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Analysis of factors associated with early menarche in adolescents

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ABSTRACT

The incidence of menarche praecox is 5.2% of adolescents in Indonesia. Indonesia ranks 15th out of 67 countries with a decline in menarche age of up to 0.145 years per decade. The study aimed to analyze factors associated with early menarche (praecox menarche) in adolescents. This type of analytic research with quantitative methods and crosssectional research design. This used primary data, the instruments used microtoise, weight scales, and checklists. The population was 145 adolescents. The sample size was 124 respondents using simple random sampling. The research was tested using the Chi Square test. It was conducted in Kediri on October to December 2022. The research results were found that adolescents who experienced praecox menarche were 41.9%, nutritional status was not obese by 75.2%, exposed to pornography by 65.6%, genetics (early menarche age of mother) by 51.2%, not active in sports by 69.6%. From the results of data analyze it can be concluded that there was no correlation between nutritional status and praecox menarche (P-value 0.100), there was correlation between exposure to pornography and praecox menarche (P-value 0.000), there was correlation between genetics and praecox menarche (P-value 0.002), there was correlation between physical activity (exercise) and praecox menarche (P-value 0.001).

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INTRODUCTION

Adolescence is a period of transition from a child to an adult. Adolescence occurs between the ages of 10 to 18 years. Before entering adolescence, a person will experience a period of puberty first. It is during this period of puberty that there will be an acceleration of growth and physical development from children to adults and to the maturity of the sexual reproductive organs. Puberty in women is marked by rapid physical growth, menarche, psychological changes and the appearance of secondary sex characteristics. At this time there has been physical maturity from the sexual aspect and

psychosocial maturity, this psychological change is marked by changes in body image, considerable attention to changes in body functions, learning about behavior and social conditions and other changes, such as changes in weight body, height, muscle development, pubic hair, breasts and menarche (Hidayat & Uliyah, 2012).

Menarche is the first menstruation experienced by women, which is physically characterized by discharge of blood from the vagina due to shedding of the endometrial lining. Menarche occurs in the middle period of puberty or which usually occurs 6 months after reaching the peak of the growth spurt. The age of menarche varies from the age range of 9-16 years, but the age of menarche can be said to be normal if it occurs at the age of 12-15 years. This condition of early menarche is associated with pubertal praecox which occurs in children aged less than 12 years. The first menstruation before the age of 12 which shows that a woman has produced estrogen earlier than other women is generally called early menarche or praecox menarche. Whereas praecox puberty is defined as genetically and without abnormalities of the female organs, with breast development at the age of 8 years or menarche before the age of 9 years. Adolescents who experience menstruation for the first time usually feel fear, anxiety and so on (Pudjiastuti & Dewi, 2012).

According to the World Health Organization, around one fifth of the world's population is adolescents aged 10-19 years in 2020. About 900 million are in developing countries which results in the rapid onset of menarche in adolescents. While 85% of them live in developing countries. The prevalence of early menarche varies in each country, for example in Canada, adolescents who experience early menarche are 14.6% and in parts of Asia, such as in China, 10% of adolescents experience early menarche. Early menarche that occurs in countries such as America and Europe increases the need to dig up information about the incidence of early menarche in other countries, including Indonesia. The age of menarche in various studies that have been conducted and listed in various literature states that the average age of menarche in various countries has several variations, namely, among others, in studies in the United States and Europe, the age of menarche events decreases at a rate of 1-3 months every decade. for over 175 years, in the United States during the last years, puberty usually occurs between the ages of 8 and 13 in adolescents and 9 and 14 in adolescents and about 95% of adolescents have signs of puberty by age 12 years and the average age is 12, 5 years (Lusiana & Dwiriani, 2007). Meanwhile in Asia, such as Hong Kong and Japan, the average age of menarche for adolescents is 12.2 years and 12.38 years (Karapanou & Papadimitriou, 2010). As for Indonesia, in 2020 it was found that 5.2% of children in 17 provinces in Indonesia had entered the age of menarche at less than 12 years. Indonesia itself ranks 15th out of 67 countries with a decrease in the age of menarche reaching 0.145 years per decade. Meanwhile for the province of East Java, the age of early menarche at the age of 9-10 is 2.3% and at the age of 11-12 years is 28.2%.

At this time the age of menarche in adolescents is changing. Improved living standards have an impact on reducing the age of menarche to a younger age (praecox menarche). Several studies also state that the age of menarche under 12 years is associated with the risk of developing breast cancer, abdominal obesity, insulin resistance, accumulation of fat in adipose tissue, risk of cardiovascular disease and hypertension. Shifting the age of menarche to a younger age will cause adolescents to experience the impact of emotional stress. Psychological changes in adolescents who have experienced menstruation include feeling anxious, restless, having inner conflicts with parents, expanding interests, starting to socialize in groups but often feeling strange, getting to know the opposite sex or dating and unstable school achievements or lessons. Adolescents who experience praecox menarche have more or less the same psychological picture as other adolescents. On the other hand, the acceleration and deceleration of reaching menarche also has several impacts. An earlier age of menarche will increase the risk of unwanted pregnancies as a result of premarital sex among adolescents also increases. Adolescents who have experienced menarche means that their reproductive organs have matured. Adolescents who experience early menarche if they are not equipped with a strong desire can cause problems with pregnancy out of wedlock, young pregnancy and abortion (Yustanta & Al Qudusa, 2020).

Research by doctors in South Korea shows that populations with an early menstrual age tend to have faster ovulatory cycles, compared to those with a slower menstrual age. The occurrence of

regular ovulatory cycles that are getting faster can also increase the risk of developing breast cancer by four times. If menarche occurs over 13 years, the risk of cancer drops by 35% compared to girls with menarche at the age of 12 and under (Noviantio, 2012). In addition to breast cancer, praecox menarche is also associated with ovarian cancer (Gong et al., 2013). From the existing data regarding the current age of menarche for adolescents and some of its effects, it should be a concern to look further at what factors are related to praecox menarche. The factors that cause praecox menarche are nutritional status, genetics, consumption of high-calorie, high-fat foods, socio-economic, exposure to adult mass media (pornography), sexual behavior, physical activity (exercise) and lifestyle (Soetjiningsih, 2020).

The purpose of this research is to analyze factors associated with early menarche (praecox menarche) in adolescents. From the background description above, the authors feel interested in conducting research with the title analysis of factors associated with early menarche (praecox menarche) in adolescents.

RESEARCH METHOD

This research was a quantitative analytic research, with a cross-sectional research design. The population in this study were 145 adolescents living in Pare District, Kediri Regency. The sampling technique in this study used simple random sampling sampling, namely the entire population was used as a sample, namely 124 respondents. The dependent variable was early menarche (praecox menarche), while the independent variables were nutritional status, pornography exposure, genetics, and physical activity. All respondents in this study agreed to be studied and filled out informed consent. The data used is primary data, using microtoise research instruments, weight scales, checklists. The categorization of praecox menarche is the age of menstruation more than 12 years, nutritional status using measurements of Body Mass Index (BMI) by calculating body weight in kg/height $(m)^2$ which then results of calculations are adjusted to the table by categorizing obesity (> 1 SD) and for the non-obese category (-3 SD to 1 SD). For physical activity variables (exercise), the active category if doing sports ≥ 3 times a week, genetic variables are categorized from the mother's menarche history with the early category if the respondent's mother experienced menarche at the age of <12 years. For the pornography exposure variable, if you have intentionally or unintentionally watched, read, or talked about pornographic matters, either directly or through electronic media, then the respondent was categorized in the exposed group. Data analysis used univariate and bivariate analysis with the Chi-Square test. The conclusion of the statistical test with chi-Square is if the p-value is ≤ 0.05 then Ho is rejected and Ha is accepted, meaning that it indicates a correlation between the variables tested. Meanwhile, if the p-value > 0.05, then Ho is accepted and Ha is rejected, which means there is no correlation between the variables tested.

RESULTS AND DISCUSSIONS

Univariate analysis was carried out using statistical tests to explain the characteristics of each of the variables studied. This analysis aims to provide an overview of the frequency and percentage of each variable, namely praecox menarche, nutritional status, exposure to pornography, genetics, and physical activity (exercise).

Table 1. Characteristic Factors Associated with early menarche (Praecox Menarche) in adolescents

Characteristic	Frequency (f)	Percentage (%)
Early menarche (praecox menarche)		
Praecox	52	41.9
Normal	72	58.1
Nutritional Status		
Obesity	18	14.5
Non-obesity	106	85.5
PonographyExposure		

Exposed	84	67.7
Not Exposed	40	32.3
Genetics		
Early	61	49.2
Late	63	50.8
Physical Activity (Exercise)		
Not Active	81	65.3
Active	43	34.7
Total	124	100.0

Based on table 1, the results of this study showed that 52 adolescents (41.9%) experienced praecox menarche. The results of this study are in line with research conducted on elementary school students in Surakarta, which found that 32 respondents (60.38%) experienced early menarche (Astuti et al., 2014). A similar study was conducted on adolescents at elementary school of 1 Pulubala, Gorontalo Regency, where the majority of respondents experienced early menarche as many as 30 respondents (83.3%) (Ismail, 2015). For adolescents experiencing praecox puberty who do not have underlying medical problems, there are two main concerns, developmental and psychological problems. When adolescent 's rapid growth occurs at an abnormally early age, it will also mature rapidly. If left untreated, this will cause the areas of bone growth to coalesce too quickly, making the adolescent's height shorter than expected. Significant premature sexual maturity can also invite temptation from the adolescent's peers and adjustment difficulties from a psychological perspective (Steven, 2015). In addition, it was found that at a younger age of menarche there is an increased risk of breast cancer with an odds ratio of 1.5 (Rasjidi, 2019).

The results showed that 89 adolescents (85.5%) had a non-obese nutritional status. These results are not much different from the frequency distribution of nutritional status as a result of research conducted by Widyaningtyas where respondents who experienced non-obese nutritional status were 61 respondents (85.9%) (Widyaningtyas & Kartini, 2013). Standards used to differentiate obese and overweight adolescents include relative weight, weight-height index, body circumference, and skinfold thickness, usually the triceps. Weight-for-age percentiles are unsatisfactory because they do not allow for variation in lean body weight (mass). The use of adult reference data such as life tables is inappropriate, because children and adolescents differ greatly in growth rates and weight distribution. Body Mass Index (BMI) defined as weight/height squared (in kilograms per square meter) is the most useful index used for screening the obese adolescent population because this index is significantly correlated with subcutaneous fat and total body fat in adolescents, especially those those with the greatest proportion of body fat. Obesity itself is usually caused by excess food intake rather than massive overeating (Nelson, 2020).

The results of the study showed that as many as 84 adolescents (67.7%) were exposed to pornography. The results of this study are in line with Indriyastuti's research where the majority of respondents had seen audio-visual media with pornographic content as many as 126 respondents (58.8%) (Indriyastuti et al., 2015). However, it is different from the research conducted by Wulandari where in his research the majority of respondents were not exposed to adult mass media (pornography), namely 92 respondents (52.3%). With the rapid advancement of technology, adolescent find it easier to access news, pictures, videos and other pornographic content coupled with a lack of control from parents or more mature people, resulting in adolescent more easily getting stimulation from outside (Wulandari et al., 2015)

The results of the study showed that as many as 63 adolescents (50.8%) had an early maternal menarche. The results of this study are in line with research conducted by Rosanti (2013) where in her study the majority of mothers had early menarche age of 81 respondents (62.3%). An adolescent with a fast menarche will have a tendency to have the same age as her mother or sister who also experiences menarche at an earlier age. This genetic link is thought to be related to lobes that regulate inherited estrogen. The closest age to menarche is for identical twins, not too close for non-identical twins and far enough for siblings from different mothers (Septiana & Sabngatun, 2018).

The results of the study showed that there were 81 respondents (65.3%) who had physical activity who were not active. These results are the same as the research conducted by Ismail where as many as 28 respondents (77.8%) did not exercise regularly (Ismail, 2015). However, this study is different from Maidartati's research where 44 respondents (57.9%) had active physical activity (Maidartati, 2013). Physical activity is basically how to use the body efficiently, coordinated and safely so as to produce good movement and maintain balance during activities (Asmadi, 2018). According to Henderson, female athletes whose training begins before the age of menarche generally occur will usually experience a delay in menarche. They will more often show symptoms of amenorrhea or have irregular periods during strenuous physical training compared to their counterparts who start exercising after passing the age of menarche (Maidartati, 2013).

Table 2. Correlation between nutritional status and praecox menarche

Nutritional Status	Praecox Menarche				P Value
	Praecox		Normal		
	N	%	N	%	
Obesity	13	10.5	5	4.0	0.100
Non- Obesity	39	31.4	67	54.1	
Total	52	41.9	72	58.1	

Based on table 2, it was found that 13 respondents (10.5%) respondents with obese nutritional status tended to experience praecox menarche and 5 respondents (4.0%) did not experience praecox menarche. Meanwhile, respondents with non-obese nutritional status tended to have fewer praecox menarche events when compared to the obese group, namely 39 respondents (31.4%) experienced praecox menarche and 67 respondents (54.1%) did not. The statistical test results using the Chi Square test obtained a value of P = 0.100. It can be concluded that there is no correlation between nutritional status and the incidence of praecox menarche in adolescents.

This research is in line with research conducted by Fitriyah which shows that there is no correlation between nutritional status and menarche status (P-value = 0.577) (Fitriyah & Ruhyana, 2015). However, the results of this study are not in line with the results of research conducted by Lusiana and Fitrah showing a correlation between nutritional status and menarche age (P-value = 0.018) (Mutasya et al., 2016).

In this study, the number of non-obese respondents who experienced praecox menarche was more than respondents who were obese and experienced praecox menarche also due to environmental factors that lead to praecox menarche. Adolescents who are well nourished have a higher growth rate before puberty (prepuberty) compared to adolescents who are malnourished. Menstruation that begins between the ages of 10-16 years is influenced by several factors, including the woman's health, nutritional consumption and nutritional status. These malnourished Adolescents grow slower for a longer time, therefore the age of menarche is also delayed (Lusiana & Dwiriani, 2007).

Table 3. Correlation Between Pornography Exposure and Praecox Menarche

Pornography Exposure	Praecox Menarche				P Value
	Praecox		Normal		
	N	%	N	%	
Exposed	47	37.9	37	29.8	0.000
Non- Exposed	5	4.0	35	28.3	
Total	52	41.9	72	58.1	

Based on table 3, it was found that 47 respondents (37.9%) were exposed to pornography and 37 respondents (29.8%) did not have praecox menarche. Meanwhile, 5 respondents (4.0%) were not exposed to pornography to praecox menarche and 35 respondents (28.3%) were not praecox menarche. Statistical test results obtained P value = 0.000, which means P-value < α 0.05. It can be concluded that

there is a correlation between exposure to adult mass media (pornography) and the incidence of praecox menarche.

The results of this study are in line with Yustanta's research with a P value = 0.001 ((Yustanta & Al Qudusa, 2020)and Yuliasari's research with a P = 0.003 which states that there is a correlation between exposure to adult mass media (pornography) and the incidence of menarche (Yuliasari & Rosida, 2016).

Adolescents who receive strong stimuli from outside, for example in the form of soap operas showing children acting as adults, films about sex, reading books and magazines featuring sex, temptation and stimulation from men, direct observation of sexual acts. Sensory stimulation is changed in the cerebral cortex and through the amygdala nucleus is channeled to the hypothalamus, stimulating formation in the form of gonadotropin-releasing-hormone (GnRH) which stimulates the anterior pituitary with the portal system so that the pituitary gland which produces FSH and LH sends signals via gonadotropins (hormones that stimulate sex glands) to the ovaries to produce the hormone estrogen. Estrogen with low concentrations has been able to stimulate breast growth because this organ has receptors for estrogen, especially in the glands. Estrogen also causes the maturation of the reproductive organs and changes in the secondary sex organs, including: the distribution of hair, the deposit of adipose tissue, and finally the development of the endometrium in the uterus. Long enough estrogen stimulation of the endometrium results in the first thin bleeding called menarche (Rasjidi, 2019).

Table 4. Correlation Between Genetics and Praecox Menarche

	Praecox Menarche				P Value
Genetics	Praecox		Normal		
	N	%	N	%	
Early	33	26.6	28	22.6	0.002
Late	19	15.3	44	35.5	
Total	52	41.9	72	58.1	

Based on table 4, it was found that 33 respondents (26.6%) had respondents with early mother menarche and 28 respondents (22.6%) did not have praecox menarche. Meanwhile, 19 respondents (15.3%) respondents with late mother menarche to the incidence of praecox menarche and 44 respondents (35.5%) did not have praecox menarche. Statistical test results obtained P value = 0.002, which means P-value < α 0.05. It can be concluded that there is a correlation between the age of the mother's menarche (genetic) and the incidence of praecox menarche.

This study is in line with research conducted by Wulandari et al. (2015) with a P value = 0.000 and research of Nugroho et al. (2016) with a P value = 0.015 which states that there is a correlation between the status of menarche (genetic) and the incidence of menarche. Meanwhile, this study was not in line with Herawati's research with a P value = 0.691 which stated that there was no correlation between the age of the mother's menarche and the age of the child's menarche (Herawati, 2013). Genetic factors are factors that cannot be changed. Estrogen receptor α (Era gene) is a specific gene that determines the age of menarche in girls that can change the biological activity of estrogen (Ismail, 2015).

Table 5. Correlation Between Physical Activity (Exercise) and Praecox Menarche

	Praecox Menarche				P Value
Physical Activity	Praecox		Normal		
(Exercise)	N	%	N	%	
Not Active	41	33.1	40	32.3	0.001
Active	11	8.8	32	25.8	
Total	52	41.9	72	58.1	

Based on table 5, it was found that 41 respondents (33.1%) had respondents who had physical activity who were not active towards the incidence of praecox menarche and 40 respondents (32.3%)

did not have praecox menarche. Meanwhile, 11 respondents (8.8%) had active physical activity towards praecox menarche and 32 respondents (25.8%) did not have praecox menarche. Statistical test results obtained P value = 0.001, which means P-value < α 0.05. It can be concluded that there is a correlation between physical activity (exercise) and the incidence of praecox menarche.

This research is in line with research conducted by Maulina (2015) with a P value = 0.000 and Herawati's research with a P value = 0.009 which states that there is a correlation between physical activity (exercise) and the age of menarche (Herawati, 2013). Meanwhile, research conducted by Fitriyah stated that there was no correlation between sports activity and menarche with a P = 0.100. (Fitriyah & Ruhyana, 2015)

Physical activity is important for the growth and development of adolescents besides being able to affect height growth, physical activity or sports can also affect the productivity of sex hormones. In connection with this it is known that exercise can increase the prolactin hormone produced by the anterior pituitary and is responsible for milk production. In adolescent athlete prolactin affects ovarian maturity, which has the effect of suppressing and inhibiting ovarian maturity by another hormone called FSH, this results in delayed menarche or transient amenorrhic (absence of the menstruation) this condition is the same as the condition of mothers who are breastfeeding (Herawati, 2013).

CONCLUSION

From the results of this study it can be concluded that: 1) There is no correlation between nutritional status and the incidence of praecox menarche (P-value = 0.100); 2) There is a correlation between exposure to pornography (adult mass media) and the incidence of praecox menarche (P-value = 0.002); 3) There is a correlation between genetics and praecox menarche (P-value = 0.000); 4) There is a correlation between physical activity (exercise) and praecox menarche (P-value = 0.001). In this study several other factors that can also be associated with the occurrence of praecox menarche have not been included in the variables studied. Other factors related to the incidence of praecox menarche, such as fast food consumption, the role and function of midwives in improving reproductive health according to adolescent development, family socioeconomic status. Therefore research on the incidence of praecox menarche can continue to be developed.

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