Nutritional Status and Lifestyle Factors Contributing to the Regulation of Reproductive Quality in Adolescent Females

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ABSTRACT

Introduction : Many health problems of adolescents cause a decline in their quality of life, including reproductive-related problems such as anemia, malnutrition, and obesity. Chronic nutritional dysfunction among adolescents has raised concerns since it may lead to stunting.

Objective :This study examines the correlation between nutritional status and lifestyle (including habitual patterns of diet, exercises, and use of insecticides or mosquito repellent, consumption of Fe tablets and folic acid) and reproduction quality (including ages, menarche, menstrual cycle, PMS score, and length and length and severity of dysmenorrhea).

Method : We used an analytic survey method with a cross-sectional study design. The population was young women aged 16-24 years, with a total of 80 people.

Result : Data were not normally distributed or homogeneous; we used a non-parametric approach with the Spearman correlation test $\alpha = 0.05$. The chi-square test resulted in a Sig value of 0.292 > 0.05, and the Spearman Rank correlation test results in Sig. (2-tailed) of 0.152 or a Sig (2-tailed) value of 0.152 > 0.05.

Conclusion : The results indicate that the reproductive quality of adolescents is multifactorial. The nutritional status and lifestyle of adolescents are only part of the factors determining the optimization of reproductive function.

Keywords: adolescence, menstruation, nutrition, reproductive

Introduction

Adolescence is a transitional stage; it begins when the child shows signs of puberty and continues with pubertal maturation (Verawaty, 2011). Internal and external factors affect the speed of puberty, including nutrition, genetics, health conditions, and social, behavioral, and environmental factors. Nutrition is the most powerful factor affecting puberty. Girls generally show the first sign of puberty at 9-12 years old. They experience an increased need for iron due to accelerated growth (growth spurt) and menstruation. In addition, they usually start to care more about body shape, and many end up taking less and inadequate food (Sediaoetomo, 2002).

Adolescents with health problems must be our concern since they, especially girls, have a very important role in the life cycle through their reproductive cycle. The 2015 population survey showed that the population aged 15-24 years reached 42,061.2 million, or 16.5% of the total population of Indonesia. The results of population projections show that the adolescent population will increase until 2030 (Lembaga Demografi FEB UI, 2017).

Adolescent-related health problems, including anemia, malnutrition, and obesity, affect their reproductive quality. Poor nutritional status during adolescence may lead to decreased health status of mothers and fetuses during pregnancy (intrauterine growth rate IUGR), during labor (prolonged labor), and low birth weight of babies (LBW). LBW contributes the highest to stunting cases in Indonesia. Reproductive health problems in adolescence include pregnancies outside of marriage, unwanted pregnan and child marriage. An increase in cases of child marriage will increase teenage pregnancies. Data shows that in 22 provinces in Indonesia the number of early marriages is above the national data (10.82%) (BPS, 2020).

Pregnancy at a young age and a state of anemia will have a negative impact on the nutritional status of the fetus and baby. Toddlers born to women who marry in their teens are significantly more at risk of having stunted children (Larasati, D. A., Nindya, T. S. and Arief, 2018). The WHO, (2018) outlines the risk factors for stunting in toddlers. Maternal factors include poor nutrition before pregnancy, child gestation, maternal mental health, premature birth, Intra Uterine Growth Restriction (IUGR), and hypertension are the first contributing factors. The second factor causing stunting is not providing early initiation of breastfeeding IMD), non-exclusive breastfeeding, and weaning that is too fast (WHO, 2018). Adolescent girls who experience pregnancy generally have a thin and very thin Body Mass Index (BMI) and are in a state of Chronic Energy Deficiency (KEK) and anemia (Rahayu, Purwandari and Wijayanti, 2017; Ministry of Health RI, 2018).

Low BMI, KEK and Anemia in young women are related to a lack of nutritional intake which has an impact on low weight gain if experiencing pregnancy which can result in a high incidence of premature birth which is one of the factors in stunting in toddlers (Vivatkusol, Thaovalai Thavaramara, 2017). Pregnant women who suffer from anemia have 4 times the risk of their child experiencing stunting compared to mothers who are not anemic (Widyaningrum, D.A, Romadhoni, 2018).

It is common for many developing countries, including Indonesia, to face the nutritional problems of adolescents. It is easy to use the Body Mass Index (BMI) to categorize adolescents as underweight, overweight, and obese. We can have a good nutritional status for adolescents by helping them maintain healthy lifestyles and balanced diets. This can be achieved by carrying out specific and sensitive nutritional interventions by all relevant parties so that adolescents who will become parents can produce superior and healthy generations

(Wahyuni, 2018).

Some literature suggests the effects of a decrease in the nutritional status of adolescents, which can disrupt the reproductive health quality of female adolescents. Various kinds of menstrual cycle disorders such as polymenorrhea, oligomenorrhea and amenorrhea (Wiknjosastro, 2009). The results of study (Hidayah, N,. Rafiludin, M.Z., Aruben, 2016) showed that 60.2% of 108 adolescents experienced irregular menstrual cycles. There are several factors that can cause an abnormal menstrual cycle including stress, nutritional consumption, smoking, consumption of hormonal drugs and endocrine disorders and nutritional status (Kusmiran, 2011). The characteristics of adolescents who pay attention to body image, especially young girls who want to have a slim body, cause adolescents to make eating patterns that are too strict in order to maintain their appearance. This body image will have an impact on the lack of intake consumed so that it has an impact on malnutrition status (Adriani, M. & Wirjatmadi, 2016).

Nutritional status has the potential to cause reproductive health problems for young women. This is due to the influence of food and other types of nutrition (Silvestris E., D Lovero., 2019). The results of another study conducted by previous researcher (Novita R, 2018) stated that ovulation disorders can occur due to variations in body weight, such as being overweight, obese or underweight. In obesity that continues into adulthood will cause earlier sexual maturity and irregular menstrual cycles. The regularity of the menstrual cycle is an indicator of women's reproductive health (Silvestris E., D Lovero., 2019).

Monica S, *et al* (2019) in the result study that menstrual problems especially dysmenorrhea are frequent among adolescent girls. BMI play a very vital role for menstrual cycle regularity. Consequently, adolescent girls have to be given healthy and balanced nutrition, which leads to maintenance of their normal BMI and regulates their menstrual cycle.

Thus, the functional reproductive system is also influenced by food and types of nutrition; this aligns with the results of other studies showing a significant relationship between protein, vitamin C, and iron intake in the menstrual cycle (Wahyuni, 2018). Variations in body weight regarding being overweight, obese, or underweight related to changes in energy balance also disrupt the ovulation process. Obesity that continues into adulthood will lead to earlier sexual maturity and irregular menstrual cycles. Obesity can exacerbate menstrual cycle disorders in the long term; this indicates that the accumulation of body fat has disrupted the reproductive system.

Under normal conditions, young girls can experience menstrual cycle disorders because the hypothalamus-pituitary-ovary has not worked optimally in the first two years after menarche. Cycle frequency can vary from less than 20 days to more than 90 days. Previous research has shown that stress and smoking are also associated with irregular menstruation. The smallest change in female hormone levels can cause changes in the menstrual cycle. However, the effect of body mass index on reproductive quality both in the short term (during adolescence) and long term (in late reproductive processes until menopause) is not fully understood.

The percentage of menstrual cycle irregularities at 10-29 years old is 16.4% ((Riskesdas), 2013). The prevalence of menstrual cycle disorders in West Java is primary amenorrhea at 5.3%, polymenorrhea at 10.5%, and mixed disorders at 15.8%. In Indonesia, 76.7% of women aged 20-24 have regular menstrual cycles, and the rest 14.4% have abnormal menstrual cycles.

The results of a preliminary survey conducted on 15 adolescents showed that 7 (seven) experienced abnormal menstrual cycles (42%). Thus, it is known that the prevalence of abnormal menstrual cycles is higher than the national prevalence, which is 13.7%.

Objective

This study examines the correlation between nutritional status and lifestyle (including habitual patterns of diet, exercises, and use of insecticides or mosquito repellent, consumption of Fe tablets and folic acid) and reproduction quality (including ages, menarche, menstrual cycle, PMS score, and length and length and severity of dysmenorrhea).

Method

Study Design

We employed an analytic survey with a cross-sectional study design.

Population and Sampling

The population was all active students of STIKes Respati. Samples were chosen using the accidental sampling technique. We had 80 female students who met the inclusion criteria: (1) healthy or not currently undergoing treatment or not consuming certain drugs for a long time, (2) aged 16-23 years, (3) had their weight checked at a maximum of within 1 (one) month, (4) had menstruated > than 3 cycles, and (5) were willing to be respondents.

Measurements

The independent variables in this study were nutritional status and lifestyle (diet, exercises, use of insecticides, consumption of Fe and folic acid tablets), while the dependent variable was reproductive health quality (menarche, menstrual cycle, PMS symptom score, duration and severity of dysmenorrhea). Respondents were asked to fill out a prepared questionnaire. Nutrititional status (BMI), BMI (kg/cm2) was calculated using WHO classification for BMI2004. The BMI cut-off points are <18.5 kg/m2 (underweight),18.5–24.9 kg/m2 (normal range), >25 (overweight), 25–29.9 kg/m2(pre-obese), and >30 kg/m2 (obesity) For anthropometric examination, weight was recorded using a standardized weighing scale, that was kept on a firm horizontal surface Height was measured using a nonstretchable tape to the nearest 1 cm. The height of girls was measured barefoot. They were made to stand with heels together so that medial malleoli were touching and feet slightly spread. The position of shoulder was relaxed with minimal lordosis. Hands and arms were loose and relaxed with palms facing medially and was to look straight ahead Lifestyle was collected, such as personal detail diet, exercises, use of insecticides, consumption of Fe and folic acid tablets. Menstruation-related information was collected, such as personal details, age of menarche in years, regularity, and problems during menstruation cycle. PMS scale instrument using the Moos menstrual distress questionnaire (MMDQ).

Data Collection and analyses

Our study took three months to complete. We collected primary data. We used assessment sheets and questionnaires as the research instruments. Data were analyzed for homogeneity and through normal distribution tests. The test results showed that the data were not normally distributed or homogeneous, so the analysis used a non-parametric test

approach. We used the Chi-square correlation test to check how the independent variables affected the dependent variable. So the Spearman rank test with α 0.05 was done.
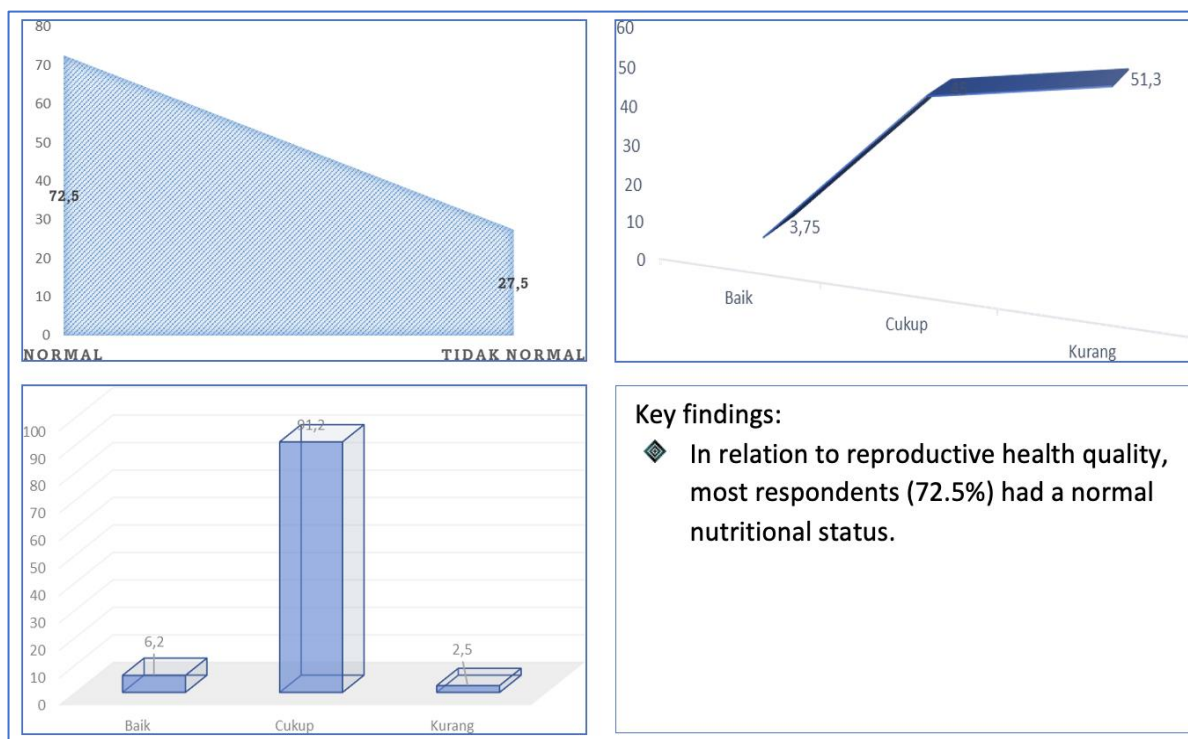
Result

Figure 1. Frequency Distribution of Nutritional Status, Life Style and Health Reproductive

Lifestyle is classified into some sub-variables, including diet, exercise, insecticide (mosquito repellent) use, and consumption of Fe tablets and folic acid. Table 1 presents the percentage of each sub-variables.

Table 1. Percentage of lifestyle sub-variables among respondents

No.	Sub-variables	Category		
		Never	Sometimes	Always
1	Diet	86.2%	0.0%	13.8%
2	Mosquito repellent	50.0%	40.0%	10.0%
3	Exercise	45.0%	25.0%	10.0%
4	Fe tablet consumption	83.8%	16.2%	0.0%
5	Folic acid	75.5%	18.8%	3.8%

Most respondents (91.2%) had a good status of reproductive health quality. It is supported by data on the sub-variables of reproductive health quality. Most respondents experienced menarche at 12-18 years old and mild PSM, as presented in Table 2.

Table 2. Frequency Distribution of Reproductive Health Quality Sub-variables

No	Sub-variable	Classified		
		12-18 yo	< 12 yo	>18 yo
1	Menarche	86.2%	0%	13.8%
	Sub-variable	Normal	Sometimes	Irregular
2	Menstrual cycles	65%	10%	25%
	Sub-variable	Mild	Moderate	Severe
3	PMS scoring	86.2%	13.8%	0%
	Sub-variable	Low	Moderate	High
4	Dysmenorrhea severity	20%	42.5%	37.5%
	Sub-variable	< 3 days	> 3 days	Throughout menstruation
5	Dysmenorrhea length	66.2%	27.2%	6.2%

Table 3. Crosstabulation

Reproductive Health Quality					
		Good	Moderate	Low	Total
Nutritional status	Normal	5	52	1	58
	Abnormal	0	21	1	22
Total		5	73	2	80

Table 4. Chi-square analysis

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.463[a]	2	.292
Likelihood Ratio	3.727	2	.155
Linear-by-Linear Association	2.395	1	.122
N of Valid Cases	80		

The significance value of 0.292 > 0.05 means no significant relationship between nutritional status and reproductive health quality; in other words, Ho is accepted, and Ha is rejected. Table 5 illustrates that the significance value (2-tailed) is 0.152. Because 0.152 > 0.05 means no significant relationship between reproductive health quality and lifestyle. SPSS outputs show a correlation coefficient value of 0.162, meaning that the correlation strength between the two variables is 0.162. Since 0.162 is in the range of 0.00 and 0.25, the correlation belongs to the "very weak" category. The correlation coefficient is positive, 0.162, meaning that the relationship between the two variables is in the same direction. In other words, the better the lifestyle, the higher the reproductive health quality. Thus, Ho is accepted, and Ha is rejected. To sum up, there is no significant relationship between reproductive health quality and lifestyle, and the two variables have a unidirectional relationship.

Table 5. Correlation analysis of lifestyle and reproductive health quality

Reproductive Health Quality				Lifestyle
Spearman'srho	Reproductive Health Quality	Correlation Coefficient	1.000	.162
		Sig. (2-tailed)	.	.152
		N	80	80
	Lifestyle	Correlation Coefficient	.162	1.000
		Sig. (2-tailed)	.152	.
		N	80	80

Discussion

Nutritional Status and Reproductive Health Quality

Many factors affect the nutritional status of adolescents, including internal and external factors. Internal factors consist of genetics, food intake, and infectious disease (Suhardjo, 2003). External factors consist of agricultural factors, economic factors, socio-cultural factors, and nutritional knowledge. In addition, other factors also determine nutritional status, including technology. Along with the development of technology, the use of chemicals in food-making is increasingly widespread. The use of hormones in breeding will affect the growth of adolescents. Teenagers who consume these food products tend to be fat and have a high BMI. One's nutritional status describes what they consume in the long term (Hapzah & Yulita, 2012).

Based on nutritional status measurement in the sample group, it was found that 72.5% had normal nutritional status and 27.5% were in abnormal conditions (consisting of 23% fat, 40% overweight, 23% thin, and 14% too thin). As for the results of cross-tabulation, it is known that in the samples with normal nutritional status, all (100%) have good reproductive health quality. However, most respondents (71%) in the sample group with normal nutritional status have moderate (sufficient) reproductive health quality. In addition, 29% of respondents with abnormal nutritional status group have moderate (sufficient) reproductive health quality.

Abnormal nutritional status is caused by an imbalance in nutrient intake with individual needs. Abnormal nutritional status can affect reproductive health quality, such as menstrual cycle. Nutritional status can describe a person's body fat percentage. The percentage of body fat affects the production of estrogen. The estrogen hormone regulates the menstrual cycle so that it can affect the menstrual cycle (Lemeshow, S., Hosmer, D.W., Klar, J. and Lwangsa, n.d.).

Relationship between body fat and menstrual cycles. One hormone that plays a role in the menstrual process is estrogen. Estrogen is synthesized in the ovaries, adrenals, placenta, testes, adipose tissue, and the central nervous system. According to the analysis, the cause of a longer menstrual cycle is the increased amount of estrogen in the blood due to increased body fat. High levels of estrogen will provide negative feedback on GnRH secretion (Hupitoyo., 2011).

The increased amount of estrogen in the blood is due to the high estrogen production in the theca cells. Theca cells produce androgens and respond to luteinizing hormone (LH) by increasing the number of LDL (low-density lipoprotein) receptors, which play a role in the entry of cholesterol into cells. LH also stimulates the activity of a special protein (P450scc), which causes an increase in androgen production. When androgens diffuse into the granulosa cells and fat tissue, more estrogen is formed. Obese women have excess androgens and estrogen,

which results in ovarian function disorders and menstrual cycle abnormalities (Hupitoyo., 2011)

Therefore, abnormal nutritional status increases the risk of reproductive function disorders. However, this is different from the results of statistical tests, which show that the group of respondents with normal or abnormal nutritional status have the same risk of having good, sufficient, or poor reproductive health quality. This is due to the complexity of the causes of nutritional status disorders and factors that affect a person's reproductive health quality. This finding aligns with the findings of other studies showing no relationship between nutritional status and dysmenorrhea (Novia Ika dan Puspitasari Nunik, 2008). Dysmenorrhea is a type of discomfort during menstruation that can reflect reduced reproductive health quality of women. Other conditions that may reflect a decrease in reproductive health quality, in addition to the severity and duration of dysmenorrhea, are the respondent's age when having their menarche and PMS scoring. Statistical analysis results for all sub-variables of reproductive health quality showed no relationship between nutritional status and reproductive health quality. Reproductive health quality is affected by multiple causes, such as genetic factors, changes in sex hormones, neurotransmitters, and the central nervous system, while environmental factors, depression, and lack of social and emotional support can affect the development and intensity of PMS symptoms and the duration and severity of dysmenorrhea (Karami J, Zalipoor S, 2015)

Another study from Bijoy KD (2018) showed the same research results that not all status of nutrition in childhood, malnutrition ranging from undernutrition (underweight) to overnutrition (overweight/obesity) affect the regulation of menstrual cycles in females. In theirs research show that significant correlation was observed between BMI with menstrual cycle length ($p < 0.001$), oligomenorrhoea ($p < 0.001$), secondary amenorrhoea ($p < 0.001$), BMI with menstrual flow duration ($p = 0.014$), perception of flow ($p = 0.001$) and dysmenorrhoea ($p < 0.001$), and no correlation between BMI and premenstrual syndrome ($p = 0.15$) and BMI with menstrual cycle regularity ($p = 0.23$).

Correlation tests confirmed no relationship between nutritional status and reproductive health quality, indicating no significant relationship between nutritional status and reproductive quality. This can also be interpreted that reproductive health quality does not correlate with nutritional status.

There are several possibilities for no correlation between nutritional status and reproductive health quality. There are still other factors that affect nutritional status. Many factors associated with reproductive disorders, including hormonal regulation disorders with trigger factors such as stress, illness, changes in routine, lifestyle, and weight, and other factors such as uterine abnormalities, physical conditions, and gynecological diseases (Liewellyn, 2002).

Our finding shows no relationship between nutritional status and reproductive health quality because many other factors affect reproductive health quality, including stress. Our respondents were around 18-24 years old, belonging to the late adolescence category with peak hormonal conditions and high productivity. As with their high productivity, this age range is prone to stress. Someone who experiences stress tends to experience menstrual cycle disorders and discomfort during premenstrual and menstruation (dysmenorrhea). Someone who does not experiences stress will have normal reproductive health quality (Makarimah, A., Muniroh, 2017). In addition, nutrient intake can also affect the menstrual cycle. Good

nutritional intake can improve reproductive function and affect the menstrual cycle (Felicia, F., Hutagaol, E., Kundre, 2015). Good nutritional intake, good stress management, and a good lifestyle and diet will cause the hypothalamus to work well and be able to produce the hormones needed by the body, including reproductive hormones related to the menstrual cycle (Paath, 2005).

The same result of study from Mozgan, et all (2018) about PMS is comprehensive assessment and it plays an essential role in diagnosing psychological and physical annoying diseases. their result were classified into three sections. In the biological section, the effect and role of sex hormones and their changes in PMS were examined. In the psychological section, hypotheses on PMS and the role of psychological problems in the development of PMS were examined. In the social section, the role and social, religious, and cultural position of women and its relationship with PMS were examined.

Lifestyle and Reproductive Health Quality

Our findings show that 61.3% of respondents had a rather unhealthy lifestyle, in which 83.8% had never consumed the Fe tablet, and 77.5% had never taken folic acid. The low consumption of Fe tablets and folic acid intake may cause intestinal disorders that will affect the absorption of nutrients into the body (Hapzah & Yulita, 2012). Nutrition is one of the determining factors of health quality. Everyone, from fetuses, infants, children, and adolescents to old age, needed adequate nutrients. A person's nutritional status describes what they consume in the long term.

In their reproductive phase during menstruation, women experience a loss of iron of 12.5-15 mg/month, or approximately equal to 0.4-05 mg daily [1]. A lot of blood loss causes anemia because women do not have sufficient supplies of Fe, and absorbing Fe into the body cannot replace the loss of Fe during menstruation (Proverawati, 2015). Consumption of Fe tablets is very helpful in improving anemia in young women with regular menstruation. Our finding aligns with the results of similar studies in which an intervention, consumption of Fe tablets, was carried out on respondents, and the results of statistical tests showed differences in Hb levels before and after the intervention in the treatment group (p = 0.000) (Andiri, 2012).

Our finding also showed that 50% of respondents rarely took an exercise. This condition strongly affects the body's metabolism quality, in which people who rarely have physical activities are more likely to suffer from problems related to obesity, cardiovascular incidents, and several other types of diseases. This is in line with the results of several similar studies on the influence of a healthy environment and healthy living behavior revealing that one of the factors related to public health status is healthy behavior(Hapsari, 2009). Other studies show that regular physical activities will improve sleep quality and the ability to deal with stress, and vice versa; low regular physical activities can cause health problems due to suboptimal metabolism (L, 1998).

The results of a meta-analysis study show that physically active women have twice a lower risk of experiencing premenstrual syndrome (Rahayu, N. S., & Safitri, 2020). Another meta-analysis study shows that exercise and some therapies, such as acupressure and heat therapy, can reduce pain intensity in menstrual disorders (Armour, M., Smith, C. A., Steel, K. A., & Macmillan, 2019). This is because sports can increase the production of cytokines as anti-inflammatories, reduce the rate of bleeding, and reduce the production of prostaglandins. Several low-intensity exercises, such as yoga, can also lower cortisol levels, so the release of

prostaglandins can be inhibited. Thus, a good lifestyle can make the hypothalamus work well to produce the hormones needed by the body, including reproductive hormones related to the menstrual cycle (Paath, 2005). The factor with the highest influence on reproductive health quality includes hormonal imbalances. Many factors can cause hormone regulation to be disrupted, some of which are stress, illness, changes in routine, lifestyle, and weight (Hutami, 2010). In addition, other factors affect the menstrual cycle, namely uterine abnormalities, physical conditions, gynecological diseases, and age (Liewellyn, 2002).

Our finding showed that 91.2% of respondents had sufficient reproductive health quality. This was obtained based on the results of analysis on the age of menarche, reproductive cycle, PMS scoring, and the severity and duration of dysmenorrhea. The assessment of sub-variables showed that the most common factor was dysmenorrhea, which was included in the moderate category.

Dysmenorrhea increases due to the lack of activity during menstruation and lack of exercise which causes decreased circulation of blood and oxygen. This leads to decreasing blood flow and oxygen in the uterus, causing pain and decreasing endorphin production in the brain, further increasing stress and dysmenorrhea severity (Lestari, 2013). Another factor that influences dysmenorrhea is having menarche at a very young age. This is in line with a study confirming that 40% of young women experience menarche at the age of <12 years.

When girls have their menarche at a very young age, they tend to experience severe dysmenorrhea because their reproductive organ is not ready for changes and due to the narrowing of the cervix leading to pain during menstruation (Widjanarko, 2006). Abnormalities of the menstrual cycle, such as the length of menstruation exceeding the normal length of menstruation (7 days), cause uterine contractions to occur longer, resulting in the uterus contracting more frequently and more prostaglandins being released. Excessive prostaglandin production causes pain, while continuous uterine contractions stop the blood supply to the uterus (Lowdermilk, 2010)

There is a difference between the findings and the results of statistical tests stating that there is no relationship between exercise and dysmenorrhea. The results of other studies that examined the relationship between exercise and dysmenorrhea also showed no relationship between nutritional status and dysmenorrhea (Novia Ika dan Puspitasari Nunik, 2008).

The statistical test results were further strengthened by the results of the correlation analysis showing a significance value or Sig. (2-tailed) of 0.152. Because of the Sig. Value (2-tailed) is 0.152 > 0.05, which means no significant relationship between reproductive health quality and lifestyle.

Many possibilities lead to the finding of no relationship between lifestyle and reproductive health quality. First, lifestyle and reproductive health quality are determined by multifactorial factors, both internal and external. Many factors are associated with reproductive disorders, including disruption of hormone regulation, nutritional status, stress, illness, changes in routine, and body weight, and other factors, such as uterine abnormalities, physical conditions, and gynecological diseases (Proverawati, 2015). Lifestyle is only one of the factors causing problems in reproductive health. Second, there might have been a bias of information in determining exposure because data collection (on lifestyle and reproductive health quality) was done based on the memory of respondents, not direct examination and medical records. We asked respondents to recall their habits related to lifestyle and their

reproductive activities; this may cause misclassification leading to underestimating or overestimation of perspective.

The questionnaire may also lead to information bias, known as non-differential misclassification. We minimized such a possibility by employing a structured questionnaire and having a group through online chat to facilitate communication (question and answer) between us as the researchers and our respondents. We encouraged our respondents to clarify or raise questions whenever they found things unclear related to the questionnaire. This technique was expected to reduce interobserver and intraobserver errors.

A repeated recall process to explore information on the subjects and their everyday life or events (such as events around menstruation) will form a better memory. Hence, the information provided by the respondents is close to the truth (Pietilainen et al., 2001)

Conclusion

The reproductive health quality of adolescents is multifactorial. The nutritional status and lifestyle of adolescents are only part of the factors determining the optimization of reproductive function. Further and more comprehensive studies are needed to know the dominant factors directly affecting the reproductive health quality of adolescents.

The results of the study show that there is no relationship between nutritional status and lifestyle in quality of reproduction. This condition different from of the result studies with the same number of samples or even fewer. It is necessary to consider the research method using a cohort approach, and further research is carry out to look for other enabling factors as predisposing factors for the occurrence of premature HPO Axis as a substitute for the independent variable, which is know that physiologically many adolescents experience menstrual disorders.

Conflict of interest
There is no conflict of interest.

Ethical approval
This study was approved by Institutional Research Board No. 001/KEPK.STIKMA/III/2022.

Authors' contribution
Each author contributed equally in all the parts of the research. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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