

THE RELATIONSHIP BETWEEN NUTRITIONAL STATUS AND THE OCCURRENCE OF PRIMARY DYSMENORRHEA AMONG UNDERGRADUATE MEDICAL STUDENTS AT UDAYANA UNIVERSITY

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ABSTRACT

Primary dysmenorrhea is menstrual pain in the lower abdomen originating from the uterus without accompanying complications or organic abnormalities. Primary dysmenorrhea most commonly occurred in late adolescence, particularly among women aged 18–24 years, which corresponds to the typical age of university students. Primary dysmenorrhea was influenced by several factors, one of which was nutritional status. Aiming to evaluate the link between nutritional status and primary dysmenorrhea, this research focused on female students within the Undergraduate Medical Program at Udayana University. Focusing on female medical students at Udayana University, this cross-sectional study analyzed the link between nutritional status and primary dysmenorrhea. Data were gathered through non-probability accidental sampling to determine the association between the independent variable (nutritional status) and the dependent variable (primary dysmenorrhea severity). The study involved 111 respondents, with a prevalence of primary dysmenorrhea of 92.8% and proportion of severe primary dysmenorrhea of 25%. Severe primary dysmenorrhea was more frequently experienced by respondents with overweight nutritional status compared to those with underweight and normal nutritional status ($p=0.058$). In addition, severe primary dysmenorrhea was more common among respondents with high stress levels ($p=0.456$). Therefore, it was concluded that there was no significant relationship between nutritional status or stress level and the severity of primary dysmenorrhea among undergraduate medical students at Udayana University.

Keywords : Nutritional Status, Primary Dysmenorrhea, Stress

INTRODUCTION

Characterized by pelvic discomfort, dysmenorrhea involves pain localized in the lower abdomen that frequently extends toward the lumbar region and upper thighs throughout the menstrual cycle⁶, added by systemic symptoms which are sweating, headache, diarrhea, nausea, and vomiting². There are two main types of dysmenorrhea, known as the primary and secondary forms. Primary type which not with underlying complications and secondary which with reproductive organ pathology such as endometritis or adenomyosis⁵. Primary dysmenorrhea affects individuals post-puberty, peaking in prevalence during late adolescence (18–24 years)⁹. Globally, the prevalence of primary dysmenorrhea among women of reproductive age ranged from 45% to 95%. In Indonesia in 2017, dysmenorrhea had a high prevalence of 64.25%, with 54.89% of women experienced primary dysmenorrhea and 9.36% experienced secondary dysmenorrhea¹⁹.

Primary dysmenorrhea has been recognized as one of the most frequent reproductive problem within young women, particularly students, due to its recurrent nature and potential to

disrupt daily activities. Recurrent menstrual pain may lead to absenteeism, reduced concentration, and decreased academic performance, which is particularly concerning in medical education where cognitive load and academic pressure are high⁵. Among students who experienced dysmenorrhea every month, 91.7% reported its occurrence, and 68.9% stated that it interfered with their learning activities¹⁷. Furthermore, untreated, chronic pain may lead to hyperalgesia, chronic pelvic pain, and risk of fibromyalgia⁷.

Risk factors for dysmenorrhea are broadly classified into non-modifiable (e.g., family history, early menarche) and behavioral factors (e.g., diet, physical activity, psychological stress, and nutritional status). Nutritional status, reflected by the Body Mass Index (BMI), is a modifiable factor that may influence dysmenorrhea severity because body fat content affects the synthesis of prostaglandin, the hormone primarily responsible for uterine contractions and pain during menstruation³. Given these considerations, this study was designed to evaluate whether nutritional status serves as a significant factor in the experience of primary dysmenorrhea among Udayana University medical students. This study aimed to analyze the relationship between

nutritional status and the occurrence of primary dysmenorrhea by assessing the distribution of nutritional status and evaluating its association with the incidence of primary dysmenorrhea among female undergraduate medical students at Udayana University.

METHOD

This research was an analytical cross-sectional study carried out among female undergraduate medical students at the Faculty of Medicine, Udayana University. The study was carried out at the Cakra Vidya Hushada building, Undergraduate Medical Program, Faculty of Medicine, Udayana University, from April to May 2025.

The accessible population consisted of female medical students from the 2023 and 2024 cohorts at Udayana University. The inclusion criteria were female students who agreed to participate and completed all stages of the study. The exclusion criteria were students with a history of reproductive organ complications or those who had been diagnosed with mental disorders and were receiving pharmacological treatment for these conditions. These exclusion criteria were applied to minimize potential confounding effects that could influence pain perception or stress levels of nutritional status.

This study applied a non-probability sampling technique using the accidental sampling method. The sample was obtained by contacting the group leaders of the 2023 and 2024 cohorts of the Undergraduate Medical Program, who were asked to disseminate information within their respective group chats. Willingness to participate was then recorded, and schedules were arranged for respondents to attend the Cakra Vidya Hushada for height and weight measurements and questionnaire completion. Exclusion criteria were applied through face to face screening questions by the researcher to each respondent.

A total of 111 female students fulfilled the eligibility criteria and were enrolled in this study. Primary dysmenorrhea was assessed using the WaLLID score questionnaire, while stress levels were evaluated with the Perceived Stress Scale-10 (PSS-10). To ensure accuracy in determining nutritional status, BMI was derived from physical measurements of height and weight rather than self-reported data. Body Mass Index was derived by dividing weight (kg) by the square of height (m²); these results were then grouped into classes following universal BMI guidelines.

The collected data were processed using statistical software and analyzed through univariate and bivariate methods, with the results presented descriptively in tables and narrative form. Univariate analysis was used to summarize the distribution of each study variable, whereas bivariate analysis employing the chi-square test was conducted to examine the relationships between nutritional status, stress level, and the severity of primary dysmenorrhea. Statistical significance was determined at a p-value of < 0.05. Ethical approval was obtained from the Research Ethics Committee with protocol number 0618/UN14.2.2.VII.14/LT/2025.

RESULT

A total of 111 undergraduate medical students from the 2023 and 2024 cohorts at the Faculty of Medicine, Udayana University were enrolled in this study.

Most of the individuals involved were between 19 and 20 years old, with an average age of 19.11 years (spanning 18 to 21 years). Their average body mass index (BMI) was 21.4, while individual scores varied between 13.3 and 31.6. The prevalence of primary dysmenorrhea was substantially higher than that of students without dysmenorrhea, with moderate dysmenorrhea being the most frequently reported severity. Regarding stress levels, the majority of participants were classified as having moderate stress.

Table 1. Demographic characteristics of participants

Variable	Frequency (f)	Percentage (%)
Age		
18 years	32	28.8
19 years	38	34.2
20 years	38	34.2
21 years	3	2.7
Cohort		
2023	57	51.4
2024	54	48.6
Nutritional status		
Underweight	21	18.9
Normal	76	68.5
Overweight	14	12.6
Primary dysmenorrhea occurrence		
Yes	103	92.8
No	8	7.2
Severity of primary dysmenorrhea		
Severe	28	25.2
Moderate	47	42.3
Mild	28	25.2
None	8	7.2
Stress level		
High	7	6.3
Moderate	99	89.2
Low	5	4.5

In Table 2, the categories of primary dysmenorrhea severity were adjusted for analytical purposes. Mild primary dysmenorrhea and no dysmenorrhea were combined into a single category (mild), while moderate and severe primary dysmenorrhea were merged into one category (severe). Based on the table, severe primary dysmenorrhea was more frequently observed among respondents with overweight nutritional status compared to those with underweight and normal nutritional status. The chi-square test yielded a p-value of 0.580 ($p > 0.05$) for the association between the two variables, indicating no significant relationship between nutritional status and the severity of primary dysmenorrhea.

Table 2. Association between nutritional status categories and the severity of primary dysmenorrhea

Nutritional status	Severity of primary dysmenorrhea			
	Severe		Mild	
	n	%	n	%
Underweight	13	61.9	8	38.1
Normal	51	67.1	25	32.9
Overweight	11	78.6	3	21.4
Total	75	67.6	36	32.4

$p = 0.058$

In Table 3, the categories of primary dysmenorrhea severity were adjusted for analytical purposes. Mild primary dysmenorrhea and no dysmenorrhea were combined into a single category (mild), while moderate and severe primary dysmenorrhea were merged into one category (severe). Based on this table, severe primary dysmenorrhea was more frequently observed among respondents with high stress levels. The chi-square test yielded a p-value of 0.456 ($p > 0.05$) for the association between stress level and primary dysmenorrhea severity, indicating no significant relationship between the two variables. Furthermore, the p-value of 0.456 ($p > 0.25$) indicated that stress level did not meet the criteria for inclusion in multivariate analysis.

Table 3. Association between stress level and the severity of primary dysmenorrhea

Stress level	Severity of primary dysmenorrhea			
	Severe		Mild	
	n	%	n	%
Low	4	80	1	20
Moderate	65	65.7	34	34.3
High	6	85.7	1	14.3
Total	75	67.6	36	32.4

$p = 0.456$

DISCUSSION

The study aimed to analyze the correlation between BMI-based nutritional status and primary dysmenorrhea, focusing specifically on the 2023 and 2024 cohorts within the Faculty of Medicine at Udayana University. The findings showed a high prevalence of primary dysmenorrhea (92.8%), with moderate severity being the most frequently reported, indicating that this condition was common among female medical students. This finding suggests that primary dysmenorrhea represents a prominent health concern that may affect daily functioning and academic performance among medical students. This prevalence was comparable to previous studies among Irish university students (91.5%)¹⁰ and students at King Saud University, Saudi Arabia (80.1%), with 49.8% experiencing moderate primary dysmenorrhea⁴. The similarity of prevalence rates across these studies may be explained by comparable age ranges, particularly late adolescence and early adulthood, which are associated with heightened hormonal activity and increased academic demands. Additionally, the use of similar diagnostic criteria and subjective

pain assessment tools may have contributed to the consistency of findings across studies.

In contrast, lower prevalences were reported among Ethiopian high school students (69.3%)¹¹ and students at Muhammadiyah University of Semarang (59%)¹⁵, which may be attributed to differences in age, educational background, definitions of primary dysmenorrhea, and the degree of control over confounding factors such as physical activity, sleep patterns, and smoking behavior.

Statistical analysis demonstrated no significant association between nutritional status and the severity of primary dysmenorrhea ($p = 0.580$, $p > 0.05$). This finding was consistent with studies conducted at STIKES Mamba'ul 'Ulum Surakarta²¹, Muhammadiyah University of Makassar¹⁶, and Politeknik 'Aisyiyah Pontianak¹⁴, suggesting that nutritional status alone was not a determining factor. This result indicates that primary dysmenorrhea is likely influenced by multifactorial mechanisms rather than a single anthropometric parameter. Although descriptively a higher proportion of severe dysmenorrhea was observed among overweight students, this trend was not statistically significant. Biologically, excess body fat may influence prostaglandin production and uterine blood flow¹³. However, these biological effects may have been masked by other unmeasured factors such as dietary quality, physical activity levels, genetic predisposition, pain tolerance, and menstrual cycle characteristics.

The absence of a significant association between nutritional status and dysmenorrhea severity indicates that body mass index may not fully capture the complexity of nutritional influences on menstrual pain. Nutritional quality, micronutrient intake, and inflammatory dietary patterns, which were not assessed in this study, may play a more critical role than anthropometric measurements alone. Consequently, future studies should consider evaluating dietary composition and nutritional adequacy rather than relying solely on BMI classification.

Conversely, studies conducted at Hang Tuah University¹, Universitas Medika Suherman¹², and among high school students in Padang¹⁷ reported a significant association, which may be explained by differences in population characteristics, BMI categorization methods, and sampling techniques that influenced the distribution of nutritional status and dysmenorrhea severity. Differences in age group, hormonal maturity, and lifestyle behaviors between high school students and university students may contribute to these inconsistent findings. Additionally, variations in BMI categorization, such as grouping nutritional status into only normal and abnormal categories, may increase the likelihood of detecting statistically significant associations.

Similarly, no significant association was found between stress level and primary dysmenorrhea severity ($p = 0.641$, $p > 0.05$). This result aligned with studies conducted at the University of Muhammadiyah Malang²⁰ and Al-Azhar Islamic University of Mataram⁸. One possible explanation for this finding is the relatively homogeneous distribution of stress levels among respondents, with most participants classified as having moderate stress, which limited variability between comparison groups. In addition, the PSS-10 measures general perceived stress and may not sufficiently capture academic-specific stressors. As a result, stress related to examinations, academic workload, and clinical responsibilities may not have been fully represented. This finding

differed from a study at Atma Jaya Catholic University, which identified stress as a risk factor for dysmenorrhea¹⁸, possibly due to differences in stress level distribution, with a higher proportion of respondents experiencing high stress, as well as differences in measurement sensitivity.

This study had several limitations. The use of accidental sampling may limit generalizability, although selection bias was considered minimal due to homogeneous participant characteristics and consistent application of inclusion and exclusion criteria. The WaLIDD score and PSS-10 were subjective instruments and may have introduced reporting bias, despite their established validity and reliability. Additionally, potential confounders such as dietary habits, physical activity, age at menarche, and family history were not fully assessed and should be considered in future research. These limitations highlight the need for future studies to incorporate broader variables and longitudinal designs to better clarify the determinants of primary dysmenorrhea.

CONCLUSION

Most undergraduate medical students at Udayana University had normal nutritional status, and the majority experienced primary dysmenorrhea. Statistical analysis showed no significant association between nutritional status and the severity of primary dysmenorrhea. In addition, no significant association was found between stress level and the severity of primary dysmenorrhea among undergraduate medical students at Udayana University.

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