The relationship between menarche age and height of adolescent girls in Simpang Kanan sub-district, Aceh Singkil District in 2024

Laila Apriani Hasanah Harahap[1], Wardah Iskandar[2], Meutia Paradhiba[3], Siti Maisyaroh Fitri Siregar[4]
[1-4] Universitas Teuku Umar, Indonesia

Corresponding author: Lailaapriani@utu.ac.id

Abstract. *an important biological sign of pubertal development in girls. The height of adolescent girls can also be affected by early menarche. Adolescent girls are an important investment in the country, as they are the next generation that will shape the future. The progress of the nation is determined by the role of active young women in the family, community, and country. They will be the key to creating positive changes and achieving development goals. This study aimed to evaluate the relationship between the nutritional status of adolescent girls and age at onset of menarche. This cross-sectional observational study included 70 adolescent girls aged 17-20 years.*

Keyword: Menarche, Nutritional Status, adolescent girls.

1. INTRODUCTION

Menarche, which marks the start of reproductive capabilities, is one of the most important indicators of the biological development of adolescent girls. The age at menarche, or the age at first menstruation, is influenced by many factors. Environmental factors such as nutrition, physical activity, and socioeconomic status also play a role. Menarche age greatly affects reproductive health and physical growth, including height (Bann et al., 2022).

The peak of puberty in girls occurs between the ages of 11 and 15 years or approximately 13. This is known as menarche or the onset of the menstrual cycle. In the last ten years, the age at menarche has decreased. It is suspected that this is because of better nutrition and health in the current generation. According to Aishah's 2011 study of primary school girls in Indonesia, 60% experienced menarche at the age of 10-11 year (Noor, 2014).

One of the most commonly used parameters for assessing a person's growth status is height. Various variables affect the height of adolescent girls, including the length of menarche. Previous studies have shown that earlier menarche indicates that the growth phase of height stops sooner, whereas later menarche may allow more time for long bones to grow before the epiphyseal plate closes (Cameron et al., 2012).

A cohort study in the UK in 1958 proved that adolescent girls who got their first menstruation at the age of 11 years had an average height of 1.62 m, this is different from the height of adolescent girls who had their first menstruation after the age of 11 years

with an average height of 1.63 m. Research in Brazil in 2006 showed that the height at the age of 19 years was 1.61 ± 0.06 m in women who had their first menstruation before the age of 13 years of age and 1.62 ± 0.06 m in women who got menstruation after the age of 13 years. Women whose menarche is one year later will grow about 0.35 cm taller (Gharravi, 2008).

Height gain fluctuates, which means that infant height growth is rapid, then slows down, and then rapidly increases again during adolescence. The growth rate of adolescents affects their final height. During puberty, the height growth rate (height growth velocity) increases and peaks for approximately two years. After approximately three years, the height growth rate will decrease and continue to increase until the epiphyses close and height growth stops (Soetjiningsih, 2015).

This study investigated the relationship between age at menarche and adolescent height in Simpang Kanan sub-district, Aceh Singkil district, in 2024. It is hoped that the results of this study will provide a clearer picture of the growth patterns of adolescent girls in the area and form the basis for better health interventions that support adolescent growth and development in an ideal manner.

2. RESEARCH METHODS

This study was conducted using an observational analytical method and a cross-sectional design. The purpose of this study was to determine the relationship between age at menarche and the height of adolescents. A cross-sectional design was chosen because of the time spent only once. In addition, this design allows for the simultaneous analysis of multiple variables and the analysis of the relationship between variables. The study will be conducted in the Simpang Kanan sub-district, Aceh Singkil District, in 2024.

This study involved 160 adolescents in Lipat Kajang village, Simpang Kanan subdistrict, and Aceh Singkil district. A simple random sample was used for determination, which was performed using the Slovin formula. The result was 62. The data will be analyzed using Chi Square and SPSS programs.

3. RESULTS

Table 1. Distribution of Menarche Age

Age Menarche	Category	Frequency	%
< 11 Years	MEarly Enarchy	33	53.2
11 – 14 Years	MenarcheNormal	25	40.3
>14 Years	Mthe Tarda enarche	4	6.4
Total		62	100%

Table 1 shows that the frequency of samples with variable age of menarche is less than 11 years categorized as early menarche (n = 33, 53.2%, age 11-14 years categorized as normal menarche (n = 25, 40.3%), and age more than 14 years categorized as menarche tarda (n = 4, 6.4%).

Table 2: Height distribution

Height (cm)	Category	Frequency	%
<154.35	Short	39	62.9
≥154.35	Not Short	23	37.1
Ttotal		62	100%

Table 2 shows that the frequency of samples with height variables is less than 154.35 cm which is categorized as short as 39 people or 62.9% or more, and equal to 154, 35 which is categorized as not as short as 23 cm or 37.1%.

Table 3. Relationship between Menarche Age and Height

Age menarche	Height		Total	P Value
	Short	Not Short		
Menarche DThis	32	1	39	
Menarche Nnormal	7	11	18	0.002
Menarche Tarda	0	5	5	
Ttotal	39	23	62	

From Table 3, the results of cross tabulation between menarche age and height are obtained, namely in samples with early menarche age, the sample has a height categorized as short, namely 32 people and not short one person; samples with normal menarche age there are seven people who have a short height category, while 11 others are categorized as not short, and samples with menarche age there are no people who have a short height category, while five others are categorized as not short.

Based on statistical tests with the chi-square method, the value of p = 0.002 ((p < 0.05), which means Ha, namely between the age at menarche and height, there is no relationship with one another and accepts Ha; namely, between the age at menarche and height, there is a significant relationship between the two. This means that there is a relationship between the age at menarche and height.

4. DISCUSSION

As shown by the distribution of these samples, those with early menarche tended to have shorter heights. In contrast, samples with normal or late menarche age or older than the early menarche samples tended to have shorter heights. Using the chi-square method to test the results, we found a probability value (p) of 0.002 or p < 0.05, indicating a significant relationship between age at menarche and height.

Theoretically, menarche causes the development of female secondary sex characteristics, as well as the growth and maturation of the female reproductive tract. additional effects on the skeletal bone. Estrogen stimulates bone growth by inhibiting osteoclastic activity in the bone. During puberty, when women enter the reproductive period, their height increases for several years. Estrogen can also affect skeletal bone growth. Estrogen first joins the epiphyses and shafts of the long bones. This stops the growth of the body (Guyton, 2008). The influence of nutrition on age at menarche and height adolescents who experience early menarche usually experience faster height growth at an earlier stage, so they tend to have shorter heights compared to adolescents who experience later menarche.

5. CONCLUSIONS AND SUGGESTIONS

The conclusion of this study is that there is a significant relationship between age at menarche and height in 2024.

REFERENCES

Bann, D., Wills, A., Cooper, R., et al. (2022). Age at menarche and trajectories of height growth in adolescence. Journal of Clinical Endocrinology & Metabolism, 107(3), 655–663. https://doi.org/10.1210/clinem/dgab756

Cameron, N., Bogin, B., & Smith, P. (2012). Human growth and development. Elsevier. ISBN: 978-0123838827

Gharravi, A. M., Hossaini, F., & Shalmani, H. R. (2008). Age at menarche and its association with adult height. Annals of Human Biology, 35(6), 631–635. https://doi.org/10.1080/03014460802381623

Guyton, A. C., & Hall, J. E. (2008). Female physiology before pregnancy and female hormones. In Textbook on Medical Physiology (11th ed., pp. 1075–1076). Jakarta: EGC Medical Book Publishers.

Kaplowitz, P. B. (2008). Link between body fat and the timing of puberty. Pediatrics, 121(Supplement 3), S208–S217. https://doi.org/10.1542/peds.2007-1813G

Karlberg, J. (2002). Secular trends in pubertal development. Hormone Research, 57(Suppl 2), 19–30. https://doi.org/10.1159/000058094

Noor, S. A. M. (2011). The relationship between nutritional status and age at menarche in elementary school (SD) and junior high school (SMP) Shafiyyatul Amaliyyah Medan students in 2011. Retrieved January 30, 2014, from http://repository.usu.ac.id

Ong, K. K., Ahmed, M. L., & Dunger, D. B. (2007). The role of leptin in puberty and its relationship with body fat. Hormone Research, 68(Suppl 5), 28–32. https://doi.org/10.1159/000110574

Soetjiningsih. (2010). Somatic growth in adolescents. Jakarta: Sagung Seto.

Soetjiningsih. (2015). Child growth and development. Jakarta: EGC Medical Book Publisher.