



Correlation between Nutritional Status and Eating Patterns with the Menstrual Cycle in Female Adolescents

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ABSTRACT

Background. The menstrual cycle occurs at the time between the start date of the last menstrual period and the beginning of the next menstruation. Menstrual cycle that occurs in women is not always regular. Menstrual cycle disorders need to be aware of because menstrual cycle irregularity indicate an ovulation problem or the risk of other diseases. Nutritional status and dietary pattern will affect the reproductive system, one of which is the menstrual cycle. The study aims to determine the correlation between nutritional status and dietary pattern with menstrual cycle in female adolescents.

Method. This research was analytic descriptive with cross sectional research design. The study was conducted at Senior High School 1 Padang (SMAN 1 Padang). Research subjects were third grade female students (average age 17,24 years old) as many as 63 people. In the subjects, BMI measurement were done to obtain nutritional status, then questionnaires were given to know the dietary pattern and menstrual cycle. Data were analyzed by univariate and bivariate analysis using Chi-Square Test with significance level (α) 0,05.

Result. The results showed that there was a significant relationship between nutritional status and menstrual cycle on female students with $P = 0.10$ ($P < 0.05$). In addition, there was also a significant relationship between the dietary pattern of female students and menstrual cycle with a value of $P = 0.001$ ($P < 0.05$).

Conclusion. The conclusion of this research was that there was significant correlation between nutritional status and dietary pattern with menstrual cycle on adolescent female.

Keywords: nutritional status, dietary patterns, menstrual cycle, adolescents

1. BACKGROUND

According to the World Health Organization (WHO) (2014), adolescents are the population aged 10-19 years, and adolescence is divided into early adolescence (early adolescence) aged 10-13 years, middle adolescence (middle adolescence) aged 14- 16 years. years and late adolescence (late adolescence) aged 17-19 years. Menstruation is a natural process for every woman, a bleeding process caused by the shedding of the uterine wall as a result of the absence of fertilization. Menstruation is a physiological change in a woman's body that occurs periodically (every month) and is influenced by reproductive hormones. Menstruation in women is physiological (normal) uterine bleeding, as a result of hormonal changes, namely estrogen and progesterone. (Sarwono, 2009)

The normal amount of blood lost in young women is between 30-70 cc per cycle, but there are some women who bleed more. The largest volume of bleeding during menstruation usually occurs on the first and second days. The age of teenage girls when they first menstruate (menarche) is between 10-16 years, the average is 12 years. Statistics show that the age of menarche is influenced by hereditary factors, nutritional conditions and general health. The menstrual cycle is the distance between the start date of the last menstruation and the start of the next menstruation. Menstruation begins on the first day of the cycle, the length of a normal menstrual cycle is 21-35 days. The menstrual cycle or menstruation that occurs in women is irregular, some young women experience problems related to menstrual cycle disorders, namely menstrual cycles shorter than 21 days (polymenorrhea) or more than 30 days. (Sarwono, 2009)

Both short and long cycles indicate metabolic and hormonal irregularities, the impact of which is that it becomes more difficult to conceive (infertility). Short cycles that occur in women can cause unovulation because the egg cells are not very mature so they are difficult to fertilize. Long cycles in women indicate that eggs are rarely produced or women experience infertility for quite a long time. If egg cells are rarely produced, it means fertilization will be very rare. The irregularity of the menstrual cycle also makes it difficult for women to find out when they are fertile and when they are not. Based on epidemiology, women who have a 28 day cycle only around 10-15%. (Sarwono, 2009)

Other consequences that often occur due to menstrual cycle disorders are feelings of pressure, breast pain, body aches, stomach feeling bloated, swollen, pain and feeling more irritable or vice versa and other emotional changes (Ifahblog, 2012). The year when menstruation begins is a period that is vulnerable

to menstrual disorders. As many as 75% of teenagers experience menstrual-related disorders. Irregular, irregular menstruation, pain and profuse bleeding cause teenage girls to see a doctor. the prevalence of primary amenorrhea was 5.3%, secondary aminorrhea 18.0%, oligominorrhoea 50%, polymenorrhea 10.5% and mixed disorders 15.8% (Ministry of Health, 2015).

There are several factors that can cause menstrual cycle disorders, such as nutritional status, diet, physical activity, stress, consumption of hormonal drugs, age, genetic disorders, systematic medical diseases (Wiknjosastro, 2011). The nutritional status of female adolescents plays an important role in determining the birth of the next generation. This is also related to the diet adopted because adequate nutritional intake is also closely related to various physiological and psychological systems of the body. Nutritional status and eating patterns will have an impact on the reproductive system, one of which is the menstrual cycle. Menstrual cycle disorders need to be watched out for because menstrual cycle disorders indicate ovulation problems or the risk of other diseases.

Based on the results of preliminary research conducted at Padang 1 State High School, of the 10 female students the researchers interviewed, six of them experienced menstrual cycle disorders such as irregular menstruation, there were even several months without menstruation and the duration of menstruation was short for these students. The researcher also conducted interviews that were more in line with the theoretical basis of what influences the menstrual cycle. It was found that of the six female students who experienced irregular menstruation, four of them were overweight or obese. This article aimed to determine the relationship between nutritional status, and eating patterns with the menstrual cycle in young female.

2. METHOD

This research was descriptive analytical with a cross sectional research design. The sample in this study were female students at Senior High School 1 Padang, totaling 63 people who met the inclusion criteria and did not meet the exclusion criteria. The inclusion criteria for this study were female students who had menstruated, had no history of systemic medical disease (e.g. thrombocytopenia, thyroid disease, pituitary tumor), and were willing to be respondents.

The sampling technique for this study was non-probability/non-random sampling which was by total sampling (saturated sampling). The independent variables of this study were nutritional status and eating patterns, while the dependent variable was the menstrual cycle. The method was carried out by distributing questionnaires to respondents. At that time, respondents answered the questions and the questionnaire was returned that same day. The research was conducted on 2-3 October 2023. Data was collected from primary data which was obtained from filling out questionnaires by respondents. The data processing steps were editing, namely the data was checked for completeness and clarity first, then coding, namely the process of assigning a code to each variable data that had been collected which was useful for facilitating further processing, entry, namely entering the data into the Statistical Package for program. the Social Sciences (SPSS) in single entry, and cleaning, namely data that had been entered was checked again to ensure that the data was free from errors, either errors in coding or errors in reading the code.

Data obtained from univariate analysis on each research variable. The purpose of this analysis was to explain or describe the characteristics of each research variable. Followed by bivariate analysis to determine the relationship between the dependent variable and the independent variable using the Chi-Square Test with a significance level (α) of 0.05. If the p value $\leq \alpha$ means there is a meaningful (significant) relationship between the two variables

3. RESULT

This research was conducted to determine the correlation between nutritional status and eating patterns with the menstrual cycle in adolescent girls, with a total of 63 female students as respondents.

3.1 Frequency Distribution of Nutritional Status

The description of the nutritional status of female students at SMAN 1 Padang was assessed by measuring BMI with the formula body weight (kg) divided by height squared (m^2). The description of nutritional status based on BMI is divided into two, namely normal nutritional status with a BMI between 18-24 kg/m^2 , and abnormal with a BMI $<18 kg/m^2$ or $\geq 25 kg/m^2$.

Table 1. Frequency Distribution of Nutritional Status in SMAN 1 Padang

Nutritional Status	Frequency (N)	Percentage (%)
Abnormal	19	29.7
Normal	44	70.3
Total	63	100.0

Based on table 1 above, it can be seen that there are 19 (29.7%) female students at SMAN 1 Padang who have abnormal nutritional status, and as many as 44 (70.3%) people with abnormal nutritional status.

3.2 Frequency Distribution of Dietary Pattern

Dietary pattern assessment was carried out using a questionnaire that describes the frequency of eating, type of eating and meal times. A diet is considered good if the score obtained is > 60 and a poor diet if the score is < 59 . Based on this assessment, the following picture of the sample's diet is obtained:

Table 2. Frequency Distribution of Dietary Patterns in SMAN 1 Padang

Dietary Pattern	Frequency (N)	Percentage (%)
Poor	20	30.2
Good	43	69.8
Total	63	30.2

Based on table 2. it shows that there were 43 (69.8%) Grade 3 female students at SMAN 1 Padang who had good diet, and 20 other female students (30.2%) who had poor diet.

3.3 Frequency Distribution of Menstrual Cycle

The menstrual cycle in this study was divided into Normal menstrual cycle (21-35 days), Polymenorrhoea (< 21 days), Oligomenorrhoea (> 35 days) and Secondary amenorrhoea (no menstruation for 3 consecutive months after menarche). Menstrual cycle assessment was carried out through administering a questionnaire. Based on this assessment, the following picture of the sample's menstrual cycle was obtained:

Table 3. Frequency Distribution of Menstrual Cycle in SMAN 1 Padang

Menstrual Cycle	Frequency (N)	Percentage (%)
Normal	49	77.8
Abnormal	14	22.2
Total	63	100.0

Based on table 3 above, it can be seen that there were 49 people (77.8%) among the 63 grade 3 female students at SMAN 1 Padang who experienced normal menstrual cycles. There were 14 (22.2%) female students with abnormal or irregular menstrual cycles.

3.4 Bivariate Analysis

The results of correlation analysis between the independent variable (nutritional status) and the dependent variable (menstrual cycle) using the 3x2 chi-square table showed a p value < 0.05 (0.010). The results of statistical analysis by combining cells obtained a p value = 0.010 (with an α value < 0.05), so there was a significant relationship between nutritional status and the menstrual cycle in female adolescents.

The second variable, based on analysis of research data regarding the correlation between dietary patterns and the menstrual cycle in female adolescents using the chi-square test showed a p value < 0.05 (0.001). The results of statistical analysis showed that the p value = 0.001 (with an α value < 0.05), so there was a significant relationship between eating patterns and the menstrual cycle in female adolescents.

4. DISCUSSION

This research was carried out at Senior High School 1 Padang (SMAN 1 Padang). Data collection was carried out on all 63 female students. The data was nutritional status data by measuring BMI, eating patterns and menstrual cycles using questionnaire assessments.

4.1 Frequency Distribution of Nutritional Status

Based on table 1 above, it can be seen that there were 19 (29.7%) female student who have abnormal nutritional status, and as many as 44 (70.3%) people with abnormal nutritional status. Adriana (2014) stated that the nutritional status of female students who are teenagers can be reflected by a regular eating pattern followed by physical activity, in order to achieve optimal physical growth. Adolescent nutritional status is also greatly influenced by protein, calorie and energy intake.

The energy needed by teenagers is in accordance with the activities they do, therefore if it is not appropriate then their needs will not be met properly (Adriani, 2014). By consuming protein and calories according to needs and sufficiently, body growth, which includes increasing body weight and height, will be achieved properly and normally (Dieny, 2014). Students who have abnormal nutritional status, namely being too thin or fat, there are various

factors that influence the nutritional status of these students. These include bad eating habits, wrong understanding of nutrition by female students where having a slim body is a dream for young women, this often causes problems because they apply the wrong understanding of food.

Apart from that, excessive enthusiasm for certain foods can cause nutritional needs not to be met, as well as excessive promotion through the mass media can also have an influence because teenagers are very easily attracted to something new so that it is used by food companies to promote their products without reminding them of the nutritional content. . what it contains is good for nutritional status. And the free entry of fast food products originating from other countries has had an influence on the eating habits of teenagers which has become a trend in the lives of modern teenagers today (Adriana, 2014).

This is in accordance with research by Felicia et al (2015), that as many as 27 respondents (75%) have the habit of consuming fast food, resulting in a higher increase in calorie intake. The results of this research show that the majority of female students have abnormal nutritional status.

4.2 Frequency Distribution of Dietary Patterns

In table 2. Based on the research results, it shows that there are 43 (69.8%) Grade 3 female students who have a good diet, and 20 other female students (30.2%) who have a poor diet. A good diet followed by physical activity can create good nutritional status so that optimal physical growth can be achieved. A good eating pattern describes a regular frequency of eating, types of food consisting of protein, calorie and energy intake, and adjusted meal times.

4.3 Menstrual Cycle Frequency Distribution

Based on table 3. above, it can be seen that there are 49 people (77.8%) among the 63 grade 3 female students who experience normal menstrual cycles. There were 14 (22.2%) female students with abnormal or irregular menstrual cycles. This data shows that the majority of female students experience normal or regular menstrual cycles, only a small percentage have abnormal menstrual cycles.

Menstruation (menstruation) is periodic and cyclic bleeding from the uterus accompanied by expulsion (desquamation) of the endometrium (Nugroho, 2012). The menstrual cycle is the distance between the start date of the last menstruation and the start of the next menstruation which takes place in a certain pattern every month. The menstrual cycle is said to be regular if it lasts 21-35 days, and is said to be irregular if it lasts <21 days or >35 days. There are several factors that influence the menstrual cycle, including stress, physical activity, excessive or insufficient nutritional status, and hormones (Dieny, 2014).

According to Wolfenden (2010) in Mentari (2015), the most influential factor in regulating the menstrual cycle is hormonal imbalance. There are many factors that can cause hormonal regulation to be disrupted, namely stress, changes in routine, illness, lifestyle and body weight. There are 5 hormones that play a role in the menstrual process, including progesterone, estrogen, LH, FSH, and GnRH (Winkjosastro, 2009). Female students who experience abnormal menstrual cycles, one of which can be caused by nutritional status. Excessive or underweight will affect ovarian function, namely increasing or decreasing progesterone, estrogen, FSH and LH. This hormonal disorder will have an impact on menstrual cycles that are too fast and short menstrual cycles (Rahayu, 2012).

Stress can also affect the regularity of the menstrual cycle because stress triggers an increase in levels of the hormone Corticotropin Releasing Hormone (CRH) and glucocorticoid hormones, thereby inhibiting the secretion of the hormone Gonadotropin Releasing Hormone (GnRH) which will cause fluctuations in the levels of the hormones FSH and LH resulting in a prolonged process of proliferation and secretion or shortened. Stress can also affect a person's eating patterns, because it can cause appetite to decrease or increase depending on the individual's habits (Dieny, 2014).

4.4 Correlation between nutritional status and menstrual cycle

The results of statistical analysis obtained a p value = 0.010, so there was a significant relationship between nutritional status and the menstrual cycle in grade 3 female adolescents.

The above results are in accordance with the literature, namely in terms of the nutritional status of the respondents, Shils and Shike (2006) stated that the nutritional status of adolescents was related to the menstrual cycle. Teenage girls who undergo special diets such as extreme weight loss diets that trigger bulimia or become vegetarians can experience menstrual cycle disorders. Nutritional status has an important role in the growth and development process of adolescents in achieving an optimal body. If nutritional status is excessive or deficient, it can affect sexual maturation, growth, body organ function, and will cause disruption of reproductive function. This is in accordance with Marmi's (2013) theory, that the female reproductive system can be disturbed, including due to the nutritional status of the body that is appropriate and not excessive.

A woman who experiences deficient or excess nutrition will have an impact on decreasing the function of the hypothalamus which does not provide stimulation to the anterior pituitary to produce FSH (Follicle Stimulating Hormone) and LH (Luteinizing Hormone).

FSH itself functions to stimulate the growth of egg cells around 1-30 follicles, each of which only contains 1 egg cell. Meanwhile, LH functions in the process of maturation of egg cells or ovulation (secretion phase) which later, if not fertilized, shedding (menstruation) will occur, so that if the production of FSH and LH is disrupted, the menstrual cycle will also be disrupted (Mentari, 2015).

In research conducted by Gharravi in 2009 in Iran, of 106 samples with variations in BMI ranging from 15 kg/m² to 29.9 kg/m², it was found that 38% of female students in Iran experienced menstrual cycle irregularities, namely 4.5% of respondents were obese. Obesity in women can pose a risk of menstrual disorders and other diseases such as the increased prevalence of cancers that are sensitive to female hormones. Most menstrual cycles in women are 28 days long. Women with a larger BMI do have a risk of experiencing irregular menstrual cycles. Menstrual cycle irregularities are also influenced by the onset of menstruation above the age of 14 years, level of depression, parity and so on (Harlow, 2001).

4.5 Correlation between dietary pattern and menstrual cycle

The results of statistical analysis show that the p value = 0.001 (with an α value < 0.05), so there is a significant relationship between eating patterns and the menstrual cycle in grade 3 female students. This is in accordance with research (Mentari, 2015), showing that if teenagers have a good diet with nutritious nutritional intake with good emotional stability accompanied by a lifestyle and can make the hypothalamus work well so that it can produce the hormones the body needs, especially reproductive hormones, so that the menstrual cycle can become regular. The menstrual cycle is greatly influenced by hormonal status in women, because in conditions of heavy psychological burden, the hormones estrogen and FSH will increase, causing the menstrual cycle to become irregular (Ellya, 2010 in Eni, 2015).

The wrong diet, such as a high-fat diet, can cause irregular menstruation because there are too many androgens (steroid hormones). If women have a high percent body fat (obesity category), there is an increase in androgens which function as precursors of reproductive hormones. Androgens are used to produce estrogen with the help of the aromatase enzyme. The process of aromatization of androgens into estrogen occurs in granulosa cells and fat tissue. If the more fat is present in the body, the more estrogen is formed which can then disrupt the hormonal balance causing menstrual cycle disorders (Rakhmawati, 2012).

5. Conclusion

From the study, it was found that the majority of female adolescents had normal nutritional status, the majority of them had normal menstrual cycles. From the research, we can conclude that there was a significant correlation between nutritional status and eating patterns on the menstrual cycle of female adolescents.

Conflict of Interest

No potential conflict of interest relevant to this article was reported

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