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The Relationship of Nutritional Status, Physical Activity, Stress, and Menarche to Menstrual Disorder (Oligomenorrhea)

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Abstract

Oligomenorrhea is problematic menstrual cycle, which is caused by several factors, including nutritional status, age, physical activity, reproductive diseases and stress. Oligomenorrhea can cause disruption of fertility and emotional stress on the patient.Oligomenorrhea more common in adolescents.Research were purposive sampling method with cross sectional design. The population in this research were students of VocationalHigh Schoolin Brebes consisting of 6school as many as 66 students who have a history of oligomenorrhea and willing to become respondents. The instrument used was a questionnaire. Data analysis using Chi Square test with significance level of 5% (α = 0.05) and Multiple Logistic Regression. The results showed no association between nutritional status (p value = 0.002), physical activity (p value = 0.035), stress (p value = 0.037) with oligomenorrhea in adolescents villagevocational schoolin Brebes. There is no relationship menarche (p value = 0.147) with oligomenorrhea in adolescents villagevocational hgh schoolin Brebes. There is a relationship between nutritional status and oligomenorrhea in adolescent at cityschool(p value = 0.000). There is no relationship of physical activity (p value = 0.627), stress (p value = 0.164), menarche (p value = 0.147) with oligomenorrhea in adolescents at cityschool. Teens are expected to be more attention to the factors that can be controlled such as body mass index, physical activity, and stress in order to have regular menstrual cycles that can affect both the health of the female reproductive organs.

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INTRODUCTION

Adolescent reproductive health is physical health, mental and social well-being as a whole on all things related systems and functions, as well as adolescent reproductive process, not just the state that is free from disease or disability. Reproductive health problems can occur due to lack of access to information on reproductive health (Manuaba, 2012).

Information about reproductive health for adolescents is seen as very important, since adolescence is this happening milestones of sexual maturity. In girls menarche is marked by the first menstuation (Susanti, 2012). Mensturation cycle in women normally ranges between 21-32 days and only 10-15% have a 28-day cycle with a long menstruation 3-5 days, or 7-8 days (Proverawati & Misaroh, 2009). Data from the Health Research Association (Rikesdas, 2018) the percentage of women aged 10-59 years old who have irregular menstruation 14.5%. More details, as many as 11.7% of adolescents aged 15-19 years in Indonesia experienced irregular menstruation and as much as 14.9% of women who live in urban areas in Indonesia have irregular menstruation.

Oligomenorrhea is problematic menstrual cycle, which is caused by several factors, including nutritional status, age, physical activity, reproductive diseases and stress (John, 2010).

Research Yassin (2012) in Alexandria, the percentage of young women who have polimenorea 6.8%, 8.4% oligomenorrhea. In Indonesia,Serly (2014) research note that, adolescents who experienced normal menstrual cycles as many high school students (61.8%), while experiencing normal menstruation as many (38.2%).

According Adnyani (2011) with the results of the menstrual cycle in young women earned 38.9% experiencing irregular periods. Meanwhile, according Rachmawati (2017) as much as 51.6% of women who work as a dancer with heavy physical activity may experience menstrual cycle disorders. Another study conducted by Rosendi (2011), stress can affect the menstrual cycle, as the hormone cortisol as a product of the adrenal cortex were synthesized glukokortioid the fasciculata zone can disrupt the menstrual cycle because it affects the amount of the hormone progesterone in the body. Another study conducted by Toduho et al. (2014) concluded that the moderate psychological stress that can affect menstrual cycles more (72.1%) of the weight (5.95%) and light (22,

Abdulla and Ibraheem (2010) research shows that the age of menarche had a significant association with body mass index (BMI), stress, and physical activity. Late menarche age also may be associated with menstrual cycle disorders. Based on research conducted by Zageye (2013) concerning suggested that delayed menarche may affect mentstruasi cycle, where 48.2% of adolescents in Ethopia experience abnormal menstrual cycles.

On two different areas characteristics, both in terms of geographical location allows the difference in age of menarche in young women, as shown in research Burhanuddin (2007) where there is a significant difference in age of menarche in young women in Bugis City and Village, South Sulawesi. The average age of menarche in young women is lower Bugis City (12.93 years) than in Bugis Village (13.18 years).

The purpose of this study to analyze nutrition status, physical activity, stress, age of menarche to oligomenorrhea.

METHOD

This study is a quantitative research. Cross-sectional study design. The population in this study is Vocational High School in Brebes consisting of 6 school above considerations the Department of Education and Culture Brebes by the number of population is 1211 people. Consists of 3 vocational high school located in the city and 3 vocational high school located in villages.The sampling technique was purposive sampling. The total sample of 66 students who have a history of oligomenorrhea and willing to become respondents. This study used a technique univariate, bivariate and multivariate analyzes.

RESULTS AND DISCUSSION

Factors Affecting Oligomenorrhea

Table 1. Frequency Distribution of Factors Affecting oligomenorrhea On Vocational High Students in Brebes, December 2018 (N = 66)

Factor	Village		City		Total	
	F	%	F	%	F	%
Nutritional status						
Abnormal	6	9.1	6	9.1	12	18.2
Normal	26	39.4	28	42.4	54	81.8
Physical activity						
Light	10	15.2	13	19.7	23	34.8
moderate	22	33.3	21	31.8	43	65.2
Stress level						
Mild stress	16	24.2	18	27.3	34	51.5
stress Medium	16	24.2	16	24.2	32	48.5
age of menarche						
Normal	29	43.9	33	50.0	62	93.9
menarche Tarda	3	4.5	1	1.5	4	6.1
Total	32	48.5	34	51.5	66	100.0

Nutritional status

Table 1 shows that the majority of vocational high school students in Brebes Kabupaen had normal nutritional status as much as 54 respondents (81.8%) and 42.4% of them in city vocational high school. Students who have moderate physical activity as much as 43 respondents (65.2%) and 33.3% of them in village vocational school. Schoolgirl has a mild stress levels as much as 34 respondents (51.5%) and 27.3% of them in city vocational high school whereas normal menarche age were 62 respondents (93.9%) and 50.0% were female students in city vocational high school.

According Almatsier (2015) suggested that nutritional status is a measure of a person's body condition that can be seen from the food consumed and the use of nutrients in the body. This is supported by the theory Paath (2005) that in young women need to maintain a good nutritional status, by eating a balanced diet because they were needed at the time of menstruation, menstrual evident at the time was primarily on leutal phase will increase nutrient needs.

Proverawati, (2009) explains that menstrual disorders basically closely related to sexual hormones in women that progesterone, estrogen, LH (luteinizing hormone) and FSH (Follicle Stimulating Hormone). The disruption of hormonal systems work is related to nutritional status. People with better nutritional status as well as implement a pattern of overeating anyway. Vice versa. Normally, organ function will be influenced by the behavior of the applied human. If the teen has a good nutritional intake with lifestyle and a good diet can make the hypothalamus to be good so that it can produce hormones that the body needs.

The results showed that most respondents had a normal nutritional status of as many as 54 respondents (81.8%) and there (77.3%) of respondents did not experience oligomenorrhea incident. Respondents who had a normal nutritional status not as many as 12 respondents (18.2%) and there (15.2%) of respondents experienced anything oligomenorrhea

The results are consistent with research Noviandari (2016) that there is a relationship between nutritional status and the menstrual cycle in young girls. Dieny (2014) says that the

nutritional status plays an important role in influencing the function of the reproductive organs. Not only in adolescents who have less nutritional status, however, menstrual cycle disorders are also found in adolescents with better nutritional status. This is associated with the amount of body fat tissue. This statement is supported by the results of research Pratama (2011) that the respondents who have experienced a cycle irregular menstrual cycles are a group of girls with thin nutritional status.

Physical activity

The results showed that students who have moderate physical activity as much as 43 respondents (65.2%) and 33.3% of them in village vocational school in Brebes. The results also show that responden light physical activity that has largely escaped oligomenorrhea as many as 22 respondents (33.3%). Respondents who have moderate physical activity most also do not experience oligomenorrhea as many as 31 respondents (47.0%).

In accordance with the theory that heavy physical activity inhibition of gonadotropin Releasig stimulating hormone (GnRH) and gonadotropin activity resulting in lower levels of serum estrogens. So in this case strenuous activities cause menstrual disorders.

According to Rabe (2002), fatigue due to excessive activity can cause hypothalamic dysfunction that causes disturbances in the secretion of GnRH. This causes disruption of the menstrual cycle. The main factors causing suppression of GnRH women is the use of excessive energy that exceeds the energy intake.

In accordance with the results of research Rachmawati (2017) which states that as many as 51.6% of women who work as a dancer with heavy physical activity experienced a disruption of the menstrual cycle.

Stress level

The results showed that students who has a mild stress levels as much as 34 respondents (51.5%) and 27.3% of them in city vocational high school. Respondents were mild stress level category largely escaped the incident oligomenorrhea as many as 32 respondents (48.5%) and respondents who stress level categories are being largely escaped the incident oligomenorrhea as many as 21 respondents (31.8%).

In accordance with the theory that the activation state of stress occur in the amygdala in the limbic system. This system stimulates the release of hormones from the hypothalamus is corticotropic releasing hormone (CRH). Increased CRH stimulates the release of endorphins, and adrenocorticotropic hormone (ACTH) into the blood. Increased ACTH levels will cause an increase in blood cortisol levels. These hormones are directly and indirectly lead to decreased levels of GnRH, which through this path then the stress causes disruption of the menstrual cycle (Sriati, 2008).

According to Rafique and AL-Sheikh (2018) showed that the menstrual problems not only of economic factors, but also the absence of class and poor academic achievement among adolescents.

In accordance with research Rosendi (2011), stress can affect the menstrual cycle, because in times of stress, the hormone cortisol stress hormone as a product of the adrenal cortex were synthesized glukokortioid the fasciculata zone can disrupt the menstrual cycle because it affects the amount of the hormone progesterone in the body. Another study conducted by Toduho et al. (2014) concluded that the moderate psychological stress that can affect menstrual cycles more (72.1%) of the weight (5.95%) and mild (22.1%) this was due to the workloads that much so stressful becomes larger.

Age of Menarche

The results showed that normal menarche age were 62 respondents (93.9%) and 50.0% were female students in city vocational high school. Respondents who had a normal age of menarche largely escaped oligomenorrhea as many as 52 respondents (78.8%) and respondents age of menarche tarda majority have oligomenorrhea as many as three respondents (4.5%).

Late age of menarche may be associated with menstrual cycle disorders. According to

research Dambhare (2012) on adolescent girls in India, showed that young women who experience menarche late with an average age of menarche 13.51 + 13.67 + 1.04 years and 0.8 years and affects the menstrual cycle length be abnormal.

Another study conducted by Esen et al. (2016) in young women in Turkey, showed that about half of the girls surveyed get menarche <2 years of reported irregular menstruation, compared to young women who are menstruating> 2 years.

Late menarche age also may be associated with menstrual cycle disorders. Based on research conducted by Zageye in 2013 on "The age of menarche and menstrual pattern Teen Secondary school in western Ethiopia" suggests that delayed menarche may affect mentstruasi cycle, where 48.2% of adolescents in Ethopia experience abnormal menstrual cycles.

Genesis oligomenorrhea

Table 2. Frequency distribution Genesis oligomenorrhea On Vocational high Students, December 2018 (N = 66)

Genesis oligomenorrhea	Village		City		Total	
	F	%	F	%	F	%
not oligomenorrhea	24	36.4	29	43.9	53	80.3
oligomenorrhea	8	12.1	5	7.6	13	19.7
Total	32	48.5	34	51.5	66	100.0

Table 2 shows that the majority of students vocational high school oligomenorrhea not experienced anything as much as 53 respondents (80.3%) and 43.9% of those in vocational Town, while experiencing the incidence of oligomenorrhea as many as 13 respondents (19.7%) and 12.1% among which are village vocational school in Brebes.

The results showed that the majority of vocational high school students oligomenorrhea not experienced anything as much as 53 respondents (80.3%) and 43.9% of those in vocational Town, while experiencing the incidence of oligomenorrhea as many as 13 respondents (19.7%) and among which 12.1% were in village vocational high school.

Oligomenorrhea is problematic menstrual cycle, which caused by several factors, including nutritional status, age, physical activity, reproductive diseases and stress (John, 2010). In addition hormone imbalance disorders in the hypothalamic-pituitary-ovarian. The disorder causes the normal menstrual cycle length becomes elongated.

Factors Affecting Oligomenorrhea

Table 3. Frequency Distribution of Factors Affecting Oligomenorrhea on Vocational High School, December 2018 (N = 66)

Factor	Oligomenorrhea				Total		* P value	OR
	not oligomenorrhea		oligomenorrhea					
	F	%	F	%	F	%		
Nutritional status							0,000	0,012
Abnormal	2	3.0	10	15.2	12	18.2		
Normal	51	77.3	3	4.5	54	81.8		
Physical activity							0,022	8.516
Light	22	33.3	1	1.5	23	34.8		
moderate	31	47.0	12	18.2	43	65.2		
Stress level							0,004	8.381
Mild stress	32	48.5	2	3.0	34	51.5		
stress Medium	21	31.8	11	16.7	32	48.5		
age of menarche							0,004	15,600
Normal	52	78.8	10	15.2	62	93.9		
Menarche Tarda	1	1.5	3	4.5	4	6.1		
Total	53	80.3	13	19.7	66	100.0		

* Chi-square test

Table 3 shows that most of the respondents had a normal nutritional status of as many as 54 respondents (81.8%) and there (77.3%) of respondents did not experience oligomenorrhea incident. Respondents who had a normal nutritional status not as many as 12 respondents (18.2%) and there (15.2%) of respondents experienced anything oligomenorrhea. Respondents who have mild physical activity largely escaped oligomenorrhea as many as 22 respondents (33.3%). Respondents who have moderate physical activity most also do not experience oligomenorrhea as many as 31 respondents (47.0%). Respondents were mild stress level category largely escaped the incident oligomenorrhea as many as 32 respondents (48, 5%) and respondents who stress level categories are being largely escaped the incident oligomenorrhea as many as 21 respondents (31.8%). Respondents who had a normal age of menarche largely escaped oligomenorrhea as many as 52 respondents (78.8%) and respondents age of menarche tarda majority have oligomenorrhea as many as three respondents (4.5%).

There is a relationship of between nutritional status (p value = 0.002), physical activity (p value = 0.022), stress (p value = 0.004), menarche (p value = 0.004) with oligomenorrhea in adolescents vocational Brebes.

Nutritional Status, Physical Activity, Stress, Menarche to Oligomenorrhea in Adolescents

Table 4. Frequency distribution of nutrition status, physical activity, stress, menarche toward oligomenorrhea in adolescent village, December 2018 (N = 32)

Factor	Genesis oligomenorrhea				Total		* P value	OR
	not oligomenorrhea		oligomenorrhea					
	F	%	F	%	F	%		
Nutritional status							0,002	0,026
Abnormal	1	3.1	5	15.6	6	18.7		
Normal	23	71.9	3	9.4	26	81.3		
Physical activity							0,035	1,571
Light	10	31.3	0	0.0	10	31.3		
moderate	14	43.8	8	25.0	22	68.8		
Stress level							0,037	11.667
Mild stress	15	46.9	1	3.1	16	50.0		
stress Medium	9	28.1	7	21.9	16	50.0		
Age of menarche							0.147	7.667
Normal	23	71.9	6	18.8	29	90.6		
menarche Tarda	1	3.1	2	6.3	3	9.4		
Total	24	75.0	8	25.0	32	100.0		

* Chi-square test

Table 4 shows that adolescents in villlage most respondents had a normal nutritional status as much as 26 respondents (81.3%) and 71.9% of them did not experience oligomenorrhea incident. Adolescents in village most have moderate physical activity as much as 22 respondents (68.8%) and the total (43.8%) did not experience oligomenorrhea among them. Adolescents in villagemost have mild stress level categories and some categories of being. Respondents who have mild stress level category (46.9%) of them did not experience oligomenorrhea incident. Age of menarche mostly normal teenagers as much as 29 respondents (90.6%) and (71.9%) of them did not experience oligomenorrhea incident.

The results showed that the responden light physical activity that has largely escaped oligomenorrhea as many as 22 respondents (33.3%). Respondents who have moderate physical activity most also do not experience oligomenorrhea as many as 31 respondents (47.0%).High-intensity physical activity increases the risk of menstrual disorders (Sianipar, Bunawan, Almazini, Calista, Wulandari, Rovenska, 2009). In this study can not be distinguished in intensity and frequency of physical activity undertaken by respondents.

The results also showed ada relationship between nutritional status (p value = 0.002), physical activity (p value = 0.0358), stress (p value = 0.037) with oligomenorrhea in adolescents village. This suggests that the nutritional status, physical activity and stress experienced by students in village associated with oligomenorrhea.

The results showed that most had normal nutritional status of as many as 54 respondents (81.8%) and there (77.3%) of respondents did not experience oligomenorrhea incident. Respondents who had a normal nutritional status not as many as 12 respondents (18.2%) and there (15.2%) of respondents experienced anything oligomenorrhea.In accordance with the statement Banudi (2012) that the lack of nutrition can affect the growth and function of organs, it will also cause disruption of reproductive function.

Proverawati, (2009) explains that menstrual disorders basically closely related to sexual hormones in women. The disruption of hormonal systems work is related to nutritional status. In

line with the opinions Proverawati and Asfuah (2009) that the nutritional status of the excess as fat and obesity will have an impact on the functioning of the body's hormonal system, considering that fats are capable of producing estrogen clicking akibatkan menstrual cycle disorders.

The results also showed ada relationship between stress (p value = 0.037) with oligomenorrhea in adolescents village.Respondents were mild stress level category largely escaped the incident oligomenorrhea as many as 15 respondents (46.9%) and respondents who stress level categories are being largely escaped the incident oligomenorrhea as many as 9 respondents (28.1%).

In the state of stress occur in the amygdala activation in the limbic system. This system stimulates the release of hormones from the hypothalamus is corticotropic releasing hormone (CRH). Where this path then the stress causes disruption of the menstrual cycle.

There is no relationship menarche (p value = 0.147) with oligomenorrhea in adolescents village vocational school in Brebes Respondents who had a normal age of menarche largely escaped oligomenorrhea as many as 23 respondents (71.9%) and respondents age of menarche tarda majority have oligomenorrhea as many as 2 respondents (6.3%).

The results are consistent with research conducted by Fatimah (2015) and Daughter (2015) concluded that there was no association with age of menarche menstrual cycle. This is supported in the research Sonia et al. (2014), where there is no statistically significant relationship between the age of menarche and menstrual cycle. These results indicate the possibility that the relationship of age of menarche and menstrual cycles or oligomenorrhea in teens are caused by many factors. Many other factors affect the menstrual cycle of the students, one of which is a hormonal factors as well as social and environmental interaction (Kusmiran, 2012). Very solid student activities could lead to the emergence of stress on students so that affects the body's hormonal system.

Status Nutrition, Physical Activity, Stress, Menarche Toward Oligomenorrhea in Adolescents

Table 5. Frequency distribution of status nutrition, physical activity, stress, menarche toward oligomenorrhea in adolescent city, December 2018 (N = 34)

Factor	Oligomenorrhea				Total		* P value	OR
	not oligomenorrhea		oligomenorrhea					
	F	%	F	%	F	%		
Nutritional status							0,000	0.167
Abnormal	1	2.9	5	14.7	6	17.6		
Normal	28	82.4	0	0.0	28	82.4		
Physical activity							0.627	2,824
Light	12	35.3	1	2.9	13	38.2		
moderate	17	50.0	4	11.8	21	61.8		
Stress level							0.164	5.667
Mild stress	17	50.0	1	2.9	18	52.9		
stress Medium	12	35.3	4	11.8	16	47.1		
age of menarche							0.147	0.121
Normal	29	85.3	4	11.8	33	97.1		
menarche Tarda	0	0.0	1	2.9	1	2.9		
Total	29	85.3	5	14.7	34	100.0		

* Chi-square test

Table 5 shows that teenagers in city majority of respondents had a normal nutritional status as much as 28 respondents (82.4%) and not at all experienced something oligomenorrhea. Adolescents in city mostly have moderate physical activity as much as 21 respondents (61.8%) and the total (50.0%) did not experience oligomenorrhea among them. Adolescents in city mostly mild levels of stress category as many as 18 respondents (52.9%) and (50.0%) of them did not experience oligomenorrhea incident. Age of menarche mostly normal teenagers as much as 33 respondents (97.1%) and (85.3%) of them did not experience oligomenorrhea incident.

Results of research on adolescent city showed ada relationship between nutritional status and oligomenorrhea in adolescent city vocational school in Brebes (p value = 0.000). There is no relationship of physical activity (p value = 0.627), stress (p value = 0.164), menarche (p value = 0.147) with oligomenorrhea in adolescents city. This suggests that any physical activity done teenagers in the city, regardless of the level of stress and menarche was not associated with oligomenorrhea. This shows that oligomenorrhea happened not because of the physical activity, stress and menarche.

In accordance with the statement Mohamadirizi and Kordi, (2013) which states that Another factor oligomenorrhea such as bleeding disorders, drugs are consumed, and endocrine factors that may affect the menstrual cycle.

Multivariate analysis

Table 6. Logistic Regression Table Risk Factors Influencing Teens Against oligomenorrhea Incident At vocational high school in Brebes, December 2018 (N = 66),
Variables in the Equation

								95% CIFOR EXP (B)	
		B	SE	Wald	df	Sig.	Exp (B)	Lower	Upper
Step 1a	Nutritional status	-4.429	1,235	12.856	1	, 000	, 012	.001	, 134
	Phyisical activity	2,122	1,634	1,687	1	, 194	8.352	, 339	205.513
	Level of Stres	, 628	1.168	, 289	1	, 591	1,873	, 190	18.490
	AgeofMenarche	, 501	1,994	, 063	1	, 801	1,651	, 033	82.243
	Constant	-, 376	4.986	, 006	1	, 940	, 687		
Step 2a	Nutritional status	-4.503	1,215	13.734	1	, 000	.011	.001	, 120
	Phyisical activity	2,180	1,632	1,783	1	, 182	8.845	, 361	216.878
	Level of Stres	, 674	1,152	, 343	1	, 558	1.963	, 205	18.763
	Constant	, 565	3,373	, 028	1	, 867	1,760		
Step 3a	Nutritional status	-4.719	1.185	15.869	1	, 000	.009	.001	, 091
	Phyisical activity	2.646	1,518	3,041	1	, 081	14.104	, 720	276.136
	Constant	1,790	2,699	, 440	1	, 507	5.990		

a. Variable (s) entered on step 1: Status_Gizi, Aktivitas_Fisik, Tingkat_Stres, Usia_Menarche.

Table 6 shows that the highest OR values obtained variables of physical activity that is equal to 14.104 so that the variables of physical activity is a risk factor that influenced the incidence of oligomenorrhea Teen vocational high school.

The results showed that ada relations nutritional status (p value 0.000), stress (p value 0.004), physical activity (p value 0.025), menarche (p value 0.022) toward oligomenorrhea in adolescents. Multivariate analysis showed thatPhysical activity is a risk

factor most influenced the incidence of oligomenorrhea Teen vocational high school.

The results of the study correspond according to Banudi (2013) which states that emotional stress, poor nutrition, excessive physical exercise, their eating disorders such as anorexia nervosa patients and their tumors that affect estrogen secretion that cause oligomenorrhea.

Strenuous physical activity inhibition of gonadotropin Releasig stimulating hormone (GnRH) and gonadotropin activity resulting in lower levels of serum estrogens. So in this case strenuous activities cause menstrual disorders.

CONCLUSION

There is a relationship betweennutritional status and oligomenorrhea (p value of 0.000).There is a relationship betweenphysical activity and oligomenorrhea (p value 0.025). There is a relationship betweenstress with oligomenorrhea (p value 0.004). There is a relationship between menarche with oligomenorrhea (p value 0.022).

There is a relationship between nutritional status (p value = 0.002), physical activity (p value = 0.035), stress (p value = 0.037) with oligomenorrhea in adolescents village. There is no relationship menarche (p value = 0.147) with oligomenorrhea in adolescents village.

There is a relationship between nutritional status and oligomenorrhea in adolescent city (p value = 0.000). There is no relationship of physical activity (p value = 0.627), stress (p value = 0.164), menarche (p value = 0.147) with oligomenorrhea in adolescents city.

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