

## PREVALENCE OF PREMENSTRUAL SYNDROME AMONG WOMEN OF CHILD-BEARING AGE WITH REGULAR MENSTRUAL CYCLE

The study on prevalence of premenstrual syndrome (PMS) with various severities was conducted in a cohort of fertile female residents of Tashkent aged from 18 to 30. Clinical and medical history data on psycho-emotional and physical PMS symptoms was put into a specially developed card-questionnaire. Severity of symptoms was determined by total score to fill in a PMS symptom scale on the basis of the examinees' self-observation. The associations of PMS with social-demographic factors, such as, level of education, employment status, sexual satisfaction and stress index were analyzed.

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### Introduction

Premenstrual syndrome (PMS) is a collection of symptoms characterized with various psycho-emotional, autonomic-vascular and metabolic-endocrine disorders leading to reduction in a woman's working efficiency, having an impact on the whole sphere of communications in professional and personal life and creating by that conditions for neuropsychic maladjustment of women (Aganezova and Linde, 2008; Obeidat et al., 2012; Pinar et al., 2011). PMS severe forms causing temporary incapacitation are reported in 3% to 10% of child-bearing women, mild ones being found in 95% (Domoney et al., 2003; Steiner, 2000).

Analysis of data on PMS demonstrates its non-uniform prevalence in various regions. Thus, according to Obeidat et al. (2003) in a total of 177 female students of one Jordanian university aged between 18 and 24 years 91.5% had two or more PMS symptoms among which fatigue (72.9%), mood swings (72.3%), anxiety (68.9%), abdominal bloating (68.9%) and depression (58.8%) were the most prevalent symptoms. A cross-sectional study in a sample of 250 undergraduate nursing student volunteers in Ankara (Turkey) (mean age  $19.89 \pm 1.43$  years) showed PMS symptoms in 36.4% of the girls (Guvenc et al., 2012). In other study PMS symptoms were registered in 72.1% of college students in Turkey (Pinar et al., 2011). Prevalence of PMS symptoms was 8.75% (95%CI: 6.43-11.07) among school students in Sri Lanka (Chandraratne and Gunawardena, 2011), 76.39% in Polish female adolescents (Drosdzol et al., 2011) and 80.2% in Jordanian women (Hamaideh et al., 2013).

In Uzbekistan PMS prevalence has never been studied. Only within the period from August 1 to September 2005 in the frames of United Nations Population Fund (UNFPA) grant "Reproductive health" pilot study was conducted in Andijan and Namangan regions of Uzbekistan. Among 1629 women of child-bearing age PMS symptoms were registered in 1039 (63.8%), 525 of 802 (65.5%) urban and 514 of 827 (62.2%) rural residents noting PMS symptoms (Khaydarova et al., 2008).

Our work was initiated to study PMS prevalence in women of child-bearing age with regular menstrual cycle in Tashkent.

### Materials and methods

The study was conducted in a cohort of fertile female residents of Tashkent. Age of 18-40 years, regular menstrual cycle and presence of PMS symptoms were the inclusion criteria.

Pregnancy, body mass index  $\geq 30$  kg/m<sup>2</sup>, diabetes mellitus, arterial hypertension (blood pressure  $> 140/90$  mm Hg), severe cardio-vascular disorders, liver and kidney disease, estrogen-dependent tumors, hemorrhage from reproductive tracts of unclear etiology, malignancy, both current and in medical history, mental disorders, current therapy with psychoactive drugs or diuretics, hormonal therapy within 3 months prior to study and premenstrual dysphoric disorder were the exclusion criteria.

Clinical and medical history data was put into a specially developed card-questionnaire. The patients were asked to score themselves on PMS symptoms they observed during previous 2 menstrual cycles to fill in a PMS symptom scale on the basis of the examinees' self-observation. Severity of symptoms was determined by total score (from 0 to 3 points for a symptom), thus, the total score ranges from 4 to 21 points and from 22 to 51 points indicated mild and moderate PMS, respectively, severe PMS being diagnosed with the total score of  $\geq 52$  points.

PMS was diagnosed by presence of five or more symptoms below, one of first four in the list was indispensable: 1) emotional lability, 2) manic depression, 3) anxiety and tension, 4) mood deterioration, desperation, 5) lack of interest in daily life, 6) undue fatigability, weakness, 7) trouble concentrating, 8) food cravings, susceptibility to bulimia, 9) somnolence or insomnia, 10) physical symptoms including breast tenderness, headaches, swellings, weight gain, myalgia, arthralgia (New PMS guidelines, 2000; Steiner M. 2000).

All data was processed by means of a Microsoft Excel, STATISTICA 6 and BIOSTAT software packet. Logistic regression was used to calculate odds ratio (OR) and 95% confidence interval (CI). Statistical significance of differences between parameters was assessed by means of non-parametric  $\chi^2$  test (Pearson's criterion). Quantitative parameters are presented as  $M \pm m$  as well as Median (*Me*) and 25th and 75th percentiles as Inter Quartile Range (IQR). Intergroup differences were considered significant at  $p < 0.05$ .

## Results and discussion

In total 1976 women were enquired, 572 of them being selected in accordance with inclusion criteria, 16 questionnaires were discarded. Thus, PMS symptoms were registered in 556 women (mean age  $27.6 \pm 0.24$  years, *Me* 27.0 years, IQR 23.0-32.0). Mild PMS ( $15.8 \pm 0.14$  points in the average, *Me* 16.0; IQR 14.0-18.0) was found in 400 examinees (81.8%). Moderate ( $36.5 \pm 1.05$  points in the average, *Me* 37.0; IQR 29.0-43.0) and severe ( $60.4 \pm 1.09$  points in the average, *Me* 59.0; IQR 56.5-64.3) PMS forms were observed in 65 (13.3%) and 24 (4.9%) women, respectively.

There were 276 patients with PMS aged from 21 to 30 years (56.4%), 146 (29.8%) women being older than 30 years of age. The mild PMS was found more frequently in the age group of 21-30 years (61.5% versus 38.5% OR 1.60; 95%CI 1.20-2.12;  $P < 0.0001$ ), while moderate PMS was registered in persons over 21 (92.3% versus 7.7%, OR 12.0; 95%CI 3.30-43.6;  $P < 0.0001$ ). As to women with severe PMS, most of them (70.8% versus 29.2%, OR 5.90; 95%CI 1.70-20.5;  $P = 0.009$ ) were over 30. Thus, severity of PMS symptoms can be seen intensifying with age.

As it can be seen from literature, depression (57.9% - 92.0%), breast tenderness (75.0%-84.2%), emotional lability 65.7%-83%), aggression (59%-88.0%), food cravings (52.5%-72.0%) as well as fatigue (72.0%), mood swings (72.3%) and anxiety (68.9%) are the most frequently occurring PMS symptoms (Kuznetsova and Sumyatina, 2004; Lekareva, 2007; Yakovleva and Loskutova, 2009; Obeidat et al., 2012). In our study PMS was found to be accompanied with undue fatigability and weakness (82.3%), emotional lability (79.1%), breast tenderness (74.2%), mood swings (64.4%) as well as disorders of appetite (58.7%) and sleep (53.8%).

In 333 (68.1%) our examinees PMS symptom severity was found progressing with time, duration of so-called symptom periods increasing, while 156 (31.9%) women noted no changes in PMS symptom severity for quite a long time. In women aged from 18 to 30

PMS symptoms tended to disappeared by the 1st -2nd day of menstrual cycle ( $1.41 \pm 0.03$  day in the average), whereas in in examinees older than 30 years of age the symptoms eliminated by the 4th-5th day ( $4.14 \pm 0.05$  day in the average) appearing 4-5 days earlier than in younger women.

No confident difference in menarche age, menstrual cycle length and number of menstruation days by PMS severity was found. All women had regular menstrual cycle of  $28.0 \pm 0.10$  days (*Me* 28.0 days; IQR 27.0-29.0). As analysis of psychological symptomatology demonstrated, women with mild PMS confidently more frequently complained of physical symptoms than of the psycho-emotional ones (26.8% versus 11.3%, OR 2.92; 95%CI 1.99-4.28;  $P < 0.0001$ ) (Table 1).

TABLE 1. PREVALENCE OF SYMPTOMS BY PMS SEVERITY

Symptoms		Mild	Moderate	P	Severe	P
Anger/irritability	%	18.8	30		41.7	
	OR (95%CI)*		1.93 (1.07-3.45)	0.04	3.1 (1.32-7.24)	0.01
	OR (95%CI)**				1.61 (0.61-4.23)	
Anxiety/tension	%	9.3	15.4		70.8	
	OR (95%CI)*		1.78 (0.84-3.79)	0.19	23.8 (9.28-61.2)	<0.0001
	OR (95%CI)**				13.4 (4.41-40.5)	<0.0001
Tearfulness or mood swings	%	18.3	29.2		41.7	
	OR (95%CI)*		1.85 (1.02-3.34)	0.06	3.2 (1.37-7.49)	0.01
	OR (95%CI)**				1.73 (0.65-4.57)	0.39
Depression	%	10	16.9		70.8	
	OR (95%CI)*		1.83 (0.89-3.79)	0.15	21.9 (8.55-55.9)	<0.0001
	OR (95%CI)**				11.9 (4.0-35.6)	<0.0001
Trouble concentrating	%	4.5	12.3		83.3	
	OR (95%CI)*		2.98 (1.24-7.17)	0.02	106(32.8-342.9)	<0.0001
	OR (95%CI)**				35.6(9.67-131.2)	<0.0001
Fatigue	%	16.3	33.8		41.7	
	OR (95%CI)*		2.64 (1.48-4.70)	0.001	3.68 (1.57-8.65)	0.004
	OR (95%CI)**				1.4 (0.53-3.65)	0.66
Food cravings	%	12.8	20		58.3	
	OR (95%CI)*		1.71 (0.87-3.36)	0.17	9.58 (4.04-22.7)	<0.0001
	OR (95%CI)**				5.6 (2.03-15.4)	0.001
Insomnia/somnolence	%	9.3	15.4		75	
	OR (95%CI)*		1.78 (0.84-3.79)	0.19	29.4 (11.0-78.7)	<0.0001
	OR (95%CI)**				16.5 (5.26-51.8)	<0.0001
Aggression	%	3	7.7		87.5	
	OR (95%CI)*		2.69 (0.92-7.93)	0.13	226.3(59.3-863.7)	<0.0001
	OR (95%CI)**				84 (18.5-382.2)	<0.0001
Physical symptoms: mastalgia, migraine, myalgia, swellings, abdominal bloating, weight gain	%	26.8	27.7		25	
	OR (95%CI)*		1.05 (0.58-1.89)	0.99	0.91 (0.35-2.36)	0.96
	OR (95%CI)**				0.87 (0.30-2.54)	0.99

Note: \* - in relation to mild PMS group, \*\* - in relation to moderate PMS group.

The symptoms included mastalgia (71.0%), headaches (64.5%), abdominal bloating (57.9%) and swellings (44.9%). In the groups of our examinees with moderate and severe PMS proportions of physical symptoms (27.7%) and psycho-emotional ones (20.0%,  $P=0.41$ ) were approximately equal. Women with moderate PMS mentioned some symptoms more frequently than the patients with mild form of the disorder, to name irritability (30.7% versus 18.8%, OR 1.93; 95%CI 1.07-3.45;  $P=0.04$ ), trouble concentrating (12.3% versus 4.5%, OR 2.98; 95%CI 1.24-7.17;  $P=0.02$ ), fatigue (33.8% versus 16.3%, OR 2.64; 95%CI 1.48-4.70;  $P=0.04$ ). In women with severe PMS psycho-

emotional symptoms were registered more frequently than the physical ones (62.5% versus 25.0%, OR 5.0; 95%CI 1.45-17.3; P=0.02), the psycho-emotional component being observed in these patients more frequently than in examinees with mild and moderate PMS.

Social-demographic factors, such as, level of education, employment status as well as sexual satisfaction is known to be by no means unimportant for PMS progression.

#### *PMS and level of education*

Among our examinees with PMS fewer women were university or college students (29.2%, OR 0.17; 95%CI 0.13-0.23; P<0.0001), most of them (59%) having secondary-level education. When assessing association of PMS with the level of education we found out secondary-level education in women with mild PMS (58.5%, OR 1.99; 95%CI 1.50-2.63; P<0.0001) and moderate PMS (63.1%, OR 2.92; 95%CI 1.43-2.63; P<0.0001) more frequently. Severe PMS was more common in women with incomplete and complete higher education (83.3%, OR 25.0; 95%CI 5.48-114.1; P<0.0001). As compared with examinees with moderate PMS (OR 6.67; 95%CI 2.39-18.6; P< 0.0001), patients with severe PMS form had higher education more frequently (OR 5.14; 95%CI 2.14-12.4; P<0.0001).

#### *PMS and employment status*

In a clinical prospective randomized multi-center open study among 196 women with PMS symptoms aged from 18 to 45 there were 67.42% white-collar workers, 59.28% of women experienced high emotional tension, 37.14% of women had overtime exempt work schedule, 32.14% were unsatisfied with their occupational status, 17.85% being university or college students and 17.14% leading employees (Basova and Volkov, 2011). According to Lekareva (2007), most patients (81.0%) with PMS were non-manual workers as well. Most women in our cohort worked (65.6% versus 3.4%, OR 3.65; 95%CI 2.80-4.75; P<0.0001). As to type of employment, there were 43.1% and 22.5% women working on a full-time and part-time basis, respectively. Analysis of PMS form dependence on type of employment demonstrated that patients with mild PMS (48.0%) occupied full-time position more frequently than those with the moderate form of disorder (23.1, OR 3.08; 95%CI 1.67-5.66; P=0.0003) and with the severe one (16.7%, OR 4.62; 95%CI 1.55-13.8; P=0.005).

Analysis of PMS form dependence on professional experience demonstrated that in the group of mild PMS there was greater number of manual workers than non-manual ones (46.3% versus 37.3% OR 1.45; 95%CI 1.09-1.92; P=0.01), whereas in the group with severe PMS white-collar women were more frequent than the blue-collar ones (75.0% versus 16.7% OR 15.0; 95%CI 3.64-61.8; P=0.0002). In the group with moderate PMS there was approximately equal number of white- and blue-collar workers (41.5% versus 43.1% OR 0.94; 95%CI 0.47-1.88; P=0.99).

#### *PMS and sexual satisfaction*

According to Nowosielski et al. (2010) in examinees with PMS sexual satisfaction level is lower than in women without PMS symptoms (77.73% versus 88.66%; P=0.001), sexual disorders occurring more frequently (28.65% versus 15.24%; P=0.001). When in our study PMS prevalence was considered by sexual satisfaction level it turned out that among the examinees there were more, though insignificantly, sexually unsatisfied women (50.5% versus 49.5%, OR 1.04; 95%CI 0.81-1.34; P=0.80). More patients with mild PMS scored themselves as sexually satisfied (54.3% versus 45.7%, OR 1.41; 95%CI 1.06-1.86; P=0.02) whereas among patients with moderate (OR 5.06; 95%CI 2.40-10.7; P<0.0001) and severe (OR 14.4; 95%CI 3.59-58.2; P<0.0001) PMS forms there were significantly more sexually unsatisfied women.

*PMS and atmosphere of home*

According to Lekareva (2007), 44.0% of fertile women indicate negative family microclimate as underlying premenstrual somatic and/or psycho-emotional symptoms. 275 (56.6%) of our examinees scored atmosphere of home as the satisfactory one. Analysis of home microclimate by PMS form severity showed that fewer women were satisfied with atmosphere of home both in the group of women with moderate PMS (OR 0.29; 95%CI 0.17-0.52;  $P < 0.0001$ ) and in the one with severe PMS (OR 0.19; 95%CI 0.07-0.51;  $P < 0.0001$ ).

*PMS and stress index*

As to stress index in examinees with PMS, it was found low in 229 (46.8%), medium in 240 (49.1%) and high in 20 (4.1%). Women with mild PMS had low stress index insignificantly more frequently than women with the moderate one (52.5% versus 47.5% OR 1.22; 95%CI 0.93-1.61;  $P = 0.18$ ) with mean total score of  $12.8 \pm 0.26$ . In patients with moderate PMS medium stress index was found more frequently than the low one (66.2% versus 21.5%, OR 7.12; 95%CI 3.25-15.6;  $P < 0.0001$ ) and the high one (66.2% versus 12.3%, OR 13.9; 95%CI 3.66-34.3;  $P < 0.001$ ), whereas in women with severe PMS high stress index was more common than the low one (66.7% versus 12.5% OR 14.0; 95%CI 3.19-61.4;  $P < 0.0001$ ) and medium one (66.7% versus 20.8%, OR 7.60; 95%CI 2.07-27.9;  $P < 0.0001$ ). Total score for stress index upon moderate PMS was  $17.1 \pm 0.41$ , that is, significantly higher than the one upon mild PMS ( $12.8 \pm 0.26$ ). Mean total score for stress index upon severe PMS was  $22.4 \pm 0.79$ , that is, significantly higher than total scores for stress indices upon mild and moderate PMS forms. Analysis of stress index showed that in group of patients with mild PMS there were more women with low index stress than the number of women in group with moderate PMS (52.5% versus 21.5% OR 4.03; 95%CI 2.16-7.51;  $P < 0.0001$ ) and in group with severe PMS (52.5% versus 12.5% OR 7.74; 95%CI 2.27-26.4;  $P = 0.0003$ ). As compared with the group of patients with moderate PMS, greater number of women with high stress index can be seen in the group of examinees with severe PMS (66.7% versus 12.3% OR 14.3; 95%CI 4.62-43.9;  $P < 0.0001$ ).

**Conclusion**

Among the examinees there were 56.4% women with PMS aged from 21 to 30 years, but most patients (70.8%) with severe form of the disorder were older than 30 years. The proportion of psycho-emotional symptoms (20.0%) is found increasing upon moderate PMS, while frequency of physical symptoms is insignificantly higher (27.7%) than the one upon mild PMS (26.8%). Severe PMS is accompanied with considerable increase in proportion of psycho-emotional symptoms (62.5% versus 11.3% upon mild and 20.0% upon moderate forms of PMS, respectively). Mild PMS was more frequently registered in manual workers (46.3%), whereas the severe form was found more typical of white-collar women (70.0%). Significantly greater proportion of women with severe PMS (66.7%) was found to have higher stress index.

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