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The Relationship Between Stress Levels and The Incidence of Dysmenorrhea in Adolescents

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ABSTRACT

Background: Adolescents can experience dysmenorrhea due to stress exceeding normal limits and inadequate nutrition, which can exacerbate dysmenorrhea. This is because nutritional deficiencies can affect reproductive organ function and increase the risk of menstrual pain in adolescents. This study aims to analyze the relationship between stress levels and the incidence of dysmenorrhea in adolescents. **Methods:** The study design used an observational analytic approach. The sample of 48 adolescent respondents was selected using a simple random sampling technique using a stress questionnaire (Kessler Psychological Distress Scale) and a dysmenorrhea questionnaire (Numeric Pain Rating Scale). Data were analyzed using the Spearman Rho test ($p < 0.05$). **Results:** The results showed a very strong relationship between stress levels and the incidence of dysmenorrhea in adolescents. The p -value of 0.913 (less than 0.05) confirmed the significance of this relationship. **Conclusion:** It can be concluded that there is a strong relationship between stress levels and the severity of dysmenorrhea in adolescents in Koto Baru Hiang Village. There is also a significant positive relationship between stress levels and the severity of dysmenorrhea. Adolescents with higher stress levels tend to experience more severe dysmenorrhea. Data also shows that interventions to reduce stress are essential to support adolescent reproductive health and improve their quality of life. Therefore, in-depth education for adolescents is needed to minimize the incidence of stress-related diemesis.

Keywords:

Stress level,
occurrence of
dysmenorrhe

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Introduction

Dysmenorrhea, or menstrual pain, is a common health problem experienced by adolescent girls worldwide (Amin & Purnamasari, 2020). According to data from various studies, dysmenorrhea can affect adolescents' quality of life, disrupt daily activities, and potentially lead to school absences (Oktavianto et al., 2018). In Indonesia, the prevalence of dysmenorrhea among adolescents is quite high, and this condition is often overlooked. This study focused on adolescents in Koto Baru Hiang Village, within the Hiang Community

Health Center (Puskesmas) coverage area, to gain a deeper understanding of this problem.

Data from the WHO indicates that as many as 1,769,425 women, or approximately 90%, experience dysmenorrhea. Of these, approximately 10-15% suffer from severe dysmenorrhea. Research in various countries indicates that the prevalence of primary dysmenorrhea is estimated to exceed 50% in each country. For example, in 2012, the prevalence of primary



dysmenorrhea among adolescents aged 12-17 in the United States reached 59.7%. The severity of the pain also varied, with 49% experiencing mild dysmenorrhea, 37% experiencing moderate dysmenorrhea, and 12% experiencing severe dysmenorrhea. This has a significant impact, as it prevents 23.6% of them from attending school (Nurwana, Sabilu, and Fachlevy 2023).

Several research data indicate a relatively high incidence of dysmenorrhea. One study found a prevalence of 84.2% in Asia, with 68.7% in East Asia, 74.8% in Middle East Asia, and 54.0% in South Asia. However, Southeast Asia shows different figures. Malaysia estimates the number of women experiencing primary dysmenorrhea at 69.4%, while Thailand estimates the figure at 84.2% (Awalia, 2023). In Indonesia, many women who experience dysmenorrhea do not report it or visit a doctor. It is estimated that 90% of Indonesian women have experienced dysmenorrhea (Garnadi et al., 2023).

According to data from the Indonesian Ministry of Health, the incidence of dysmenorrhea in Indonesia is 64.52%, consisting of 54.89% primary dysmenorrhea and 9.36% secondary dysmenorrhea. A preliminary survey conducted in Koto Baru Hiang, within the Hiang Community Health Center, found 40 adolescent girls. Interviews with 10 individuals revealed that 5 experienced mild stress, 3 experienced moderate stress, and 2 experienced severe stress. Stress is a suspected contributing factor to dysmenorrhea. In the context of mental health, stress can trigger various physiological reactions that can potentially worsen health conditions (Indriyani, 2024). Pathophysiologically, dysmenorrhea is primarily influenced by increased production of prostaglandins, particularly PGF₂ α and PGE₂, in the endometrium

following a decline in progesterone levels at the end of the luteal phase of the menstrual cycle. This increase in prostaglandins causes excessive myometrial contractions and uterine vasoconstriction, resulting in decreased blood flow to uterine tissue, leading to myometrial hypoxia and ischemia. This results in the accumulation of anaerobic metabolites that stimulate sensory nerve endings and lower the pain threshold, resulting in the characteristic pain of dysmenorrhea (Anggraini et al., 2022). Furthermore, prostaglandins can also cause systemic symptoms such as nausea, vomiting, and diarrhea due to their effects on the smooth muscles of other organs. In some cases, the hormone vasopressin plays a role by increasing myometrial sensitivity and exacerbating pain by reducing uterine blood flow (Widodo, 2024). This mechanism explains why dysmenorrheal pain occurs simultaneously with or shortly before menstruation and can last from several hours to several days.

In adolescents, primary dysmenorrhea has a high prevalence (60-75% in Indonesia), with major risk factors including early age at menarche (<12 years), family history, and a sedentary lifestyle (Minarti & Istiana, 2023). This condition is often accompanied by systemic symptoms such as nausea, vomiting, dizziness, diarrhea, and fatigue due to the effects of prostaglandins on the gastrointestinal and nervous systems (Triningsih & Mas'udah, 2023). A study at Bhumi Husada Pharmacy Vocational School in Jakarta showed that 77.7% of adolescent girls experienced primary dysmenorrhea, with 56.4% of cases associated with abnormal menarche and 60.6% with a family history (Hamal & Juliana, 2022). Although no significant association with physical activity has been found, lack of exercise was found in 83% of cases.

The impact of primary dysmenorrhea on adolescents is not only physical but also psychological, such as anxiety and impaired concentration, potentially leading to school absenteeism (De Sanctis et al., 2015). Research shows that prostaglandin levels in adolescents with dysmenorrhea are twice as high as in those without symptoms, strengthening the direct link between prostaglandin production and pain intensity. Initial management with non-pharmacological therapies such as warm compresses and acupressure has proven effective, although the use of NSAIDs such as ibuprofen remains the primary choice for inhibiting prostaglandin synthesis (Triningsih & Mas'udah, 2023).

Previous research has shown a link between stress levels and increased menstrual pain, but results often vary depending on the population and environment studied. Therefore, it is important to explore this relationship further, especially among adolescents who experience numerous physical and emotional changes. Koto Baru Hiang Village is an area with unique social and cultural characteristics, which can influence adolescent stress levels. A less supportive environment, as well as pressure from family and peers, can be additional sources of stress for adolescents. Therefore, understanding the local context is crucial in this study. This study aims to analyze how stress levels relate to the incidence of dysmenorrhea among adolescents in the village.

Adolescents often experience emotional shifts that can increase vulnerability to stress. Academic pressure, relationship problems, and expectations from the social environment can be significant stressors. This study will also consider various factors that may contribute to stress levels, such as socioeconomic status, family support,

and healthy lifestyles (Kartawinata & Evi, 2024). This analysis is expected to provide a more comprehensive picture of the factors influencing adolescent health. Adolescent reproductive health is a crucial issue that requires attention, given its long-term impact on health. Untreated dysmenorrhea can lead to other health problems, including mental health disorders (Rahmawati, 2023). Therefore, this study aims not only to determine the relationship between stress and dysmenorrhea but also to provide recommendations for community health centers and related parties in addressing adolescent health issues. The research method used is a quantitative survey approach to collect data from adolescent girls in Koto Baru Hiang Village. By measuring stress levels using a specific scale and recording the frequency and intensity of dysmenorrhea, it is hoped that clear patterns will be identified regarding the relationship between the two variables. Appropriate data analysis will produce valid and reliable results.

The results of this study are expected to provide new insights into the health problems faced by adolescents in the area. Furthermore, they are expected to serve as a reference for community health centers in designing more effective intervention programs to address dysmenorrhea and its contributing factors. This research also has the potential to contribute to the development of knowledge in the field of adolescent reproductive health.

Considering all of the above factors, this research is highly relevant and is expected to help raise public awareness of the importance of adolescent reproductive health and provide better support for those experiencing dysmenorrhea. This research will not only enrich the existing literature

but also contribute to efforts to improve the quality of life for adolescent girls in Koto Baru Hiang Village.

Methods

The research method used is a quantitative approach with a survey to collect data from adolescent girls in Koto Baru Hiang Village. The population and sample in this study were selected using a non-probability sampling method, namely purposive sampling. The sample size was determined based on the researcher's own judgment. The calculation results for determining the sample size are as follows: the required sample size for a population of 90 with a 10% error rate is 48.

The instrument used to measure stress levels in adolescents was a dysmenorrhea questionnaire (numeric pain rating scale). Data processing techniques included data editing, coding, data entry, and data cleaning. Then, the data were analyzed using univariate analysis to explain the characteristics of each research variable. Bivariate analysis was used to explore the relationship or correlation between two variables suspected to be related. This study used the Spearman test using SPSS. Data were analyzed using the Spearman rho test ($p < 0.05$). The results of the study

showed a very strong relationship between stress levels and the incidence of dysmenorrhea in adolescents. The p-value of 0.913 (less than 0.05) confirmed the significance of the relationship.

Results

Univariate analysis

From the 48 respondents in this study, at the age of 14, there were 15 respondents (31.25%) of the total 48 respondents. This age group reflects the early phase of identity and social development of adolescents who are still in the process of adjusting to physical and emotional changes. Meanwhile, the age group of 17 years was the group with the largest number, namely 20 respondents (41.67%). This age is known as a critical phase in adolescent development, where they begin to experience significant changes both physically and psychologically, and begin to show a greater interest in education and social life. On the other hand, the age of 20 years recorded 13 respondents (27.08%), who may have entered the early stage of adulthood and have a more mature perspective on life and greater responsibilities. A more detailed breakdown of this data can be found in Table 1.

Table 1. Respondent Characteristics Based on Age

Variable	Frequency	%
Age		
14	15	31.25
17	20	41.67
20	13	27.08
Stressor		
Problems academic	20	41.67
Problems Social	15	31.25
Problems family problems	10	20.83
Problems of environmental	3	6.25
Total	48	100

Respondents indicated that the higher the age, the better the maturity. Academic problems were the main stressor for respondents

Of the 48 respondents in this study, 20 adolescents (41.67%) reported having normal stress levels, meaning nearly half of the respondents felt they did not experience significant stress in their lives. On the other hand, 12 adolescents (25.00%) experienced low stress levels, indicating that there were positive factors in their lives that could help reduce stress and

maintain mental well-being. Ten adolescents (20.83%) reported moderate stress levels, indicating that one-third of the respondents faced some challenges that could impact their mental well-being, although not severely. Finally, only six adolescents (12.50%) reported experiencing high stress levels. This figure indicates that a small proportion of adolescents experience significant stress, which may require further attention and efforts to help them manage stress and prevent negative impacts on their mental health.

Table 2. Frequency Distribution of Adolescent Stress Levels

Stress level	Frequency	%
Normal	20	41,67
Light	12	25,00
Moderate	10	20,83
Heavy	6	12,50
Total	48	100

Normal adolescent stress levels

Category of Pain	Frequency	%
Normal	10	20,83
Ligh	15	31,25
Moderate	13	27,08
Heavy	10	20.83
Total	48	100

The majority of teenagers experience mild dysmenorrhea

Bivariate Analysis

Based on the results, it can be seen that the relationship between stress levels and menstrual pain in adolescents is clear. In the normal stress group, 10 adolescents (20.83%) experienced no pain, 5 (10.42%) had mild dysmenorrhea, 3 (6.25%) had moderate, and 2 (4.17%) had severe pain, indicating lower pain. In the low stress group, all adolescents experienced pain, with 4 (8.33%) experiencing mild, 4 (8.33%) experiencing moderate, and 4 (8.33%)

experiencing severe pain, indicating that pain persisted despite low stress. In the moderate stress group, none were pain-free; 3 adolescents (6.25%) experienced mild, 5 (10.42%) experiencing moderate, and 2 (4.17%) experiencing severe pain, indicating higher pain levels. In the high stress group, all experienced pain, with 3 (6.25%) experiencing mild, 1 (2.08%) experiencing moderate, and 2 (4.17%) experiencing severe pain, indicating that pain tended to be more severe. Overall,

the higher the stress level, the greater the likelihood of experiencing severe menstrual pain. The Spearman Rho statistical test results obtained a correlation coefficient of 0.03 (low correlation level) and a p-value of $0.03 < 0.05$.

Table 3. Shows a clear relationship between stress levels and menstrual pain in adolescents

Stress Level/Dysmenorrhea	No Pain Mild Dysmenorrhea	Moderate Dysmenorrhea	Moderate Dysmenorrhea	Severe Dysmenorrhea	Total
Normal	10 (20.83%)	5 (10.42%)	3 (6.25%)	2 (4.17%)	20 (41.67%)
Light	0 (0%)	4 (8.33%)	4 (8.33%)	4 (8.33%)	12 (25.00%)
Moderate	0 (0%)	3 (6.25%)	5 (10.42%)	2 (4.17%)	10 (20.83%)
Heavy	0 (0%)	3 (6.25%)	1 (2.08%)	2 (4.17%)	6 (12.50%)
Total	10 (20.83%)	15 (31.25%)	13 (27.08%)	10 (20.83%)	48 (100%)
Spearman Rho Statistical test value (p value = 0.03)					

It can be concluded that there is a very strong correlation between stress levels and dysmenorrhea in adolescents in Koto Baru Hiang Village. This indicates that the higher the stress level, the higher the likelihood of experiencing dysmenorrhea.

Discussion

Based on the results of the univariate analysis in Table 5.3, the majority of the 48 respondents experienced stress at various levels: normal (41.67%), low (25.00%), moderate (20.83%), and high (12.50%). Several factors trigger stress in adolescents in Koto Baru Hiang Village, within the Hiang Community Health Center (Puskesmas) work area.

Low-level stress is often latent and not immediately apparent in daily behavior, so it is often overlooked by those around them, both family and school. If not promptly addressed, low-level stress can

develop into moderate or even severe stress, especially if adolescents are continuously exposed to triggering factors without adequate support or intervention (Syifa & Purwandari, 2023).

The causes of low stress in adolescents are diverse, including academic pressure stemming from school demands and parental expectations for achievement, social pressure from friends, and environmental factors such as a less harmonious family environment or a residential environment that does not support adolescent emotional development (Rendra Zola et al., 2021). Furthermore, unresponsive parenting, internet addiction, and a lack of attachment to peers or school can also increase the risk of stress in adolescents. Studies show that strong attachments to parents, peers, and school can be significant protective factors in reducing stress levels, while a lack of social support

actually increases vulnerability to stress (Nurwela & Israfil, 2022).

Theoretically, several factors can contribute to stress. One of these is mental well-being, which is a fundamental aspect of health and impacts individuals, families, and society as a whole. However, amidst the increasingly complex pressures of modern life, stress issues are becoming more common and have a significant impact on mental well-being. Chronic stress is a type of stress that is persistent and often difficult to manage. This condition can arise as a reaction to various factors, such as work pressure, financial problems, interpersonal relationships, or changes in our environment (Putra, 2023). Based on the results of a univariate analysis of the total respondents, 41.67% were in the normal category, indicating that the majority of adolescents in the village did not experience significant stress. This indicates emotional stability among adolescents, which can be influenced by their social environment, family support, and other factors contributing to their mental health.

The moderate level of stress experienced by 20.83% of respondents is a finding that deserves special attention. Although not classified as severe stress, adolescents with moderate levels of stress exhibit various symptoms that can impact their daily lives and the achievement of their developmental tasks. Common symptoms in this group include anxiety, tension, difficulty concentrating, sleep disturbances, fatigue, and changes in eating patterns. Research at SMP PGRI Kasihan Bantul also found that the majority of adolescents with moderate stress experienced symptoms such as nervousness, difficulty sleeping, and loss of appetite, which, if prolonged, can

increase the risk of physical and mental health disorders (Khasanah, 2020).

The factors that trigger moderate stress in adolescents are diverse and interrelated. Academic pressures, such as heavy schoolwork, exams, and competition for achievement, are among the main triggers. Furthermore, less harmonious social relationships, both with peers and within the family, can also exacerbate stress. Other research shows that the residential environment, family economic status, and unexpected events also play a role in increasing psychosocial stress in adolescents (Rendra Zola et al., 2021). A competitive school environment and high expectations from teachers and parents can increase emotional stress, leading adolescents to feel depressed and overthink their future or academic performance (Alamsyah et al., 2023).

A total of 12.50% of respondents in this study experienced high levels of stress, which is a serious indicator and requires special attention from various parties. Stress at this level can have a detrimental impact on both the mental and physical health of adolescents. Adolescents experiencing high levels of stress are more likely to experience significant emotional disturbances, such as excessive anxiety, depression, and deviant behaviors like self-harm. Research shows that the higher the level of stress experienced by adolescents, the greater their tendency to engage in self-injurious behavior as a form of uncontrolled emotional outburst (Islamy et al., 2023). This occurs because emotional maturity during adolescence is not yet stable, making it difficult for adolescents to manage pressures arising from various aspects of life, such as physical changes, academic pressure,

parental demands, and social issues in the surrounding environment.

Therefore, it is crucial for families, schools, and health professionals to provide psychosocial support, provide access to counseling services, and teach adolescents stress management skills from an early age. Appropriate interventions, such as holistic therapy or mindfulness, have been shown to reduce levels of severe stress in adolescents and prevent long-term negative impacts (Indriyati et al., 2025).

Therefore, comprehensive attention and treatment for adolescents experiencing high levels of stress are essential to ensure optimal growth and development, both physically and mentally. Excessive stress is often associated with more serious problems, such as depression or anxiety, requiring more in-depth medical or psychological attention (Nurwana et al., 2017). Therefore, psychological support programs or counseling are needed to help adolescents manage their stress.

Based on the univariate analysis presented in Table 4 of 48 respondents, it was revealed that 20.83% of adolescents did not experience any pain at all. This finding suggests that the small proportion of adolescents who did not experience pain in Koto Baru Hiang Village may be in good health or more tolerant of pain associated with the menstrual cycle. This absence of pain could be indicative of genetic factors, a healthy lifestyle, or a painless menstrual experience (Nurhanif et al., 2020).

However, more than half of respondents experienced some degree of menstrual pain, with 31.25% of adolescents experiencing mild dysmenorrhea. This indicates that the pain experienced is still

within tolerable limits, but still requires attention. Adolescents experiencing mild dysmenorrhea may be able to manage this pain with home care or over-the-counter medications. Although not severe, mild dysmenorrhea can still impact daily activities and quality of life.

A total of 27.08% of adolescents experienced moderate dysmenorrhea, which is a more serious concern. Moderate pain can interfere with activity and concentration, so adolescents may need to seek medical care or counseling for better pain management (Rahmawati, 2023). Moderate dysmenorrhea can also indicate an underlying health condition, such as endometriosis, which needs to be identified and treated appropriately. This condition can also decrease motivation to participate in activities, leading adolescents to choose to rest or even miss school during menstruation.

Research shows that moderate to severe dysmenorrhea significantly disrupts activities and increases morbidity in adolescent girls. Furthermore, many adolescents with moderate dysmenorrhea require medical intervention, such as analgesic medication, as well as complementary therapies such as warm compresses, acupuncture, aromatherapy, or yoga to help reduce pain (Triningsih & Mas'udah, 2023). Support from family and the school community is crucial to ensure adolescents do not feel isolated or embarrassed about discussing their symptoms and receive education on proper menstrual pain management (Hizkia P et al., 2024).

Furthermore, 20.83% of adolescents experience severe dysmenorrhea, indicating significant levels of pain. This level of pain can cause significant disruption to daily activities, such as

school and social activities. Severe dysmenorrhea often requires medical intervention, either in the form of medication or other therapies (Amin & Purnamasari, 2020). Providing support to these adolescents is crucial so they feel heard and receive appropriate treatment to reduce the impact of their pain.

Although there was a group of adolescents who did not experience pain, the majority experienced varying degrees of dysmenorrhea, indicating the need for greater attention and intervention from the Hiang Community Health Center. Educational programs on menstrual pain management, as well as health education on reproductive health, need to be strengthened to help adolescents address this issue (Kartawinata & Evi, 2024). This is expected to enable adolescents to better understand their condition and take appropriate steps to manage dysmenorrhea effectively.

From the data obtained in Table 5.5 from 48 respondents, it is clear that adolescents with normal stress levels experienced a wider variation in their menstrual pain experiences. 20.83% of adolescents in this category experienced no pain, while those who experienced dysmenorrhea experienced symptoms ranging from mild to severe. This suggests that lower stress levels tend to be associated with better pain experiences during menstruation.

When looking at adolescents with low stress levels, all individuals in this category experienced dysmenorrhea, with an even proportion across the various levels of severity. This suggests that even with low stress levels, adolescents can still experience significant menstrual pain (Wati et al., 2017). This situation may

indicate that other factors, such as physical or hormonal health conditions, play a role in the experience of dysmenorrhea, regardless of stress levels (Astuti & Kulsum, 2020).

In the group of adolescents with moderate stress levels, none reported experiencing no pain. The distribution of pain showed a trend toward increasing levels of dysmenorrhea, with the majority experiencing mild to severe dysmenorrhea. This finding suggests that increasing stress levels correlate with increased pain intensity, suggesting that stress can exacerbate the experience of dysmenorrhea (Pujiati, 2024).

The group with high stress levels showed similar results, with no adolescents experiencing no pain. All adolescents in this group experienced dysmenorrhea, although the proportions of those experiencing mild, moderate, and severe pain varied. This emphasizes that high stress levels can significantly contribute to more severe dysmenorrhea and suggests that stress can influence an individual's perception of pain (Pujiati, 2024).

The results of statistical tests using Spearman's Rho, with a correlation coefficient of 0.913, indicate a very strong relationship between stress levels and the incidence of dysmenorrhea in adolescents. The resulting p-value, 0.913 (less than 0.05), confirms the significance of this relationship. Thus, it can be concluded that there is a strong correlation between stress levels and the severity of dysmenorrhea in adolescents in Koto Baru Hiang Village.

This finding highlights the importance of addressing adolescent mental health, as effective stress management can help

reduce menstrual pain and improve their quality of life. The results of this analysis indicate that effective stress management is crucial in addressing adolescent reproductive health issues. The Hiang Community Health Center needs to develop a program focused on mental health and education about menstrual pain management to help adolescents better cope with dysmenorrhea. With the right approach, it is hoped that adolescents can reduce the negative impact of stress and improve their overall health.

Conclusion

The findings of this study are as follows: A significant positive relationship was found between stress levels and the severity of dysmenorrhea. Adolescents with higher stress levels tended to experience more severe dysmenorrhea. The majority of respondents experienced moderate levels of stress, with a significant proportion experiencing moderate to severe dysmenorrhea. The frequency distribution of the relationship between stress levels and dysmenorrhea incidence indicates that interventions to reduce stress are essential to support adolescent reproductive health and improve their quality of life. Based on the research findings, several recommendations that can be implemented include developing an educational program at the Hiang Community Health Center that focuses on mental health and stress management through workshops and seminars. Furthermore, providing psychological support services, such as individual or group counseling, is crucial for adolescents experiencing high levels of stress.

Comprehensive reproductive health programs also need to be implemented to improve adolescents' understanding of dysmenorrhea, the menstrual cycle, and appropriate treatment. Parental and teacher involvement in supporting adolescents' mental well-being is also recommended, including providing education to them to better understand and listen to their children's concerns. Further research with a longitudinal design is needed to explore other factors influencing stress and dysmenorrhea and to develop more effective interventions. These measures are expected to improve the mental and physical health of adolescents in Koto Baru Hiang Village, enabling them to function more optimally in their daily lives.

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Conflict of interest

Conflict of interest No conflicts of interest has been declared by the author

Author contribution

Study Design: Amira Esti, Nurhadia. Data collection: Nurhadia. Analysis: Amira Esti, Nurhadia. Manuscript preparation: Amira Esti, Nurhadia. All authors critically reviewed the article and approved the final version.

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