

# RELATIONSHIP BETWEEN SLEEP QUALITY AND ACADEMIC STRESS WITH PREMENSTRUAL SYNDROME IN FINAL-YEAR NURSING STUDENTS

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## Keywords:

Academic Stress  
Final-Year Female Students  
Premenstrual Syndrome  
Sleep Quality

## Abstract

*Premenstrual Syndrome (PMS) is a common condition among menstruating women, often influenced by factors such as sleep quality and stress levels. Final-year female students are particularly vulnerable to sleep disturbances and academic stress. This study analyzes the relationship between sleep quality and academic stress with PMS among final-year nursing students at UPN “Veteran” Jakarta. A Cross-Sectional design was used, and data was collected in November 2024. The study involved 188 final-year students: Bachelor of Nursing (79 respondents), Diploma in Nursing (45 respondents), and Professional Nurse Education Program (64 respondents), selected through Stratified Convenience Sampling. Pittsburgh Sleep Quality Index (PSQI), Student-Life Stress Inventory (SLSI), and Shortened Premenstrual Assessment Form (SPAF) were used to measure sleep quality, academic stress, and PMS. Data were collected via online questionnaires and analyzed using the chi-square test. Results revealed a significant relationship between sleep quality ( $p = 0.000$ ;  $OR = 5,989$ ) and academic stress ( $p = 0.000$ ;  $OR = 28,761$ ) with PMS. Students with poor sleep quality had a 6-fold higher risk of severe PMS, while those with high academic stress had a 29-fold higher risk. This study emphasizes the importance of maintaining healthy lifestyles, such as improving time management to enhance sleep quality and adopting coping strategies to reduce academic stress, thereby minimizing PMS complaints.*

Received: March 2025

Accepted: April 2025

Published: May 2025



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## INTRODUCTION

Women often experience disorders before or during menstruation, commonly known as Premenstrual Syndrome (PMS). WHO reports that the prevalence of PMS in Asian countries is relatively high compared to other continents. The Ministry of Health in Indonesia states that the prevalence rate of PMS has reached 85% of 60-75% of the female population with productive age who experience moderate to severe PMS (1). The prevalence of PMS in Jakarta shows that 58.7% of early adult respondents experienced mild PMS, and 37.3% experienced moderate to severe PMS (2). In adolescents, especially students, PMS can reduce study concentration and interfere with communication with friends (1). Previous research conducted by students of the National Development University “Veteran” Jakarta to 160 Bachelor of Nursing

students showed that the percentage of students who felt severe and moderate PMS symptoms reached 81.2% (3). The main factor of PMS is still unknown, but generally, PMS is caused by several factors, including sleep quality, stress levels, nutritional status, smoking, and alcohol (4).

Students in their final-year are part of a vulnerable group who often experience sleep disturbances. The intensity and pressure of education that is high enough can provide an immense burden that affects rest time (5). Research at universities in Indonesia proves that most health students, especially final-year students, have poor sleep quality, as much as 56.64% (6). Another factor that affects PMS is stress in students. Stress that students often experience is known as academic stress. The prevalence of stress experienced by Indonesian students is 36.7-71.6% (1). The condition of academic stress in students, especially final-

year students, has various causative factors, namely academic burden (47.06%), which comes from final assignments, curriculum, competition with friends and so on, personal problem factors (68.63%), high clinical problems (43.14%) which come from lack of knowledge possessed, lack of clinical skills, fear of failure, and so on (1).

The level of academic stress can affect the incidence of PMS (7). When women experience stressful conditions, the hormone cortisol will be produced due to the active Hypothalamic Pituitary Axis (HPA). The cortisol hormone inhibits the release of Luteinizing Hormone (LH) and Gonadotropin Releasing Hormone (GnRH). The hormonal imbalance will occur due to the inhibition of the LH hormone, which produces estrogen and progesterone hormones and causes PMS (8). The occurrence of PMS has a significant impact on the level of quality of life. In female students, especially final-year students, PMS can interfere with productivity during lectures, especially during final project research and absenteeism. PMS also affects communication with family and friends and affects social life (9).

Several factors are behind the incidence of sleep quality and academic stress, such as the final project or thesis and interpersonal conflict. Other things that can influence this are ineffective environmental conditions and hybrid learning systems. Although many studies have examined sleep quality and academic stress with PMS, few have examined it specifically in final-year students. Based on the background that the researcher has stated, the researcher is interested in reviewing and further analyzing the relationship between sleep quality and academic stress with PMS in final-year nursing students of UPN "Veteran" Jakarta.

## METHODS

This study uses a quantitative method with a descriptive observational design and a cross-sectional approach. The sampling technique used is two types of techniques in stages. The first stage is the Stratified method of Stratified Random Sampling, and the second is Convenience Sampling. The sample used amounted to 188 respondents who came from

Diploma / D3 Nursing semester 5 (45 people), Bachelor / S1 Nursing semester 7 (79 people), and Ners Profession (64 people). The inclusion criteria used are active students, and the exclusion criteria used are students who have a history of / suffer from gynaecological diseases and often consume analgesic drugs.

The standardized instrument used to measure the independent variable of sleep quality is the Pittsburgh Sleep Quality Index (PSQI) which measures 7 components of sleep quality. There are 17 question items on the PSQI instrument where each item is given a scale of 0-3. Sleep quality is said to be good if the total score value is  $\leq 5$  (minimum score of 0) and is said to be poor if the total PSQI score is  $> 5$  (maximum score of 21) (10).

The second instrument used is the Student-Life Stress Inventory (SLSI) instrument which consists of 2 dimensions, namely academic stress and reaction to stress. The SLSI instrument has 49 positive statement items and 2 negative statement items. Likert scale (1-5) was used in this instrument with a range of answer options: never, rarely, sometimes, often and always. The results of the questionnaire were interpreted into two categories, namely mild and severe. Academic stress is said to be mild if the total score of the final score  $\leq 145$  (minimum score 51) and is said to be severe if the final total score is  $> 145$  (maximum score 255) (11).

The last instrument used was the Shortened Premenstrual Assessment Form (SPAF) instrument. The SPAF questionnaire has become a standardized and fixed questionnaire and consists of 10 question items. Respondents are said to experience premenstrual syndrome if they experience one of the PMS symptoms described in the questionnaire, even if the symptoms are only a few. Each question asked has a score of 1-6 with the description of no complaints, very mild, mild, moderate, severe, and very severe. The results of the questionnaire were interpreted into two categories, namely mild and severe. PMS complaints are said to be mild if the total final score is  $< 30$  (minimum score 1) and said to be severe if the total final score is  $\geq 30$  (maximum score 60) (12).

This research was conducted at the University in Jakarta in November 2024. The questionnaire was distributed via a

Google form. The bivariate data analysis used in this study is the chi-square test, which aims to find the relationship between sleep quality and academic stress and PMS. This research was conducted after obtaining Ethical Approval issued by the Health Research Ethics Commission, UPN “Veteran” Jakarta with Number: 476/XI/2024/KEP.

**RESULTS AND DISCUSSION**

**Table 1** Average distribution of respondent characteristics (n=188)

Variable	Min	Mean	Max	SD
Age	19	21.44	25	1.148

The results of the respondents' characteristics show that of the 171 respondents involved, the average (mean) age of the respondents is 21 years old, with a range of 19-25 years old.

**Table 2** Frequency distribution of respondent characteristics (n=188)

Variable	Frequency	Percentage (%)
<b>Level of education</b>		
D3/Diploma of Nursing	45	24
S1/ Bachelor's Degree in Nursing	79	42
Ners Profession	64	34
<b>Age at Menarche</b>		
Early (< 10 Years)	16	8,5
Standard (10 –13 Years)	126	67
Late (> 13 Years)	46	24,5
<b>Menstrual Duration</b>		
Short (<4 days)	19	10,1
Regular (4-8 days)	148	78,7
Long (>8 days)	21	11,2
<b>Menstrual Cycle</b>		
Polimenorrhea (< 21 days)	35	18,6
Regular (21-35 days)	135	71,8
Oligomenorea (> 35 days)	18	9,6
<b>Family History of PMS</b>		
Yes	68	36,2
No	120	63,8
<b>Total</b>	<b>188</b>	<b>100</b>

The results of the univariate test of respondent characteristics showed that the respondents involved were aged 19-25 years with an average age of 21 years. Most respondents were in the Bachelor / S1 Nursing education level, with as many as 79 respondents (42%).

Most respondents experienced their first menstruation at 10-13 years (67%). This aligns with previous research, which shows that women experience their first menstruation in the age range of 10-13 years (78.5%) (1). The results of this study are also supported by the Indonesian Ministry of Health, which states that 89% of women experience their first menstruation in the range of 11-13 years (13).

Most respondents experienced menstruation with a regular period of 4-8 days (78.7%). This study's results align with previous research that most respondents experienced expected menstrual duration of 4-8 days (90%) (3). The duration of menstruation is also influenced by psychological factors such as stress and physiological factors such as excessive uterine muscle contractions. Menstruation with a long duration is caused by an increase in the hormone prostaglandin due to uterine muscle contractions, which then triggers PMS symptoms (14).

The menstrual cycle experienced by most respondents was also in the regular category (21-35 days) (71.8%). Most female students have a regular menstrual cycle because their sexual reproductive organs have experienced maturity in the early adult age range (15). This is supported by previous research that the most nursing students have a regular menstrual cycle (83.1%) (3). Another study also showed that most final year nursing students had a regular menstrual cycle (80.3%) where the respondents were 20-22 years and still in the reproductive period so that generally, the menstrual cycle was classified as regular (16).

Based on family history with PMS, the results showed that most respondents did not have a family history with PMS (63.8%). The study's results were supported by previous research, which showed that most respondents did not have a family history of PMS (76.5%). The study also proved that family history did not have a significant relationship with the incidence of PMS, with a p-value of 0.241 > 0.05. This is because other factors can influence the incidence of PMS, such as dysmenorrhea and menstrual duration (17).

**Table 3** Frequency distribution of sleep quality in final-year female students (n=188)

Variable	Sleep Quality				Total	
	Good		Bad		N	%
	N	%	N	%		
<b>D3/Diploma of Nursing</b>	5	11,1	40	88,9	45	100
<b>S1/ Bachelor's Degree in Nursing</b>	15	21,5	62	78,5	79	100
<b>Ners Profession</b>	5	7,8	59	92,2	64	100
<b>Total</b>	27	12,3	161	85,6	188	100

Based on table 3, respondents who experienced poor sleep quality were 161 respondents (85.6%) and 27 respondents (12.3%) experienced good sleep quality. The results prove that most respondents have poor sleep quality and students who experience poor sleep quality are mainly from the Nursing Profession (92.2%).

Based on the results of the study, it can be seen that most students at the Ners Professional level have poor sleep quality (92.2%) compared to the other two education levels. This is in line with previous research conducted on Ners Profession students at Klabat University which shows that most Ners Profession students have poor sleep quality (95.6%) (6).

Most Ners Professional students have poor sleep quality because they have demands for coursework and clinical practice, so they have an effect on shorter sleep times. This is supported by previous research conducted on Ners Professional students at one of the nursing campuses in North Sulawesi. The burden of clinical practice experienced by Ners Professional students can interfere with sleep at night, with daily activities and tend to feel tired during activities during the day (18).

**Table 4** Frequency distribution of academic stress in final-year female students (n=188)

Variable	Academic Stress				Total	
	Mild		Severe		N	%
	N	%	N	%		
<b>D3/Diploma of Nursing</b>	18	40	27	60	45	100
<b>S1/ Bachelor's Degree in Nursing</b>	32	40,5	47	59,5	79	100
<b>Ners Profession</b>	7	10,9	57	89,1	64	100
<b>Total</b>	57	30,3	131	69,7	188	100

Based on table 4, 131 respondents (69.7%) experienced severe academic stress and 57 respondents (30.3%) experienced mild academic stress. The results showed that the majority of respondents experienced severe academic stress. Respondents who experienced severe academic stress mainly were from the Nursing Profession (89.1%).

Based on the results of the study, it can be seen that most students at the Ners Professional level experience severe academic stress (89.1%) compared to the other two education levels. Students have moderate to severe academic stress influenced by academic demands and heavy emotional loads (19).

Clinical practice tasks and workloads such as clinical learning, assignment reports, and clinical supervision from seniors and lecturers can be stressors for Ners Professional students, thus increasing academic stress. This is in line with previous research conducted on nursing profession students at the University of Muhammadiyah Gorontalo which states that there is an influence of task factors and professional practice workload with stress levels (20).

**Table 5** Frequency distribution of Premenstrual Syndrome in final-year female students (n=188)

Variable	Premenstrual Syndrome				Total	
	Mild		Severe		N	%
	N	%	N	%		
<b>D3/Diploma of Nursing</b>	23	51,1	22	48,9	45	100
<b>S1/ Bachelor's Degree in Nursing</b>	42	53,2	37	46,8	79	100
<b>Ners Profession</b>	7	10,9	57	89,1	64	100
<b>Total</b>	72	38,3	116	61,7	188	100

Based on table 5, respondents who experienced severe PMS complaints were 116 respondents (61.7%) and 72 respondents (38.3%) experienced mild PMS complaints. Respondents who experienced severe PMS complaints mainly were from the Nursing Profession (89.1%).

Based on the results of the study, it can be seen that most female students at the Ners Professional level experience severe PMS (89.1%) compared to the other two education levels. This is

influenced by psychological factors with the pressure of academic loads that are different from other levels of education, thus exacerbating the symptoms of PMS (21).

**Table 6** Analysis of the relationship between sleep quality and PMS in final-year female students (n=188)

Variable		Premenstrual Syndrome				Total	
		Mild		Severe		N	%
		N	%	N	%		
Sleep Quality	Good	20	27,8	7	6	27	14,4
	Bad	52	72,2	10	94	161	85,6
<b>Total</b>		<b>72</b>	<b>100</b>	<b>116</b>	<b>100</b>	<b>188</b>	<b>100</b>
<b>P-Value</b>		<b>OR</b>					
<b>0,000</b>		<b>5,989</b>					
		<b>(2,38-15,05)</b>					

The results of bivariate research indicate a significant relationship between sleep quality and the incidence of PMS. These results align with several previous studies conducted on undergraduate nursing students of UPN "Veteran" Jakarta during the pandemic and students of the Faculty of Public Health and the Department of Architecture, University of Indonesia. These studies also show that sleep quality is related to the incidence of PMS (3,22)

Students with poor sleep quality have a 6-fold higher risk of experiencing severe PMS complaints than students with good sleep quality. Final-year nursing students have a higher risk of experiencing PMS than health students in general. The results of this study are evidenced by previous research which states that health students with poor sleep quality have a 3.5 times higher risk of experiencing PMS compared to health students who have good sleep quality (22)

Sleep quality is influenced by the secretion of hormones in the body, such as serotonin and melatonin. Serotonin is a neurotransmitter hormone that regulates mood, eating, and sleep patterns and plays a vital role in controlling one's sleep onset. When serotonin levels decrease, individuals are more prone to sleep difficulties and depression, which worsen sleep quality and cause PMS symptoms (20). Poor sleep quality also affects the production of the hormone melatonin. If the level of melatonin decreases, the production of estrogen hormone will

increase and affect the hormonal imbalance between estrogen and progesterone. This can cause PMS complaints to increase (3).

In contrast to research conducted on students of the Widya Mandala University Medical Study Program Surabaya which revealed no relationship between sleep quality and PMS (p> 0.05). This happens because other factors that affect PMS such as the menstrual cycle, the habit of consuming caffeine, and the habit of consuming herbal medicine / medical drugs. This study was also conducted when respondents experienced the early luteal phase where the data should have been in the late luteal phase, thus affecting the study results (23).

**Table 7** Analysis of the relationship between academic stress and PMS in final-year female students (n=188)

Variable		Premenstrual Syndrome				Total	
		Mild		Severe		N	%
		N	%	N	%		
Academic Stress	Mild	49	68,1	8	6,9	57	30,3
	Severe	23	31,9	108	93,1	131	69,7
<b>Total</b>		<b>72</b>	<b>100</b>	<b>116</b>	<b>100</b>	<b>188</b>	<b>100</b>
<b>P-Value</b>		<b>OR</b>					
<b>0,000</b>		<b>28,761</b>					
		<b>(12,02-68,81)</b>					

The results of bivariate research indicate a significant relationship between academic stress and the incidence of PMS. These results align with previous studies conducted on final-year students of the Faculty of Health, Aisyah University Pringsewu and students of the Faculty of Public Health and the Department of Architecture, University of Indonesia. These studies also showed that academic stress was associated with the incidence of PMS (7,22).

Students who experience severe academic stress have a 29-fold higher risk of experiencing severe PMS complaints compared to students who experience mild academic stress. Final-year nursing students have a higher risk of experiencing PMS than health students in general. The results of this study are in line with previous research, which states that students with severe academic stress have a 2.2 times higher risk of experiencing PMS compared to students who have mild academic stress (22)

If a person experiences stress, the Hypothalamic pituitary axis (HPA) becomes activated and secretes the hormone cortisol. The cortisol hormone released will inhibit the release of Gonadotropin Releasing Hormone (GnRH) and Leutinizing Hormone (LH). During menstruation, LH is needed to produce estrogen and progesterone. Hormonal imbalance due to the production of cortisol is a contributing factor to the occurrence of PMS (22).

Research conducted on undergraduate midwifery students of AKBID Bandung has another opinion. The study revealed that academic stress had nothing to do with PMS ( $p > 0.05$ ). This happened because some theories state that other factors such as family history, age, vitamin and mineral levels below normal limits, and excessive coffee consumption are more dominant (21).

## CONCLUSION

The results illustrate that most female students have poor sleep quality, severe academic stress, and experience severe PMS complaints. The results also showed that there was a significant relationship between sleep quality and academic stress with PMS. Students with poor sleep quality have a 6-fold higher risk of experiencing severe PMS complaints compared to students with good sleep quality. Likewise, female students who experience severe academic stress have a 29-fold higher risk of experiencing severe PMS complaints compared to female students who experience mild academic stress.

This study can be used as a reference in maintaining a lifestyle such as time management to improve sleep quality and using coping strategies to reduce academic stress to reduce the degree of PMS incidence. Future researchers are expected to further develop this research by adding other variables that influence PMS and testing it on respondents other than nursing students.

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