ORIGINAL RESEARCH ARTICLE

Prevalence and Associated Factors of Dysmenorrhea Among University Students in Tamil Nadu, India: A Cross-Sectional Study

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ABSTRACT

Introduction: Dysmenorrhea is a common gynaecological condition of uterine origin characterised by excruciating menstrual cramps. For more than 50% of menstruating women primary dysmenorrhea is both a clinical and a social problem. A cross-sectional study was conducted to estimate the prevalence and determine the factors associated with dysmenorrhoea among university students in Tamil Nadu.

Methods: With ethical approval from the Institutional Ethical Committee of SRMIST (Deemed University), 1076 students aged 18-25 were selected with simple random sampling. Data were collected using a structured questionnaire over June-Sept. 2023. The pain of dysmenorrhea was assessed using the Visual Analogue Scale (VAS).

Results: The estimated prevalence of dysmenorrhoea was 25.5% (274), and 92.47% (n=995) had menstrual pain. It was found that 45.45%, 28.90%, 17.01% and 8.64% of the university students experienced mild, moderate, severe, and worse pain, respectively, as measured using the VAS. There is a significant association between dysmenorrhea and clots during menstruation (AOR=1.40; 95% CI [1.032, 1.913]) and skipping of meals (AOR=1.7; 95% CI [1.172, 2.489]).

Conclusions: It is evident from the study that more than 25% of university students face dysmenorrhea, and most have pain with varied degrees and types. The students should seek help for dysmenorrhoea, not neglect it, and take care of their physical activities and nutrition. In addition, universities should promote education on nutrition and physical activities and empower students to seek help for dysmenorrhea.

Keywords: Menstrual disorder, Menstrual pain, Prevalence, Primary dysmenorrhea, young girls

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INTRODUCTION

Dysmenorrhea is a common gynaecological condition of uterine origin characterised by excruciating menstrual cramps. It is classified into primary and secondary dysmenorrhea, in which menstrual pain without any pelvic pathology is referred to as primary dysmenorrhea. Elevated endometrial prostaglandins (PGF2a and PGE2) and their metabolites are the root cause of these symptoms.[1] Increased myometrial contractility brought on by increased prostaglandin synthesis in response to increased uterine muscle sensitivity to prostaglandin exposes the uterus to hypoxia and ischemia, which in turn causes pain.[2-4] For more than 50% of menstruating women, primary dysmenorrhea is both a clinical and a social problem.[5] Starting in the first 24-36 hours of the menstrual cycle, the pain continues for two to three days after the menses. The early years of menstrual flow are typically when primary dysmenorrhea occurs.[6,7] Globally significant variation is observed in the prevalence of pain reporting owing to various socio-ocultural factors. Nearly 45% to 95% of women experience dysmenorrhea during childbearing age, 2% to 29% experience severe pain, and 70% to 90% of women are below 24 years of age. [1]The combined prevalence of primary dysmenorrhea falls between 60% and 73%, as per recent systemic reviews and meta-analyses.[8–11] According to other published reports, the prevalence varies between 16.8% and 95%. The estimated prevalence of dysmenorrhea in India has been reported at 79.7%.[12-13] The degree of dysmenorrhea varies between countries and reproductive age groups. This discrepancy can be explained by the fact that dysmenorrhea differs depending on the age of the study participants.[14] Several factors contribute to dysmenorrhea. Dysmenorrhea is linked to variables such as age, alcohol consumption, family history, low body mass index, degree of menstrual flow, anxiety, persistent pelvic pain, and flow duration.[5,15-18] Academic performance, interpersonal relationships and quality of life are all significantly affected by dysmenorrhea. This effect is contingent upon the degree of pain felt. Other side effects include sleep disturbances, social disengagement, poor personal activities, and limited daily activities.[5,19,20] With this background, a cross-sectional study was carried out to estimate the prevalence and assess the factors associated with dysmenorrhea among university students in Tamil Nadu, India.

The study's main objectives were to estimate the prevalence of dysmenorrhea and determine the factors associated with dysmenorrhea among university students.

METHODOLOGY

The study adopted a descriptive cross-sectional study design. The study followed different phases that were carried out at different points of the research cycle: conceptualization (March 2023), Ethical approval and Questionnaire design (April 2023), Pilot testing (May 2023), Data collection (June-Sept 2023), Analysis and report writing was carried out in November and December 2023.

The study was conducted among students at various universities across Tamil Nadu. University students aged 18-25 years pursuing education were selected through a simple random sampling technique.

Sample size: The Leshlie Kish formula $n = Z^2_{\alpha} \times p(1-p)/d^2$ is used to calculate the minimum sample size. The calculated sample size was 379 taking p as 44% at 95% CI. The minimum estimated sample size was further adjusted with 2.5 times of design effect and 10 per cent of non-response. Sample size adjusting with design effect of 2.5 was 948. Additional 10 per cent samples were added to compensate non-response. So, the sample size became 1043. Furthermore, as the data were collected using an online tool, more data could be collected, and the final sample was fixed at 1076.

Inclusion and exclusion criteria: The study included women aged 18 to 25 years who attained puberty and are currently studying in universities. The study excluded women with a history of stillbirth, abortion and pregnancy, as these factors are related to secondary dysmenorrhea. Furthermore, women with a known history of secondary dysmenorrhea were excluded from the study as well.

Study tool: A structured questionnaire was used to estimate the prevalence and assess the factors associated with dysmenorrhoea among university students. The questionnaire consisted of five sections: socio-demographic profile, menstruation and reproductive health, assessment of dysmenorrhoea, and lifestyle factors. Each question had multiple choices to answer. The pain of dysmenorrhea was assessed using the Visual Analogue Scale (VAS).[21]

Data collection method: The questionnaire was distributed using an online tool among the study participants, and brief information about the study's objectives was narrated in the local language to all the study participants. Investigators' details were appended in the tools for clarifications about the tools, if any.

Timeline of data collection: The data collection was conducted from June 2023 to September 2023.

Analysis: The collected data were checked for missing data and then transposed to STATA (SE Standard Edition-17, developed by STATA Cop, Texas 77845, USA) analysis software and the required analysis was carried out. In the descriptive analysis, the mean, standard deviation, percentage and skewness of the distribution were analysed. In the inferential statistics, the point estimate for the mean and standard deviation for the sample was calculated with a 95% confidence interval. The study used multivariate logistic regression to identify the factors that affect dysmenorrhea among university students.

Ethical approval: The study proposal was approved on April 26, 2023, by the Institutional Ethical Committee of SRMIST (Deemed University). Written informed consent was obtained from each of the study participants.

RESULTS

The study estimated the prevalence of dysmenorrhea at 25.5% (274) among 1076 respondents. Most of the respondents belonged to the age group of 18-20, and Bachelor's degree students were 78.6% (n=846). The average age of menarche was 12.8±1.4 among university students, which explains that the age of menarche varied by 1.4 years from the average age of 12.8 years in the study sample. A total of 48.8% (n=516) of them were in the age category of 13-14 years. The district-wise distribution of students includes 29.2% (314) from Kancheepuram, 25.5% (n=274) from Coimbatore, 19.9% (n=214) from Chengalpattu and 12% (n=129) from Chennai. In marital status, unmarried were 98.3% (n=1058), and most of the respondents belonged to urban residences 61.8% (n=665). The BMI of 57.6% (n=620) of the respondents were normal. Eight out of ten (79.5%, n=855) of them didn't have a family history of dysmenorrhea, and 91% (979) of them had no history of PCOD. Of the total, 42.6% (n=458) of the respondents had the presence of a clot during menstruation, and 57.4% (618) of respondents did not experience the presence of a clot during menstruation. Of the total, 48% (n=516) of them had stress in their daily lives, 50.3% (n=541) of them consumed junk food 2-4 days a week, and 53.2% (n=572) consumed soft drinks daily. The prevalence of physical activity was 77.7% (n=836), and physical inactivity was 22.3% (n=240), of which 36.3% (n=390) of students engaged in vigorous physical activity, 41.4% (n=446) of them were engaged in moderate physical activity and 22.3% (n=240) of them engaged in doing mild physical activity.

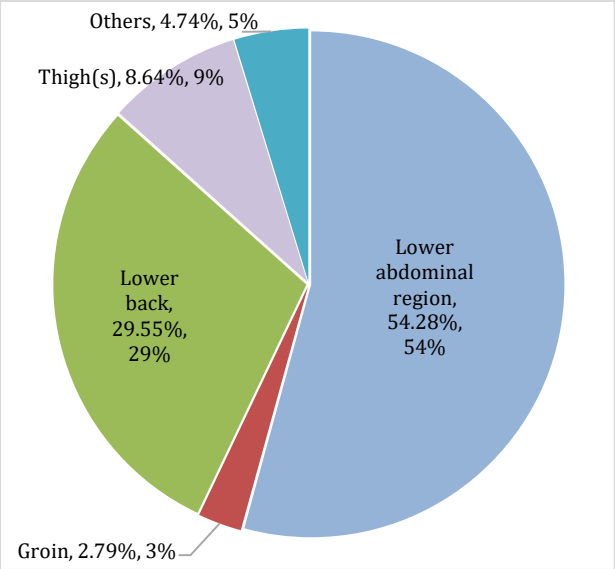

Figure 1: Sites of menstrual pain

It was found that 92.47% (n=995) of the participants had menstrual pain, and 7.53% (n=81) of them had no menstrual pain. The participants reported pain at different sites the maximum reported site of pain was the lower abdomen. Table 1 presents the severity and the types of menstrual pain reported by the study participants, and Fig 1 represents the sites of the pain, as reported by the study participants.

Table 2 presents the association of dysmenorrhea with age group, education, district, residence, BMI and Monthly Per Capita Income (MPCI).

Table 1: Types and severity of menstrual pain (N=1076)

Characteristics	Participants (%)
Severity of dysmenorrhea	
VAS (1-3)-Mild pain	489 (45.45)
VAS (4-6) -Moderate pain	311 (28.9)
VAS (7-8)-Severe pain	183 (17.01)
VAS (9-10)-Worse pain	93 (8.64)
Type of menstrual pain	
Spasmodic pain	466 (43.31)
Shooting pain	308 (28.62)
Piercing pain	114 (10.59)
Stabbing	136 (12.64)
Others	52 (4.83)

*VAS (Visual Analogue Scale)

Table 2: Association of dysmenorrhea and socio-demographic & socio- economic characteristics (n=1076)

Variables	Dysmenorrhea		p- value
	Yes (%)	No (%)	
Age group			
18 to 20	169 (23.37)	554 (76.63)	0.068
21 to 23	92 (29.3)	222 (70.7)	
24 to 25	14 (33.33)	26 (66.67)	
Education			
Diploma/Graduate	217 (25.65)	629 (74.35)	0.957
Master's degree	53 (24.88)	160 (75.12)	
Doctoral degree	4 (23.53)	13 (76.47)	
District			
Chennai	41 (31.78)	88 (68.22)	0.000*
Chengalpattu	82 (38.32)	132 (61.68)	
Coimbatore	50 (18.25)	224 (81.75)	
Kancheepuram	67 (21.34)	247 (78.66)	
Others	34 (23.45)	111 (76.55)	
Residence			
Urban	190 (28.57)	475 (79.56)	0.003*
Rural	84 (20.44)	327 (71.43)	
BMI			
Underweight	60 (24.39)	186 (75.61)	0.094
Normal	171 (27.58)	449 (72.42)	
Overweight	38 (22.62)	130 (77.38)	
Obese	5 (11.9)	37 (88.1)	
MPCI			
Richest	160 (30.19)	370 (69.81)	0.001*
Richer	52 (22.22)	182 (77.78)	
Middle	35 (19.02)	149 (80.98)	
Poorer	12 (14.63)	70 (85.37)	
Poorest	15 (32.61)	31 (67.39)	

*Significant p<0.05

Table 3: Multivariate analysis result of factors associated with dysmenorrhea (n=1076)

Variables	Dysmenorrhea		Bivariate	p-value	Multivariate	p-value
	Absent (%)	Present (%)	UOR [CI]		AOR [CI]	
Age						
18-20	553(76.6)	169(23.4)	1		1	
21-23	222(70.7)	92(29.3)	1.35 [1.00, 1.82] *	0.044	1.41 [1.03, 1.93]*	0.029
24-25	26(66.7)	13(33.3)	1.63 [0.83, 3.26]	0.140	1.71 [0.83, 3.50]	0.140
Age at menarche						
12 & below	340(73.9)	120(26.1)	1		1	
13-14	386(74.8)	130(25.2)	0.71 [0. 66, 1.22]	0.71	0.89 [0. 66, 1.22]	0.495
15 & above	76(76)	24(24)	0. 54 [0.54,1.48]	0.54	0. 84 [0.541,1.44]	0.541
BMI						
Underweight	186(75.6)	60(24.4)	1		1	
Normal	449(72.4)	171(27.6)	1.18 [0.83, 1.70]	0.339	1.19 [0.83, 1.70]	0.325
Overweight	130(77.4)	38(22.6)	0.90 [0.48, 1.28]	0.677	0.79 [0.48, 1.28]	0.344
Obese	37(88.1)	5(11.9)	0.41 [0.11, 0.83]	0.081	0.30 [0.11, 0.83]*	0.021
History of PCOD						
No	733(74.9)	246(25.1)	1		1	
Yes	69(71.1)	28(28.9)	1.20 [0.76, 1.91]	0.421	1.22 [0.75, 1.99]	0.411
Family history of dysmenorrhea						
No	646(75.6)	209(29.4)	1		1	
Yes	156(70.6)	65(29.4)	1.28 [0.92, 1.78]	0.131	1.23 [0.86, 1.74]	0.243
Clot during menstruation						
No	481(77.8)	137(22.2)	1		1	
Yes	321(70.1)	137(29.9)	1.49[0.99, 1.83]*	0.004	1.35 [0.99, 1.83]	0.051
Skipping of Breakfast						
No	553(75.1)	117(24.9)	1		1	
Yes	269(73.5)	97(26.5)	1.08 [0.48, 1.01]	0.575	0.69 [0.48, 1.01]	0.060
Skipping of Meals						
No	574(77.4)	168(22.6)	1		1	
Yes	228(68.3)	106(31.7)	1.58 [1.22, 2.58] *	0.002	1.78 [1.22, 2.58] *	0.002
Consumption of tobacco						
No	790(74.6)	269(25.4)	1		1	
Yes	12(70.6)	5(29.4)	1.22 [0.16, 2.31]	0.38	0.60 [0.16, 2.31]	0.467
Consumption of alcohol						
No	789(74.9)	264(25.1)	1		1	
Yes	13(56.5)	10(43.5)	2.29 [0.96, 8.08]	0.051	2.78 [0.96, 8.08]	0.059
Stress in daily life						
No	434(77.5)	126(22.5)	1		1	
Yes	368(71.3)	148(28.7)	1.38[0.89, 1.64]*	0.020	1.21[0.89, 1.64]	0.220
Junk food consumption						
0-1	98(71.5)	39(28.5)	1		1	
2-4	406(75.1)	135(24.9)	0.83 [0.54, 1.27]	0.401	0.74 [0.48, 1.15]	0.189
5-7	298(74.9)	100(25.1)	0.84 [0.54, 1.30]	0.442	0.78 [0.49, 1.24]	0.309
Consumption of soft drinks						
No	378(75)	126(25)	1		1	
Yes	424(74.1)	148(25.9)	1.04[0.79, 1.37]	0.743	0.97[0.72, 1.32]	0.885
Physical activity						
No Active	171(71.2)	69(28.8)	1		1	
Minimal active	331(74.2)	115(25.8)	0.86[0.606, 1.22]	0.403	0.86[0.600, 1.24]	0.264
Healthy PA	300(76.9)	90(23.1)	0.77[0.515, 1.07]	0.112	0.77[0.523, 1.13]	0.113

*Significant p<0.05

Note: UOR- Un-adjusted Odds Ratio, AOR-=Adjusted Odds Ratio, BMI-body mass index, CI-confidence interval, PCOD-polycystic ovarian syndrome, MPCI-monthly per capita income, PA-Physical activity.

The MPCI is based on the formula: Per capita income = Total household income / Total number of individuals in the household. It reflects the economic status of the individuals but is often used as a proxy for their consumption level. The Chi-squared value for district, residence, and MPCI indicates a significant association with dysmenorrhea (p <0.05).

Table 3 shows the factors associated with dysmenorrhea using chi-square and multivariate analysis to show the relationship. For finding association, the factors that are used to associate with dysmenorrhea are age, age at menarche, body mass index (BMI), family history of irregular menstruation, history of PCOD, physical activity, consumption of junk food and soft drinks, stress in daily life, skipping of breakfast, consumption of alcohol and tobacco.

There is a significant association between dysmenorrhea and clots during menstruation (AOR=1.40; 95% CI [1.032, 1.913]) and skipping of meals (AOR=1.7; 95% CI [1.172, 2.489]).

DISCUSSION

The study estimated the prevalence at 25.5% (274), including the severity, sites and types of pain. Several studies conducted in other parts of the country and outside reported variations in the estimation of the prevalence of dysmenorrhea. A central India study conducted among 310 university students found that the prevalence of dysmenorrhea was 84.2% (n=261), with 34.2% of girls experiencing severe pain.[5] Research conducted in the tribal district of Odisha among 341 women aged 15-49 reported the prevalence at 69.25%.[22] A Bengaluru-based study among nursing students estimated the prevalence of dysmenorrhea at 62.5%. With the mean duration of bleeding of 3-5 days.[23] A study conducted among the medical students at a medical university in Kancheepuram district, Tamil Nadu, found the prevalence at 70.54% for primary dysmenorrhea.[24] Another study conducted in the Sirohi district of Rajasthan among 672 adolescents reported a prevalence of 60% with significant severe pain.[25] The Nepalese study among 137 undergraduate students estimated the prevalence of dysmenorrhea at 73.08% (n=95).[26] Wide variations in these estimates may be due to the use of different selection methods, sample size, study setting and other socio-economic factors in the study groups[27] and the fact that there is no universally accepted definition of dysmenorrhea and no classification system for its severity.[28] These are only diagnosed based on the student's subjective pain, which is hard to measure and could be brought on by non-menstrual events. In addition, the way that people perceive pain and other lifestyle factors may vary depending on their socioeconomic status and cultural background. Significant risk factors for dysmenorrhea included age, age at menarche, body mass index, junk food, soft drink consumption, tea and coffee consumption, and physical activity.[29]

This study found that 45.45%, 28.90%, 17.01% and 8.64% of the university students experienced mild pain, moderate pain, severe pain and worse pain, respectively, as measured using the VAS. The study conducted among 310 university students in Madhya Pradesh found that 34.2% of girls experienced severe pain, 36.6% moderate, and 29.2% had mild pain as measured using the VAS.[5] In a cross-sectional study among 137 pharmacy students in Tamil Nadu, 62% of students experienced moderate pain at a prevalence of 82%.[30] In a cross-sectional study among 703 higher secondary school girls in Imphal West District, Manipur, 21.2% experienced severe dysmenorrhea with a prevalence of 76.0%.[31] It is clear from the findings many students experienced menstrual pain hence, regardless of the methods used to score pain, students experienced pain, demonstrating the depth and complexity of the problem.[3]

The result of the study confirmed that those aged 21-23 years were 1.4 times (AOR 1.41; 95% CI: 1.03, 1.93) experienced primary dysmenorrhea over 24-25 years. However, a study conducted in southern Ethiopia found that those aged 14–17 years were 2.55 times more likely to experience primary dysmenorrhea than those aged ≥18 years (AOR 2.55; 95% CI (1.77, 3.68)).[20] Another study shows a reduction in the incidence of dysmenorrhea by 18% if age increases, in other words, the higher the age, the lower the incidence of dysmenorrhea.[31] The finding from the study shows that by skipping meals, the participant experienced dysmenorrhea, and another study found that students who skipped breakfast are more likely to get dysmenorrhea.[33] Physical activity has no significance towards dysmenorrhea. However, another study found that women who were engaged in regular physical activity experienced fewer bouts of dysmenorrhea. Furthermore, regular exercise helps women feel less stressed, which enhances the blood flow and increases endorphins and neurotransmitters.[34] Thus, educational and counselling sessions should be organised for university students to emphasise the importance of exercise and physical activity for dysmenorrhea.[32]

Moreover, in Tamil Nadu, women's experiences with and reporting of dysmenorrhea are influenced by sociocultural norms. Women's comfort level in addressing menstrual discomfort might be influenced by cultural beliefs that frequently shape conceptions of menstruation, including rituals and restrictions during the period. Many women in Tamil Nadu still experience cultural stigmas related to menstruation, which affect their behaviour during it. These stigmas include avoiding religious locations and isolating themselves. This is especially true in rural regions.[35] Women may underreport or downplay their dysmenorrhea symptoms as a result of these societal expectations. Especially among older or less educated women, traditional menstruation hygiene methods like using cloth instead of sanitary napkins are still common in rural regions. This is frequently connected to a lack of resources, access issues, or ingrained behaviours. These economic and cultural barriers mean that women who use traditional ways are less likely to seek medical attention for dysmenorrhea. Although the Tamil Nadu government has implemented better menstrual hygiene management (MHM) programs, such as giving away free sanitary napkins, many women still adhere to conservative social norms, which may also have an impact on how often they report menstruation discomfort.[36] This is true for adolescents who study at different universities in the state, as their practice is influenced by their families and the proximal communities where they live.

The study was conducted using an online tool with self-reported responses by the study participants, which invariably attracts bias. This is one of the major limitations of the study. However, efforts were made to phrase the questions carefully without any alteration, leading questions were avoided, and utmost attempt was made to maintain privacy in ask-

ing the questions to the study participants to reduce the recall bias.

Conclusion

Dysmenorrhea is both a clinically and socially relevant problem among university-going students. Due to its detrimental effects on quality of life, young women require preventive and supportive measures through education and awareness-building about healthier lifestyles, including regular physical activity, proper nutrition and timely help-seeking. The university curriculum should provide ample scope to empower the students about help-seeking on problems related to menstruation. In addition, value-added courses should also be offered at the university level on menstrual hygiene, common signs and symptoms of menstrual disorders and where to seek help when such a problem arises among university students. Universities should also offer counselling support from the faculty pool of universities, especially from departments of psychology, on issues related to menstruation. In addition, longitudinal studies can also be planned among a cohort of university students over 4-5 years from when they enter university till, they graduate to understand the clinical profile and socio-behavioural factors of dysmenorrhoea.

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