined in medication for premenstrual problems; 55.8% of team athletes said no while 44.2% of them said yes for medication during this period. Again branches were examined and the results are as follows in Table 4; 31.5% of team athletes said yes while 68.5% of them said no for medication during this period.

there is no negative effect while 56.1% of them think that there is an increase in performance. Again branches were examined and the results are as follows in Table 5; 65.9% of individual athletes think that no negative effect while 34.1% of them think that there is an increase in performance during this period.

When branches examined in willingness for competition in menstrual period; 43.9% of team athletes think that

When branches examined in unwillingness for competition in menstrual period; 81.05% of team athletes think

that there is negative effect while 14.3% of them think that there is pain; also 4.8% of them think that there is a decrease in performance. Again branches were examined and the results are as follows in Table 6; 75.2% of team athletes think that there is negative effect while 6.7% of them think that there is pain and 8.6% of them fear from appearance; also 9.5% of them think that there is a decrease in performance during mentioned period.

## DISCUSSION

This research is one of the unique studies in the subject manner. In other words there are rare studies with this theme and topic. For that reason there are few studies to make comparison with this study. Although there is a shortage of literature about premenstrual period of athletes, there are some studies about this topic.

Physical attributes may be related with genetic tendencies to menstrual dysfunction and a delay in menarche [20]. It is often difficult to separate the environmental influences from the genetic: both should be considered in evaluating the female athlete. Amenorrhoeic athletes tend to have a later age of menarche than athletes with regular cycles. Many factors are thought to be involved in the menstrual delay – including low body weight or body fat, high levels of physical training, genetic predisposition, dieting behaviour, stress and the amount of training prior to the first period. There are compelling reasons to believe that a combination of hereditary and environmental factors may be involved in the development of delayed menarche [21].

When Table 2 is observed the negative effect of participation to competition to performance in menstrual period is higher with 39.7% for individual athletes whereas the negative effect is higher with 31.7% for team athletes. There is significant difference between the branches and the effect of participation to competition to performance in menstrual period ( $p < 0.01$ ). As it is seen in Table 3, levels of using medication for premenstrual problems in team athletes are higher than in individual athletes and this difference is significant ( $p > 0.05$ ). The medication levels for menstrual problems are higher in individual athletes and this difference is significant statistically ( $p > 0.05$ ) (see Table 4).

Moreover, the effects of regular exercise on PMS have been examined [22–24]. Finally, the relevance of various biological factors, such as age, anthropometric characteristics, and reproductive and menstrual history, has been evaluated [25]. Despite the wealth of studies, the etiology of PMS remains elusive. Of the many studies conducted to date, only a few have been population based [14] and most have used primarily white samples

derived from women attending a university or seeking treatment for PMS at health clinics [26].

In Table 5, there is significant difference between branches and willingness for competition in menstrual period ( $p < 0.05$ ). The increase in performance is 56.1% in team athletes at menstrual period competition and individual athletes affect in a positive way with 65.9%. Team athletes affect negative (81%) and have pain (14.3%) and the decrease in performance is 9.5% for individual athletes. There is significant difference between branches and unwillingness for competition in menstrual period ( $p < 0.05$ ) (see Table 6).

Various bio-social and psychological causes have been proposed as the cause of the syndrome, including abnormal serotonin function, presence of progesterone, altered endorphin modulation of gonadotropin secretion, exercise habits, smoking, use of alcohol, altered transcapillary fluid balance and a diet rich in beef or caffeine containing beverages [27]. Severe PMS was associated with more premenstrual symptoms, impairment of daily activities and psychological distress symptoms. Older student age, rural residence, earlier age of menarche, regular cycles and positive family history could be considered as predictors for PMS [28].

## CONCLUSIONS

Typically, menstrual cycle phase does not influence motor performance including strength [29,30] and muscle fatigability [29]. Ballet dancing, long distance running and gymnastics, which require thin bodies for better performance and aesthetic appearance, report a much higher incidence of menstrual irregularities and delayed menarche compared with the non-weight bearing sports, where leanness is not emphasized. The prevalence of menstrual irregularities varies greatly in various studies due to methodological differences between the populations studied in terms of age, athletic discipline, level of activity and performance and training prior to menarche [21].

As a result, the responsibility of competitive in team sports was shared by all team athletes. In individual sports, athletes must cope with psychological and physical stresses of competitive by herself. Therefore, the findings of this study suggest that individual athletes may be confronted with the psychological stresses during match and training. In this research the individual sports were chosen as; judo, wrestling and taekwondo according to their weight categories. The necessity of making a particular weight in these sports can cause more psychological stress for athletes. In follow-up studies female athletes can be observed whether the weight is crucial or not.

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