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Study on The Prevalence of Pre Menstrual Syndrome and Its Relationship With Age at Menarche, Anthropometric Measure and Anemia

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***Abstract*:-Background : Menstrual cycle is the cycle of changes that occurs in the uterus and ovary for the purpose of sexual reproduction.1,2 Premenstrual symptoms are defined as one or more types of physical, physiological or emotional changes before the starting of menstrual cycles.**
Objectives: The objectives of the present study were to find the prevalence and severity of premenstrual symptoms in the selected sample of staff and students of Hail university in Saudi Arabia, and its correlation with BMI and different parameters of the menstrual cycle.
Methodology: Survey was carried out on a sample of 206 female students and staff of Hail university using a pretested and modified questionnaire. The questionnaire included questions related to the menstrual cycle, anthropometric measures, and the prevalence of PMS and dysmenorrheal. Hemoglobin estimation was done to know the presence of anemia. Analysis was done using SPSS-17.0 software.
Results: The present study shows mean age at menarche as 12.94±1.61 years. Majority of the subjects (96.1%) reported any 2 or more premenstrual symptoms. Prevalence of dysmenorrhea was found to be 90.3%. This could be attributed to the high prevalence rate of obesity, however the BMI was not significantly correlated to Premenstrual symptoms (PMS). On the other hand correlation between PMS and percent body fat was statistically significant.
Conclusion: Both PMS and dysmenorrhea as well as obesity was found to be highly prevalent in the present study. Therefore it could be concluded that there is a need of intervention and health education programs for the overall health promotion to the effected population. Further studies need to be done on large scale to find out the cause of this high prevalence rate.
Key word : Premenstrual symptoms, menarche, Anthropometry, anemia, Hemoglobin

I. INTRODUCTION

Menstruation is a natural process which takes place in woman's body every month. Before explaining the Premenstrual symptoms, it seems ap- propriate to discuss, in short, that why does this take place?

God has created the woman such that she plays the major role in the perpetuation of the human race. The primary reproductive organs of a woman are her ovaries. When a girl is born, her ovaries already con- tain about 400,000 immature eggs (which are known as ova). At puberty, the eggs start maturing, usually one ovum each month. The maturing of the ovum takes place roughly halfway between two menstrual cycles. After maturing, it finds its way from the ovary to the fallopian tube and ends up in the womb. Meanwhile the womb (while preparing for the possi- ble arrival of a fertilized egg) develops a thick, soft, velvety lining which is made up mostly of blood vessels.3

This thick, soft lining in the womb is called endometrium. If an egg is fertilized, it will be embedded in endometrium and continues its growth. But if no egg is fer- tilized, the endometrium (i.e. the lining of the womb) is no longer needed and is shed or discarded. This process of discarding the endometrium is known as menstruation.3

From this biological explanation it is clear that menstruation is neither "the curse" on woman nor a result of the so-called original sin of Eve. Rather it is a very normal biological process that ensures the perpetuation of the human race.3

In humans, the length of a menstrual cycle varies greatly among women (ranging from 21 to 35 days), with 28 days designated as the average length.4 Each cycle can be divided into three phases based on events in the ovary (ovarian cycle) or in the uterus (uterine cycle).1 The ovarian cycle consists of the follicular phase, ovulation, and luteal phase whereas the uterine cycle is divided into menstruation, proliferative phase, and secretory phase. Both cycles are controlled by the endocrine system and the normal hormonal changes that occur can be interfered with using hormonal contraception to prevent reproduction.5

In the menstrual cycle, changes occur in the female reproductive system as well as other systems (which lead to breast tenderness or mood changes, for example). A woman's first menstruation is termed menarche, and occurs typically around age 12-13. The end of a woman's reproductive phase is called the menopause, which commonly occurs somewhere between the ages of 45 and 55. The different phases of the menstrual cycle correlate with women's moods. In some cases, hormones released during the menstrual cycle can cause behavioral changes in females; mild to severe mood swings can occur.6

Premenstrual syndrome, commonly called PMS, is a medical condition that has symptoms that affect many women of childbearing age. PMS can cause a variety of physical and psychological symptoms that occur just before your menstrual period. The American College of Obstetrics and Gynecology defines PMS as "The cyclic occurrence of symptoms that are sufficiently severe to interfere with some aspects of life, and that appear with consistent and predictable relationship to the menses [menstrual period]."7

While most women of child-bearing age (up to 85%) report having experienced physical symptoms related to normal ovulatory function, such as bloating or breast tenderness, medical definitions of PMS are limited to a consistent pattern of emotional and physical symptoms occurring only during the luteal phase of the menstrual cycle that are of "sufficient severity to interfere with some aspects of life".8

The three key elements of the diagnosis are symptoms consistent with PMS, consistent occurrence of symptoms only during the luteal phase of the menstrual cycle, and negative impact of symptoms on function and lifestyle.9

II. MATERIALS AND METHODS

A. Research setting and subjects

A cross sectional study was conducted in Hail university , KSA, in the college of Applied Medical sciences with an objective to know the prevalence and severity of Pre Menstrual Symptoms among the students, teaching as well as non teaching staff. The study was carried out during academic session 2013 - 14. Subjects were randomly selected from all the classes and departments.

B. Research tools

A pre-tested questionnaire was used for the purpose of data collection. The questionnaire was piloted on a small sample of students (20 students) prior to sample collection. It was modified according to the results of pilot study. Final questionnaire was given to a total of 220 subjects of which 206 completed questionnaires were analyzed after correction of errors. General information was collected from each participant which included age, height, weight, BMI, marital status and the number of children. Hemoglobin estimation was done using hemometer. Weight, BMI and other in body measurements were done using In-Body 720 (Bio space, Korea). Other part of the questionnaire included questions related to the history of menarche, pattern of menstrual cycle like duration of bleeding, length of menstrual cycle, amount of blood flow and the presence and severity of dysmenorrhea and the presence of Pre Menstrual symptoms.

Pre menstrual symptoms are a group of physical as well as emotional symptoms that start 7-14 days prior to the menstrual cycle and subsides as soon as the periods start. The present study included a variety of symptoms like, nervousness, depression and crying, bloated feeling of the stomach and breasts, backache and generalized body ache, headache, nausea, and sometimes diarrhea. The symptoms may vary from person to person or from cycle to cycle.

The data was coded and entered in the computer for analysis using the SPSS 17.0 Software package. The data was analyzed using descriptive statistics, chi square, students 't' test and correlation analysis. The results were analyzed at 0.05 level of significance.

III. RESULTS

Out of 220 questionnaires, 206 completed responses were analyzed for results. Table 1 shows the frequency and percentages of the study variables.

Table 1- Background, gynecological and anthropometric characteristics of the study population

Characteristics		Number	Percentage
Marital status	Married	**26**	**12.6**
	Unmarried	**180**	**87.4**
Menarche	Early	**40**	**19.4**
	Normal	**90**	**43.7**
	Late	**76**	**36.9**
Anemia	Present	**40**	**19.4**
	Absent	**166**	**80.6**
BMI	Underweight	**14**	**6.8**
	Normal	**96**	**46.6**
	Overweight	**60**	**29.1**
	Obese I	**24**	**11.7**
	Obese II	**12**	**5.8**
parity	0	**194**	**94.2**
	>Or = 1	**12**	**5.8**
Length of menstrual cycle	<25 days	**148**	**71.8**
	25-30 days	**48**	**23.3**
	>30 days	**10**	**4.9**
Duration of bleeding	< 7 days	**164**	**76.6**
	7-10 days	**38**	**18.4**
	>10 days	**4**	**1.9**
Menstrual flow	Minimal	**16**	**7.8**
	Moderate	**160**	**77.7**
	Heavy	**30**	**14.6**
PMS	Yes	**198**	**96.1**
	No	**8**	**3.8**
Dysmenorrhea	No	**20**	**9.7**
	Mild	**50**	**24.3**
	Moderate	**80**	**38.8**
	Heavy	**56**	**27.2**
Total body protein	Normal	**82**	**39.8**
	Deficient	**124**	**60.2**
Total body minerals	Normal	**142**	**68.9**
	Deficient	**64**	**31.1**

Table 1 shows that the majority (87.4%) of the subjects were unmarried, only 12.6% were married. Among the married participants only 5.8% had 1 or 2 children. In the present study, mean age at menarche was found to be 12.94±1.61 years, with the maximum number of girls attaining menarche at the age of 13 years. However 36.9% of the participants attained menarche after the age of 13.5 years (late matures). Anemia was found in 19.4% of the participants.

On assessing the BMI of the study population, it was found that only 46.6% of the subjects were having normal BMI, 29.1% were overweight and 17.5% were having obesity of either I or II degree. On analyzing the in body measurements it was found that only 39.8% of the girls had normal level of body protein and 60.2 % were deficient. On the other hand 68.9% of the subjects had normal levels of minerals in the body, and 31.1% were having deficiency of minerals.

Analysis of the menstrual history revealed that only 23.3 % of the subjects had the normal length of menstrual cycle ranging from 25 – 30 days. 79.6 % of the subjects had the duration of bleeding less than 7 Days. 18.4 % had 7 – 10 days of menstrual bleeding, and 1.9 % of the participants were found with dysfunctional uterine bleeding (i.e. more than 10 days).

77.2% girls had moderate menstrual flow, 7.8% girls had minimal whereas 14.6% girls had heavy flow during their menstrual periods. 9.7% of the girls reported no pain during their periods (dysmenorrhea) , 24.3% had mild pain, 38.8% had moderate pain and 27.2 % girls reported severe degree of pain during their menstrual cycle which disturbed their daily activities. On analyzing the prevalence of premenstrual symptoms , it was found that 96.1% of the subjects reported two or more symptoms before the onset of their menstrual periods regularly. Just 3.4% girls said they have no premenstrual symptoms.

Table 2 presents the prevalence of the most commonly occurring premenstrual symptoms. The most commonly occurring symptom was found to be back and generalized body ache (118) followed by nervous tension (76), depression and crying (70) and irritability (68). Pain in stomach had the prevalence rate of 36. Least commonly occurring symptoms were identified as dizziness (16), palpitation (14) and diarrhea (14).

Table 2 - The prevalence of Commonly occurring Premenstrual symptoms according to marital status

Premenstrual symptoms	**Marital status**		**Total**
	Married	**Un married**	
Irritability	**4**	**64**	**68**
Nervous tension	**10**	**66**	**76**
Headache	**8**	**28**	**36**
Dizziness	**4**	**12**	**16**
Palpitation	**2**	**12**	**14**
Depression/crying	**2**	**68**	**70**
Bloated stomach	**6**	**30**	**36**
Pain in breasts	**8**	**54**	**62**
Back and generalized body ache	**10**	**108**	**118**
Diarrhea	**4**	**10**	**14**

Table 3 shows the correlation between BMI and the prevalence of PMSs, however the chi -square test shows that the correlation between the two was statistically insignificant.

Table 3 - Correlation of BMI and Prevalence of PMS

BMI	**PMS**				**Total**
	Not present	**mild**	**moderate**	**severe**	
Underweight	0	8	6	0	14
Normal	2	20	62	12	96
Overweight	4	8	38	10	60
Obese I	0	6	12	6	24
Obese II	2	6	2	2	12
Total	8	48	120	30	206
	$\chi 2 = 15.7, P > 0.05$ (NS)				

Table 4 shows the correlation of the duration of bleeding in individual menstrual cycle with the prevalence of PMS and BMI. On applying chi square test the correlation was found to be significant (P=0.021 and 0.004 respectively)

Table 4 – Correlation of the duration of bleeding with PMS and BMI

variables	**Category**	**Duration of bleeding**			**Total**	**Correlation**
		≤ 7days	7-10 days	≥10 days		
PMS	No	4	2	2	8	$\chi 2 = 14.8$ P = 0.021 (S)
	Mild	34	12	2	48	
	Moderate	100	20	0	120	
	Severe	26	4	0	30	
	Total	164	38	4	206	
BMI	Underweight	14	0	0	14	$\chi 2 = 28.89$ P = 0.004 (S)
	Normal	80	16	0	96	
	Overweight	48	8	4	60	
	Obese I	20	4	0	24	
	Obese II	2	10	0	12	
	total	164	38	4	206	

Table 5 – Restrictions during the menstrual cycle

Restrictions	number	percentage
Religious rituals	32	15.5
Physical exercise	34	16.5
College absenteeism	24	11.6
House work	8	3.8
Family functions	4	1.9
No restrictions	96	46.6

Table 5 shows different types of restrictions which the subjects faced during their menstrual cycle. Around 11.6 % girls missed college due to PMSs of painful periods. 15.5% girls reported that they had restrictions from performing religious rituals, 16.5% from physical exercise, and 3.8% reported restrictions from house work. 1.9% girls told that they do not attend family functions during their periods. However a large group of the participants (46.6%) said that they do not have any restriction. Multiple regression analysis was done to find out the set of most confounding variables significantly correlated to PMS. Results show dysmenorrhea, duration of bleeding, Hemoglobin level and percent body fat as then most significantly correlated variables.

Table 6 – Multiple regression analysis for the most cofounding variables correlated to PMS

Model		R	R Square	ANOVA	Sig
1	Dysmenorrhea	.579	.336	59.593	.000
2	Dysmenorrhea ,Duration of bleeding	.607	.368	34.067	.000
3	Dysmenorrhea ,Duration of bleeding Hemoglobin level	.628	.394	25.116	.000
4	Dysmenorrhea ,Duration of bleeding Hemoglobin level Percent body fat	.649	.406	23.214	.004

Model		Un standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.580	.165		9.561	.000
	Dysmenorrhea	.440	.057	.579	7.720	.000
2	(Constant)	1.987	.232		8.574	.000
	Dysmenorrhea ,	.422	.056	.556	7.500	.000
	Duration of bleeding	-.292	.119	-.182	-2.452	.016
3	(Constant)	.829	.569		1.456	.148
	Dysmenorrhea ,	.419	.055	.551	7.552	.000
	Duration of bleeding	-.307	.117	-.191	-2.615	.010
	Hemoglobin level	.093	.042	.161	2.220	.028
4	(Constant)	37.899	5.550		6.828	.000
	Dysmenorrhea ,	.206	.040	.333	5.140	.000
	Duration of bleeding	.277	.054	.302	5.170	.000
	Hemoglobin level Percent	1.557	.625	.163	2.492	.013
	body fat	-.252	.126	-.116	-2.004	.046

Table 6 shows that for the group of variables predicting Premenstrual syndrome, dysmenorrhea was the single best proctor entered at the first step (R2 = 33.6% , P = 0.000), followed by duration of bleeding (step 2 R2 = 36.8%, P = 0.000), Hemoglobin level (step 3 R2 = 39.4%, P=0.000), and lastly Percent body fat (step 4 R2 = 40.6% P = 0.004).

Table 7 shows the correlation of mean percent of body fat to the total amount of protein and minerals in the body and the prevalence of PMS. The correlation was found to be highly significant for proteins and minerals and fairly significant for PMSs. The table clearly shows that as the prevalence increased from mild to severe the percent body fat also increased from 38.4% to 38.7% followed by 41.2% for the subjects having severe prevalence of PMS.

Table 7 – Correlation of mean percent body fat to total amount of protein, mineral and prevalence of PMS

Variables	Mean percent body fat			P value
		Mean	**S.D**	
Amount of protein	Normal	43.9	6.2	0.000***
	Deficient	36.0	7.6	
Amount of mineral	Normal	41.7	7.1	0.000***
	deficient	33.3	7.1	
PMS	Mild	38.4	9.8	0.04*
	Moderate	38.7	7.1	
	severe	41.2	8.8	

IV. DISCUSSION

Dysmenorrhea and the premenstrual symptom (PMSs) are the most common types of health problems among the reproductive age of females. The present study revealed a high percentage of both of these problems (90% and 96% respectively). There is lack of available literature regarding these aspects from a country like Saudi Arabia (especially Hail region) which suggest that these problems are still ignored and do not seek the attention of health workers.

Although the symptoms are not life threatening, the pain of dysmenorrhea and PMS can interrupt the life and daily activities of the woman. In the absence of appropriate pain relief measures , the woman may not be able to carry out the daily activities.10,11

The problem of absenteeism from school or work was also worth noted. The present study reported that about 12% of the students had symptoms which were severe enough for them to be absent from college. In several studies of young women, rates of absenteeism ranged from 34% to 50%. 12,13,14 Other studies showed that up to 40% of female students in their study reported that their ability to perform work was affected. 14,15,16 The most common of the various premenstrual symptoms reported from different studies were anxiety, irritability, feeling of depression, abdominal bloating, backache, breast tenderness, fatigue, forgetfulness and weight gain.12,17. These symptoms are similar to the symptoms reported in the present study.

Several studies are done in different parts of the world on dysmenorrhea and PMSs but it is not very clear that the symptoms remain constant or subside with age.18,19 However, age, is an important influencing variables.19,20 According to various other studies the characteristics of menstrual cycle, age, cognitive attributions, socio economical variables, number of children and life style variables have not been identified as influencing factors for PMS.21,22

The present study shows that the psychological problems were more common as compared to the physical ones except for generalized body pain. Study done by researchers in other parts of the world also found similar results, where psycho behavioral problems prior to menstruation were more prevalent in females.23,24

However, as a result of the different researches done in this area it is often suggested that life style modifications in the form yoga, meditation and exercises are helpful in management of mild symptoms along with dietary supplements in the form of calcium, vitamin B6 and soy isoflavones. Counseling the victims and relatives is more essential so that sufferers gain adequate care and attention and it also helps to overcome them with the sufferings.25, 26,27

V. CONCLUSION

The present study shows a high prevalence of PMSs which requires attention. The young college students are the future of the nation and their health is of prime importance. Reproductive health components should be introduced into school and college health education curriculum which will help the young students in getting information, education and support regarding reproductive health in general and menstrual problems especially dysmenorrhea and PMS in particular. Treatment methods should be easily available for girls as many girls feel shameful and reluctant to report dysmenorrhea and treat it as a part of normal menstrual cycle. As a result they do not seek medical advice. It should be one of the roles of health care providers in the respective institutions to ask about and screen for dysmenorrhoea and pre-menstrual syndrome and offer treatment if necessary. The health care providers along with the support of parents can help the young girls solve their problems in a better way.

VI. RECOMMENDATIONS

Health education and appropriate medical treatment should be provided to the effected females. Further extensive studies are recommended to precisely determine the prevalence of dysmenorrheal and PMS and factors contributing to it. Academic Privileges are recommended for the university students specially in the first year. Since in the present study it was concluded that mothers are the main source of information regarding menstrual cycle, they should also be involved in the general discussion of the various problems faced and how to deal with the same. This is a common health issue irrespective of age, literacy level and socioeconomic background , thus it is suggested that lifestyle modification and counseling is also a crucial part of intervention measures.

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