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# Integrating an HAKI-Based Menstrual Calendar to Examine the Relationship between Nutritional Status, Dietary Intake Patterns, and Menstrual Cycle Regularity among Adolescent Girls

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**Abstract—Background:** Adolescents generally experience very rapid growth so that nutritional needs increase. The problem in adolescence in Indonesia in 2019 is that most people often consume food that does not meet balanced nutrition with a nutritional status of 8.5%, overweight 16.4% and obesity 6.1% (Global Nutrition Report, 2019). Many teenage girls experience menstrual irregularities due to excess nutrition. The aim of this research is to analyze the relationship between nutritional status and food intake patterns and menstrual cycle regularity in adolescent girls at MTs Negeri 2 Ciamis, Ciamis Regency. **Methods:** This type of research is descriptive analytics with a correlational approach. The independent variables are nutritional status and food intake patterns, while the dependent variable is the menstrual cycle. The research population was 190 teenage girls in grades VIII and IX. The sampling technique was carried out using Proportionate Stratified Random Sampling with a total of 129 people. The research instruments used questionnaires, digital scales and microtoises. Data analysis was carried out using univariate and bivariate analysis with the Spearman Rank test. **Results:** The nutritional status was normal for 78 people (60.5%), the pattern of adequate food intake was 84 people (65.1%), and the menstrual cycle was normal for 94 people (72.9%). There is a weak relationship between nutritional status and menstrual cycle regularity with  $p$ -value = 0.003 and  $r$  value = 0.257, and there is a weak relationship between food intake patterns and menstrual cycle regularity with  $p$ -value = 0.001 and  $r$  value = 0.285. **Conclusion:** There is a relationship between nutritional status and food intake patterns and the regularity of menstrual cycles in adolescent girls. It is hoped that young

women can maintain a balanced diet and adequate nutrition, to help maintain reproductive health and regular menstrual cycles.

Keywords— *Nutritional Status; Food Intake Pattern; Menstrual Cycle*

## I. INTRODUCTION

Adolescence is a critical developmental stage characterized by rapid physical growth, hormonal maturation, and psychological transition. During this period, nutritional needs increase substantially, and imbalances in dietary intake may affect reproductive health outcomes, including menstrual cycle regularity. Menstrual irregularities are common in adolescent girls, particularly in the early years after menarche, and may reflect underlying physiological or metabolic disturbances.

Globally, nutritional problems among adolescents remain significant. According to the Global Nutrition Report (2019), Indonesia continues to face a double burden of malnutrition, with underweight, overweight, and obesity affecting adolescents aged 5–19 years. Both undernutrition and overnutrition have been associated with endocrine imbalance and disruption of the hypothalamic–pituitary–ovarian axis, which plays a central role in regulating the menstrual cycle. Excess adipose tissue may increase estrogen production and interfere with follicle-stimulating hormone (FSH) and luteinizing hormone (LH) regulation, while insufficient nutritional intake may impair hormonal synthesis and ovulatory function.

Previous studies have reported associations between nutritional status, dietary intake, and menstrual cycle patterns. For instance, Yuniyanti et al. (2022) found that inadequate energy intake and abnormal nutritional status were

significantly associated with irregular menstrual cycles among university students. Similarly, Fitria (2021) reported that obesity was linked to higher risk of menstrual disturbances in adolescents. Other research has also highlighted the influence of physical activity and stress on menstrual regularity.

However, most previous studies examined nutritional status or dietary intake separately and did not comprehensively explore their combined relationship with menstrual cycle regularity within a specific school-based adolescent population. Furthermore, limited research has integrated objective anthropometric measurements with structured dietary pattern assessment in Islamic junior secondary school settings in West Java.

Preliminary observations conducted in a public Islamic junior secondary school in Ciamis Regency indicated that several students experienced suboptimal nutritional status and reported irregular menstrual cycles. This situation underscores the need for empirical investigation to better understand the relationship between nutritional status, dietary intake patterns, and menstrual cycle regularity among adolescent girls in this context.

Therefore, this study aims to analyze the relationship between nutritional status and dietary intake patterns with menstrual cycle regularity among adolescent girls in a public Islamic junior secondary school in Ciamis Regency. The findings are expected to contribute to evidence-based strategies for improving adolescent reproductive health through nutritional interventions.

## II. METHOD

This study was conducted in a public Islamic junior secondary school in Ciamis Regency, West Java, Indonesia. The type of research used was descriptive analysis with a correlational approach. The independent variables in this study were nutritional status and dietary patterns. The dependent variable in this study was the menstrual cycle. The data collected by the researcher was primary data obtained by filling out a questionnaire after the researcher obtained research permission from Universitas Bhakti Husada Indonesia ethical committee. The population consisted of 190 female students in grades VIII and IX enrolled in the 2023/2024 academic year.

The sampling technique used by the researcher was *Proportionate Stratified Random Sampling*. The sample size for the study was 129 respondents who were willing to participate. The research instruments used questionnaires, digital scales, and microtoise. Data analysis was performed using univariate and bivariate analysis with the Spearman's rank test.

## III. RESULTS AND DISCUSSION

### RESULTS

#### A. Univariate Analysis

TABLE I. OVERVIEW OF NUTRITIONAL STATUS, DIETARY INTAKE PATTERNS, AND MENSTRUAL CYCLE REGULARITY IN ADOLESCENT GIRLS

| Variables                         | N  | %    |
|-----------------------------------|----|------|
| <b>Nutritional Status</b>         |    |      |
| Underweight                       | 16 | 12,4 |
| Normal                            | 78 | 60,5 |
| Overweight                        | 35 | 27,1 |
| <b>Dietary Patterns</b>           |    |      |
| Insufficient                      | 45 | 34,9 |
| Adequate                          | 84 | 65,1 |
| <b>Menstrual Cycle Regularity</b> |    |      |
| Abnormal                          | 35 | 27,1 |
| Normal                            | 94 | 72,9 |

Based on Table 1, it was found that of the 129 respondents, most had a normal nutritional status, totaling 78 people (60.5%). Most had an adequate food intake pattern, totaling 84 people (65.1%). Most had a normal menstrual cycle, totaling 94 people (72.9%).

#### B. Bivariate Analysis

TABLE II. RELATIONSHIP BETWEEN NUTRITIONAL STATUS AND DIETARY PATTERNS WITH MENSTRUAL CYCLE REGULARITY IN ADOLESCENT GIRLS

| Variable                      | Menstrual Cycle |      |        |      | Total |     | P-value | R     |
|-------------------------------|-----------------|------|--------|------|-------|-----|---------|-------|
|                               | Not Normal      |      | Normal |      | N     | %   |         |       |
|                               | n               | %    | n      | %    |       |     |         |       |
| <b>Nutritional Status</b>     |                 |      |        |      |       |     |         |       |
| Underweight                   | 8               | 50   | 8      | 50   | 16    | 100 | 0,003   | 0,257 |
| Normal                        | 6               | 7,7  | 72     | 92,3 | 78    | 100 |         |       |
| Overweight                    | 21              | 60   | 14     | 40   | 35    | 100 |         |       |
| <b>Dietary Intake Pattern</b> |                 |      |        |      |       |     |         |       |
| Severe                        | 20              | 44,4 | 25     | 55,6 | 45    | 100 | 0,001   | 0,285 |
| Mild                          | 15              | 17,9 | 69     | 82,1 | 84    | 100 |         |       |

Based on Table 2, it can be seen that respondents who were underweight had abnormal menstrual cycles in 8 respondents (50%) and normal menstrual cycles in 8 respondents (50%). Respondents who were of normal weight had almost all respondents with normal menstrual cycles in 72 respondents (92.3%) and had abnormal menstrual cycles in 6 respondents (7.7%). Respondents who were overweight had almost all respondents with abnormal menstrual cycles in 6 respondents (6.7%) (92.3%) and had an abnormal menstrual cycle in 6 respondents (7.7%). Respondents with an overweight nutritional status mostly had an abnormal menstrual cycle in 21 respondents (60%) and had a normal menstrual cycle in 14 respondents (40%). Based on the statistical test results, a p-value of 0.003 < 0.05 was obtained. This means that there is a relationship between nutritional status and the regularity of the menstrual cycle in adolescent girls at MTs Negeri 2 Ciamis Regency. Furthermore, a correlation coefficient of  $r = 0.257$  was also obtained, meaning that there is a correlation.

This means that there is a relationship between nutritional status and the regularity of the menstrual cycle in adolescent girls at MTs Negeri 2 in Ciamis Regency. Furthermore, a

correlation coefficient of  $r = 0.257$  was obtained, meaning that there is a weak correlation and the higher the nutritional status, the weaker the menstrual cycle.

Respondents with an inadequate dietary intake pattern Most respondents had a normal menstrual cycle (25 respondents, 55.6%) and an abnormal menstrual cycle (20 respondents, 44.4%). Meanwhile, respondents with adequate dietary intake mostly had normal menstrual cycles (69 respondents, 82.1%) and abnormal menstrual cycles (15 respondents, 17.9%).

Based on the statistical test results, a p-value of  $0.001 < 0.05$  was obtained. Therefore, it can be interpreted that there is a relationship between dietary intake patterns and the regularity of menstrual cycles in adolescent girls at MTs Negeri 2 Ciamis Regency. Furthermore, a correlation coefficient of  $0.285$  was obtained, meaning that there is a weak correlation and the higher the dietary intake pattern value, the higher the menstrual cycle value.

## DISCUSSION

This study found that nutritional status and dietary intake patterns were significantly associated with menstrual cycle regularity among adolescent girls. Although the strength of correlation was weak, the findings suggest that body composition and eating behavior play a meaningful role in reproductive health during adolescence.

Nutritional status influences hormonal regulation through its effect on fat distribution and energy balance. Both undernutrition and overnutrition may disrupt hypothalamic–pituitary–ovarian function, affecting estrogen production and ovulatory cycles. Adolescents with excessive body fat may experience elevated estrogen levels, which can interfere with follicular development and cycle stability. Conversely, insufficient energy intake may suppress gonadotropin-releasing hormone (GnRH), leading to irregular cycles.

Dietary intake patterns also contribute to menstrual health. Adequate intake of carbohydrates, protein, and healthy fats supports hormone synthesis and endometrial development. Poor dietary patterns, including excessive consumption of high-fat and low-fiber foods, may alter metabolic and endocrine balance, thereby influencing menstrual regularity.

These findings are consistent with previous research indicating that nutritional adequacy and balanced dietary patterns are important determinants of adolescent reproductive health. However, the relatively weak correlation suggests that menstrual regularity is multifactorial and may also be influenced by stress levels, physical activity, sleep patterns, and psychosocial factors.

The use of a structured menstrual calendar strengthened data documentation and reduced recall bias, highlighting the importance of systematic menstrual monitoring in school-based reproductive health research.

### 1. Overview of Nutritional Status in Adolescent Girls at MTs Negeri 2 Ciamis Regency 2023

Based on the research that has been conducted, it was found that out of 129 respondents, most had a normal nutritional status, namely 78 people (60.5%). A person's

nutritional status is based on food consumption and the body's ability to process nutrients. To achieve optimal growth and development, physical and mental health, and to prevent health issues related to poor nutrition, adolescents require good nutritional status. According to Wanggy's (2022) research, poor diet and physical activity, sleep duration, genetics, and socioeconomic environment are some of the factors that can affect the nutritional status of adolescents<sup>11</sup>. An unhealthy diet and lack of physical activity can have an impact on growth and development of the body<sup>5</sup> and the higher the nutritional status, the weaker the menstrual cycle. Respondents with inadequate dietary intake Most respondents had a normal menstrual cycle (25 respondents, 55.6%) and an abnormal menstrual cycle (20 respondents, 44.4%). Meanwhile, respondents with adequate dietary patterns mostly had normal menstrual cycles (69 respondents, 82.1%) and abnormal menstrual cycles (15 respondents, 17.9%).

Based on the statistical test results, a p-value of  $0.001 < 0.05$  was obtained. This can be interpreted as meaning that there is a relationship between food intake patterns and the regularity of the menstrual cycle in adolescent girls at MTs Negeri 2 in Ciamis Regency. Furthermore, a correlation coefficient of  $0.285$  was also obtained, meaning that there is a weak correlation and the higher the dietary intake pattern value, the higher the menstrual cycle value. This is supported by Basri's (2017) research, which shows a relationship between nutritional status and physical activity: less physical activity increases the likelihood of experiencing nutritional status such as overweight or obesity<sup>12</sup>.

The research results show that more than half of the respondents have a normal nutritional status. The nutritional status of respondents can be evaluated using the body mass index, which indicates the balance between height and weight. Normal nutritional status is also achieved through healthy eating practices. People often use eating habits to meet their body's nutritional needs. Teenagers' eating habits include the type of food, amount, frequency, distribution, and method of food selection. Not many respondents in this study had the habit of always eating breakfast, and most respondents rarely ate junk food. Additionally, physical activity, which is the size and body composition of an individual with an activity level appropriate to their body's needs, is a factor in achieving normal nutritional status.

This study also found that 35 respondents (27.1%) were overweight. Most respondents Most respondents experienced overnutrition because they rarely ate breakfast and often consumed junk food, according to the researchers. They also said that many adolescents often bought snacks outside the home and did not care much about the nutrition in their food. Adolescents today also really like foods such as fried foods, soft drinks, and fast food because they are considered more practical and tasty. These foods have low nutritional content and are unhealthy because they are high in calories from sugar or fat, with little fiber and few micronutrients, which cannot meet the body's nutritional needs. If consumed continuously and not balanced with nutritious foods, this condition will lead to overweight and obesity due to the accumulation of body fat.

Additionally, if the energy intake exceeds or is unbalanced compared to energy expenditure, it can result in malnutrition or being underweight. An unbalanced diet, loss of appetite, or excessive physical activity can be causes. Researchers suggest that poor nutrition in adolescents can impact their health and development. Nutritional deficiencies can cause poor growth, decreased immunity, hormonal disorders, and health problems such as anemia, osteoporosis, and menstrual disorders in adolescent girls. Conversely, obesity in adolescents can increase the risk of heart disease, diabetes, hormonal disorders, and other health problems in adulthood<sup>11</sup>. Based on research that has been conducted, it can be concluded that most adolescents have normal nutritional status, but there are also some who are overweight or undernourished. Factors such as unhealthy eating patterns, lack of physical activity, sleep duration, genetics, and socioeconomic environment can affect the nutritional status of adolescents. Adolescents who rarely eat breakfast, frequently consume junk food, and lack physical activity tend to experience overnutrition, while adolescents who have an unbalanced diet, loss of appetite, or excessive physical activity tend to experience undernutrition.<sup>6</sup>

Based on the research results, the researchers assumed that diet and physical activity play an important role in determining the nutritional status of adolescents. In addition, the researchers also assumed that adolescent eating habits, such as rarely eating breakfast and consuming unhealthy foods, can have an impact on their growth and development. Furthermore, researchers also argue that poor nutrition in adolescents can impact their health and development, such as decreased immunity, hormonal disorders, and the risk of heart disease, diabetes, and other health problems in adulthood.

## **2. Overview of Dietary Patterns Among Adolescent Girls at MTs Negeri 2 Ciamis Regency 2023**

Based on the results of the study, it was found that most of the 129 respondents had adequate food intake patterns, namely 84 people (65.1%). Diet is the way of regulating and types of food in the form of a daily food arrangement that contains nutrients, consisting of six substances, namely carbohydrates, protein, fat, vitamins, minerals, water, and a variety of foods. Dietary patterns are the composition of the amount of food consumed that provides balanced nutrition in the body and contains two substances, namely building substances and regulating substances. A balanced diet is food that has a high nutritional content and nutritional intake found in staple foods, animal-based side dishes, plant-based side dishes, vegetables, and fruits<sup>13</sup>.

Poor dietary patterns can have a negative impact on the health of adolescent girls. Inadequate nutritional intake can cause health problems such as lack of energy, vitamin and mineral deficiencies, and growth and development problems<sup>14</sup>. In order to improve dietary patterns among adolescent girls, it is necessary to educate them about the importance of a balanced and nutritious diet. Schools can play an active role in providing information about the importance of consuming foods that contain carbohydrates, protein, healthy fats, and vitamins and minerals necessary for optimal growth and development. In addition, it is necessary to collaborate between

schools, parents, and the community in creating an environment that supports healthy eating habits. Support from the environment can include the provision of healthy food in school canteens, the promotion of healthy food, and the regulation of regular meal times<sup>8</sup>.

Dietary patterns refer to the quantity, type of food, and frequency of consumption each day or at each meal by respondents, consisting of staple foods, side dishes (animal and plant-based side dishes, as well as vegetables and fruits)<sup>15</sup>.

A diet is considered balanced if there is regularity in meal schedules and consumption of quality food. Diet affects a person's nutritional status. Good nutritional status can cause psychosocial disorders, physical growth disorders, respiratory disorders, endocrine disorders, obesity, and non-communicable diseases. Meanwhile, poor nutritional status can increase the risk of infectious diseases<sup>16</sup>.

Based on the research results presented, it can be concluded that most adolescents have adequate food intake patterns, but there are still negative impacts on the health of adolescent girls due to insufficient nutrient intake. The researchers suggest that educational efforts regarding the importance of a balanced and nutritious diet need to be carried out, and schools can play an active role in providing information about the importance of consuming foods that contain carbohydrates, protein, healthy fats, as well as vitamins and minerals that are necessary for optimal growth and development. Additionally, collaboration between schools, parents, and the community in creating an environment that supports healthy eating habits is also considered important.

Based on the research findings, researchers assume that inadequate dietary patterns can have negative effects on the health of adolescent girls, such as issues related to growth and development, energy deficiency, and vitamin and mineral deficiencies. Furthermore, researchers also assume that educational efforts and cooperation between schools, parents, and the community can help improve dietary patterns among adolescent girls. Furthermore, researchers also believe that a balanced diet can influence an individual's nutritional status, and that inadequate or excessive nutritional status can lead to various health issues, both physical and psychosocial.

## **3. Overview of Menstrual Cycle Regularity in Adolescent Girls at MTs Negeri 2 Ciamis Regency 2023**

Based on the results of the study, it was found that of the 129 respondents, the majority had a normal menstrual cycle, namely 94 people (72.9%). For women, menstruation is a physiological process. The discharge of blood, mucus, and cells from the uterine lining, accompanied by cyclic shedding, or desquamation, of the uterine lining, is what is referred to as menstruation. Menstruation begins 14 days after ovulation. In women, the menstrual cycle typically ranges from 21-32 days, and only 10-15% have a 28-day cycle with a menstrual period lasting 3-5 days, or 7-8 days. The menstrual cycle is defined as the period from the start of one menstrual period to the start of the next. Women have a menstrual cycle that changes each month, but some women have the same number of days in each menstrual cycle. Within three months, the menstrual cycle is

considered irregular if one of the menstrual periods is less than 21 days or more than 35 days<sup>17</sup>.

The menstrual cycle is regular if the entire cycle lasts from 21 to 35 days within three months. Factors that affect the menstrual cycle include physical activity, nutritional status, and age at menarche. Meanwhile, another study conducted by Anjasari states that stress levels and the menstrual cycle have a significant relationship, where respondents with mild stress experience irregular menstruation<sup>18</sup>.

This study found that more than half of the respondents had normal menstrual cycles. The better the nutritional status, the more normal the menstrual cycle. Most of the respondents' physical activities were light physical activities. The longer the duration and higher the intensity of physical activity, the greater the likelihood of experiencing menstrual cycle disorders. Excessive physical activity can affect hypothalamic dysfunction, which causes disturbances in GnRH due to energy expenditure exceeding energy intake. Therefore, appropriate physical activity is needed, tailored to the individual's physical condition and daily needs, to avoid disrupting the hormonal system, especially reproductive hormones, which can affect the menstrual cycle.

Based on the research findings, the researchers assume that nutritional status and physical activity influence the menstrual cycle in adolescent girls. The researchers also assume that excessive physical activity can affect hypothalamic dysfunction, leading to GnRH disruption, which in turn can affect the menstrual cycle. Additionally, researchers also argue that stress levels also have a significant relationship with menstrual cycle irregularities, where respondents with mild stress levels tend to experience irregular menstruation.

#### **4. Relationship Between Nutritional Status and Menstrual Cycle Regularity in Adolescent Girls at MTs Negeri 2 Ciamis Regency 2023**

Based on the results of the study, respondents who were underweight had abnormal menstrual cycles (8 respondents, or 50%) and normal menstrual cycles (8 respondents, or 50%). Respondents with normal nutritional status had almost all respondents with normal menstrual cycles (72 respondents, 92.3%) and abnormal menstrual cycles (6 respondents, 7.7%). Respondents with overweight nutritional status mostly had irregular menstrual cycles, totaling 21 respondents (60%) and had regular menstrual cycles totaling 14 respondents (40%). Based on the statistical test results, a p-value of 0.003 ( $p < 0.05$ ) was obtained. This means that there is a relationship between nutritional status and the regularity of the menstrual cycle in adolescent girls at MTs Negeri 2 Ciamis Regency.

The growth and function of organs, including reproductive organs, are influenced by a person's nutritional status. Healthy foods can improve reproductive function and affect the menstrual cycle. Good foods will improve nutritional status so that the hypothalamus can produce the reproductive hormones needed to regulate the menstrual cycle. The function of the hypothalamus and anterior pituitary gland in releasing FSH and LH hormones can be affected by excess or deficiency of nutrition in women. In adolescents with excess nutrition, there is fat that increases estrogen hormones, which inhibits FSH

production, disrupts follicular proliferation, and rapidly increases LH<sup>19</sup>.

The results of the study found that respondents who were overweight most respondents had abnormal menstrual cycles as many as 21 respondents (60%). These results may be due to factors other than nutritional status because women's menstrual cycles are very easily influenced by other conditions. However, there were also respondents with underweight or overweight nutritional status who had abnormal menstrual cycles due to factors such as stress, physical activity, hormonal disorders, and other factors. These research results are in line with research by Dya (2019), which found a significant relationship between nutritional status and menstrual cycles. In that study, individuals with normal nutritional status tend to experience normal menstrual cycles, while respondents with obese nutritional status tend to experience irregular menstrual cycles<sup>17</sup>. These results also align with the findings of Zahra (2023), who analyzed factors influencing the menstrual cycle, one of which is nutritional status<sup>20</sup>.

According to the study conducted, it was found that dietary intake, such as energy intake, protein intake, and carbohydrate intake, also plays a role in improving nutritional status. Another factor influencing an individual's nutritional status is knowledge, as knowledge can change behavior in selecting nutritious foods that align with their needs and preferences<sup>21</sup>.

According to Dieny in (Fiana, 2019) factors that can affect nutritional status can be determined by internal and external factors. Internal factors include genetics, food intake, and infectious diseases. External factors include physical activity, age, gender, knowledge, family factors, environment, socio-cultural and economic factors<sup>21</sup>.

Sunarsih's (2017) research states that a low Body Mass Index (BMI) indicates low body fat levels, which can trigger irregular menstrual cycles. Excessive fat levels in the body are also detrimental to the menstrual cycle. Where if excessive fat levels in the body cause a person to experience obesity, this impacts the stability of hormones produced, thereby affecting the regularity of the menstrual cycle<sup>22</sup>.

Based on the results of the study, researchers assumed that there is a significant relationship between nutritional status and the regularity of menstrual cycles in adolescent girls. Researchers also assumed that other factors such as stress levels, physical activity, and other health conditions can also affect the regularity of menstrual cycles, although nutritional status remains a significant factor. In addition, the researchers also argue that food intake, including energy, protein, and carbohydrate intake, as well as knowledge about nutrition, also play an important role in influencing a person's nutritional status, which in turn can affect the regularity of the menstrual cycle. It can be concluded that nutritional status, dietary intake, stress levels, physical activity, and other health conditions are interrelated and can affect the regularity of the menstrual cycle in adolescent girls. Efforts to maintain good nutritional status, pay attention to dietary intake, and manage stress levels are important for maintaining a regular menstrual cycle.

It can be concluded that nutritional status, food intake, stress levels, physical activity and other health conditions are interrelated and can affect the regularity of the menstrual cycle

in adolescent girls. Efforts to maintain good nutritional status, pay attention to balanced food intake, manage stress effectively, and maintain healthy physical activity can help maintain the health of the menstrual cycle in adolescent girls.

### **5. Relationship Between Dietary Patterns and Menstrual Cycle Regularity in Adolescent Girls at MTs Negeri 2 Ciamis Regency 2023**

Based on the research results, respondents with inadequate dietary patterns. Most respondents had a normal menstrual cycle (25 respondents, 55.6%) and an abnormal menstrual cycle (20 respondents, 44.4%). Meanwhile, respondents with adequate dietary patterns mostly had normal menstrual cycles (69 respondents or 82.1%) and abnormal menstrual cycles (15 respondents or 17.9%). Based on the statistical test results, a p-value of 0.001 ( $p < 0.05$ ) was obtained. This indicates that there is a relationship between dietary intake patterns and the regularity of the menstrual cycle in adolescent girls at MTS Negeri 2 Ciamis Regency.

Nutrition during menstruation is necessary to replace lost components and for tissue proliferation in the endometrium. Due to blood loss and iron depletion, diet during menstruation must be more carefully considered, especially nutrients that form red blood cells. The menstrual cycle can also be disrupted by unhealthy eating habits. If eating habits are poor, it can cause a person to become obese or, conversely, underweight. Excess fat in the body will increase estrogen hormone levels, which triggers the ovaries to stop releasing eggs. If the amount of body fat is low, the estrogen levels produced are insufficient to build the uterine lining that will later break down as menstrual blood. High fat deposits will cause menstrual cycle disorders with the accumulation of estrogen levels in the body so that if carbohydrate, protein and fat intake is fulfilled and in accordance with requirements then the menstrual cycle will be normal<sup>23</sup>.

This study aligns with research conducted by Fairuz (2018) on the "Relationship Between Dietary Patterns, Physical Activity and Nutritional Status with the Menstrual Cycle at Khadijah High School in Surabaya". Based on the Spearman rank correlation test with a p-value of 0.000, this indicates a strong association between dietary patterns and the menstrual cycle<sup>24</sup>.

The study is also consistent with research conducted by (Batubara, 2021) on the "Relationship Between Dietary Patterns of Reproductive-Age Women and Menstrual Cycles in Medan Perjuangan District." Based on statistical analysis using the chi-square test, the p-value was 0.004, indicating that there is a significant relationship between dietary patterns and the menstrual cycle<sup>23</sup>.

From the research results, it can be concluded that dietary patterns and the menstrual cycle have a significant relationship because if the intake of carbohydrates, protein, and fat is met and in line with the caloric needs of adolescent girls, it will result in a normal menstrual cycle. Conversely, if the intake of carbohydrates, protein, and fat is not met or exceeds the caloric needs, it can cause an irregular menstrual cycle.

Based on the results of the study, researchers assumed that there was a significant relationship between dietary patterns and the regularity of menstrual cycles in adolescent girls. The researchers also assume that adequate nutritional intake,

especially carbohydrates, protein, and fat, plays an important role in maintaining hormonal balance and bodily functions that affect the menstrual cycle. Additionally, the researchers also believe that unhealthy eating patterns, such as excessive or insufficient intake relative to the body's needs, can affect hormone production and body metabolism, which in turn can influence the regularity of the menstrual cycle.

It can be concluded that a balanced diet that meets the body's needs plays an important role in maintaining the regularity of the menstrual cycle in adolescent girls. In addition, the results of this study also support findings from other studies that show a relationship between diet and the regularity of the menstrual cycle, which emphasizes the important role of nutrition in maintaining the reproductive health of adolescent girls.

## **IV. CONCLUSIONS**

There is a relationship between nutritional status and menstrual cycle regularity in adolescent girls at MTs Negeri 2 Ciamis Regency. There is a relationship between dietary patterns and menstrual cycle regularity in adolescent girls at MTs Negeri 2 Ciamis Regency. It is hoped that adolescent girls can maintain a balanced diet and adequate nutrition, including intake of iron, calcium, and vitamin D. This can help maintain reproductive health and regular menstrual cycles. Additionally, it is recommended to avoid unhealthy eating patterns, such as fast food and foods high in saturated fat, as these can affect hormonal balance and the menstrual cycle.

### **A. Study Implications**

This study highlights the importance of integrating nutritional education and menstrual health monitoring in school-based health programs. Schools can serve as strategic platforms for early identification of menstrual irregularities and nutritional imbalances. The use of structured menstrual calendars may enhance reproductive health literacy and encourage self-monitoring among adolescents.

### **B. Study Limitations**

Several limitations should be acknowledged. First, the cross-sectional design limits causal interpretation between nutritional status and menstrual cycle regularity. Second, dietary intake patterns were assessed using self-reported questionnaires, which may introduce reporting bias. Third, other potential confounding variables such as stress levels, sleep quality, and hormonal profiles were not measured.

### **C. Recommendations for Future Research**

Future studies should employ longitudinal designs to explore causal pathways between nutritional changes and menstrual patterns. Including biochemical markers such as hemoglobin levels or hormonal assays would strengthen the physiological explanation. Additionally, intervention-based studies evaluating school nutrition programs and menstrual tracking education are recommended to assess practical effectiveness.

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