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DETERMINANT OF EARLY MENARCHE AT MUARA MEGANG ELEMENTARY SCHOOL SOUTHERN SUMATRA

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ABSTRACT

Backgrounds: High rate of early menarche is one of the problems that should be the focus of government attention because the health impact will be in the future. The purpose of this study was to determine the effect of diet, physical activity and exposure to mass media on early menarche at Students Elementary School Muara Megang Southern Sumatra 2017.

Methods: This research used a quantitative study with cross sectional design. Purposive sampling technique was done in the fifth and sixth graders with total population of 69 people. After selecting those who experienced early menarche, thirty respondents were eligible in this study. Univariate, bivariate correlation test, and multivariate multiple linear regression were employed to analyze the data.

Results: The correlation test resulted in the score of diet (p -value=0.001), physical activity (p -value=0.040<0.05) and exposure to mass media (p -value=0.454). It was concluded eating patterns and physical activity had significant correlation with early menarche among students. Meanwhile, the mass media exposure had no significant influence to incidence of early menarche. Multivariate test results were obtained from the results of multiple linear regression tests of eating patterns ($0.011 < 0.05$) affecting the incidence of early menarche while physical activity ($0.463 > 0.05$) and exposure to mass media ($0.733 > 0.05$) had no effect on the incidence of early menarche.

Conclusions: This study recommends a need of coordination between health center and the health office to conduct counseling or form peer consultants involving young women to be more able to get to know themselves.

Keywords: Physical Activity, Mass Media Exposure, Early Menarche, Dietary Habit

INTRODUCTION

Menstruation is periodic and cyclic bleeding from uterus entailed by exfoliation (desquamation) of endometrium [1, 2]. Menarche is first menstrual period experienced by women, marked by discharge of blood from vagina [3]. Age of teenage girls to have first menstruation (menarche) varies from 11-13 years. But currently there are also teenagers under 11 years who have experienced menstruation or early menarche. Early menarche is menstruation occurring at a younger <11 years [4].

There are various kinds of causes of early menarche, which are influenced by endogenous factors and exogenous factors. Endogenous factors include genetics, age of menarche mother, and hormonal. Exogenous factors include percent body fat, diet, food intake, additional nutrition, physical activity, closeness to parents, mass media exposure, socio-economic, nutritional status and weight at birth. Some environmental factors include social and psychological factors [5]. According to Agres Vivi Susanti and Sunarto of 2012 stated that the greatest risk of early menarche incidence was fiber intake. This means

that fiber intake factors are influenced due to improper eating patterns, so eating patterns need to be considered [6].

Declining living standards have an impact on age digression of *menarche* towards a younger age (early *menarche*). According to research results from Nagar S and Aimol KR in 2012, age of *menarche* under 12 year has a health problems such as young women experiencing breast cancer, abdominal obesity, insulin resistance, fat accumulation in adipose tissue, risk of cardiovascular disease, and hypertension [7].

The results of the 2013 Basic Health Research report (RisKesDas) revealed that seven billion and around one-fifth of the world's population of 1.4 billion (20%) were teenagers aged 10-19 years. The number of teenagers in Indonesia reached 36 million and 55% of them were young women. Teenage girls in Indonesia experience *menarche* varies between 10-16 years and an average of *menarche* 12.5 years [8]. Based on the results of Basic Health Research in 2010, 5.2% of children in 17 provinces in Indonesia have been included to have *menarche* under the age of 12 years. Indonesia ranks 15th out of 67 countries with a age digression of *menarche* reached 0.145 decades of decadence [9].

The diet or diversity of food consumption is the main triggers to release hormone GnRH (Gonadotropin Releasing Hormone). Fat tissue that sufficiently affects levels *non-gonadal estrogen* and stimulates GnRH hormone make children experience early menstruation [6]. Based on Cheng G et al, It was stated that nutritional intake which included fat, protein (animal and vegetable) intake, fiber and calcium played important roles as determinant of the age of *menarche* young [10]. More animal protein intake is also associated with *menarche* age digression. Animal protein has an effect on increasing the frequency of LH peaks and extending the follicular phase [11]. Another case with vegetable protein which is rich in isoflavones is related to delay of *menarche* age. Isoflavones are associated with anti estrogens which can replace estradiol interact directly with exogenous receptor (ERA *gene*). This condition will spur the Era gene to carry out gene transcription as the initial trigger of puberty [12].

Excessive physical activity and inadequate food intakes can delay age of *menarche* [13]. Several weight loss and loss of MTB due to fatigue and loss of appetite and heavy physical exercise could slow *menarche* [14]. It is estimated that severe physical exercise delays *menarche* through hormonal mechanisms because it has reduced progesterone production which results in delaying endometrial maturity [15]. According to Kroll study, there was also no association between physical activity and menstrual disorders in women at the University of Massachusetts [16]. According to Sianipar O et al in the District of Pulo Gading, East Jakarta declared higher intensity and frequency of physical activity, the greater the possibility of menstrual disorders. High intensity physical activity increases risk of menstrual disorders, while moderate intensity physical activity decreases risk of menstrual disorders [17].

Age of *menarche* is also related to mass medium exposures (television, radio, magazines) which indirectly causes the age of *menarche* in adolescent girls. Children who often access internet sites that use communication media, and watch adult shows that should not have been purposed to children of that age can stimulate the child's hypothalamus to follow what is informed on the site, with its positive and negative impact. These stimuli is received and led to excitatory center, then the hypothalamus stimulates maturation of hormones *estrogen* and *progesterone* then it provides feedback to central senses, so that the hormones fluctuate. This affects maturity of children's reproductive hormones so that children experience *menarche* premature [18]. According to Putri (2009) which concluded that there was a relationship between exposure to mass media and age of *menarche* on students of Al-Azhar Rawamangun Middle School in East Jakarta [19]. According to Kusuma (2012), there was a relationship between audio visual exposure and age of *menarche* in early adolescents at Junior High School 11 Kota Semarang [20].

Based on a preliminary study, the researchers obtained from 127 Muara Megang elementary school students in Southern Sumatra 69 female students experiencing early *menarche* for which researchers

were interested in examining the effect of diet, physical activity, and mass media exposure to incidence of early *menarche* of Muara Megang Elementary School Students in Southern Sumatra in 2017. .]

METHODS

The design of this study used descriptive analytics. This type of research is quantitative research. The approach used is *cross sectional*. The population in this study were all students of fifth and sixth graders of Elementary School Muara Megang Southern Sumatra, 69 people. The sample in this study were 30 students who had early *menarche* and met inclusive, non-inclusive, and exclusive criteria. The sample size is 30 people. The sampling technique is done by *purposive sampling* based on inclusive criteria, and for exclusive were 30 students. From the population, that did not meet the inclusive and exclusive criteria, there were 39 people.

The independent variables in this study are diet, physical activity, and exposure to mass media. Meanwhile, the dependent variable in this study is early *menarche*. The type of data taken in this study is primary data. Data collection used in this study is a questionnaire that is measured using a *semantic differential scale*. The questionnaire used in this study uses a closed statement type. Respondents only need to checklist (v) on the selected answer. To measure them it is done by: filling in the questionnaire, measuring instruments using questionnaire sheets, measuring results using score the respondent's answer, and measuring scale using intervals. Data processing using univariate analysis aims to explain or describe the characteristics of each research variable. The bivariate analysis of the correlation test aims to determine the degree of closeness and know the direction of the relationship between two variables and multivariate multiple linear regression analysis to find the influence of several independent variables with one dependent variable.

RESULTS

Characteristics of Diet, Physical Activity, Mass Media Exposure with Events Early *Menarche*

Table 1. Distribution of Frequency of Respondents' answers

Variable	Mean	Std. Deviation	Minimum	Maximum
Dietary Habit	49.67	8.576	27	65
Physical Activity	42.10	11.966	20	62
Mass Media Exposure	41.77	9.562	24	62

Based on table 1 the results of the study show frequency distribution obtained from 30 respondents who studied dietary variables with the incidence of early *menarche* which had an average score of 49.67 with Std Deviation 8,576. Variables of physical activity with early *menarche* that have an average score of 42.10 with Std Deviation 11,966. The variable of exposure to mass media with the incidence of early *menarche* has an average score of 41.77 with Std Deviation 9.562.

Relations on Diet, Physical Activity and Mass Media Exposure With Genesis Early *Menarche*

Table 2 Correlation Test Results

Variable	Pearson Correlation	Sig. (2-tailed)
Dietary habit	-0,555	0,001
Physical Activity	-0,377	0,040
Mass Media Exposure	-0,142	0,454

Based on Table 2 correlation test results showed a correlative coefficient between the variable diet on the incidence of early *menarche* 0.001-0.555 with significant level then show significant negative correlation. The correlative coefficient between the variables of physical activity on the incidence of early *menarche* -0.377 with significant level of 0.040 indicates significant negative correlation. The

correlative coefficient between mass media exposure to the incidence of early *menarche* -0.142 with significant level of 0.454 hence shows no correlation.

Effect of Diet, Physical Activity, and Mass Media Exposure Events on Early Menarche

Table 3 Partial Results (t-Test)

Variable	T	Sig	95.0% Confidence Interval for B	
			Lower Bound	Upper Bound
Dietary habit	-2.740	.011	-.928	-.133
Physical Activity	-.745	.463	-.362	.169
Exposure Mass Media	-.344	.733	-.354	.252

Based on table 3 above, the results of the t test in this study can be explained as follows: Variable diet with significant level of 95% ($\alpha = 0.05$). Significant score (p value) in the dietary pattern is $0.011 < 0.05$ and the score of t count is $-2.740 > t$ table 2.353 then H_0 is rejected or the eating pattern variable has significant effect on the incidence of early *menarche*. Variables of physical activity with significant level of 95% ($\alpha = 0.05$). Significant score (p value) on physical activity variables is $0.463 > 0.05$ and the score of t count is $-0.745 < t$ table 2.353, so H_0 is accepted or the variable physical activity does not have significant effect on the incidence of *early menarche*. Variables of exposure to mass media with significant level of 95% ($\alpha = 0.05$). The significant score (p value) in the mass media exposure variable is $0.733 > 0.05$ and the calculated t score is $-0.344 < t$ table 2.353, so H_0 is accepted or the mass media exposure variable does not have significant effect on the incidence of early *menarche*.

Table 4 Results Test F (ANOVA)

Model	F	Sig
Regression	4.350	.013 ^a
Residual		

Based on table 4 above from the results of the F test was F count of $4.350 > F$ table 2.98 with significant score (p value) of 0.013. With significant level of 95% ($\alpha = 0.05$) the significant score (p value) is $0.013 < 0.05$. On the basis of these comparisons, H_0 is rejected, meaning that simultaneously, all variables have significant influence on the coping mechanisms of adolescents who experience early *menarche*. The score of B (beta) Constant is a constant = 7.186, which means that if there is no added score on diet, physical activity, and exposure to mass media, the early *menarche* is 7.186. As with the addition of a 1% diet, it will affect the decrease in early *menarche* by 0.530 or half and decrease due to the relationship being negative if the positive relationship with the increase in the score of the dependent variable will increase the score of the dependent variable..

DISCUSSION

The Effect of Eating Patterns Early Menarche Events

Based on studies, dietary patterns significantly influence the incidence of early *menarche*. The results of partial test (t test) with significant level of 95% ($\alpha = 0.05$). The eating pattern variable has significant score (p value) of $0.011 < 0.05$ and the calculated t score is $-2.740 > t$ table 2.353 so H_0 is rejected or the eating pattern variable has significant effect on the incidence of early *menarche*.

The results of this study are in line with Dina Safitri, Ameliwati, and Erwin University of Riau Nursing Study Program "Analysis of Indicators of Lifestyle Associated with the Age of Young Women Menarche". The results showed the majority of respondents did an unbalanced diet. This is in accordance with the data from Riskesdas (2007) which showed that not a few adolescents had an unbalanced diet. Research by Soemar and Nurhayati (2006) concluded that the data recall of food 24 hours shows that

the 100% deficit energy intake, 95% deficit intake of protein, 50% deficit the intake of iron and 100% deficit vitamins C. These data strongly prove that there are still many adolescents who have unbalanced diet. Even if the fulfillment of these nutrients is continuously lacking, it will affect the growth and maturity of child sex (Supartini, 2004).

The results of this study are in line with Susanti Agres Vivi research "Risk Factors for Events Early *Menarche* in Adolescents at SMP 30 Semarang in 2015" which showed significant influence between diet and the incidence of early *menarche*. Eating patterns or the diversity of food consumption as the main triggers to release the hormone (GnRH) so that fatty tissue that adequately influences levels of *estrogen non-gonads* and stimulates the GnRH hormone to get out faster causes teenagers to experience early *menarche*.

Based on social and economic conditions in the study area, the average population has low economy causing poor diet, such as the availability of food in the vicinity and socio-economic conditions that affect the level of human purchasing power for food, one of the reasons health problems for adolescents due to poor diet, adolescents who are well off and living in urban nutrition problems that are often faced are over nutrition problems. In addition to economic factors, social factors also cannot be denied that social norms and lifestyle can influence individual eating habits.

Based on the discussion, there is an assumption about the effect of diet on the incidence of early *menarche* is the influence of interrelated where the better one's diet, the smaller risiko incidence of early *menarche* and the worse one's diet, the greater the risk of early *menarche*. So the researchers recommend counseling on how to have a good diet, especially for young women, in order to prevent early *menarche*. [?].

Effect of Physical Activity on Events Early Menarche

Based on research on physical activity does not significantly influence the incidence of early *menarche*. The results of the partial test (t test) with significant level of 95% ($\alpha = 0.05$). The physical activity variable has significant score (p value) of $0.463 > 0.05$ and the score of t count is $-0.745 < t$ table 2.353 then H_0 is accepted or the variable physical activity does not have significant effect on the incidence of early *menarche*.

The results of this study are not in line with Monsma and Feltzs theory which stated that excessive physical activity could delay the age of *menarche* such as by losing a few kilograms of weight and losing MTB due to fatigue or severe physical exercise could slow *menarche*. It was estimated that severe physical exercise delayed *menarche* through hormonal mechanisms because it reduced progesterone production resulting in delaying endometrial maturity and is not in line with the theory by Rumawas whose body fat is lacking or body fat loss will drastically result in metabolic drops and production *estrogen* will also decrease, resulting in *amenorrhea*. The results of this study are also not in line with the theory of Ambar Sulitiani, which states that lack of exercise can lead to early *menarche*.

The results of this study are not in line with Dina Safitri, Arneliwati, and Erwin, University of Riau Nursing Study Program "Analysis of Indicators of Lifestyle Associated with the Age of Young Women Menarche". The results of the study could be concluded that the number of respondents who did regular exercise habits as the same as the number who did irregularly. Similar to the Riskesdas (2013) data which concluded that the physical activity of adolescents in Riau was still lack, as many as 66.9% of adolescents aged 10-14 years still lacked regular physical activity. Regular exercise should be done at least 10 minutes without stopping 3 times a week, can be mild, moderate or severe physical activity.

The results of this study are not in line with the research conducted by Puhl and Brown showing that girls taking physical activities that increased before the arrival of *menarche* would experience delays in *menarche* and the occurrence of menstrual irregularities, but these researchers found no association between physical activity *menarche* and research. This is in line with the research conducted by

Fibriastuti (2012) stating that there was no negative significant relationship between physical activity and the incidence of *menarche*.

Based on the social and economic factors of research in the region, there was no transportation in the area that made teenagers went everywhere on foot, so that their physical activities were fulfilled such as leaving and returning to school on foot with school friends.

The discrepancy between theory and results of this study could be due to the possibility of measurement of physical activity should consider all aspects of the type and purpose of physical activity, intensity, efficiency, duration, frequency i.e. per week and spending time energy specifics of the activities undertaken. This was due to difficulties in measuring physical activity due to the lack of ideal standards for validating data. Based on the discussion, there was an assumption about the effect of physical activity on the incidence of early *menarche* an interlocking effect whereby if the measurement standards of physical activity is ideal for validating data and when the measurement is not fulfilled, there is no effect related to physical activity to the occurrence of early *menarche*.

The Effect of Mass Media Exposure Early to Menarche Events

Based on research, mass media exposure did not significantly influence the incidence of early *menarche*. The results of the partial test (t test) with significant level of 95% ($\alpha = 0.05$). The mass media exposure variable has significant score (p score) of $0.733 > 0.05$ and the score of t count is $-0.344 < t_{table} 2.353$ then H_0 is accepted or the mass media exposure variable did not have significant effect on the incidence of early *menarche*.

The results of this study are not in line with Surbey (1990) theory, that the factor of exposure to influential media was lesser than other factors with the incidence of *menarche*. The more frequent a person is exposed to media exposure the greater opportunity of early *menarche*. The results of this study are also not in line with other theories which stated that the age of *menarche* was also related to the social environment, one of which was exposure of mass media such as television, radio, and magazines which indirectly caused age *menarche* in adolescent girls and teenagers who often access internet sites who used communication media, and watched adult shows that should not have been seen by adolescents could stimulate the hypothalamus to follow what was informed of the site whether it had a positive impact or negative. Stimulation was received and led to center of the hypothalamus stimulates the maturation of excitatory then the hormones *estrogen* and *progesterone* and provided feedback to the center of five senses so that fluctuated hormones and affected reproductive hormones maturity. This result is in line with Afika Dwi Kiswae dhani Public Health Study Program of the Muhammadiyah University of Surakarta "Relationship Between Nutritional Status, Mass Media Exposure Levels and Hereditary Factors with Age of Menarche in Students in Public Schools 1 Subah Batang Regency" indicating that there was no relationship between level of exposure to mass media and age of menarche in female students in Subah Middle School 1 in Batang Regency. A total of 24 female students (77.4%), included in the category of not exposed to mass media and had quick age of *menarche*. The absence of a relationship between the two variables is shown from the results of the calculation of the chi square test with a confidence level of 95% obtained p score = 0.409. Because $p > 0.05$, the hypothesis (H_a) of the study is rejected, so it can be concluded that there was no relationship between exposure to mass media and age of *menarche* on students of 1 Subang Middle School, Batang Regency.

The results of this study are not in line Putri (2009) which concluded that there was a relationship between mass media exposure and age of *menarche* in female students, relationship between nutritional status, level of exposure to mass media and heredity with age of *menarche* in female students in State Middle School I Subah Batang Regency Faculty of Health Sciences University of Muhammadiyah Surakarta 13 Al-Azhar Rawamangun Middle School East Jakarta. In this study stated that 69.9% of respondents had been exposed to adult electronic media and as many as 97.1% of respondents had been exposed to adult printed media.

The results of this study are not in line with by Kusuma (2012) concluded that there was a relationship between audio visual exposure and age of early *menarche* in adolescents at Semarang 11 Middle School. In the study, 100% of respondents were never exposed to audio visual in the form of watching or reading adult magazines. The results of the chi square test in this study obtained a score of $p = 0,000$. P score <0.05 which means there is a very significant relationship.

Both printed and electronic media are also said to be one of the factors that can cause behavioral irregularities in adolescents. But the printed media has a more real impact on the occurrence of cases of behavior irregularities. Because there are shows that are not age-appropriate, the teenagers on television could affect the maturity of reproductive hormones so that they experienced *menarche* premature.

The discrepancy between the theory and the results of this study could be due to the possibility of research conducted by other researchers located in junior high schools in large cities. The difference in the location of the school and the number of respondents strongly influenced the results of the study. Based on the discussion above, there are assumptions about the effect of mass media exposure on the incidence of early *menarche*, in which is an interrelated influence where if a measurement or questionnaire is given a statement that only leads to the negative impact of the use of mass media and the location of the study in the big city. So the researchers recommend counseling for young women to reduce the amount of intensity of mass media use.

CONCLUSIONS

Based on the results of the study, there was a relationship and influence between diet, physical activity and the incidence of early *menarche*. Where as there was no relationship and influence of mass media exposure to the incidence of early *menarche*. Simultaneously there were influences of diet, physical activity, and exposure of mass media simultaneously to the incidence of early *menarche*. So that it could be concluded that among the three independent variables, only the dominant dietary patterns affect early *menarche* 30.8% and of the three independent variables could explain the dependent variable is 34% while the rest is explained by other factors not examined. Further research is needed with more samples and a list of questions on the questionnaire adjusted to the sample so that the resulting data is more valid. This research recommends coordination between health center and health office to conduct counseling or form peer consultants involving young women to be more able to get to know themselves.

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