

CORRELATION OF NUTRITIONAL STATUS AND SLEEP QUALITY WITH INCIDENCE PRIMARY DYSMENORRHOEA IN OBSTETRIC STUDENTS

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ABSTRACT

Women in worldwide had experienced dysmenorrhea, with 10-15% experiencing severe dysmenorrhea. The intensity and pain can affect sleep quality. Out of 51 female undergraduate midwifery students, 20 of them experienced dysmenorrhea. They reported having difficulty sleeping and often slept after 11 PM. During lectures, some of them felt exhausted. This study aimed to identify the correlation between nutritional status and sleep quality with the occurrence of primary dysmenorrhea in midwifery students. This research was a quantitative study with an analytic cross-sectional design. The sample consisted of 107 undergraduate midwifery students selected using a total sampling technique. Data collection involved measuring the weight and height of respondents to categorize their body mass index (BMI), and then the respondents completed the Pittsburgh Sleep Quality Index (PSQI) questionnaire and the Numeric Rating Scale (NRS) questionnaire for primary dysmenorrhea. Data analysis was conducted using the Spearman rank correlation test. The results showed a significant negative correlation between nutritional status and the occurrence of dysmenorrhea, as well as a meaningful correlation between sleep quality and primary dysmenorrhea in midwifery students. Based on this research, we concluded that there was a correlation between nutritional status and sleep quality with the occurrence of primary dysmenorrhea.

ABSTRAK

Wanita di dunia merasakan dismenorea dimana 10-15% diantaranya mendapatkan dismenorea yang berat. Intensitas dan nyeri dapat mempengaruhi kualitas tidur. Terdapat 20 dari 51 orang mengalami dismenorea pada mahasiswa sarjana kebidanan. Mereka tidak tidur nyenyak dan tidur > Jam 23.00 WIB. Saat perkuliahan sebagian dari mereka merasa tidak segar dan rasa kantuk tinggi. Tujuan dari studi ini untuk mengidentifikasi adakah hubungan antara status gizi dan kualitas tidur dengan kejadian dismenorea primer pada mahasiswa kebidanan. Penelitian ini merupakan jenis kuantitatif dengan desain penelitian analitik (*cross-sectional*). Sampel yang digunakan yaitu mahasiswa sarjana kebidanan dengan teknik pengambilan sampel *Total sampling* berjumlah 107 orang. Proses pengambilan data dengan mengukur BB dan TB responden kemudian dikategorikan dalam IMT, lalu responden mengisi Kuesioner Kualitas Tidur model *Pittsburgh Sleep Quality Index* (PSQI) dan Kuesioner Skala Dismenorea Primer dengan menggunakan *Numeric Rating Scale* (NRS). Pengolahan data menggunakan uji korelasi *spearman rank*. Hasil yang didapatkan yaitu hubungan negatif yang signifikan antara status gizi dan kejadian dismenorea serta adanya hubungan yang signifikan antara kualitas tidur dengan dismenorea primer pada

mahasiswa kebidanan. Berdasarkan penelitian ini maka dapat disimpulkan bahwa terdapat hubungan yang signifikan antara status gizi dan kualitas hidup dengan kejadian dismenorea primer.

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INTRODUCTION

Menstruation is the main process of initial changes in adolescent girls (Ningsih et al., 2013). Menstruation is the release of the endometrium layer of the uterus, resulting in the discharge of blood from the vaginal opening (Janiwarty & Pieter, 2013). This process occurs regularly every month in normal women and begins 14 days after ovulation. However, many women, especially teenagers, experience menstrual pain (dysmenorrhea) during this process (Sukarni & Wahyu, 2013). Dysmenorrhea is the most common reproductive problem among women and is understood as pain or cramping in the lower abdomen that occurs before or during menstruation. (Omidvar et al., 2016). Dysmenorrhea is divided into primary and secondary categories. Primary dysmenorrhea refers to pain during menstruation that is not caused by any dangerous conditions (including physiological factors) (Larasati & Alatas, 2016). However, primary dysmenorrhea is a burden or discomfort for women. Approximately 140 million women worldwide miss school or work every hour due to dysmenorrhea (Hailemeskel et al., 2016).

According to the World Health Organization (2012), approximately 90% of the total 1,769,425 women worldwide experience dysmenorrhea, with 10-15% experiencing severe dysmenorrhea. In Indonesia, the incidence rate of primary dysmenorrhea among adolescents aged 14 to 19 years is approximately 54.89% (Delistianti et al., 2019). Reports from Adolescent Health Care Services (PKPR) and community health centers show that the occurrence of dysmenorrhea in Bandung City is the highest, at 73% based on data from health centers and 82% based on PKPR data, followed by Sexual Transmitted Infection at 8% and consultation regarding contraceptive use issues at 4% (Andriyani et al., 2016). Another study found that the majority (74.5%) of female students aged 15-18 who have started menstruating experience dysmenorrhea with moderate pain intensity (Savitri, 2015).

There are various risk factors that can influence the occurrence of dysmenorrhea. Some of them are early menarche, a family history of dysmenorrhea, the habit of consuming junk food, exposure to cigarette smoke, excessive coffee or milk consumption, having anemia or inappropriate Body Mass Index (Larasati & Alatas, 2016).

According to the balanced nutrition guidelines, Body Mass Index (BMI) is used as a measure of nutritional status for adults aged 18 and above (PMenkes RI No 41/14, 2014). Based on previous research, it has been found that BMI scores have a close relationship with the occurrence of dysmenorrhea (Harmoni, 2018). Another study indicates a connection between nutritional status and dysmenorrhea, revealing that women with poor nutritional status are 10,500 times more likely to experience menstrual pain compared to those with good nutritional status (Lail, 2017).

Apart from nutritional status, other research suggests that sleep quality can be linked to the duration and intensity of pain (Finan et al., 2013). Sleep quality is a measure of the quality of human sleep. Poor sleep quality is associated with insomnia, physical discomfort, impairment in performing activities, and an increased likelihood of psychological disorders including depression. A study by Woosley and Lischein (Yi et al., 2006) among women of reproductive age explains that women with a history of sleep difficulties experience more severe menstrual pain compared to those without such history. Another study indicates that adolescent girls with poor sleep quality are more prone to experiencing primary dysmenorrhea (Moniung et al., 2014).

Based on previous data from UNISA Bandung midwifery students, around 20 students experiencing primary dysmenorrhea have the habit of going to sleep after 11:00 PM. This habit is often

due to having a lot of assignments and a busy field practice schedule. Consequently, during morning lectures, some of them feel tired and drowsy, or experience persistent dysmenorrhea. However, effective learning during lectures would likely enhance their understanding of the subject matter, which in turn would impact their academic performance and the quality of graduates/students. Therefore, the researcher intends to investigate the correlation between nutritional status, sleep quality, and the occurrence of primary dysmenorrhea among midwifery students. The general objective of this study is to identify whether there is a correlation between nutritional status, sleep quality, and the occurrence of primary dysmenorrhea among midwifery students.

METHOD

Types of research

This study employs a quantitative correlational research design using a cross-sectional approach.

Location and Time of Research

The research was conducted at Campus 1 of 'Aisyiyah University Bandung, located at K.H Ahmad Dahlan Dalam Street No.6, Bandung City. Data collection took place from June to August 2022.

Population and Sample

The population of this study consists of all female students in the Midwifery Program, Faculty of Health Sciences, 'Aisyiyah University Bandung, under the regular pathway, totaling 107 individuals. The study was conducted on the entire population (total sampling).

Data collection

Data collection involved measuring Body Mass Index (BMI), administering a questionnaire on sleep quality, and using an instrument to assess the level of dysmenorrhea experienced by midwifery students. Technically, the data collection process included providing information about the research objectives and obtaining informed consent, culminating in the respondents' willingness to participate. This was followed by measuring Body Weight and Height, processing the data using the BMI formula, distributing the research questionnaire to the respondents, and providing guidance on how to fill out the questionnaire.

Instruments used in this study include the BMI calculation results, the Pittsburgh Sleep Quality Index (PSQI) questionnaire assessing Sleep Quality, and the Numeric Rating Scale (NRS) assessing the level of menstrual pain. For BMI calculation, the results are categorized as underweight if BMI < 18.5, normal if BMI is between 18.5 – 25.0, and overweight if BMI > 25. In the PSQI questionnaire, each component has a score range of 0, 1, 2, 3. The total score of all questions is summed up to a single value within a range of 0 – 21. There are two conclusions for PSQI: sleep quality is considered good if the final score is < 5 and sleep quality is considered poor if the final score is > 5. The NRS questionnaire, which measures primary dysmenorrhea occurrences, has a scale range of 0 - 10, where 0 represents no pain, 1-3 represent mild pain, 4-6 represent moderate pain, and 7-10 represent severe pain. This research had a ethical approval from University of 'Aisyiyah Bandung with number 194/KEP.01/UNISA-BANDUNG/VII/2022.

Processing and analysis of data

Data processing begins with coding the questionnaire results, data entry, and tabulating data by calculating percentages as a step in univariate data analysis. Subsequently, the researcher calculates the relationship between the independent and dependent variables using the Spearman rank correlation test

RESEARCH RESULT

Distribution of Frequency Based on Respondent Characteristics According to First Menstruation.

Table 1. Distribution of Frequency of Respondent Characteristics Based on Respondent Age, Grade Level, and Age of First Menstruation (Menarche)

Respondent Age	Frekuensi (f)	Persentase (%)
< 18 years	14	13,1
18 – 21 Years	93	86,9
>21 Years	0	0
Total	107	100
Grade Level	Frekuensi (f)	Persentase (%)
I	46	43,0
II	32	29,9
II	29	27,1
Total	107	100
Age of Menarche	Frekuensi (f)	Persentase (%)
<11 Years	18	16,8
11 – 14 years	78	72,9
> 14 Years	11	10,3
Total	107	100

Based on Table 1, it is evident that the majority of respondents was between 18-21 years old (86.9%), most of them are in Grade Level I (43%), and the highest proportion experienced menarche between the ages of 11 – 14 years (72.9%).

Furthermore, the results of the Frequency Distribution based on Nutritional Status, Sleep Quality, and Primary Dysmenorrhea Incidence can be seen in the table below:

Table 2. Frequency Distribution of Respondents Based on Nutritional Status, Sleep Quality, and Primary Dysmenorrhea Incidence

Nutritional status	Frekuensi (f)	Persentase (%)
Not enough	25	23,4
Normal	57	53,3
More	25	23,4
Total	107	100
Sleep Quality	Frekuensi (f)	Persentase (%)
Good	14	13,1
Bad	93	86,9
Total	107	100
Primary Dysmenorrhea	Frekuensi (f)	Persentase (%)
No pain	8	7,5
Mild Pain	41	38,3
Moderate Pain	38	35,5
Severe Pain	20	18,7
Total	107	100

Based on table 2, it showed that most respondents had normal nutritional status (53.3%), most respondents have poor sleep quality (86.9%), and most respondents have primary dysmenorrhea with mild pain (86.9%) and moderate pain (35.5%).

Next is the result of calculating the correlation between nutritional status and sleep quality with the incidence of primary dysmenorrhea in midwifery students. The study used the Spearman Rank statistical test with the result $p < 0.05$.

Table 3. Correlation between nutritional status and primary dysmenorrhea Midwifery Students

Nutritional Status (BMI)	Dysmenorrhea									
	No Pain		Mild Pain		Moderate Pain		Severe Pain		Total	
	F	%	F	%	F	%	F	%	F	%
Not enough	1	4	6	24	10	40	8	32	25	100
Normal	3	5,2	25	43,9	20	35,1	9	15,8	57	100
More	4	16	10	40	8	32	3	12	25	100
Total	8	7,5	41	38,3	38	35,5	20	18,7	107	100
$r = -0,232, p = 0,016$										

Based on Table 3, it is shown that a small portion of the respondents experienced dysmenorrhea with mild pain and normal Body Mass Index (BMI) (43.9%). According to the Spearman rank correlation test in this study, the p-value obtained is 0.016, with a result of $p < 0.05$. The correlation coefficient (r) value is -0.232. It can be concluded that there is a significant negative correlation between nutritional status and the occurrence of dysmenorrhea. This implies that a higher nutritional status is associated with milder occurrences of dysmenorrhea, and conversely, if nutritional status decreases or there is insufficient food intake, it is linked to more severe cases of dysmenorrhea.

Table 4. Correlation between sleep quality and primary dysmenorrhea in midwifery student

Sleep Quality	Dismenorea									
	No Pain Mild		Pain Moderate		Pain Severe Pain		Severe Pain		Total	
	F	%	F	%	F	%	F	%	F	%
Good	1	7,1	6	42,9	5	35,7	2	14,3	14	100
Bad	7	7,5	35	37,6	33	35,5	18	19,4	93	100
Total	8	7,5	41	38,3	38	35,5	20	18,7	107	100

r = 0,346, p < 0,001

Based on Table 4, it is indicated that a small portion of respondents experience dysmenorrhea with mild pain and good sleep quality (42.9%). According to the Spearman rank correlation test conducted in this study, the obtained p-value is 0.001, with a result of $p < 0.05$. The correlation coefficient (r) value is 0.346. It can be concluded that there is a significant relationship between sleep quality and the occurrence of primary dysmenorrhea in midwifery students. Good sleep quality exhibits a strong positive association with milder occurrences of dysmenorrhea. Conversely, poor sleep quality has a robust positive connection with more severe instances of dysmenorrhea.

DISCUSSION

Correlation Between Nutritional Status and Primary Dysmenorrhea

Based on the Spearman rank correlation test in this study, the obtained p-value is 0.016, with a result of $p < 0.05$, and the correlation coefficient (r) value is -0.232. It can be concluded that there is a significant negative correlation between nutritional status and the occurrence of dysmenorrhea. A higher nutritional status is associated with milder occurrences of dysmenorrhea, and conversely, when nutritional status decreases or food intake is insufficient, it is linked to more severe cases of dysmenorrhea.

The strong connection between nutritional status and the occurrence of primary dysmenorrhea in this study aligns with research by Proverawati and Misaroh (Proverawati & Misaroh, 2012) who explained that women with either underweight or overweight bodies are prone to experiencing dysmenorrhea. This is because a lower Body Mass Index (BMI) is associated with a more severe level of dysmenorrhea. However, in this study, it is noted that even overweight individuals are at risk of increased dysmenorrhea occurrence. This is due to the fat accumulation in women with excessive nutritional status, which can trigger the production of prostaglandin hormones, leading to increased dysmenorrhea. The severity of dysmenorrhea varies among individuals, with some being able to function normally while others cannot.

Primary dysmenorrhea is most commonly experienced by women with abnormal BMI compared to those with a normal BMI. Menstrual pain occurs due to hormones stimulating contractions in the heavier uterine lining, resulting in mismatched sensations in the uterus. The amount of prostaglandin hormone in women with abnormal BMI is generally higher than those with a normal BMI (Wahyuni et al., 2018).

Other research findings suggest that individuals classified as underweight based on their BMI experience a higher prevalence of menstrual pain compared to those classified as overweight (Omidvar et al., 2016). Menstrual pain appears 1.5 times more frequently in the underweight BMI group (Ozerdogan et al., 2009). Another study explains that primary menstrual pain significantly increases in women with an underweight BMI, with a p-value of < 0.001 (Mandhubala & Jyoti, 2012).

Based on Table 3, it can be concluded from the p-value of 0.016 that there is a significant negative correlation between nutritional status and the occurrence of dysmenorrhea. As nutritional status increases, it is more associated with milder occurrences of dysmenorrhea, and conversely, if nutritional status decreases or there is insufficient food intake, it is related to more severe cases of dysmenorrhea.

The findings of this study do not align with other research explaining that Body Mass Index (BMI) values influence the occurrence of primary dysmenorrhea. For adolescents, increased body fat contributes to a higher risk of experiencing dysmenorrhea. In this study, respondents with abnormal BMI (46.8%) were found to have a lower level of dysmenorrhea pain. This is because these students actively participate in physical fitness activities, which can help alleviate dysmenorrhea with reduced pain. Another factor might be their regular consumption of pain-relieving beverages like herbal remedies or traditional concoctions containing ingredients like turmeric, honey, and water

Women with poor BMI are likely to exacerbate menstrual pain, and conversely, poor sleep quality has a strong positive association with more severe instances of dysmenorrhea

Correlation between Sleep Quality and the Occurrence of Primary Dysmenorrhea

Based on the results of this study, where a significant relationship exists between sleep quality and the occurrence of primary dysmenorrhea, this study is consistent with other research findings demonstrating a strong link between sleep quality and menstrual pain. Women with good sleep patterns experience optimal sleep duration, avoid staying up too late, wake up at appropriate times, do not have sleep-related problems, and are not restless during sleep (Yudhanti, 2018).

If the amount of sleep time is short, it will affect the quality of an individual's sleep. The PSQI instrument includes a component for sleep duration. The results of Rivhan's study showed that the majority of the sample had a sleep duration of only up to 4 and a half hours at most during the night, and only a small portion slept for more than 7 hours at night. In the age range of 18-40 years, individuals generally require 7-8 hours of sleep at night. Primary dysmenorrhea is menstruation accompanied by pain associated with prostaglandin hormones during the ovulation cycle, but without any other pelvic diseases (Fauzan, 2014).

The prevalence of menstrual pain in Indonesian women aged 14-19 years is approximately 54.89% (Purba, 2015). Sleep quality is also influenced by various factors such as hormones, pain syndromes, and psychological factors, especially depression (Hertz, 2012).

Typically, hormones related to reproduction can cause sleep problems in women. These issues can have a direct effect during sleep or arise from other problems, such as when a woman is angry. These sex hormones are linked to brain neurons in women during the luteal phase and the increase in core body temperature during sleep. Reducing sleep time to a total of 4 hours can increase prostaglandin hormones as pain inducers and the bioavailability of inflammation markers, such as interleukin-6 (IL-6) and tumor necrosis factor alpha (TNF- α), which contribute to actual pain. Consistent and prolonged sleep difficulties will disrupt the function of endogenous pain inhibition and increase unconscious pain. The pathophysiological system also plays a role in chronic sleep problems (Haack et al., 2009).

CONCLUSIONS AND RECOMMENDATIONS

Based on the research, it can be concluded that there is a significant correlation between nutritional status and sleep quality with the occurrence of primary dysmenorrhea. These findings demonstrate that these factors play a crucial role in regulating and influencing the incidence of primary dysmenorrhea in women.

The recommendations that can be drawn from this study are as follows:

- a) Enhanced Education and Nutritional Awareness: To reduce the occurrence of primary dysmenorrhea, it is important to enhance education and raise public awareness about the significance of balanced nutrition and adequate nourishment. Health professionals, in collaboration with community leaders and schools, can conduct nutritional education campaigns and programs at educational institutions and health centers to provide accurate information and promote healthy eating habits.
- b) Prioritize Sleep Quality: Poor sleep quality can impact women's reproductive health, including the occurrence of primary dysmenorrhea. Therefore, it is important to prioritize sleep quality and adopt healthy sleep habits, such as maintaining a consistent sleep routine, creating a comfortable sleep environment, and avoiding factors that can disrupt sleep, such as using electronic devices before bedtime.
- c) Further Studies: Further research is needed to deepen the understanding of the relationship between nutritional status, sleep quality, and the occurrence of primary dysmenorrhea. More extensive studies could involve a larger number of respondents and employ more detailed research methods, such as cohort studies or randomized clinical trials, to provide stronger and more objective results.

Implementing the above recommendations, it is hoped that the incidence of primary dysmenorrhea can be reduced, thereby enhancing the overall quality of life for women.

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