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RESEARCH ARTICLE

The Relationship between Nutritional Status and Lifestyle with Risk of Early Menarche among Adolescent

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Abstract

Introduction: Early menarche is one of the major of concern in reproductive health, and affects a large number of women throughout their reproductive life from early adolescent. Early menarche is an important indicator of sexual and reproductive health. The aim of this research was to explain the relation between nutritional status and lifestyle with early menarche case in-adolescent in Surabaya. Method: The research design used was cross sectional. The study population consisted of 232 early-adolescent. The study sample totaled 145 early adolescents based on Purposive sampling with a study period of 2 months. The independent variables were nutritional status and lifestyle, while the dependent variable was early menarch. The data collection method used was a questionnaire sheet filled out by the adolescents and BMI measurement. The statistical analysis used Spearman rho ($\alpha \leq 0, 05$). Results: The results showed that nutritional status and lifestyle were positively related to early menarche in early-adolescents ($p = 0.000$). Discussion: Overweight nutritional status or high BMI and unhealthy lifestyle will tend to experience early menarche. Early menarche can lead to a premature menapouse as well, the risk of heart and bone disorders.

Keywords: *Nutritional status, Lifestyle, Early menarche, Early-adolescent.*

Introduction

Early menarche is one of the major of concern in reproductive health, and affects a large number of women throughout their reproductive life from early adolescent [1].

Early menarche is an important indicator of sexual and reproductive health [2].Underweight girls attained menarche comparatively in later age (12.67±1.23) than that of healthy and overweight girls [1]. Adolescent who are tall and weigh more with large body mass will tend to experience early menarche. Children with obese nutritional status had 2.42 times the risk of having early menarche compared with normal nutritional [3].

In the United States the average age of menarche is 12.2 years, whereas early menarche age is in the age less than 12 years [4]. The results of Indonesian DHS in 2017 show the average age of menarche in Indonesia 13 years (28.0%) [5]. Basic Health Research states that 5.2% of children in 17 provinces in Indonesia experience menarche under the age of 12 years.

Indonesia ranks 15th out of 67 countries with declining menarche age reaching 0.145 years per decade [6].Nutritional status can be interpreted from a person's Body Mass Index. BMI is determined by Weight and Body Height. The presence of Adipocyte-derived Leptin hormone derived from body fat is thought to affect early puberty. The increase in LH is associated with increased estradiol and early menarche [7].Early menarche can lead to a premature menapouse as well, the risk of heart and bone disorders. We conducted this research to understand with the association between nutritional status and lifestyle with risk of early menarche.

Material and Methods

The design of this study was correlational using a cross-sectional approach intending to determine the relationship between the

independent variables and the dependent variable. The sampling method applied was purposive sampling. The independent variables in this study were nutritional status and lifestyle.

The dependent variable in this study was early menarche. The population in this study consisted of early adolescents who attended a elementary school in Surabaya. The number of population in the study was 232 early adolescent with the sample size was 145 in Surabaya, Indonesia. Surabaya is the capital of the East Java province and is one of the major cities in Indonesia. The study was conducted over a period of 2 months.

The inclusion criteria in this study consisted of (1) Early adolescents aged 9-11 years old studying in elementary school (2) adolescents who were willing to become respondents. The subject recruitment process consisted of 2 days. The researchers entered each class to ask respondents for informed consent for respondents who were willing to sign the teacher / homeroom teacher while the witnesses were assisted by consulted teachers / homeroom teacher.

Respondents who were willing, at the time of the study day, were collected during school breaks in one classroom, after all respondents had gathered in the class then the researcher would explain the order of the study and explain how to fill out the questionnaire. after completing the questionnaire, weight and height measurements will be carried out. The questionnaire used to assess the nutritional status in this study using BMI (Body Mass Index) measurements. The body weight and height were measured to calculate the BMI.

The WHO standard cut-offs were used to categorise the BMI into severe thinness (BMI z-score <−3), thinness (BMI z-score ≥−3 to <−2), normal (BMI z-score ≥−2 to <1), overweight (BMI z-score ≥+1 to <+2) and obese (BMI z-score >+2). Lifestyle questionnaire uses 5 dietary indicators: Dietary habit, fast food and snacks/ snacks, sports, sleep rest, history of adult mass media. This questionnaire is measured using a likert scale; the answer consists of very often, often, rarely, and never.

The statements that were submitted were 20 questions. There were both positive and negative statements. The score of positive statement 4 = Very often, if you do three or more in a month, 3 = Often, if you do it twice a month, 2 = rarely, if you do it once a month, 1 = Never do. Negative statement with score 1 = Very often, if you do three or more in a month, 2 = Often, if you do it twice a month, 3 = rarely, if you do it once a month, 4 = Never do.

After that will divide two categorizes. Unhealthy = 20-50 and Healthy = 51-80. The results of the data obtained were then used to carry out descriptive and inferential analysis. The descriptive data analysis was about the percentage or frequency distribution,mean and standard deviation. The inferential analysis used chi-square analysis and Spearman's Rho Test correlation with α=0.05

Results

Table 1: Characteristics of Respondents (n=145)

Characteristics	Category	f	%
Information about menstrual and reproductive health in women	Yes	46	31.7
	No	99	68.3
Father's Education	elementary	3	2.1
	junior high school	24	16.6
	Senior high school	92	63.4
	Colleges / Universities	26	17.9
Father's Occupational	Not Working	8	5.5
	Servant	12	8.3
	Private Employee	83	57.2
	Self	42	29
Mother's Education	elementary	7	4.8
	junior high school	31	21.4
	Senior high school	87	60
	Colleges / Universities	20	13.8

Mother's Occupational	Housewife	93	64.1
	Servants	1	7
	Private Employees	33	22.8
	Self Employed	18	12.4
Families Income	< City wage	71	49
	≥City wage	74	51
	Total	**145**	**100**

Table 2: Analysis of the relationship between nutritional status and early menarche in adolescents in Surabaya

Early *menarche*	Nutritional Status										Total	
	Severe thinness		Thinness		Normal		Overweight		Obesity			
	f	%	f	%	f	%	f	%	f	%	f	%
Yes	0	0	0	0	16	11	18	12,4	5	3,4	39	26,9
No	4	3,8	8	7,5	68	46,9	19	13,1	7	4,8	106	73,1
Total	**4**	**3,8**	**8**	**7,5**	**84**	**57,9**	**37**	**25,5**	**12**	**8,3**	**145**	**100**
Spearman's rho r =-0,332; p=0,000												

Table 3: Analysis of the relationship between Life Style and early menarche in early adolescents in Surabaya

Early *menarche*	Lifestyle				Total	
	Unhealty		Healty			
	f	%	F	%	f	%
Yes	23	15,9	16	11	39	26,9
No	17	11,7	89	61,4	106	73,1
Total	**40**	**27,6**	**105**	**72,4**	**145**	**100%**
Spearman's rho r =0,426; p=0,000						

Most respondents have not known information about menstruation and reproductive health in women that is as much as 99 early adolescent (68.3%). The last education of the respondent's father was the highest number of senior high school as many as 92 early adolescent (63.4). Most of the father's occupational as private employees 83 (57.2 %). The education of the respondent's mother at most senior high school as many as 87 (60%).Most mother work as housewife as many as 93 (64.1%).Family income is mostly above the standard of MSC of Surabaya as much as 74 female (51%). (Table 1) Early adolescent who have experienced early menarche most have overweight nutritional status.

The result of statistical test using Spearman's Rho (r_s) obtained the degree of significance of p = 0,000 by setting the degree of significance α≤0,05. Correlation coefficient (r) obtained value -0.332 the direction of a negative relationship means the higher nutritional status have risk of experiencing early menarche (Table 2).Early adolescent who had early *menarche* more likely to have an unhealthy lifestyle. Statistical test results using *Spearman's Rho* (r_s)obtained the degree of significance of p = 0.000 with significance level set α≤0,05. The correlation coefficient obtained value of 0.426 which indicates that the strength of the relationship was and the direction of a positive relationship means that increasingly unhealthy lifestyle then the incidence of early *menarche* will be higher. (Table 3).

Discussion

Relationship between Nutritional Status and Early Menarche in Adolescents in Surabaya

Overall most of the early adolescent have overweight nutritional status experienced early menarche. Early menarche is associated with increased weight, because of the high levels of leptin secreted by the adipose gland, high levels of leptin secreted in the blood [7]–[9]. This leptin affects the metabolism of Gonadothropin Releazing Hormone (GnRH). This release of GnRH will trigger the release of Folicle Stimulating Hormone (FSH) and Letuinizing Hormone (LH) in the ovaries resulting in follicular maturation [10]. Increased LH serum also affects the increase in serum estradiol which then ends with sexual maturity that affects early menarche [11].

Adolescent who experience early menarche show higher BMI at the age 11 years [11]. Frisch and Revelle stated on the theory of "Critical Weight" that weight is an onset of

menarche occurrence is closely related to early menarche (<11 years) [13]. All respondents who have obese nutritional status often eat fatty foods and get early menarche. In accordance with the results of previous studies show that asserting that high-nutrient and animal-derived foods will result in increased estrogen levels, so that improved nutrition or good nutritional intake can lead to faster menarche life [14, 15]. Excessive protein intake also affects early menarche, in non-vegetarian girls will experience menarche 6 months early and physical maturity faster than vegetarians [16].

Young women with a high animal protein intake were 1.8 times more likely to have early menarche than girls who consumed no more animal protein [17]. Early menarche conditions need to be prevented, as they can cause breast cancer cells due to estrogen stimulus to epithelial cell division or because estrogen and its metabolites directly act as mutagen [18]. Early menarche can lead to an earlier menapouse, the faster menapouse it will be increasingly at risk of interference with the ovaries such as tumors [11].

Relationship between Life Style and Early Menarche in Early Adolescents in Surabaya

Lifestyle has a correlation with the incidence of early menarche in early adolescent. Respondents who have an unhealthy lifestyle mostly lie in the consumption fast food, soft drinks and packaged foods like instant noodles. The results of the research conducted by [19], which states that significant relationship was found between menarche with lifestyle. Modern lifestyle conditions with a large selection of ready-to-eat foods, packaged foods and soft drinks will lead to accelerated menarche (early menarche) because fast food contains high-fat, sugar, and calories [20].

In line with research [21], which states that Soft drink consumption is significantly linked to overweight, and obesity. Girls who consume 1.5 portions of artificial sweetener each day will experience menarche earlier than girls who consume artificial sweetener ≤ 2 times a week [22]. Incident early menarche occurred in 165 (8.3%) of the girls.

Consumption of artificially sweetened soft drinks was also positively associated with risk of early menarche (RR for 1 serving/d increment: 1.43; 95% CI: 1.08, 1.88) [9]. Snacks are often consumed by elementary school students, including chiki, fried, sausage, soft drinks. Most snacks consumed contain high salt and calories and do not provide adequate nutrients have risk nutritional status obese and will lead to acceleration of menarche age [23]. Regular physical activity during early puberty may decline the proportion of girls who have early menarche (<11 years) [24].

This research conducted by [25], which states that exercise and age at menarche, which was in agreement with that of other studies indicating delayed menarche. Early menarche women are more interested in viewing sexual content in movies, television, magazines and listening to sexual content in music than women who have not menarche. The spectacle that leads to sensuality can affect the pituitary to secrete FSH so that it will accelerate the age of menarche [26].

Conclusion

Early adolescent who have obese nutritional status or have a high BMI and unhealthy lifestyle will tend to experience early menarche. Early menarche can lead to an earlier menapouse, the faster menapouse it will be increasingly at risk of interference with the ovaries such as tumors.

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