

To Evaluate the Effect of Perceived Stress on Menstrual Function

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ABSTRACT

Introduction: Menstrual irregularities affect 2-5% of childbearing women, a number that is considerably higher among females under constant stress during a cycle.

Aim: To study the effect of perceived stress on cycle length, regularity and dysmenorrhoea.

Materials and Methods: A cross-sectional study was conducted on 100 female undergraduate students of a medical college. A questionnaire along with the Perceived Stress Scale (PSS) and Pictorial Blood Assessment Chart (PBAC) was provided to the students. The menstrual pattern was then correlated with the PSS using the chi-square test and the Fisher's Exact test for statistical analysis.

Observations and Results: Out of the 100 undergraduate medical students, 30 students had a PSS score >20 while 70 had a score ≤20. An association was established between high stress levels (PSS >20) and menstrual irregularity. No association was found in students with PSS >20 with hypomenorrhoea, menorrhagia, dysmenorrhoea, long cycle length and short cycle length.

Conclusion: High stress levels (PSS >20) was associated with only menstrual irregularities and not with duration, amount of flow or dysmenorrhoea. Hence, other causes should be looked for in young women complaining of menstrual problems before stress is assumed to be the cause.

Keywords: Dysmenorrhoea, Irregular menstrual cycle, Menstrual irregularities

INTRODUCTION

Menstrual irregularities affect 2-5% of childbearing women, a number that is considerably higher among females under constant stress during a cycle [1]. A woman's menstrual cycle typically follows a 28-day cycle and ends with the shedding of uterine lining leading to bleeding. The normal menstrual cycle indicates the proper functioning of hormones, having a normal menstrual cycle signifies a healthy hypothalamo-pituitary axis with a normal uterus. However, a number of conditions such sudden weight loss, over-exercising, medical conditions and even stress can interfere with a woman's ability to experience a normal menstrual cycle. Both longer duration of menstrual bleeding and cycle irregularity are associated with major depression.

Although there appears to be a relationship between the type and severity of the stress and the proportion of women who develop menstrual problems, in practice it is difficult if not impossible to identify a threshold at which stress will interfere with the normal cycle. The individual response to abnormality in body function is heightened due to psychobiological characteristics [2-3]. This study was planned to establish a correlation between the levels of perceived stress and its effect on the menstrual cycle.

MATERIALS AND METHODS

This cross-sectional study was conducted in the undergraduate girl's hostel of a medical college. Hundred female students aged above 18 years were the target population of the study. The students with current medical, psychiatric or gynaecological problems like pregnancy and amenorrhoea were excluded from the study.

The participants were given liberal verbal explanations plus description letters about the topic and the aim of the study with attached consent forms. After the students had duly signed the consent form, a questionnaire along with the PSS (available freely online) [4] and PBAC (prior permission taken) [5] was provided to them.

The questionnaire dealt with anthropometric data, lifestyle, menstrual history, and menstrual health status. Body Mass Index (BMI) was calculated using self-reported data on height and weight. The students were then asked to record their menstrual pattern on the PBAC for the next menstrual cycle and fill the PSS for the month. Based on the answers, PSS was calculated for each participant.

The PSS is the most widely used psychological instrument for measuring the perception of stress [4]. It is a measure of the degree to which situations in one's life are appraised as stressful. Items were designed to tap how unpredictable, uncontrollable, and overloaded respondents find their lives. The scale also includes a number of direct queries about current levels of experienced stress. The questions in the PSS ask about feelings and thoughts during the last month. In each case, respondents are asked how often they felt a certain way.

PSS is a Likert type scale where

- 0 = Never
- 1 = Almost Never
- 2 = Sometimes
- 3 = Fairly Often
- 4 = Very Often

PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items. The subjects who scored ≤20 on the PSS were categorized to have low stress levels, while subjects with score >20 were categorized to have high stress.

Pictorial Blood Assessment Chart and Scoring System is used for assessment of menstrual blood loss [5]. During the course of the period, use of tampons and sanitary towels was recorded by placing a tally mark under the day next to the box that represents how stained the sanitary materials were each time they are changed.

Any incidence of flooding/clot was recorded by placing a tally mark in the clots/flooding row under the relevant day. Using the above records, the scores were calculated from the PBAC Scoring System and menstrual blood loss was quantified.

Scores

-A lightly stained towel scored 1 point; a moderately stained towel 5 points; a towel which was saturated with blood scored 20 points.

-A lightly stained tampon scored 1 point; a moderately stained tampon 5 points and a tampon that was fully saturated scored 10 points.

-A 50p sized clot scored 5 points and flooding also scored 5 points.

Menstrual cycle was defined as normal if the cycle interval is of 21-35 days, with duration being 2-7 days or the amount of blood loss was less than 100 score but more than 10 as on the PBAC.

Menstrual pattern was said to be abnormal if it met any of the following criteria:

Amenorrhoea – Defined as absence of menstruation.

Oligomenorrhoea – Menstrual bleeding occurring more than 35 days apart and remains constant at that frequency.

Hypomenorrhoea – Either a score of less than 10 on PBAC or bleeding lasting for less than 2 days.

Metrorrhagia – Irregular, acyclic bleeding.

Menorrhagia – Cyclic bleeding at normal intervals, bleeding being either excessive in amount or duration or both.

Irregular menstrual cycle – Acyclical bleeding at irregular intervals.

The menstrual pattern was then correlated with the PSS using the chi-square test and the Fisher’s Exact test for statistical analysis.

OBSERVATIONS AND RESULTS

All the 100 students recruited were included in the study as none of them met the exclusion criteria. The age of the students was between 19 to 23 years of age with a mean age of 20.9 years with majority of students being 20 and 21 years old (35 in each group). Most weighed between 51 to 60 kg with a mean weight of 54.21 kg. Three fourth of the students had a normal BMI, while 17% were underweight and 8% were obese. Mean BMI was 20.91 [Table/ Fig-1].

The daily routine of the students included 4 hours of lecture and 3 hours of clinics. In the evening, most of the students spent time studying and engaged themselves in physical activities like brisk walk for ½ - 1 hour or a yoga session of 1 hour duration. The average night time sleep was 6-8 hours.

Out of the 100 students, 30 students had a PSS score >20 while 70 had a score ≤20. The students with PSS >20 were evaluated for menstrual irregularities, hypomenorrhoea, menorrhagia,

BMI(kg/m ²)	Frequency
<18.50	17
18.50-24.99	75
≥25.00	8
Mean	20.91

[Table/Fig-1]: BMI

Irregularity	Present	Absent
Perceived Stress Score		
>20	11	19
≤20	10	60

p = 0.012

[Table/Fig-2]: Relation between high stress levels and menstrual irregularity
An association was established between high stress levels and menstrual irregularity using the chi-square test

dysmenorrhoea, long cycle length (>35 days) and short cycle length (<21 days). Results are demonstrated in [Table/Fig-2-7] respectively. The chi-square test and the Fisher’s Exact test was applied and no association was found in students with PSS >20 with hypomenorrhoea, menorrhagia, dysmenorrhoea, long cycle length and short cycle length. However, an association was established between high stress levels (PSS>20) and irregular menstrual cycles (p = 0.012).

PBAC score	<10	≥10
Perceived Stress Score		
>20	1	29
≤20	0	70

p = 0.3

[Table/Fig-3]: Prevalence of hypomenorrhoea among females with high stress levels An association could not be established between levels of stress and prevalence of hypomenorrhoea by Fisher’s Exact test

PBAC score	<100	≤100
Perceived Stress Score		
>20	14	16
≤20	23	47

p = 0.190

[Table/Fig-4]: Prevalence of menorrhagia among females with high stress levels An association could not be established between levels of stress and prevalence of menorrhagia using chi-square test

Dysmenorrhoea	Present	Absent
Perceived stress score		
>20	17	13
≤20	29	41

p = 0.132

[Table/Fig-5]: Relation between high stress levels and dysmenorrhoea An association could not be established between levels of stress and prevalence of dysmenorrhoea using chi-square test

Length	>35 days	≤35 days
Perceived Stress Score		
>20	0	30
≤20	1	69

p = 0.99

[Table/Fig-6]: Relation between high stress levels and long length of cycles An association could not be established between stress levels and long length of cycles using the Fisher’s Exact test

Length of cycle	<21 days	≥21 days
Perceived Stress Score		
>20	0	30
≤20	1	69

p = 0.99

[Table/Fig-7]: Relation between high stress levels and short length of cycles An association could not be established between stress levels and short length of cycles using the Fisher’s Exact test

DISCUSSION

The research aimed at finding a relation between stressful life events and menstrual abnormalities among hostellers of an undergraduate medical college. Studies in the past have reported a high percentage of distressed postgraduate medical students and resident doctors (32.8%, 36.4%) [6-7]. 8.2% to 10.6% of students at Cambridge have been reported to be suffering from depression [8].

In the present study, about 30% of the students had raised stress levels (PSS >20). An association was established between high stress levels and irregular menstrual cycle using the chi-square test. But no correlation could be established between stress levels

and menstrual abnormalities like hypomenorrhoea, menorrhagia, dysmenorrhoea, long cycle lengths and short cycle lengths using the Chi-square test and the Fisher's Exact test.

In a study on Taiwanese nurses, 72.3% had a high level of self-perceived job stress, which was significantly associated with irregular menstrual cycles and longer menstrual bleeding periods, but was not related to long or short menstrual cycles [9]. Present study too showed a relation between high stress levels and irregular menstrual cycles. But no association could be established between stress levels and length of bleeding periods. This could probably be due to different job profiles as the nurses had night shifts which was not so in our study population.

Our study had results similar to the California Women's Reproductive Health Study of 1990-1991. It was found that women working in stressful jobs were twice as likely to have a short menstrual cycle as women working in non-stressful jobs. No notable association was observed between work stress as measured by a single summary question and menstrual function. The findings are consistent with the results in that no increased risk for dysmenorrhoea, hypomenorrhoea, menorrhagia, long bleed length or short bleed length was observed [10].

The participants in the Hungaro study 2002, nationwide representative survey were reported to experience severe dysmenorrhoea that limited their daily activity. Low job control, low co-worker social support and low job security were found to be associated with a higher risk for dysmenorrhoea [11]. But our study could not establish a relation between high stress levels and dysmenorrhoea. A study conducted at the Department of Nursing, Chang Gung Institute of Technology, Taiwan, ROC showed that some factors including age, marital status and perceived life satisfaction were significantly related to dysmenorrhoea. However, other life factors such as exercise, perceived life stress and perceived work stress showed no correlation with dysmenorrhoea [12].

Among the Japanese college students, the ones who reported premenstrual symptoms, menstrual pain, and the experience of irregular menstrual cycles had higher stress scores than those who did not. The results suggest that psychosocial stress is independently associated with premenstrual symptoms and the experience of irregular menstrual cycles among college students [13]. Similarly our study showed that the students with high stress levels (PSS >20) experienced irregular cycles more often than the ones with low stress levels (PSS ≤20).

The literature over the past decade could not establish a definitive relationship between stress and menstrual function. Some studies showed a correlation while others showed no effect of stress on

menstrual cycle. Our study too could not establish a relation of high perceived stress on menstrual function. However, knowing the limitation of our study of a small sample size, we recommend larger multi-centered trials which are adequately powered to draw a conclusion on this conflicting issue.

CONCLUSION

We could not establish an association between high stress levels in students (PSS >20) and hypo-menorrhoea, menorrhagia, dysmenorrhoea, long or short cycle length. But an association was established between high stress levels (PSS >20) and irregular menstrual cycles. Hence, in spite of high levels of stress in undergraduate students, other factors may play an important role in maintaining their menstrual cycle and other causes should be looked for in young girls complaining of menstrual problems before it is assumed to be because of stress.

REFERENCES

- [1] Beers, Mark H., MD, Berkow R. The Merck Manual of Diagnosis and Therapy: Menstrual Abnormalities and Abnormal Uterine Bleeding. 17th Edition. *Merck Publishers*. Chapter 235.
- [2] Bianco V, Cestari AM, Casati D, Cipriani S, Radici G, Valente I. Premenstrual syndrome and beyond: lifestyle, nutrition, and personal facts. *Minerva Ginecol*. 2014;66(4):365-75.
- [3] Poromaa IS. Physiological Correlates of Premenstrual Dysphoric Disorder (PMDD). *Curr Top Behav Neurosci*. 2014;21:229-43.
- [4] Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983;24(4):385-96.
- [5] Higham JM, O'Brien PM, Shaw RW. Assessment of menstrual blood loss using a pictorial chart. *Br J Obstet Gynaecol*. 1990;97(8):734-39.
- [6] Yusoff B, Rahim A. Prevalence and sources of stress among postgraduate medical trainees: initial findings. *Asean Journal of Psychiatry*. 2010;11(2):1-10.
- [7] Saini NK, Agarwal S, Bhasin SK, Bhatia MS, Sharma AK. Prevalence of stress among resident doctors working in medical colleges of Delhi. *Indian J Public Health*. 2010;54(4):219-23.
- [8] Quince TA, Wood DF, Parker RA, Benson J. Prevalence and persistence of depression among undergraduate medical students: a longitudinal study at one UK medical school. *BMJ Open*. 2012;2(4):pii:e001519.
- [9] Lin HT, Lin LC, Shiao JS. The impact of self-perceived job stress on menstrual patterns among Taiwanese Nurses. *Ind Health*. 2007;45(5):709-14.
- [10] Fenster L, Waller K, Chen J, Hubbard AE, Windham GC, Elkin E, Swan S. Psychological stress in the workplace and menstrual function. *Am J Epidemiol*. 1999;149(2):127-34.
- [11] László KD, Györfy Z, Adám S, Csoboth C, Kopp MS. Work-related stress factors and menstrual pain: a nation-wide representative survey. *J Psychosom Obstet Gynaecol*. 2008;29(2):133-38.
- [12] Chung FF, Yao CC, Wan GH. The associations between menstrual function and life style/working conditions among Taiwan nurses. *J Occup Health*. 2005;47(2):149-56.
- [13] Yamamoto K, Okazaki A, Sakamoto Y, Funatsu M. The relationship between premenstrual symptoms, menstrual pain, irregular menstrual cycles, and psychosocial stress among Japanese College Students. *J Physiol Anthropol*. 2009;28(3):129-36.

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