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Original research article

Association of dysmenorrhea and level of perceived stress score with premenstrual and menstrual symptoms in medical and non-medical students

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Abstract

Background: Menstruation is a physiological phenomenon which has multiple biophysical and psychosocial elements that have reverberations for a woman of any background. Dysmenorrhea is described as the presence of painful cramps that are of uterine origin occurring during menstruation, representing one of the most common causes of pelvic pain and menstrual disorder. **Objectives:** This study is intended to assess the association between levels of perceived stress with its effect on the various symptoms of menstrual cycle in medical and non-medical students. **Materials and Methods:** This is a cross-sectional which was conducted among female students of MBBS, BSc Nursing, Physiotherapy, Art and Science courses of a tertiary care hospital in India. 291 students from the mentioned courses, who are aged above 18 years, after taking their consent were included in the study. **Results:** 27.15% students are medical students and 31.62% are nursing students, 23.02% of the students are physiotherapy students and 18.21% are art & science students. 53.26% are 1st and 2nd year students. The mean weight of the students was 54.92 ± 10.28 kg and the mean height was 157.18 ± 8.14 cm, whereas mean BMI was 22.28 ± 4.12 **Discussion:** Our study pointed that mild to moderate severity of pain due to dysmenorrhea reduced the routine physical activity. Risk of dysmenorrhea was twice higher with people of moderate levels of stress in comparison to lower levels, which was in accordance with the study by Wang et al. **Conclusion:** Early identification and deceleration of the causal factors may have a better preventive role. Programs for stress reduction aiming at reproductive age women, especially for those with a history of dysmenorrhea, can be considered as a possible preventive strategy to reduce the occurrence of dysmenorrhea and associated concerns.

Keywords: Dysmenorrhea, Perceived Stress scale (PSS), Menstruation, PreMenstrual Syndrome, Students

Introduction

Menstruation is a physiological phenomenon which has multiple bio physical and psychosocial elements that have reverberations for a woman of any background. [1] Dysmenorrhea is described as the presence of painful cramps that are of uterine origin occurring during menstruation, representing one of the most common causes of pelvic pain and menstrual disorder. [2] It is one of the most prevalent menstrual problems during adolescence and early adulthood. Stress can make a person difficult to cope and leads to conditions like depression, anxiety or other personality disorders. [3] From the existing literature, it is evident that medical students are known to suffer from higher levels of stress due to their academic burden. Females have been attributed to experience more stress than males, consistently experiencing more physical and psychological symptoms. [4] It was learned that elevated levels of stress, in turn, elevates the levels of cortisol, which has a wider range of side effects. This may also include disruption of normal luteinizing hormone (LH) rhythm, thereby affecting the menstrual cycle. College going younger female students experience a variety of menstrual-related complaints frequently, including dysmenorrhea, menorrhagia, irregular menses, and menstrual-related mood changes. [5] Pre-Menstrual Syndrome (PMS) is a common concern which is an array of annoying symptoms like fatigue, backache, and irritability that develops a week before the onset of menstruation and goes down slowly when menstruation starts. [6] A uniform menstrual cycle is an indicator of overall good health of a female, whereas, abnormal cycles with irregular and heavy bleeding disrupt both the personal and professional life of a person which require evaluation as that may have a major deleterious impact on their future reproductive and general health. [7] Identification of modifiable risk factors for dysmenorrhea is important because the condition affects a large proportion of women of reproductive age and contributes to school absenteeism, lost work time, and reduced quality of life. [8] Various studies have identified stress as one of the key factors responsible for menstrual irregularities. However, very few studies associated the levels of perceived stress and dysmenorrhea, and not many have compared the changes in medical students with that of non-medical students. Hence, this study is intended to assess the association between levels of perceived stress with its effect on the various symptoms of the menstrual cycle in medical and non-medical students.

Objectives:

To evaluate the premenstrual and menstrual symptoms in medical and non-medical students

To analyze the relation between dysmenorrhea and level of perceived stress score among medical and non-medical students

To assess the association of dysmenorrhea and level of perceived stress score with premenstrual and menstrual symptoms among medical and non-medical students

Methodology:

This cross-sectional study was conducted among female medical students like MBBS, BSc Nursing, Physiotherapy, and Non-medical students like Arts and Science courses of a tertiary care hospital in Tamilnadu, India. 291 students from the mentioned courses, who are aged above 18 years, after obtained their consent, included in the study. The students who are with ongoing medical illnesses, amenorrhea of primary type, or any history of pelvic pathology were strictly excluded from this study. After properly explaining the study participants about the research project, a questionnaire consisting of anthropometric data, complete menstrual history along with the Perceived Stress Scale (PSS) was provided to them. The stress questionnaire consisted of 14 items elucidating the frequency at which they experienced

symptoms like headaches, excessive sweating, etc., where each option corresponds to a number, the sum of which provides the stress score. Hence, classifications of scores were done in the range of 0-40, under the category of 0-13 (low level), 14-26 (moderate level), and 27-40 (high level).

Statistical analysis was performed by SPSS version 24.0 (SPSS Inc, Chicago, IL, USA) and the results were expressed as mean ± standard deviation (SD). The groups were compared for various parameters using a two-tailed student's t-test and Chi-square test. Correlation analysis was performed using the Spearman rank correlation coefficient. $P \leq 0.05$ was considered significant for all statistical tests.

Results:

Among the 291 study respondents, the mean age was 20 ± 1.51 years. 27.15% of students are medical students and 31.62% are nursing students, 23.02% of the students are physiotherapy students and 18.21% are art & science students. 53.26% are 1st and 2nd-year students. The mean weight of the students was 54.92 ± 10.28 kg and the mean height was 157.18 ± 8.14 cm, whereas the mean BMI was 22.28 ± 4.12 (Table 1). Decreased physical activity during menstruation was found in 53.95% (n=157) of the students. The majority (70.45%, n=205) of the study participants have regular menstrual cycles which were associated with moderate levels of stress in most students (47.32%, n=97) (Table 2) and amount of flow was moderate among most (65.64, n=191) of the students, which was associated with moderate levels of stress in many students (49.74%, n=95). Dysmenorrhea was noted in 48.8% (n=142) students, which was associated with moderate levels of stress in most of the people (51.42%, n=73) (Table 3). Premenstrual symptoms were observed in 53.61 students (n=156), which was associated with moderate levels of stress in 55.77% (87%) (Table 4). Severe levels of stress were associated with people who experience premenstrual mood swings in every menstrual cycle (48.28%, n=28) (Table 4). Medical students perceived a higher percentage of stress levels than the overall average and there were no significant differences in the perception of menstrual symptoms between the medical and non-medical students

Table 1: Anthropometric variables of the study participants:

Variables		**Number of students**	**%**
Age	18-19 years	111	38.14%
	20-21 years	128	43.99%
	22-23 years	52	17.87%
Weight	< 50 kg	133	45.70%
	51-60 kg	86	29.55%
	61-70 kg	50	17.18%
	>70 kg	22	7.56%
Height	< 150 cm	44	15.12%
	151- 160 cm	160	54.98%
	161- 170 cm	71	24.40%
	> 170 cm	16	5.50%
BMI	Under weight	51	17.53%
	Normal	169	58.08%
	Over weight	56	19.24%
	Obese	15	5.15%

Table 2: Association between level of PSS score and menstrual cycle in study participants

Menstrual cycle		Level of PSS score						n	P value
		Low		Moderate		High			
		n	%	n	%	n	%		
Age at menarche (the first occurrence of menstruation)	Less than 10 years	20	58.82 %	12	35.29 %	2	5.88%	34	**χ2=15.49p=0.02* (S)**
	11 -14 years	41	29.93 %	69	50.36 %	27	19.71 %	137	
	14 -16 years	30	25.86 %	62	53.45 %	24	20.69 %	116	
	More than 16 years	2	50.00 %	2	50.00 %	0	0.00%	4	
Menstrual cycle :	Regular cycles	79	38.54 %	97	47.32 %	29	14.15 %	205	**χ2=16.71p=0.01** (S)**
	Frequent Irregular Cycles	6	14.63 %	23	56.10 %	12	29.27 %	41	
	Infrequent Irregular Cycles	8	17.78 %	25	55.56 %	12	26.67 %	45	
Average length of menstrual cycle:	21- 24 days	17	35.42 %	30	62.50 %	1	2.08%	48	**χ2=20.63p=0.01** (S)**
	25-28 days	49	40.50 %	49	40.50 %	23	19.01 %	121	
	29-32 days	19	21.84 %	49	56.32 %	19	21.84 %	87	
	> 32 days	8	22.86 %	17	48.57 %	10	28.57 %	35	
Premenstrual spotting:	Yes	23	24.21 %	45	47.37 %	27	28.42 %	95	**χ2=10.88p=0.01** (S)**
	No	70	35.71 %	100	51.02 %	26	13.27 %	196	
Duration of Flow (Days):	Less than 2	4	23.53 %	9	52.94 %	4	23.53 %	17	**χ2=20.06p=0.01** (S)**
	3-5 years	75	37.50 %	99	49.50 %	26	13.00 %	200	
	5-7 years	13	18.84 %	33	47.83 %	23	33.33 %	69	
	More than 7	1	20.00 %	4	80.00 %	0	0.00%	5	
Amount of Flow:	Mild (≤ 2 Pads/days)	24	28.24 %	46	54.12 %	15	17.65 %	85	**χ2=26.76p=0.001*** (S)**
	Moderate (3-5 Pads/days)	68	35.60 %	95	49.74 %	28	14.66 %	191	
	Heavy (≥ 6 Pads/days)	1	6.67%	4	26.67 %	10	66.67 %	15	
Passage of clots during menses:	Yes	28	19.44 %	84	58.33 %	32	22.22 %	144	**χ2=20.63p=0.001*** (S)**
	No	65	44.22 %	61	41.50 %	21	14.29 %	147	

Table 3: Association between level of PSS score and experience of symptoms suffering from Dysmenorrhea of both medical and non-medical students

Symptoms Suffering		Level of PSS score						n	Chi-square test
		Low		Moderate		High			
		n	%	n	%	n	%		
Dysmenorrhoea (painful menstruation and its associated symptoms):	Yes	36	25.35 %	73	51.41 %	33	23.24 %	142	**χ2=7.77p=0.02* (S)**
	No	57	38.26 %	72	48.32 %	20	13.42 %	149	
Pain during menstrual period:	Always	25	32.89 %	40	52.63 %	11	14.47 %	76	χ2=10.75p=0.10 (NS)
	Usually	11	22.00 %	23	46.00 %	16	32.00 %	50	
	Sometimes	53	36.55 %	70	48.28 %	22	15.17 %	145	
	Never	4	20.00 %	12	60.00 %	4	20.00 %	20	
Severity of pain:	No pain	5	21.74 %	15	65.22 %	3	13.04 %	23	χ2=6.51p=0.36 (NS)
	Mild pain	34	32.38 %	50	47.62 %	21	20.00 %	105	
	Moderate pain	45	36.00 %	56	44.80 %	24	19.20 %	125	
	Severe pain	9	23.68 %	24	63.16 %	5	13.16 %	38	
Location of Pain:	No Pain	3	15.00 %	14	70.00 %	3	15.00 %	20	χ2=12.13p=0.43 (NS)
	Abdominal Pain	21	30.43 %	36	52.17 %	12	17.39 %	69	
	Back Pain	14	28.57 %	27	55.10 %	8	16.33 %	49	
	Pain extends to thighs	4	36.36 %	5	45.45 %	2	18.18 %	11	
	Pain extends to anus	0	0.00%	6	85.71 %	1	14.29 %	7	
	Abdominal & Back Pain	32	36.36 %	39	44.32 %	17	19.32 %	88	
	Abdominal Pain extends to thighs	19	40.43 %	18	38.30 %	10	21.28 %	47	
Nausea during menstrual period:	Always	1	7.14%	10	71.43 %	3	21.43 %	14	**χ2=21.64p=0.001*** (S)**
	Usually	2	9.09%	10	45.45 %	10	45.45 %	22	
	Sometimes	29	40.28 %	29	40.28 %	14	19.44 %	72	
	Never	61	33.33 %	96	52.46 %	26	14.21 %	183	

Dietary restriction during menstrual period:	Always	4	22.22 %	10	55.56 %	4	22.22 %	18	**χ2=24.16p=0.001*** (S)**
	Usually	8	26.67 %	9	30.00 %	13	43.33 %	30	
	Sometimes	36	45.00 %	32	40.00 %	12	15.00 %	80	
	Never	45	27.61 %	94	57.67 %	24	14.72 %	163	
Take medicine during menstrual period:	Always	0	0.00%	1	14.29 %	6	85.71 %	7	**χ2=40.21p=0.001*** (S)**
	Usually	0	0.00%	2	28.57 %	5	71.43 %	7	
	Sometimes	8	21.05 %	23	60.53 %	7	18.42 %	38	
	Never	85	35.56 %	119	49.79 %	35	14.64 %	239	
Are medicines effective:	Always	4	17.39 %	8	34.78 %	11	47.83 %	23	**χ2=32.23p=0.001*** (S)**
	Usually	1	7.14%	10	71.43 %	3	21.43 %	14	
	Sometimes	3	10.71 %	15	53.57 %	10	35.71 %	28	
	Never	85	37.61 %	112	49.56 %	29	12.83 %	226	

Table 4: Association between level of PSS score and experience of symptoms suffering from Dysmenorrhea

Experience Of Symptoms Suffering		**Level of PSS score**						**n**	**Chi-square test**
		Low		**Moderate**		**High**			
		n	**%**	**n**	**%**	**n**	**%**		
Pre-menstrual Symptoms present (a group of psychological and somatic changes occurring a few days preceding menstruation)	Yes	28	17.95 %	87	55.77 %	41	26.28 %	156	**χ2=35.06p=0.001*** (S)**
	No	65	48.15 %	58	42.96 %	12	8.89%	135	
Breast tenderness during menstrual period:	Always	1	5.26%	2	10.53 %	16	84.21 %	19	**χ2=77.55p=0.001*** (S)**
	Usually	8	25.00 %	11	34.38 %	13	40.63 %	32	
	Sometimes	18	32.14 %	32	57.14 %	6	10.71 %	56	
	Never	66	35.87 %	100	54.35 %	18	9.78%	184	
Premenstrual Headache / migraine	Always	1	7.69%	5	38.46 %	7	53.85 %	13	**χ2=41.64p=0.001*** (S)**
	Usually	1	6.67%	5	33.33	9	60.00	15	

during menstrual period:					%		%		
	Sometimes	21	25.93 %	41	50.62 %	19	23.46 %	81	
	Never	70	38.46 %	94	51.65 %	18	9.89%	182	
Premenstrual Pimples :	Always	15	21.74 %	34	49.28 %	20	28.99 %	69	**$\chi 2=14.67 p=0.05^{*}$ (S)**
	Usually	18	36.73 %	20	40.82 %	11	22.45 %	49	
	Sometimes	36	31.03 %	66	56.90 %	14	12.07 %	116	
	Never	24	42.11 %	25	43.86 %	8	14.04 %	57	
Premenstrual bloating / distended:	Always	1	4.17%	8	33.33 %	15	62.50 %	24	**$\chi 2=60.34 p=0.05^{*}$ (S)**
	Usually	3	21.43 %	4	28.57 %	7	50.00 %	14	
	Sometimes	12	18.75 %	44	68.75 %	8	12.50 %	64	
	Never	77	40.74 %	89	47.09 %	23	12.17 %	189	
Premenstrual mood swings:	Always	9	15.52 %	21	36.21 %	28	48.28 %	58	**$\chi 2=84.73 p=0.001^{***}$ (S)**
	Usually	6	15.00 %	23	57.50 %	11	27.50 %	40	
	Sometimes	21	22.83 %	62	67.39 %	9	9.78%	92	
	Never	57	56.44 %	39	38.61 %	5	4.95%	101	
Visit to Doctor to relieve Pre-menstrual Symptoms:	Always	1	11.11 %	1	11.11 %	7	77.78 %	9	**$\chi 2=30.64 p=0.001^{***}$ (S)**
	Usually	0	0.00%	2	40.00 %	3	60.00 %	5	
	Sometimes	4	26.67 %	7	46.67 %	4	26.67 %	15	
	Never	88	33.59 %	135	51.53 %	39	14.89 %	262	
Average number of pad (s) Changed in day time (8 am to 8 pm)alone:	Always	1	7.14%	8	57.14 %	5	35.71 %	14	$\chi 2=10.23 p=0.11$ (NS)
	Usually	34	33.01 %	49	47.57 %	20	19.42 %	103	
	Sometimes	43	38.05 %	51	45.13 %	19	16.81 %	113	
	Never	15	24.59 %	37	60.66 %	9	14.75 %	61	

Discussion:

With this study, we attempted to interpret the association between perceived stress levels and menstrual symptoms and rule out the comparison between the medical and non-medical students. In this study, 49.83% (n=145) of the students have moderate levels of stress, and their association with premenstrual symptoms and dysmenorrhea was established by the Chi-square test.

A nationwide representative survey, Hungaro study 2002 reported that most of the participants experienced severe dysmenorrhea that limited their daily activity, where job control and co-worker social support low were found to be associated factors. [9] But our study pointed out that mild to moderate severity of pain due to dysmenorrhea reduced the routine physical activity. Risk of dysmenorrhea was twice higher with people of moderate levels of stress in comparison to lower levels, which was in accordance with the study by Wang et al. [10] Association between stress and dysmenorrhea is consistent and significant with the previous studies like Yamamoto et al. [11] and Chung et al. [12]

In a similar study among Japanese college students by Yamamoto et al., the ones who reported premenstrual symptoms and menstrual pain with irregular menstrual cycles had higher stress scores than the people with no symptoms. [11] Similarly our study showed that the students with moderate stress levels experienced irregular cycles more often than the ones with low-stress levels.

Psychological stress significantly influences the endocrine function and reproductive health. Medical students suffer from higher levels of distress; as compared to the students of other courses which has been evident from various studies performed across the globe. [13] Workload, sleep deprivation, academic pressure, and exposure to patient's suffering are hypothesized to be the main attributing factors to the mental health of medical students. [14] The present study also observed that medical students are having a higher level of stress as compared to students from other courses. But, there were no major differences in pre-menstrual and menstrual symptoms of the comparative groups of the students. Therefore, perceived stress may be a causal factor for pre-menstrual tensions in the present study, as high number of medical students suffered from more than average levels of stress as compared to non-medical students (50%), which was in accordance with Singh et al. [15] The Studies have also shown that stress not only increases the level of cortisol but also the progesterone and its metabolites like allopregnanolone. Progesterone is probably the underlying cause for premenstrual symptoms in susceptible females, as it is responsible for ovulation and as premenstrual syndrome occurs in ovulatory cycles. [16]

Apart from the previous studies, where premenstrual symptoms and dysmenorrhea were more in people with higher levels of stress, this study is one of its kinds, which showed significant premenstrual symptoms and dysmenorrhea symptoms in students with moderate levels of stress.

Conclusion:

Despite higher levels of stress in the undergraduate students, there may be other factors that may play an important role in influencing the menstrual cycle. In the present accelerated lifestyle, with full of challenges, this study is a mightier step in understanding the problems being faced by young females with respect to their reproductive cycle. With this fast-growing era, there comes the disease burden which can be created by psychological stress, anxiety and depression that may lead to further adverse outcomes like infertility, endometrial hyperplasia, etc., in par with the effects on quality of life. Early identification and deceleration of the causal factors may have a better preventive role. Programs for stress reduction aiming at reproductive-age women, especially for those with a history of dysmenorrhea, can be considered as a possible preventive strategy to reduce the occurrence of dysmenorrhea and associated concerns.

References:

1. Sharma A, Taneja DK, Sharma P, Saha R. Problems related to menstruation and their effect on daily routine of students of a medical college in Delhi, India. Asia Pac J Public Health 2008; 20:234-41.

2. Paula JAH. Benign disease of the female reproductive tract. In: Berek JS. editor. Berek and Novaks Gynecology. 14 th ed. Philedelphia: Lippincott, William and Wilkins: Wolters Kluwer Business; 2007. p. 446.
3. Nepomnaschy PA, Sheiner E, Mastorakos G, Arck PC. Stress, immune function, and women′s reproduction. Ann N Y Acad Sci 2007; 1113:350-64.
4. Waghachavare VB, Dhumale GB, Kadam YR, Gore AD. A study of stress among students of professional colleges from an urban area in India. Sultan Qaboos Univ Med J 2013;13:429-36.
5. HT Lin, LC Lin, JS Shiao. The impact of self-perceived job stress on menstrual patterns among Taiwanese Nurses. Ind Health. 2007;45(5):709–14.
6. Adams Hillard PJ, Deitch HR. Menstrual disorders in the college age female. Pediatr Clin North Am 2005;52:179-97.
7. Kudielka BM, Kirschbaum C. Sex differences in HPA axis responses to stress: A review. Biol Psychol 2005;69:113-32.
8. Sood M, Ambigga D, Azlinawati, Daher AM, Razali S, Nawawi H, *et al*. Poor correlation of stress levels and menstrual patterns among medical students. J Asian Behav Stud 2012;2:59-66.
9. KD László, Z Gyorffy, S Adám, C Csoboth, MS Kopp. Work-related stress factors and menstrual pain: a nation-wide representative survey. J Psychosom Obstet Gynaecol. 2008;29(2):133–38.
10. Wang L, Wang X, Wang W, *et al.* Stress and dysmenorrhoea: a population based prospective study. *Occupational and Environmental Medicine* 2004; 61:1021-1026.
11. K Yamamoto, A Okazaki, Y Sakamoto, M Funatsu. 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.
12. FF Chung, CC Yao, GH Wan. The associations between menstrual function and life style/working conditions among Taiwan nurses. J Occup Health. 2005;47(2):149–56.
13. Kudielka BM, Kirschbaum C. Sex differences in HPA axis responses to stress: A review. Biol Psychol 2005; 69:113-32.
14. Mavor KI, McNeill KG, Anderson K, et al. Beyond prevalence to process: the role of self and identity in medical student well-being. Med Educ. 2014;48:351–360.
15. Singh A, Kiran D, Singh H, Nel B, Singh P, Tiwari P. Prevalence and severity of dysmenorrhea: A problem related to menstruation, among first and second year female medical students. Indian J Physiol Pharmacol 2008; 52:389-97.
16. Wyatt K, Dimmock P, Jones P, Obhrai M, O′Brien S. Efficacy of progesterone and progestogens in management of premenstrual syndrome: Systematic review. BMJ 2001; 323:776-80