

Pattern of Menarche Age in Two Generations Among Female Medical Students in Faculty of Medicine Sriwijaya University

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Abstrak

In life, women go through many significant events in their growth and body development, one of which is experiencing their first menstruation that commonly occurs during adolescence. In sexual development, the first episode of the first bloodstream is called menarche. The age of menarche is different for each individual, and on average happens in the age range of 11-15 years old. Like many other complex traits, menarcheal age is influenced by many factors, such as genetic and environmental. This study is done to know more about the age distribution of mothers and their daughters to observe the inheriting trend of menarcheal age. This is a descriptive study using 154 samples collected from Faculty of Medicine Universitas Sriwijaya University students batch 2017 that meet the inclusion criteria. Based on the results of research conducted on female students of the Doctor Program Faculty of Medicine Universitas Sriwijaya batch 2017, there is a similarity of distribution in the age of menarche experienced by mothers and their children. Among respondents, the highest age of distribution for female students are between 12 to 14 years old which is 66,9%. For mothers, the age of menarche is the highest between the age of 12 to 14 years old, namely 77,3%. Female students' BMI has the highest distribution of data in normal scores, which is 70,8%. The distribution of menarcheal age on female students Doctor Program Faculty of Medicine Sriwijaya University and mothers have the biggest number in between the age of 12 and 14.

Kata kunci: Age, Menarche, Puberty

1. Introduction

In women, menarche is an early marker of the body's capacity to reproduce and can be associated with the development of secondary sexual characteristics. There are many important events of puberty in girls, some of which are PHV or peak height velocity and menarche.¹

The average age of menarche worldwide is currently decreasing.² This phenomenon has been associated with an increase in the incidence of increased body mass index, insulin resistance, and an unhealthy lipid profile. This culminates in a higher risk of cardiovascular diseases, such as hypertension, CHD, stroke, and diabetes in women.³ In addition, late menarche also comes with its health problems, where late experiencing menarche can be associated with osteoporosis, depression, and social anxiety problems.¹ Meanwhile, in women who experienced menarche before the age of 12 years, the risk of breast cancer will be higher than those who experienced their first menstruation at the age of 15 years or older.

Maternal weight gain in pregnancy, size at birth, and gestational diabetes can be responsible for genetic factors that can affect early menarche. Diet is also an important factor in the age of menarche. Everything a mother consumes during pregnancy can affect the health of her child. If the mother eats nutritious food, the good nutrition will be transferred to the child. In the last few decades, the age of menarche has continued to decline due to many factors, one of which is the increasing rate of obesity in children. In studies that have been conducted, it was found that breastfeeding children can reduce the risk of obesity in children. This research is expected to provide more understanding and knowledge as well as a starting point for other researchers in the future in identifying age inheritance of menarche in families.

2. Methods

This type of research is an observational descriptive study, with a cross-sectional study designed to determine the distribution of age inheritance of menarche among female students in the Medical Education Study Program of the Faculty of Medicine, Sriwijaya University.

The method of sampling in this study is by using a total sampling technique, where all populations that meet the inclusion criteria will be included and become samples in the study. The inclusion criteria in this study were students of the Faculty of Medicine, Sriwijaya University class of 2017, students who had experienced menarche, and students of the Faculty of Medicine of Sriwijaya University class of 2017 who were willing to participate in filling out and collecting questionnaires to completion. The exclusion criteria included female students whose mothers could not remember the age of their menarche, female students who did not have mothers, so they could not get information about the age of maternal menarche, and female students who knew that they had menarche and other hormonal disorders.

3. Results

The results of the study were taken from a questionnaire that was distributed to students of PSPD FK Unsri class of 2017 via the google form link. The data taken to be researched included the age of the respondent's menarche, the BMI value of the respondent, the age of the menarche of the sibling, and the age of the mother's menarche. The questionnaire was distributed to all PSPD FK Unsri students batch 2017, totaling 160 students

during December 2020. The questionnaire link was sent online via the LINE communication application. Of the 160 respondents, 6 were

not willing to participate in this study. So that leaves 154 respondents who all meet the inclusion criteria.

Table 1. Menarche age among Female Students in Medical Education Study Program of the Faculty of Medicine, Sriwijaya University

Menarche Age (year)	n	%
<12	45	29,2
12-14	103	66,9
>14	6	3,9
Total	154	100,0

Tabel 2. BMI among Female Students in Medical Education Study Program of the Faculty of Medicine, Sriwijaya University

BMI	n	%
<18,5 (<i>Underweight</i>)	15	9,7
18,5-25 (<i>Normal</i>)	109	70,8
25-27 (<i>Overweight</i>)	21	13,6
>27 (<i>Obese</i>)	9	5,8
Total	154	100,0

Table 3. Menarche age of the mothers

Menarche Age (year)	n	%
<12	20	13,0
12-14	119	77,3
>14	15	9,7
Total	154	100,0

4. Discussion

In this study, all samples have already got their menstruation. Based on the results of the data, 29% of female students experienced their menarche at the age of fewer than 12 years. As many as 66.9% had menarche between the ages of 12 and 14 years. As many as 3.9% of female students experienced menarche at the age above 14 years.

Gradually, the hormone increase will occur because the pituitary will secrete gonadotropin hormones. The peak of gonadotropin secretion will occur in the age range 11-16 years.⁵ Collaboration between the hypothalamus, pituitary gland, and ovaries leads to ovulation. The hypothalamus, which triggers the pulsed secretion of GnRH, will trigger the next stage, where GnRH now

stimulates the pituitary gland to secrete gonadotropin hormones, namely FSH and LH. The gonadotropin hormone will cause oogenesis, folliculogenesis, and steroidogenesis in the ovaries. This process will produce ovulation events that occur every month will form a fixed cycle.

The BMI of female students with a value of <18.5 is 9.7%. As many as 70,% of female students have a normal BMI with a value of 18.5-25.5. It can also be found that 13.6% of female students have a BMI overweight with a score of 25-27. As many as 5.8% of female students had an obese BMI, that is, with a BMI value above 27.

It is suspected that the increase in body fat can be a factor, through the secretion of leptin protein made by fat, which in turn

increases the secretion of gonadotropin-releasing hormones that can secrete LH and FSH, which are hormones that play an important role in individual sexual development. in 2004 stated that BMI is known to affect the age of menarche⁸. Quoted to Santrock, the percentage of fat in the body, when reaching a certain percent can start the onset of menarche.

According to Waryono's theory, adolescents can experience estrogen metabolism disorders when they are overweight. This is also related to the process of changing androgens to estrogen in individuals who tend to be overweight. Cholesterol in body fat, when excessive, will increase the precursor to estrogen.¹⁰ The presence of hormonal abnormalities, especially sexual hormones in women such as progesterone, estrogen, LH, and FSH will cause abnormalities in menstruation. Disorders of the hormonal system can be associated with nutritional status which can be interpreted through body mass index.¹¹

The results of data exposure showed that respondents who experienced menarche in the age range of 12 to 14 years, as many as 46.1% also had a normal BMI with a value of 18.5-25.5. This study also shows, there are 5.8% of female students whose age at the incidence of menarche is less than 12 years of age have a BMI with a value of 25.5-27 or are overweight. In the table, it can also be seen that 1.3% of female students who experienced the incidence of menarche for less than 12 years had a BMI > 27 or were obese.

Parameters of body size, such as body weight and BMI as well as height. Karapanou's research states that the age of menarche is negatively related to hip and thigh circumference, but is positively related to waist circumference.¹

The mechanism of increased body fat that can lead to premature puberty and menarche can be explained by some hypotheses tested in

animal studies. Leptin is a hormone that is secreted from body fat and acts directly on the hypothalamus. Leptin levels in the blood are needed to a certain extent to promote reproductive capacity in women.¹² The hypothalamus is responsible for the secretion of GnRH, which in turn produces LH and FSH, which in turn stimulates follicle formation and estrogen secretion in girls. In the hypothalamus, leptin has a stimulating effect that will accelerate the secretion of GnRH.¹³

In this study, as much as 55.2% of the data showed that most menarche concentrations occurred at the age of 12 to 14 years. This shows the consistency of the distribution of female age inheritance in experiencing menarche. These results are in line with research by Towne which states that, although the specific genes that determine it are still unknown, it is possible that the age of menarche can be influenced by heredity. Evidence for the effect of heredity arises from studies that show a pattern of inheritance at the age of maternal menarche which tends to be the same as the age of her daughter when experiencing menarche.¹⁴ Women with high BMI tend to experience menarche earlier and have a higher BMI as adults. Keim, et al. Reported that a maternal BMI of 25 or higher predicted a child with menarche at an earlier age.¹⁶ Findings regarding the relationship between maternal age of menarche and faster growth in children suggest that this rapid growth may be a trait. Heredity.¹⁷ Postnatal rapid growth and obesity in children are thought to have genetic determinants. However, it is also possible that the maternal age of menarche is associated with non-genetic characteristics, such as nutritional status or physical activity, which in turn can affect the development of the child.¹⁷

5. Conclusion

Based on the results of research conducted on students of the Medical

Education Study Program of the Faculty of Medicine, Sriwijaya University, 2017, there are similarities in the distribution of age inheritance of menarche experienced by mothers and their children. Among respondents, the largest distributor of menarche ages is between the ages of 12 and 14, as well as the age of mothers who have the most distribution of menarche in the 12-14 year age group.

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