



Poor Correlation of Stress Levels and Menstrual Patterns among Medical Students

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Abstract

Background: There are conflicting reports about the effect of psychological stress upon menstruation. We studied menstrual patterns and stress in 254 undergraduate medical students. **Method:** All girls of years one and two were included. The students maintained menstrual records over six months. DASS questionnaires measured stress. Salivary cortisol levels were also measured. **Results:** In year 1 and 2 students, persisting normal cycles were 39.4% and 36.5%; normal becoming abnormal were 28.8% and 23.1%; abnormal becoming normal were 19.2% and 17.3%; persisting abnormal were 12.5% and 23.1%. Students with moderate to severe stress (20% and 21%) had less stress at six months (13% and 15%) **Comment:** Most students have normal menstrual patterns, and no stress. Stress if present tends to decrease with time. There is no clear association between psychological stress and menstrual abnormality.

Keywords : Menses; stress; medical students; DASS score

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1.0 Introduction

Menstrual abnormality in young adults may be due to organic causes, or related to psychological factors, like stress, anxiety and hormonal causes. Irregular and heavy bleeding can cause disruption to women's personal and professional lives. Warren (Warren, 2002)¹⁴ reported that 40% of women with heavy bleeding could not work outside the house during their periods. They also worried about accidents due to the unpredictability or heaviness of their menstrual bleeding.

Women are particularly susceptible to stress caused by hormonal changes. During puberty, menstrual cycle, pregnancy, and menopause, the hormone levels fluctuate and cause stress. Stress also alters menstrual phase length. Psychological stress produces physiologic responses, such as activation of the corticotrophin-releasing hormone system, which might affect menstrual function (Chrousos, Torpy, & Gold, 1998; Rose, 1987)³. Menstrual function is disrupted by stressors that activate the hypothalamic– pituitary–adrenal (HPA) axis; this activation is part of a catabolic response of the whole body that mobilizes metabolic fuels to meet energy demand. Functional menstrual disorders are associated with an increase in cortisol and symptoms of energy deficiency (Burton, Hinton, Neilson, & Beastall, 1996; Harenstam & Theorell, 1990; Zeier, Brauchli, & Joller-Jemelka, 1996)^{2,7,16}.

Studies on menstrual disorders in college students and school students have shown a prevalence of about 11.3% to 14.6%; oligomenorrhoea or amenorrhoea is the main complaint in 72.5% of these (Bachmann & Kemmann, 1982; Demir, Kadayyfcy, Vardar, & Atay, 2000; Singh, 1981)^{13,6,1}. A study on 5000 adolescents reported a 43% irregular cycle rate with 20% having irregular menses even after 5 years post menarche (Widholm & Kantero, 1971)¹⁵. Demir *et al* (Demir *et al.*, 2000)⁶ reported a 36.7% irregular menses rate. Stressful events (physical, emotional, social) and/or the competitive life style including severe exercise and marked weight loss, can contribute to the incidence of oligomenorrhoea/amenorrhoea. They also stated that 16% had a positive correlation between irregular menses and examination stress. The most common effects on daily routine reported by the study subjects were prolonged resting hours (54%) and inability to study (50%).

Medical students need to study harder than most, and are a high risk group for stress (Saipanish, 2003; Sherina, Rampal, & Kaneson, 2004)^{10,12}. Yet few studies are available on effect of stress on menstrual patterns in medical students. Clarvit (Clarvit, 1988)⁴, in a cross-sectional, questionnaire-based study of 159 students, found no evidence to support the hypothesis that a high perceived level of stress was associated with a change in any of the measures of menstrual function. In contrast, Sharma *et al* (Sharma, Taneja, Sharma, & Saha, 2008)¹¹, in an Indian study on 122 medical students reported a high incidence of premenstrual syndrome and dysmenorrhoea. Both studies were relatively small, cross-sectional, and did not use a validated stress questionnaire.

The present study was designed to assess the effect of stress on normal and abnormal menses in undergraduate students of year one and two in a medical college.

2.0 Methodology

The study was a prospective longitudinal study, carried out over two years (2009 to 2011). It was carried out at the Faculty of Medicine, University Teknologi MARA.

Three hundred and fifty-nine female medical students were recruited from years one and two. Following a written informed consent, with full explanation of the study procedures, the subjects were enrolled. Students of years one and two are in a new environment, away from home, with increased workloads of study and examinations. We expected them to be at a higher risk of stress, and consequently selected these students for the study. A similar preclinical stage would ensure fewer variables to confound.

All students were 16-20 years of age, of average height and weight, with previous normal cycles. Students with any medical/ surgical or endocrine condition, on any drug or hormone treatment, or those with previous abnormal cycles were excluded. All subjects were trained to maintain a menstrual diary once every month for six months. In this diary they recorded date of onset, number of bleeding days, and any associated problems. They were also guided for completing a menstrual questionnaire evaluating detailed aspects of their menses at baseline, three and six months.

All subjects collected the early morning salivary sample, on rising from bed, by using a salivette. The swab was collected after saliva sample was obtained and replaced into the suspended insert. The container was kept in a freezer. The saliva samples were stored for 5 days at 2-8 degree centigrade. The salivette was centrifuged for 2 minutes at 1000g and the clear supernatant used for cortisol assays.

A single pelvic sonogram was done in all cases of to rule out an organic cause of menstrual abnormality. The data was analyzed using the SPSS version 12.0.

3.0 Results

The percentage of students in year 1 and year 2 with normal patterns of menses was similar. Those with normal cycles that become abnormal over the 6 months study period was also similar in year 1 and 2, 28.8% and 23.1%. Abnormal cycles that restored to normal was 19.2% in year 1 and 17.3% in year 2, while persisting abnormal cycles were seen in 12.5% year 1 and 23.1% year 2 students (Table 1). These were not statistically significant.

Table 1: Menses Patterns in Year 1 and Year 2 Over 6 Months

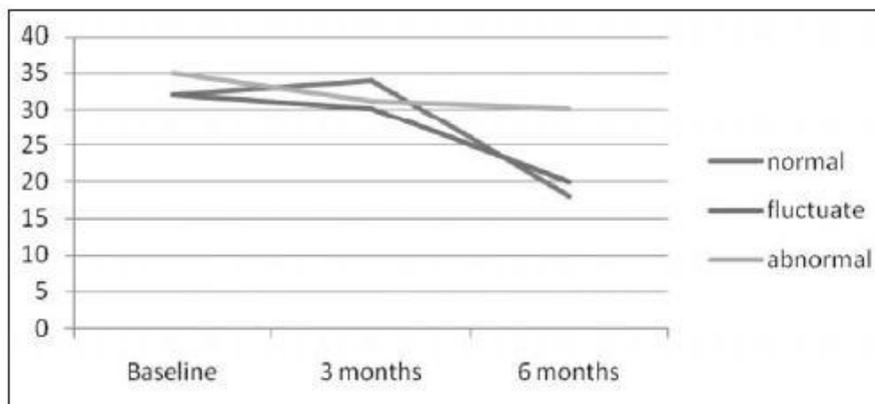
Menses patterns	Year 1	Year 2	Significance
Normal-normal	39.4%	36.5%	NS
Normal-abnormal	28.8%	23.1%	NS
Abnormal-normal	19.2%	17.3%	NS
Abnormal-abnormal	12.5%	23.1%	NS

The stress estimation done both objectively by the DASS score and also the salivary cortisol estimations revealed that the students in most (62% to 73%) were not stressed in years 1 and 2. Mild to moderate stress was more common and similar in both year 1 and year 2 students, that seemed to slightly reduce by 6 months (Table 2).

Table 2: Change in Stress Levels in Year 1 and Year 2 Medical Students

Stress	Year1 (138)			Year 2 (116)		
	baseline	3 months	6 months	baseline	3 months	6 months
None	62%	61%	71%	65%	65.5%	73.5%
Mild	18.3%	19.2%	16.7%	14.3%	16.4%	12.2%
Moderate	14.3%	12.1%	9%	13%	11%	8.2%
Severe	4%	3%	2.6%	7.8%	7.3%	6.1%
Very severe	1.6%	5.1%	1.3%	0%	0%	1%

When the stress scores of all students was assessed in relation to the menses patterns at baseline, three and six months, a pattern emerged, as shown in Figure 1.



X Axis: Median of Total DASS Score, Y Axis: Time (months)
 Legend: Blue: normal menstrual pattern, red: fluctuating, green: abnormal patterns.

Figure 1: Naturalistic Observation of Menstrual Pattern and Stress During 6 Months Period

4.0 Discussion

Students with abnormal menstrual patterns show minimum reduction of stress over 6 months. For students with fluctuating menstrual pattern, there is a moderate reduction in

stress score as measured by DASS. Students with normal menstrual patterns show reduction in stress levels over 6 months.

Medical students are a high risk group for developing menstrual irregularities due to lifestyle with less sleep, irregular food and exercise habits. Menstrual irregularity over prolonged periods of time can lead to development of infertility, endometrial hyperplasia and problems due to prolonged anovulation, besides the deterioration in the quality of life. Therefore early diagnosis and management is important.

The current study does not show any association between stress levels and menses patterns. Similar findings were reported by Clarvit (Clarvit, 1988)⁴ in her study among 159 female medical students. In contrast, other studies reported that stress score is a predictor for irregular menstrual cycle (Harlow & Matanoski, 1991)⁸. These differences might be due to the fact that the current study has used a validated questionnaire for measuring stress, and includes a larger sample size.

5.0 Conclusion

This study suggests that there is no significant association between stress levels and menstrual changes among preclinical medical students. Stress if present tends to decrease with time.

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