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A Research Article

MENSTRUAL CYCLE RELATION WITH ANXIETY AND OTHER PSYCHOLOGICAL SYMPTOMS IN WOMEN

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Abstract:

Background: The menstrual cycle in women is characterized by high variability in cycle length with variable associated physiological and psychological changes along different phases. The premenstrual period was associated with a rise in negative psychological symptoms like anxiety, depression and fatigue. Mood and behavioral changes such as irritability, stress, mood fluctuations, exhaustion, and food cravings are all signs of premenstrual syndrome (PMS) that occur within a few days of menstruation during the luteal process. **Objective:** The main objective of this study is to highlight the role of menstrual cycle phase in anxiety among Saudi women. **Methods:** A community based cross-sectional study was conducted in different regions of Saudi Arabia from the period of 1 September to 30 November 2020. Data was compiled and analyzed using statistical package for the social sciences (SPSS, version 16) and results were analyzed with frequencies and Chi-squared test as appropriate. P value was considered significant if <0.05 . **Results:** 56.4% of women suffer from anxiety before or during menstruation. 70.6% of women reported anxiety before menstruation, 27.8% during menstruation and only 16% after menstruation. 42.1% reported anxiety every month, 46.6% reported prevention of menses due to anxiety and 23.7% reported that anxiety affects duration of menses. 47.3% feel depressed before menstruation, 14% have panic attacks during menses and 38.4% reported sleeping disturbance during menstruation. **Conclusion:** Anxiety and stress adversely affects the menstrual cycle. There was a significant correlation between anxiety and duration of the menstrual cycle, severity of bleeding and menstruation prevention. Health professionals should facilitate good self-care to increase the quality of life of women of reproductive age.

Key Words: menstrual cycle and anxiety, anxiety effect on menstruation, menstruation irregularity and its association with anxiety

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INTRODUCTION:

The menstrual cycle in women is characterized by high variability in cycle length with variable associated physiological and psychological changes along different phases [1]. In most women, the average cycle is (26-35 days), a 5-day menstrual period, a fertile period from 5 days before ovulation, and low fertility depending on the duration and age of the cycle [2]. Anxiety is among the most prevalent psychiatric disorders in the general population [3].

Hormone variations associated with some stages of the menstrual cycle have been linked with rise in the prevalence or symptoms of a variety of neurological illnesses and conditions [4]. Ovarian hormonal changes occurring in the premenstrual phase of the menstrual cycle may constitute a neuromodulatory effect that contributes to the development and maintenance of a maladaptive or pathological disorder [5].

The premenstrual period was associated with a rise in negative psychological symptoms like anxiety, depression and fatigue. Mood and behavioral changes such as irritability, stress, mood fluctuations, exhaustion, and food cravings are all signs of premenstrual syndrome (PMS) that occur within a few days of menstruation during the luteal process [6]. PMS accounts for up to 75% of females at reproductive years. At least one premenstrual symptom is regularly identified by approximately 80 % of women during their menstruation. Estimates of cumulative comorbidity between PMS and other mood disturbances vary from 30% to 70% [7].

Nearly 10% of women with PMS experience premenstrual dysphoric disorder (PMDD) which is a very severe form of PMS. PMDD causes severe irritability, depression, or anxiety in the week or two before bleeding days. There are pathophysiological and psychobiological links between PMDD and PD reported in previous studies. Changes in hormones levels during premenstrual period are likely involved in the manifestation of PMS and PMDD [8]. Similar prevalence of PMDD during PMS was reported in the United States, Canada, Europe, India, Nigeria, and Japan (nearly 10%) [9- 15].

The significance of serotonin for mood regulation and the probable role of serotonin in sex-steroid-driven behavior modulation indicate that serotonin may be involved in PMS pathophysiology [16]. The inhibitory amino acid GABA is another neurotransmitter that has been related to PMS. In addition, much of the work involving GABA in PMS pathophysiology is based on the premise that

premenstrual complaints are due to the removal of progesterone, a hypothesis that has been questioned [17].

Latthe et al. in his systematic review reported that women with pelvic pain had more psychological disorders like depression, anxiety, neuroticism, and somatization than pain-free controls. He also found that women with dysmenorrhea had 2.77 times more chance of experiencing anxiety [18].

The potential correlation between primary dysmenorrhea and depression / anxiety was seen in another recent systematic analysis by Bajalan et al., but only the data about the relationship between mental health attributes and primary dysmenorrhea was investigated [19].

Objective of the study:

The main objective of this study is to highlight the role of menstrual cycle phase in anxiety among Saudi women

PARTICIPANTS AND METHODS:

Study design and duration: A cross-sectional study was conducted in different regions of Kingdom of Saudi Arabia. The study was conducted during the period of 1 September to 30 November 2020.

Data collection: Data was collected using a pre-designed online questionnaire targeting all Saudi women and girls in reproductive age. The questionnaire was self-administered by women participating in study after reading a brief introduction or explanation of the idea of the research and its objective. The questionnaire included relevant questions to collect data about socio-demographic characteristics of the women and girls participating as age, educational level, marital status and region of residence. There were also questions about age of starting menarche, if the patient has menstrual problems, PMS or PMDD symptoms. Questions to measure anxiety at different times of cycle and its relation to pelvic pain and other menstrual symptoms were assessed.

Statistical analysis:

Collected data was coded and analyzed using statistical package for the social sciences (SPSS, version 15). Descriptive statistics for the prevalence and quantitative variables were used. Relation between anxiety and menstrual disturbance was determined using the chi-square test. P-value of less than 0.05 was considered statistically significant.

Ethical considerations:

This study was reviewed and approved from King Fahad Medical City in Riyadh. Participants will be informed that participation is completely voluntary and data collectors introduced and explained the research to participants. No names were recorded on the questionnaires and all questionnaires kept safe.

RESULTS:

Table (1) shows that; 43.5% of participating females aged between 15- 24 years old and 22.7% between 25- 34 years old. 44.2% of them were married and 50.8% were single. 80.3% went to university. 21.5% were house wives, 43.1% were students and 35.4% were employees. 55.1% live in the eastern region of Saudi Arabia.

According to table (2); 56.4% of women suffer from anxiety before or during menstruation. 70.6% of women reported anxiety before menstruation, 27.8% during menstruation and only 16% after

menstruation. 42.1% reported anxiety every month, 46.6% reported prevention of menses due to anxiety and 23.7% reported that anxiety affects duration of menses.

Table (3) shows that; 47.3% feel depressed before menstruation, 14% have panic attacks during menses and 38.4% reported sleeping disturbance during menstruation. Only 10.3% use medications to relieve menstrual anxiety while 58.3% use herbal drinks for the same purpose. Regarding signs of anxiety before menstruation; 58.7% reported mood swings, 45.7% breast swelling, 63.8% feel annoyed, 52.5% reported exhaustion and 31% reported avoidance of social relations.

Table (5) shows that; there was a significant correlation between anxiety and duration of the menstrual cycle, severity of bleeding and menstruation prevention ($P < 0.05$).

Table (1): Sociodemographic characteristics of the studied population (N=1914)

	Frequency	Percent
age:		
15 -24	833	43.5
25-34	435	22.7
35- 44	363	19.0
45 or more	283	14.8
age period started:		
10 or less	55	2.9
10-12	757	39.6
13-15	983	51.4
16-18	110	5.7
18 or more	9	.5
marital status:		
widow	34	1.8
Single	973	50.8
Married	846	44.2
Separate	61	3.2
The standard of living:		
Weak	33	1.7
good	402	21.0
very good	933	48.7

Excellent	546	28.5
educational level:		
uneducated	7	.4
primary	9	.5
Intermediate	29	1.5
Secondary	332	17.3
University	1537	80.3
working status:		
House wife	411	21.5
student	825	43.1
employee	678	35.4
place of residence in the Kingdom:		
Southern Region	44	2.3
Eastern Region	1055	55.1
The northern Region	126	6.6
Western Region	108	5.6
Central Region	581	30.4

Table (2): prevalence, characteristics of anxiety and its effect on menses (N=1914)

	Frequency	Percent
Anxiety before or at the time of the menses		
Yes	1079	56.4
No	189	9.9
Sometimes	560	29.3
Rarely	86	4.5
If anxiety occur every month at the date of the menstrual cycle		
Yes	805	42.1
No	364	19.0
Sometimes	650	34.0
Rarely	95	5.0
Prevention of menses due to anxiety		
yes	892	46.6
No	1022	53.4
If anxiety affect duration of menses		
Yes	454	23.7
No	902	47.1
Sometimes	558	29.2

Concerns about anxiety and mood swings		
Yes	1129	58.9
No	785	41.1
Practical performance affected due to anxiety		
Yes	811	42.4
No	339	17.7
Sometimes	741	38.7
Never	23	1.2
If anxiety during menses coincide with time of the pain before the menses		
Yes	847	44.3
No	438	22.9
Sometimes	599	31.3
Never	30	1.6
When anxiety occur		
After your period	30	1.6
Before your period	1351	70.6
Time of your period	533	27.8
Evaluation of severity of anxiety		
severe	383	20.0
moderate	1135	59.3
mild	396	20.7
Severity of anxiety during two weeks before menses		
yes	595	31.1
No	586	30.6
Sometimes	733	38.3
Anxiety in first bleeding day;		
It decreases on the first day	1146	59.9
Fixed even after the first day	768	40.1
If anxiety affect the severity of bleeding		
yes	425	22.2
No	715	37.4
Sometimes	654	34.2
Rarely	120	6.3
If anxiety during menstruation increases with age		
yes	482	25.2
No	942	49.2
Sometimes	395	20.6
Rarely	95	5.0

Table (3): Other psychological signs and symptoms during menstrual cycle

	Frequency	Percent
Feeling of depression before menses		
yes	905	47.3
No	454	23.7
Sometimes	555	29.0
Panic attacks during menses		
yes	268	14.0
No	1341	70.1
Sometimes	305	15.9
Sleeping disturbance during menses		
yes	735	38.4
No	607	31.7
Sometimes	572	29.9
Family members suffer from anxiety before or during menses		
yes	665	34.7
No	382	20.0
I do not know	867	45.3
Presence of glandular disease		
yes	173	9.0
No	1741	91.0
Use of medications to relieve anxiety		
yes	197	10.3
No	1553	81.1
Sometimes	164	8.6
Use of herbal drinks and alternative medicine to alleviate pain and anxiety associated with menstruation		
yes	1116	58.3
No	798	41.7
Signs of stress before menstruation		
Mood swings	1125	58.7
Breast swelling	876	45.7
Annoyed	1222	63.8
Exhaustion	1005	52.5
Avoidance of social relations	594	31.0
Despair	371	19.3
Suicidal tendencies	86	4.4
Others	223	11.6

Table-4

		Anxiety				Total (N=1914)	P value
		Yes	No	Sometimes	Rarely		
Age	15-24	465	84	241	43	833	0.001
		43.1%	44.4%	43.0%	50.0%	43.5%	
	25-34	281	42	102	10	435	
		26.0%	22.2%	18.2%	11.6%	22.7%	
	35-44	200	30	118	15	363	
		18.5%	15.9%	21.1%	17.4%	19.0%	
45 or more	133	33	99	18	283		
	12.3%	17.5%	17.7%	20.9%	14.8%		
Social status	Married	484	65	266	31	846	0.019
		44.9%	34.4%	47.5%	36.0%	44.2%	
	Single	539	113	271	50	973	
		50.0%	59.8%	48.4%	58.1%	50.8%	
	widow	15	6	12	1	34	
		1.4%	3.2%	2.1%	1.2%	1.8%	
Separate	41	5	11	4	61		
	3.8%	2.6%	2.0%	4.7%	3.2%		
Menstruation prevention due to anxiety	Yes	543	67	249	33	892	0.0001
		50.3%	35.4%	44.5%	38.4%	46.6%	
	No	536	122	311	53	1022	
		49.7%	64.6%	55.5%	61.6%	53.4%	
Duration of the menstrual cycle	Yes	292	36	113	13	454	0.0001
		27.1%	19.0%	20.2%	15.1%	23.7%	
	No	472	118	260	52	902	
		43.7%	62.4%	46.4%	60.5%	47.1%	
	Someti mes	315	35	187	21	558	
		29.2%	18.5%	33.4%	24.4%	29.2%	
Negative practical performance	Yes	587	37	173	14	811	.00001
		54.4%	19.6%	30.9%	16.3%	42.4%	
	No	95	88	123	33	339	
		8.8%	46.6%	22.0%	38.4%	17.7%	
	Someti mes	390	62	254	35	741	
		36.1%	32.8%	45.4%	40.7%	38.7%	
Never	7	2	10	4	23		

		0.6%	1.1%	1.8%	4.7%	1.2%	
Severity of bleeding	Yes	262	29	119	15	425	.0001
		24.3%	15.3%	21.3%	17.4%	22.2%	
	No	396	90	195	34	715	
		36.7%	47.6%	34.8%	39.5%	37.4%	
	Someti mes	368	58	203	25	654	
		34.1%	30.7%	36.3%	29.1%	34.2%	
Rarely	53	12	43	12	120		
	4.9%	6.3%	7.7%	14.0%	6.3%		
Family history of anxiety or tension before or at the time of the menstrual period	Yes	468	33	140	24	665	.0001
		43.4%	17.5%	25.0%	27.9%	34.7%	
	No	164	91	109	18	382	
		15.2%	48.1%	19.5%	20.9%	20.0%	
	I Don't know	447	65	311	44	867	
		41.4%	34.4%	55.5%	51.2%	45.3%	

DISCUSSION:

Anxiety is one of the most common psychiatric disorders. Acne, constipation, diarrhea, fatigue, fluid retention, headaches, insomnia, increased sex drive, joint or muscle pain anxiety, bursts of energy, sweet or salty food cravings, feeling of loss of control, irritability, poor concentration, and tension are the most commonly reported menstrual signs [20]. Altered exposure to gonadal hormonal variations, such as loss of estrogen or progesterone in the late luteal phase and during the menstrual cycle, may lead to premenstrual symptoms in susceptible women [21]. Studies have not shown association between anxiety symptoms and estrogen or progesterone levels [22]. Women with PMDD have biological markers of anxiety vulnerability [23] and cognitive anxiety sensitivity [24].

Our study was conducted to highlight the role of menstrual cycle phase in anxiety among Saudi women. According to our findings; 56.4% of women suffer from anxiety before or during menstruation. 70.6% of women reported anxiety before menstruation, 27.8% during menstruation and only 16% after menstruation. A previous study showed that a high percentage of the participants suffer from psychological disorders despite the menstruation signs in pre-menstruation, during bleeding, and post-menstruation periods (the highest prevalence of signs was for during bleeding period (94%) and the lowest was for post-menstruation period (40.8%)). There was a significant association between menstruation signs and anxiety [25]. Unlike our findings; Balaha's cross-sectional study of 250 medical students in

Saudi Arabia found no significant association between premenstrual symptoms and anxiety, depression, and stress [26].

McLeod et al reported severe anxiety symptoms in patients with PMS [27]. Another study in Assiut city in Egypt reported that, students with mild menstruation symptoms reported more depression (20 per cent) than anxiety and stress (13.8 % and 10.7 %, respectively). Students with slight menstruation symptoms were more nervous (17.3%) than depression and stress (12.5%, 10.7 %, respectively) [28]. This was in accordance with Mohamadirizi and Kordi who reported high percentage of students suffering from psychological disorders despite pre-menstrual menstrual pain [29].

Van Veen et al. demonstrated the premenstrual exacerbation of anxiety symptoms among women with social anxiety disorder [30]. Derman's study reported the prevalence of pre-menstruation signs including anxiety as 61.4% in Turkey [31] while Vichin reported the prevalence of pre-menstruation signs as 59% among 13-18-year-old students in the USA [32]. Kim and colleagues reported current prevalence anxiety rate among women with PMDD 4–38% for Generalized Anxiety Disorder [33]. Gajapriya et al. demonstrated that stress plays an important role on menstrual cycle which causes negative impacts on menstrual cycle among the teenage girls [34].

There are some evidence that psychosocial stressors as socioeconomic status, marital status, stressful life events, and perceived stress are related to PMDD

[23]. A prospective study of women with different levels of premenstrual signs, global perceived stress, averaged across the 5 days before menses, predicted premenstrual symptoms. Furthermore, premenstrual symptoms also predicted perceived stress suggesting a common relationship between stress and premenstrual signs [35]. Many studies concluded that changes in the incidence of PMS symptoms were strongly and substantially associated with increases in stress scores, as well as participants indicating that PMS symptoms were aggravated by stress [36- 38].

Regarding influence of anxiety on menstrual cycle regularity and severity of bleeding, according to our study there was a significant correlation between anxiety and duration of the menstrual cycle, severity of bleeding and menstruation prevention. Previous study reported statistical significance difference between level of severity of distress before during and after menstruation $p < 0.000$. There was a significant correlation between menstrual distress before, during and after menstruation and depression, anxiety and stress at $p=0.000$ [28]. Also, Mohamadirizi and Kordi, [29] and Ionelli, [39] showed a positive correlation between premenstruation signs and depression, anxiety, and stress disorders. Nillni *et al.* reported that women with depressive symptoms had an 80% greater prevalence of cycle irregularity than women without these symptoms; it also reiterated the prevalence of cycle irregularity with high levels of perceived stress [40]. This agreed with Schlep *et al.* who reported that high levels of stress affect various hormone levels, leading to a significant impact on menstrual cycle parameters, including ovulatory function [41].

CONCLUSION:

Anxiety and stress adversely affects the menstrual cycle. There was a significant correlation between anxiety and duration of the menstrual cycle, severity of bleeding and menstruation prevention. Stress mitigation and the use of prescription coping strategies can reduce the incidence of morbidity due to the negative effect of stress on menstruation. Health professionals should facilitate good self-care to increase the quality of life of women of reproductive age.

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