

RISK FACTORS OF DYSMENORRHEA AMONG ADOLESCENT GIRLS AT SMP N 2 BUNTA, SIMPANG RAYA DISTRICT, BANGGAI REGENCY

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ABSTRACT

One of the common problems experienced by adolescent girls is dysmenorrhea. According to the 2020 National Basic Health Survey (Riskesdas), the prevalence of dysmenorrhea was 64.3%, with a rate of 41.3% in Central Sulawesi Province. This study aimed to determine the relationship between stress, physical activity, and nutritional intake with the incidence of dysmenorrhea among adolescent girls. This study employed a quantitative, cross-sectional design. The population consisted of all female students at SMP N 2 Bunta through 2024, totaling 92 students. Data were processed using univariate, bivariate, and multivariate analyses with the aid of Statistical Package for the Social Sciences (SPSS) software. The results showed that there was a significant relationship between stress, nutritional intake, and physical activity with the risk of dysmenorrhea among adolescent girls at SMP N 2 Bunta. Stress was identified as the most influential factor for dysmenorrhea in adolescent girls at SMP N 2 Bunta, Simpang Raya Sub-district, Banggai Regency. This is because stress has a greater effect in triggering or worsening dysmenorrhea symptoms. It is recommended that adolescent girls pay attention to their dietary patterns and nutritional intake by increasing consumption of fiber-rich foods, as well as foods rich in iron, magnesium, and B-complex vitamins. Regular physical activity, such as exercise, and stress management through adequate rest and reducing exposure to stress-inducing social media are also encouraged.

Keywords: Stress, Nutritional Intake, Physical Activity, Dysmenorrhea

1. Introduction

Adolescence is a period of identity exploration, during which adolescents are highly susceptible to environmental influences. According to the World Health Organization (WHO), adolescence is defined as the age range of 12 to 24 years. In general, physical maturation in adolescents occurs more rapidly than psychological maturation, which often makes them highly sensitive and vulnerable to stress. Stress is a physical and mental reaction to certain pressures that cause tension, potentially disrupting resilience in daily life and influencing the body's hormonal system (Siska Delvia, 2020). Menstruation is a natural physiological process experienced by women; however, it becomes a health concern when menstrual disorders occur (Novita, 2018). Such disorders may manifest as irregular menstrual cycles or patterns, prolonged menstrual duration, and other related disturbances (Hidayat, Kusumawati, Lusiana, & Mustika, 2019).

Dysmenorrhea is a condition characterized by pain or discomfort in the lower abdomen during menstruation, which can interfere with daily activities. Premenstrual syndrome (PMS) occurs before menstruation and disappears once menstruation begins, with symptoms that may include physical, psychological, and emotional changes (Prawirohardjo, 2010). One of the most common reproductive health problems experienced by women, and a major public health concern, is menstrual disorders. These disorders often include irregular menstrual cycles, abnormal menstrual volume such as prolonged or excessive bleeding, painful menstruation or dysmenorrhea, and premenstrual syndrome (Tambun, 2021). Among adolescent girls, one of the most frequently encountered problems is dysmenorrhea.

According to WHO (2018), approximately 80% of women experience irregular menstruation. The Indonesian Ministry of Health, through the Basic Health Research (Riskesdas), reported in 2018 that among women aged 15–19 years in Indonesia, 11.7% experienced irregular menstrual cycles. Dysmenorrhea can be caused by several factors, including high levels of stress and nutritional status (Hapsari, 2019). Efforts to prevent menstrual cycle problems include reducing stress, providing opportunities for relaxation, and ensuring adequate sleep. Many women experience menstrual cycle disorders but do not realize that there are actually ways to manage them. A woman should be able to understand what her body is experiencing and immediately find ways to relieve the discomfort. If menstrual cycle problems occur frequently, it is recommended to seek medical consultation with an obstetrician or general practitioner (Eny Kusmiran, 2014).

SMP N 2 Bunta is one of three junior high schools within the working area of UPTD Puskesmas Simpang Raya and has the largest number of female students, with an average age ranging from 12 to 15 years. The location is easily accessible, situated in the middle of the Sumber Mulya residential area, approximately 0.5 km from the UPTD Puskesmas Simpang Raya, which facilitates data collection. Data obtained by the researchers show an increasing trend of dysmenorrhea cases from 2022 to 2024, with the following details: in 2022, out of 96 students, eight experienced dysmenorrhea; in 2023, out of 80 students, 11 experienced dysmenorrhea; and in 2024, out of 92 students, 15 experienced dysmenorrhea. Based on this background, it indicates that a significant number of female adolescents still experience menstrual cycle disorders, thus encouraging the researchers to conduct a study on the risk factors of dysmenorrhea among female adolescents at SMP N 2 Bunta, Simpang Raya District.

2. Methodology

Study Design

This study is an analytical Research study with a cross-sectional design. It was conducted to analyze the risk factors of dysmenorrhea among female adolescents at SMP N 2 Bunta, Simpang Raya District, Banggai Regency, in 2025.

Data Collection Procedures

The primary data obtained were then processed through the following steps:

a. Editing (Data Verification)

Editing refers to the process of checking and correcting data, which in this study was conducted by distributing questionnaires to respondents.

b. Coding (Assigning Codes)

The researcher manually coded the collected and verified data to facilitate data entry.

c. Entry (Data Input into Computer System)

The coded data (in the form of letters or numbers) were entered into a computer program for computerized processing.

d. Cleaning (Data Cleaning)

All data entered into the computer program were rechecked to prevent errors.

Data Analysis

The collected data were tabulated into tables according to the variables to be measured. Data analysis was conducted through the stages of editing, coding, tabulation, and statistical testing. The statistical tests applied were univariate, bivariate, and multivariate analyses

using the Statistical Product and Service Solutions (SPSS) software. The data analysis included the following steps:

a. **Univariate Analysis**

Univariate analysis was performed for each variable in the study, with results presented as frequency distributions and percentages.

b. **Bivariate Analysis**

Bivariate analysis was conducted to examine the relationship between independent and dependent variables. Since categorical data were used, the statistical test applied was the Chi-Square (X^2) test with a significance level (α) of 0.05 or a 95% confidence interval, using the following formula:

$$X^2 = \sum ((O-E)^2)/E$$

Where:

X^2 : Chi-Square

O: Observed value

E: Expected value

$\sum$: Summation

Interpretation: The alternative hypothesis is accepted if the calculated X^2 value (X^2 calculated) is greater than the critical X^2 value (X^2 table).

c. **Multivariate Analysis**

Regression analysis is essentially a study of the dependence of a dependent variable on one or more independent variables, to estimate and/or predict the population mean of the dependent variable based on the known values of the independent variables (Ghozali, 2009). This study employed regression analysis using the stepwise method (binary logistic regression). Binary logistic regression is used to model the relationship between a dichotomous (binary) dependent variable and its independent variables.

3. **Results**

Univariate Analysis

Univariate analysis was conducted to determine the distributions and frequencies of each variable, including independent, dependent, and respondent characteristics. The univariate results of this study are as follows:

Frequency Distribution of Respondent Characteristics

Table 1. Frequency Distribution of the respondents' characteristics.

Variable	Frequency (n)	Percentage (%)
Age (Year)		
12	2	2.2
13	32	34.8
14	23	25.0
15	26	28.3
16	8	8.7
17	1	1.1

Based on Table 1, the age group with the highest percentage of respondents was 13 years old, totaling 32 individuals (34.8%).

b. Frequency Distribution of the Studied Variables

Table 2. Frequency and Percentage Distribution of the Studied Variables

Variable	Frequency (n)	Percentage (%)
Stress		
Good	19	26.8
Moderate	39	54.9
Poor	13	18.3
Dismenorrhea		
Normal	35	38.0
Abnormal	57	62.0
Nutritional Intake		
Healthy	33	35.9
Unhealthy	59	64.1
Physical Activity		
Light	57	62.0
Moderate	35	38.0

Based on Table 2, the highest percentage of respondents for the stress variable was in the *moderate* category, with 39 students (54.9%). For the dysmenorrhea variable, the most frequent category was *abnormal*, with 57 students (62%). Regarding nutritional intake, the majority of respondents (59 students, 64.1%) fell into the unhealthy category. For physical activity, the most common category was *light*, with 57 students (62%).

Bivariate Analysis

Bivariate analysis was conducted to determine the relationship between two variables. In this study, the dependent variables are stress, physical activity, and nutritional intake, while the independent variable is dysmenorrhea.

- a. Relationship Between Stress and the Risk of Dysmenorrhea Among Female Adolescents at SMP N 2 Bunta, Simpang Raya District, Banggai Regency

Table 3. Relationship Between Stress and the Risk of Dysmenorrhea Among Female Adolescents At SMP N 2 Bunta, Simpang Raya Subdistrict, Banggai Regency

Stress	Dismenorhea				Total		<i>P-Value</i>
	Normal		Abnormal				
	n	%	n	%	n	%	
Normal	29	31.5	5	5.4	34	37	0.000
Light	0	0	11	12	11	12	
Moderate	6	6.5	41	44.6	47	51.1	
Total	35	38	57	62	92	100	

Based on Table 3, the highest percentage of respondents was those with moderate stress levels and abnormal dysmenorrhea, totaling 41 individuals (44.6%), while the lowest percentage was observed among respondents with light stress levels and normal dysmenorrhea, totaling zero individuals (0%). The Chi-Square test yielded a P-value of 0.000. Since the P-value is < 0.05 , H_0 is rejected and H_a is accepted. This indicates that there is a significant relationship between stress and the risk of dysmenorrhea among female adolescents at SMP N 2 Bunta, Simpang Raya District, Banggai Regency.

- b. Relationship Between Nutritional Intake and the Risk of Dysmenorrhea Among Female Adolescents at SMP N 2 Bunta, Simpang Raya District, Banggai Regency

Tabel 4. Hubungan Asupan Nutrisi Dengan Risiko Dismenorhea Pada Remaja Putri Di SMP N 2 Bunta Kecamatan Simpang Raya Kabupaten Banggai

Nutritional Intake	Dismenorhea				Total		<i>P-Value</i>
	Normal		Abnormal				
	n	%	n	%	n	%	
Healthy	29	31.5	4	4.3	33	35.9	0.000
Unhealthy	6	6.5	53	57.6	59	64.1	
Total	35	38	57	62	92	100	

Based on Table 4, the highest percentage of respondents was found in the category of unhealthy nutritional intake and having abnormal dysmenorrhea, totaling 53 respondents (57.6%). The lowest percentage was among respondents with healthy nutritional intake but

experiencing abnormal dysmenorrhea, totaling four respondents (4.3%). The Chi-Square statistical test yielded a P-value of 0.000. Since the P-value is < 0.05 , H_0 is rejected and H_a is accepted. This indicates that there is a significant relationship between nutritional intake and the risk of dysmenorrhea among female adolescents at SMP N 2 Bunta, Simpang Raya District, Banggai Regency.

c. The Relationship Between Physical Activity and the Risk of Dysmenorrhea in Female Adolescents at SMP N 2 Bunta, Simpang Raya District, Banggai Regency

Table 5. The Relationship Between Physical Activity and the Risk of Dysmenorrhea in Female Adolescents at SMP N 2 Bunta, Simpang Raya District, Banggai Regency

Physical Activity	Dismenorhea				Total		<i>P-Value</i>
	Normal		Abnormal				
	n	%	n	%	n	%	
Light	11	12	46	50	57	38	0.000
Moderate	24	26.1	11	12	36	38	
Total	35	38	57	62	92	100	

Based on Table 5, the highest percentage of respondents was in the light physical activity with abnormal dysmenorrhea category, totaling 46 students (50%), while the lowest percentage was in the moderate physical activity and normal dysmenorrhea category, totaling 11 students (12%). The Chi-Square statistical test yielded a P-value of 0.000. Since the P-value is < 0.05 , H_0 is rejected and H_a is accepted. This indicates that there is a significant relationship between physical activity and the risk of dysmenorrhea in female adolescents at SMP N 2 Bunta, Simpang Raya District, Banggai Regency.

4. Discussion

a. The Relationship Between Stress and the Risk of Dysmenorrhea in Female Adolescents at SMP N 2 Bunta, Simpang Raya District, Banggai Regency

Dysmenorrhea is one of the most common gynecological problems experienced by women, both adolescents and adults. Dysmenorrhea is abdominal pain originating from uterine cramps during menstruation. Primary dysmenorrhea refers to menstrual pain not caused by any pathological condition of the uterus. It is associated with uterine muscle contractions and prostaglandin secretion. Based on relative pain intensity, dysmenorrhea can be classified as mild, moderate, or severe. Mild dysmenorrhea is defined as menstrual pain that does not restrict daily activities, with no systemic complaints, and typically does not require analgesics.

Stress is the human body's response to stressors, and it can be experienced by everyone, including students (Deby et al., 2022). Stress can disrupt various body systems, including the endocrine system. It is suspected that stress is related to the incidence of dysmenorrhea due to neuroendocrine responses that increase prostaglandin levels. Elevated prostaglandins can lead to stronger myometrial contractions and uterine blood vessel constriction, causing hypoxemia and resulting in dysmenorrhea.

Indicators of stress include excessive anxiety that drains energy, irritability, difficulty remaining calm in certain situations, being easily annoyed, frequent anger over minor issues, and restlessness. Research findings show that most respondents reported feeling easily irritated or angered by trivial matters.

These findings are consistent with Yulis (2025), who found a significant relationship between stress and dysmenorrhea in female adolescents at SMPN 06 Kota Pekalongan. The chi-square test showed a p-value of 0.028, which is less than the significance level (0.05). This indicates that H_0 was rejected, meaning there is a relationship between stress and dysmenorrhea. Psychological factors such as emotional instability and stress are key contributors to menstrual pain. Stress can unconsciously tighten the hip and lower back muscles, leading to primary dysmenorrhea.

Stress can also reduce pain tolerance, making it strongly associated with primary dysmenorrhea in adolescents. High levels of stress put adolescents at greater risk for primary dysmenorrhea. During stress, sensory nerves transmit stressor signals to the brain's limbic system (neurotransmitters), which then signals hormonal glands (endocrine system) and other connected body organs.

The study further found that the largest percentage of respondents were those with moderate stress and abnormal dysmenorrhea, totaling 41 individuals (44.6%). This is influenced by low self-esteem and anxiety/depression, which exacerbate stress and relate to dysmenorrhea. Stress affects menstrual pain both directly and indirectly through negative emotional mediation. Another contributing factor is sleep disturbance in adolescents, leading to daytime sleepiness, increased stress, and dysmenorrhea. Studies indicate that fatigue from insufficient sleep worsens irregular menstrual cycles and pain.

These findings align with Research conducted in Korea examining the relationship between sleep disturbances, increased stress, and dysmenorrhea risk. Insufficient sleep, poor sleep quality, and insomnia were significantly associated with dysmenorrhea. Sleep disturbances may exacerbate symptoms by increasing inflammatory and stress responses and decreasing melatonin levels, which are important for reproductive health. Higher levels of insomnia are also correlated with greater severity of dysmenorrhea and interference with daily activities (Daye Jeong, 2023).

b. The Relationship Between Nutritional Intake and the Risk of Dysmenorrhea in Female Adolescents at SMP N 2 Bunta, Simpang Raya District, Banggai Regency

There is a relationship between dysmenorrhea and certain nutrients, such as calcium, magnesium, iron, zinc, vitamin E, and omega fatty acids. Zinc, as one of the micronutrients that can inhibit prostaglandin metabolism, is among the most effective antioxidants and anti-inflammatory agents. Dysmenorrhea can be categorized into two types: primary and secondary. Dietary patterns and physical activity are closely related to weight reduction. Nutritional deficiencies can act as both causes and triggers that worsen dysmenorrhea symptoms.

Calcium plays a crucial role in relieving menstrual pain by acting as a uterine muscle relaxant. This nutrient supports the interaction between actin and myosin, which are involved in uterine muscle contraction. Calcium deficiency can hinder the relaxation of muscles after contraction, which may ultimately trigger cramps and pain during menstruation. Dysmenorrhea is also closely associated with low nutrient intake, particularly iron. Studies have shown that nearly half of adult women experiencing mild dysmenorrhea have insufficient iron intake. Iron deficiency can disrupt hemoglobin formation in the blood. Hemoglobin binds oxygen and distributes it

throughout the body. When hemoglobin levels decrease, the amount of oxygen available for distribution also diminishes. As a result, tissues, including blood vessels in reproductive organs, that experience constriction do not receive an adequate oxygen supply, leading to pain.

Research by Septiyani & Simamora (2021) reported that in the current fast-paced, convenience-oriented environment with readily available, imbalanced, and tasty food options, the dietary habits of many individuals, including adolescent girls, are greatly affected. Poor dietary patterns can significantly influence and cause respondents to experience primary dysmenorrhea. Damayanti, Bagus Setyoboedi, and Fatmaningrum (2021) explained that poor dietary habits during adolescence and adulthood disrupt the development and maturation of reproductive function, leading to gynecological and obstetric issues that may lack clear symptoms but can be addressed through dietary improvements. Additionally, reproductive function decline may occur, potentially leading to obstetric and gynecological problems in the future.

Based on the results of the conducted Research, it was found that 57.6% of respondents with abnormal dysmenorrhea had unhealthy nutrient intake. This is because the majority of respondents had poor dietary habits, typically characterized by increased consumption of sweetened beverages and fast food, providing excessive amounts of fat, cholesterol, and sodium. Moreover, adolescent girls often disregard the nutritional content of their daily meals. Dysmenorrhea can occur with unhealthy dietary patterns, whereas healthy eating can minimize its incidence. Poor dietary patterns can lead to nutrient deficiencies, increasing the risk of dysmenorrhea. Food variables, macronutrient composition, and micronutrient content all influence the occurrence of dysmenorrhea.

In line with the findings of Suciati & Erlyn Hapsari (2022), malnutrition in adolescent girls affects their growth and reproductive function, impacting menstrual issues but improving with proper nutrition. Nutrient deficiencies, such as vitamin B6, vitamin E, vitamin C, magnesium, iron, zinc, manganese, fatty acids, and linoleic acid, exacerbate premenstrual syndrome symptoms and initiate menstrual discomfort (dysmenorrhea).

Statistical testing using the chi-square test yielded a p-value of 0.000, indicating a significant relationship between nutrient intake and the risk of dysmenorrhea in adolescent girls. This is because adolescents tend to consume insufficient vegetables and fruits, leading to poor dietary patterns that can exacerbate dysmenorrhea. This study aligns with Research by Yusrah Taqiyah & Fatma Jama (2022), which found that adolescents with poor eating habits, consuming foods high in preservatives, artificial sweeteners, excessive fat, fried foods, and spicy foods, were more likely to experience menstrual pain. These foods easily stimulate nerve endings in pathways connected to the uterus. These nerve endings are responsible for receiving signals from prostaglandins, which cause pain during menstruation (Suciati, 2022).

However, these findings differ from those of Afrilianti & Anggraini (2022), who reported no significant association between dietary patterns and dysmenorrhea incidence, despite poor dietary habits. The discrepancy may be due to other factors, such as physical activity, which can influence the severity of dysmenorrhea.

c. The Relationship Between Physical Activity and the Risk of Dysmenorrhea in Adolescent Girls at SMP N 2 Bunta, Simpang Raya District, Banggai Regency

Physical activity can increase endorphin production, which helps reduce the intensity of perceived pain. A decline in physical activity generally occurs during early adolescence, particularly among girls. The incidence of dysmenorrhea tends to be higher in women who exercise

less. This is due to reduced oxygen flow to the reproductive organs' blood vessels during vasoconstriction, which can exacerbate pain. One highly effective way to prevent dysmenorrhea is by engaging in regular physical activity. Exercises such as walking, jogging, running, cycling, swimming, or aerobic workouts can improve overall health and help maintain a regular menstrual cycle.

According to the Research results, 57 respondents engaged in light physical activity, while 35 respondents had moderate activity levels. Chi-square analysis showed a significant difference in physical activity levels between students who experienced dysmenorrhea and those who did not ($p = 0.000$). Most adolescents who did not experience dysmenorrhea had a wider variety of physical activities in their daily routines, resulting in higher energy expenditure. In contrast, the group experiencing dysmenorrhea mostly performed light activities, such as sitting in class, rarely helped with household chores, frequently used vehicles, and spent much time in bed. Meanwhile, the non-dysmenorrhea group was more physically active, with daily activities such as exercising, sweeping, mopping, washing, ironing, and walking. Overall, the duration and frequency of exercise among respondents remained insufficient.

These findings align with the results of Siti et al. (2024), who also found a significant relationship between physical activity and the severity of dysmenorrhea. Lower levels of physical activity are associated with a higher risk of experiencing more severe dysmenorrhea. Conversely, regular physical activity has been shown to improve vascular function, reduce menstrual pain, and enhance overall physical fitness.

The low level of physical activity is caused by various factors, including laziness, unwillingness to exert effort, limited equipment, time constraints, and habits such as watching TV, playing computer games, excessive sleeping, and using gadgets. Regular physical activity, however, can increase blood flow throughout the body, including to the reproductive organs, thereby improving oxygen supply to areas experiencing vasoconstriction and helping alleviate dysmenorrhea symptoms.

Similarly, Diny & Farida (2024) reported that low physical activity is a contributing factor to menstrual problems; the prevalence of menstrual issues increases with decreasing activity levels and low exercise, which may lead to a reduction in estrogen and progesterone hormones. Adolescents who perform regular physical activity tend to be less sedentary at home and more engaged in activities such as watching TV while working, playing computer games, sleeping for extended periods, or using gadgets. This indicates that lighter levels of physical activity can increase the risk of dysmenorrhea.

Thus, the incidence of dysmenorrhea tends to increase when physical activity during menstruation is reduced and exercise is lacking, leading to decreased blood and oxygen circulation. This affects the uterus by reducing blood and oxygen flow, which causes pain. Pain can be mitigated through physical activity, as exercise stimulates the production of endorphins. These hormones act as natural sedatives produced by the brain and can enhance an individual's pain perception, including dysmenorrhea. Consequently, reduced blood and oxygen flow to the uterus can contribute to pain.

d. Factors Most Associated with the Risk of Dysmenorrhea in Adolescent Girls at SMP N 2 Bunta, Simpang Raya District, Banggai Regency

Based on the table of variables in the equation (multivariate analysis), when all variables were tested simultaneously, the results showed that two independent variables had a significant

relationship with the dependent variable: stress ($p\text{-value} = 0.001 < 0.05$) and nutrient intake ($p\text{-value} = 0.013 < 0.05$). Meanwhile, the other variable, physical activity, had a $p\text{-value}$ of 0.257, indicating no significant relationship ($p\text{-value} > 0.05$). Among the three variables tested in the multivariate analysis, stress was the most strongly associated with the risk of dysmenorrhea, with a $p\text{-value}$ of 0.001 and a B value of 5.689. This means that adolescent girls with moderate stress levels have a 5.689 times higher risk of experiencing dysmenorrhea compared to those without stress.

Menstrual pain can vary from mild to severe, impacting daily activities. Dysmenorrhea is classified into two types: primary dysmenorrhea (not caused by reproductive organ abnormalities or without gynecological disorders) and secondary dysmenorrhea (caused by reproductive organ abnormalities or gynecological issues) (Ummyati & Dewi, 2023).

One of the most influential factors in dysmenorrhea among adolescent girls is stress. Stress is the physical and psychological response to specific pressures or demands. The study found that adolescent girls may experience stress due to academic demands, social or peer conflicts, and hormonal changes, which can cause irregular menstrual cycles.

Stress in adolescents can have negative consequences on learning processes and cognitive function. Symptoms arising from stress during menstruation include anxiety, irritability, difficulty thinking, shoulder pain, shortness of breath, and excessive worrying. Furthermore, stress can affect the menstrual cycle and should therefore not be underestimated, as it can disrupt metabolic processes in the body. Menstrual cycles may become irregular when metabolic systems are disturbed (Melia Rahma et al., 2023).

Irregular menstrual cycles influence the occurrence of dysmenorrhea. This is consistent with research conducted by Tadese et al. (2021) in Ethiopia, Nyirenda et al. (2023) in Zimbabwe, and Hu et al. (2020) in China, which found that women with irregular menstrual cycles are at higher risk of dysmenorrhea. This is due to hormonal imbalances during irregular cycles, leading to excessive prostaglandin production in the uterus.

During stress, the body produces higher levels of hormones such as adrenaline, estrogen, and prostaglandins. Elevated estrogen levels can trigger excessive abdominal contractions. Similarly, increased adrenaline levels can cause muscle tension throughout the body, including in the uterine muscles (Marlanti, S. A., et al., 2021).

Research by Feronika (2022) showed a significant relationship between stress levels and the incidence of dysmenorrhea, indicating that adolescents with higher stress levels experience dysmenorrhea more frequently. This demonstrates that psychological factors play an important role in menstrual pain, as supported by studies stating that stress can affect various bodily functions, including the menstrual cycle.

From the logistic regression analysis, stress was found to have a stronger effect on dysmenorrhea incidence than dietary patterns. Although diet also contributes, stress has a greater impact on triggering or worsening dysmenorrhea symptoms. This finding aligns with initial survey results, in which most respondents indicated that stress was the primary factor influencing dysmenorrhea. Statistical analysis showed a significant correlation between stress levels and dysmenorrhea symptoms among female students in Medan City, with a $p\text{-value}$ of 0.001 (< 0.05), indicating a strong correlation.

These findings are consistent with previous Research demonstrating that stress can affect menstrual cycles and increase the intensity of menstrual pain. Adolescents with moderate to severe stress levels tend to experience higher dysmenorrhea symptoms compared to those with normal or low stress levels. Physiologically, this can be explained by the stress-induced increase in cortisol

levels, which can disrupt the balance of reproductive hormones such as estrogen and progesterone, ultimately worsening dysmenorrhea symptoms (Suhardin, 2024).

5. Conclusion

Based on the results of the study and discussion, the following conclusions can be drawn:

- a. There is a significant relationship between stress and the risk of dysmenorrhea in adolescent girls at SMP N 2 Bunta, Simpang Raya District, Banggai Regency.
- b. There is a significant relationship between nutrient intake and the risk of dysmenorrhea in adolescent girls at SMP N 2 Bunta, Simpang Raya District, Banggai Regency.
- c. There is a significant relationship between physical activity and the risk of dysmenorrhea in adolescent girls at SMP N 2 Bunta, Simpang Raya District, Banggai Regency.
- d. Stress and nutrient intake have a substantial influence on the risk of dysmenorrhea in adolescent girls at SMP N 2 Bunta, Simpang Raya District, Banggai Regency, with Exp(B) values of 5.689 for stress and 7.468 for nutrient intake. This indicates that stress and nutrient intake have a greater effect in triggering or worsening dysmenorrhea symptoms.

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