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Primary Dysmenorrhea and Sleep Quality: A Study in Tarumanagara University Medical Students

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ABSTRACT

Introduction: Primary dysmenorrhea is a common menstrual pain experienced by young women, characterized by lower abdominal quadrant pain without any underlying pelvic pathology. The intensity of menstrual pain can significantly impact daily activities, and it can also influence various factors, including sleep quality.
Objective: This study aimed to determine the association between sleep quality and dysmenorrhea severity.
Methods: This study used a cross-sectional design in 214 female medical students at Tarumanagara University aged between 18 to 25 years. Sleep Quality was measured using the Pittsburgh Sleep Quality Index (PSQI) and the severity of primary dysmenorrhea was measured using a questionnaire adapted from a previously developed instrument. It was validated and tested for reliability by the authors in this study (Cronbach's $\alpha = 0.767$). Data were analyze using the Chi-square and multivariable logistic regression, adjusting for BMI and age at menarche.
Result: The study found that 49.1% students have poor sleep quality, and 47.2% experienced severe primary dysmenorrhea. Poor sleep quality was significantly associated with higher dysmenorrhea severity (OR = 3.07; 95% CI: 1.76–5.37). Good sleep quality was independently associated with lower odds of severe dysmenorrhea (OR = 0.309; 95% CI: 0.174–0.548; $p < 0.001$), while BMI and menarche age were not significant.
Conclusion: Good sleep quality is independently associated with reduced severity of primary dysmenorrhea and may reduce the risk of experiencing severe dysmenorrhea.

Keywords: Dysmenorrhea; sleep quality; young adult: menstrual pain

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Introduction

The menstrual cycle in women usually lasts 28 days, with dysmenorrhea symptoms being a common symptom. Primary dysmenorrhea, not caused by any underlying medical conditions, often happens among students.[1,2] A study reported that 49% of medical school students experience primary dysmenorrhea, in 35.5% experience severe dysmenorrhea at Tarumanagara University.[3] In addition, a university in India has reported that 45% of its medical students experience primary dysmenorrhea.[4] Furthermore, Erciyes University Turkey determined that 82.4% had primary dysmenorrhea.[5]

Primary dysmenorrhea is mainly caused by excessive uterine contraction, and vasoconstriction leads to uterine ischemia (lack of blood flow) and pain. This can be mediated by the use of prostaglandin. Women with dysmenorrhea have higher levels of prostaglandins (PGF2α and PGE2) throughout menstruation when compared to those with asymptomatic. The pain is most severe in the first 48 hours of menses for dysmenorrhea.[6] Besides the pain, primary dysmenorrhea also consists of symptoms such as nausea, headaches, vomiting, diarrhea, dizziness, fatigue, irritability, and nervousness.[7]

Contributing risk factors to primary dysmenorrhea include family history, early menarche, lifestyle (such as smoking, caffeine intake, alcohol consumption, physical activity), stress, and poor sleep quality.[7] Poor sleep quality may aggravate dysmenorrhea symptoms by increasing proinflammation factors such as prostaglandin and cytokine along with increasing the pain sensitivity.[8] With these conditions, we need to research the relationship between sleep quality and the severity of primary dysmenorrhea among medical students from the class of 2021 to 2023.

Methods

This study used a cross-sectional design to determine the relationship between sleep quality and severity of primary dysmenorrhea among 214 medical students at Tarumanagara University. Participants were selected through consecutive sampling techniques with inclusion criteria, such as being aged 18 to 25 years old, menstruating for at least one year, non-smoker, never giving birth, never been diagnosed with any gynecological disease, agreed to be a respondent and signed an informed consent record.

Data were collected through a Google form, including Body mass index (BMI), age at menarche, sleep quality, and the severity of dysmenorrhea. The sleep quality was assessed using a Pittsburgh Sleep Quality Index (PSQI), and the severity of dysmenorrhea was assessed using a questionnaire adapted from a previously developed instrument. The questionnaire was tested through pilot testing on a small group of participants from the same population to assess clarity and usability. The reliability of the questionnaire was confirmed with Cronbach Alpha value of 0.767, indicating its suitability for use in this study. This study was conducted at the Faculty of Medicine, Tarumanagara, class of 2021 to 2023, in May 2025. All

participants have given their consent. This study was approved by the Ethics Committee of Tarumanagara University with approval number 312/KEPK/FK UNTAR/I/2024.

Data was analyzed with SPSS version 25, with descriptive statistics to summarize participant characteristics. Chi-square is used to analyze the correlation between sleep quality and the severity of dysmenorrhea, and the Odds ratio (OR) is calculated as the strength of the correlation. Multivariable binary logistic regression was performed to evaluate the independent association between sleep quality and dysmenorrhea severity. Nutritional status (BMI) and age at menarche were included as potential confounders. Adjusted odds ratios (AORs) and 95% confidence intervals were reported. A p-value < 0.05 was considered statistically significant.

Result

This study involved 214 medical students, 74.3% of whom were under 20 years old, while 25.7% were aged 20 or older. The Body Mass Index (BMI) of respondents was 46.7% normal, 23.8% obese, and 14% underweight. Most of the respondents have early menarche (54.7%), average menarche (36.9%), and late menarche (8.4%). The respondents reported that 52.8% experienced mild dysmenorrhea and 47.2% experienced severe dysmenorrhea. The respondents also reported that 50.9% have good sleep quality and 49.1% have poor sleep quality. Respondent characteristics are shown in Table 1.

Table 1 Characteristics of the respondents Faculty of Medicine at Tarumanagara University

Characteristics	N (%)	Mean ± SD	Median (Min - Max)
Age		20.29 ± 1.07	20 (18 - 23)
≥ 20 years	55 (25.7%)		
< 20 years	159 (74.3%)		
Body Mass Index		22.59 ± 4.14	21.72 (15.62 - 38.67)
Underweight	30 (14.0%)		
Average	100 (46.7%)		
Overweight	33 (15.4%)		
Obese	51 (23.8%)		
Menarche		12.44 ± 1.43	12 (8 - 17)
Early	117 (54.7%)		
Average	79 (36.9%)		
Late	18 (8.4%)		
Dysmenorrhea			
Mild	113 (52.8%)		
Severe	101 (47.2%)		
Sleep quality			
Good	109 (50.9%)		
Poor	105 (49.1%)		

Bivariate Analysis

Based on the Chi-square test ($p < 0.001$), there is a statistically significant correlation between sleep quality and the severity of primary dysmenorrhea. The majority of the respondents with poor sleep quality have been experiencing severe primary dysmenorrhea (60.6%), whereas the respondents with good sleep quality mostly reported mild dysmenorrhea (66.7%).

The crude Odds Ratio (OR) was calculated from the table:

$$OR = \frac{66 \times 70}{43 \times 35} = \frac{4620}{1505} \approx 3.07$$

The crude Odds Ratio (OR) was calculated as:

$$CI = e^{ln(OR) \pm 1.96 \times SE}, \text{ where } SE = \sqrt{\frac{1}{66} + \frac{1}{43} + \frac{1}{35} + \frac{1}{70}} \approx 0.285$$

$$CI = e^{1.124 \pm 1.96 \times 0.559} = e^{1.124 \pm 0.559} = (1.76, 5.37)$$

The Odds Ratio of 3.07 (95% CI: 1.76–5.37) indicates that the respondent with poor sleep quality was 3.07 times more likely to experience severe primary dysmenorrhea compared to those who have a good sleep quality. The result of this study confirms that poor sleep quality is related to increased severity of primary dysmenorrhea.

Table 2 Correlation between sleep quality and the severity of primary dysmenorrhea in medical students at Tarumanagara University

Sleep Quality	Category			*p-value*	*Odds Ratio (95%CI)*
	Mild	Severe	Total		
Good	70 (66.7%)	35 (33.3%)	105		3.07
Poor	43 (39.4%)	66 (60.6%)	109	<0.001	(1.76 – 5.37)
Total	113 (52.8%)	101 (47.2%)	214		

*Chi-square test

Multivariable Analysis

The result of the multivariable logistic regression analysis assessing factors associated with severe primary dysmenorrhea. After controlling for body mass index (BMI) and age at menarche, sleep quality remained significantly associated with dysmenorrhea severity.

Students who reported good sleep quality had significantly lower odds of experiencing severe dysmenorrhea compared to those who have poor sleep quality (OR = 0.309; 95% CI: 0.174–0.548; $p < 0.001$). This suggests that good sleep quality reduces the odds of severe dysmenorrhea by approximately 70% less likely to experience severe menstrual pain compared to those with poor sleep quality, independently of BMI and menarche age.

Other variables including, body mass index and age at menarche were not significantly associated with severe dysmenorrhea ($p > 0.05$). Although late menarche had a higher OR (2.109), the association did not reach statistical significance.

Table 3 Multivariable logistic regression analysis of factors associated with severe dysmenorrhea

Variable	Adjusted OR	95% CI	Sig.
Good sleep quality	0.309	0.174 – 0.548	<0.001
Overweight	1.006	0.434 – 2.332	0.988
Obese	1.335	0.649 – 2.746	0.432
Underweight	1.398	0.579 – 3.377	0.457
Early menarche	0.771	0.417 – 1.427	0.408
Late menarche	2.109	0.689 – 6.457	0.191

Reference category: Poor sleep quality

Discussion

50.9% of the respondents had good sleep quality, and 49.1% had poor sleep quality. A study by Adnan and Citrawati (2022) also found that 43 clinical clerkship students (41.3%) had poor sleep quality, and 61 clinical clerkship students (58.7%) had good sleep quality.[9] A study by Vidović et al. (2023) also reported a higher prevalence of poor sleep quality (67.9%) in 262 medical students in Croatia.[10] Medical students are highly vulnerable to sleep disturbances due to how they manage academic stress, study and rest time balance, and sleep hygiene. According to a study by Fitriyani et al. (2024), poor sleep quality may result from an activation of the hypothalamic-pituitary-adrenal (HPA) axis in response to excessive stress. This condition leads to elevated cortisol levels, heartbeats, and blood pressure, placing the body in a 'fight or flight' response that disrupts sleep. If this happens continuously, it may decrease sleep quality.[11]

In this study, 113 medical students (52.8%) experienced mild dysmenorrhea, and 101 medical students (47.2%) experienced severe dysmenorrhea. A recent national study by Situmorang et al. (2025) reported that 301 medical students (47.8%) experienced moderate to severe dysmenorrhea, 274 medical students (43.49%) experienced mild dysmenorrhea, and 55 medical students (8.73%) did not experience dysmenorrhea.[12] Another study by Sima et al. (2022) across five Romanian universities found that 507 students (37.6%) considered their menstrual pain to be severe, 778 students (57.7%) considered their menstrual pain to be moderate, and only 4.7% of students considered the menstrual pain to be mild.[13] All three studies further confirms that not only the prevalence but also the impact of dysmenorrhea on daily activity. Students reported that they have depleted energy levels, emotional stability, academic focus, and social interaction. Sima et al. recorded that 666 (49.4%) students had a negative effects on academic performance. Additionally, Situmorang et al. also found that there is an association between dysmenorrhea with depression and stress symptoms.[12,13] Likewise, this study observed that students are more prone to experience severe menstrual pain and often struggle with their daily tasks.

This study revealed a significant association between sleep quality and the severity of primary dysmenorrhea among medical students at Tarumanagara University. It shows that 49.1% of medical

students have poor sleep quality, and 47.2% of medical students experience severe primary dysmenorrhea. These findings justify the hypothesis that poor sleep quality is associated with severe menstrual pain, emphasizing the importance of sleep quality in reproductive health. Biologically, poor sleep quality may disrupt the hormone balance of estrogen and progesterone, and increase levels of prostaglandins and cortisol which may heighten uterine contractions and disrupt pain modulation in the brain. This study result is consistent with the meta-analysis by Liu et al. (2024) which reported that 70.3% prevalence of primary dysmenorrhea among college students and acknowledged having adequate sleep as a protective factor with an odds ratio (OR) of 0.328.[14] A study by Delistianti et al. (2019) at Islam Bandung University has found that 62% medical students had poor sleep quality, with the majority in that group experiencing moderate to severe primary dysmenorrhea. The statistics found in the study highlight the significant correlation between poor sleep quality and severe dysmenorrhea ($p = 0.04$).[15] Based on our study findings, college students with poor sleep quality are prone to experience severe primary dysmenorrhea.

In this study, multivariable logistic regression was performed to examine the independent association between sleep quality and dysmenorrhea severity, adjusting for Body Mass Index (BMI) and age at menarche. Sleep quality remained significantly associated with the severity of primary dysmenorrhea, whereas BMI and age at menarche were not significantly associated with the severity of primary dysmenorrhea. These results are aligned with a cross-sectional study among Jordanian women, which also reported no statistically significant association between severe dysmenorrhea and BMI or age at menarche, as well as other factors such as age and weekly study hours.[16] This similarity suggests that these biological characteristics may not have an independent effect on dysmenorrhea severity when other lifestyle and physiological variables are taken into account. In contrast, a study among Turkish women by Çınar et al. (2021), using multinomial logistic regression, found that the higher BMI was associated with less severe dysmenorrhea, while early menarche was licked to an increase of severe dysmenorrhea. The differences between their findings and this study may be due to methodological variations, including the use of multinomial logistic regression with three pain categories as opposed to binary logistic regression, as well as variation in sample size, participant characteristics, and sociocultural or lifestyle factors.[17] In this study, only sleep quality was independently linked with dysmenorrhea severity suggesting its potential as a modifiable factor.

Conclusion

Poor sleep quality is associated with severe of primary dysmenorrhea among medical students. It suggests that sleep plays a significant role in menstrual pain through hormonal and neurological mechanisms.

This research suggests the need for a more holistic approach to dysmenorrhea management, including concerns about sleeping patterns. Further research is needed to assess the effectiveness of lifestyle interventions.

Conflicts of Interest

There is no conflict of interest.

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References

1. Barrett KE, Barman SM, Brooks HL, Yuan JXJ. Ganong's review of medical physiology. 26th ed. McGraw-Hill Education; 2019. 893–959 p.
2. Sembulingam K, Sembulingam P. Essentials of medical physiology. 9th ed. Jaypee Brothers Medical Publishers; 2023. 482–491 p.
3. Permata I, Halim S. Pengaruh kejadian dismenore primer dengan kualitas tidur pada mahasisiwi Fakultas Kedokteran Universitas Tarumanagara. Ebers Papyrus. 2023 Jun;29(1):57–65.
4. Syed A, Rao SB. Prevalence of premenstrual syndrome and dysmenorrhea among medical students and its impact on their college absenteeism. Int J Reprod Contracept Obstet Gynecol. 2020 Mar 25;9(4):1377–81.
5. Polat DC, Mucuk S. The relationship between dysmenorrhea and sleep quality. Cukurova Medical Journal. 2021 Jan 5;46(1):352–9.
6. Iacovides S, Avidon I, Baker FC. What we know about primary dysmenorrhea today: A critical review. Hum Reprod Update. 2015 Feb;21(6):592–611.
7. Hyun M, Kim J. Association between sedentary behavior and primary dysmenorrhea in young Korean women: A cross-sectional online survey. Healthcare (Switzerland). 2025 May 8;13(10):1098.
8. Kourbanova K, Alexandre C, Latremoliere A. Effect of sleep loss on pain—New conceptual and mechanistic avenues. Vol. 16, Frontiers in Neuroscience. 2022. p. 1009902.
9. Adnan AW, Citrawati M. Hubungan kualitas tidur dengan tingkat kecemasan dokter muda di Fakultas Kedokteran UPN Veteran Jakarta. Jurnal Kedokteran YARSI. 2022;30(2):65–73.
10. Vidović S, Rakić N, Kraštek S, Pešikan A, Degmečić D, Zibar L, et al. Sleep quality and mental health among medical students: A cross-sectional study. J Clin Med. 2025 Apr 1;14(7):2274.
11. Fitriyani, Fathurrahman A, Mandala Z, Anggorotomo W. Gambaran kualitas tidur pada mahasiswa pendidikan profesi dokter di Rumah Sakit Pertamina Bintang Amin. Jurnal Ilmu Kedokteran dan Kesehatan [Internet]. 2024 Jun;1(2):1244–51. Available from: http://ejurnalmalahayati.ac.id/index.php/kesehatan
12. Situmorang H, Sutanto RL, Tjoa K, Rivaldo R. Association between primary dysmenorrhoea on quality of life, mental health and academic performance among medical students in Indonesia: a cross-sectional study. BMJ Open. 2025 Jan 6;15(1).
13. Sima RM, Sulea M, Radosa JC, Findeklee S, Hamoud BH, Popescu M, et al. The prevalence, management and impact of dysmenorrhea on medical students' lives—A multicenter study. Healthcare (Switzerland). 2022 Jan 14;10(1):157.
14. Liu J, Wang Y, Wu L, Wang L, Fang H. Study on the influencing factors of primary dysmenorrhea in female college students: Systematic review and meta-analysis. Medicine (United States). 2024 Dec 6;103(49):e40906.

15. Delistianti RY, Irasanti SN, Ferri AFM, Ibnusantosa RG, Sukarya WS. Hubungan antara kualitas tidur dengan kejadian dismenore primer pada mahasiswi Fakultas Kedokteran Universitas Islam Bandung. Jurnal Integrasi Kesehatan & Sains. 2019 Jul;1(2):134–8.
16. Al-Husban N, Odeh O, Dabit T, Masadeh A. The influence of lifestyle variables on primary dysmenorrhea: A cross-sectional study. Int J Womens Health. 2022 Apr 13; 14:545–53.
17. Çinar GN, Akbayrak T, Gürşen C, Baran E, Üzelpasacı E, Nakip G, et al. The influence of lifestyle variables on primary dysmenorrhea: A cross-sectional study. Reproductive Sciences. 2021 Aug 11;28(2):381–92.