

Age Pattern at Menarche as Results from a Puberty Survey

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Abstract

Background: Range age of menarche is 15 to 17 years old from 1950's to 20th century. However, in the current generation, the menarche age ranges from 13 to 16 years old. The factors affecting the change in the age of menarche over time and individual variation are due to the genetic or environmental factors. This study was performed to determine age pattern at menarche in Jatiningor, Sumedang, West Java, Indonesia.

Methods: The data for this descriptive study was obtained from a puberty survey performed by faculty members of Faculty of Medicine Universitas Padjadjaran from April–September 2013 in Jatiningor, Sumedang, West Java. A total of 249 female respondents aged 11–70 years old were included in this study. The age and year onset of menarche was determined and analyzed using computer.

Results: The range age of menarche in Jatiningor population from early 1963 until 2013 was 9–17 years old, with 0.8% (n=2) cases of precocious puberty in current generation (year onset of menarche, year 2004–2013). For the onset of menstruation, the current generation had a youngest age compared to the other older generations with a mean age of 12.28 years old. Furthermore, most of the respondents from the current generation reached menarche at the age of 12 years old (37.4%).

Conclusions: The onset of menarche in current generation is earlier compared to the older generations with most of them reaching menarche at the age of 12 years old. [AMJ.2016;3(4):640–3]

Keywords: Menarche, menstruation age pattern, puberty survey

Introduction

The development and interaction of hypothalamus-pituitary-ovarian axis with reproductive and endocrine system cause the onset of menarche. Normally, the age at onset of menarche ranges from 11–15 years old.¹ However, there are two main factors that cause this age to vary among individuals, and time, which are the genetic and environmental factors. Examples of the environmental factors include nutritional status, adipose tissue composition, and socioeconomic status.² From 1950's to 20th century, the average age at menarche was 15 to 17 years old. However, in the current generation, the mean age at menarche can range from 13 to 16 years old.³

Nevertheless, in Indonesia, a multicenter survey conducted in 1992–1995 showed that the mean age at menarche was 12.96 with slight variation of the age in different regions in Indonesia.⁴

Jatiningor is a small town in Indonesia and the place where many studies conducted by the faculty members of Universitas Padjadjaran. One of the studies was Puberty Survey. The inhabitants of this town have low socioeconomic status decreasing their accessibility to get proper food and health care especially for children and women. Besides, a sedentary lifestyle experienced by children in this era leads to risks of obesity. Moreover, the environmental factor such as stress is common among children nowadays. All these changes in environment, lifestyle, and nutritional level in this population could be influential factors in the common menarcheal age over time. Therefore, this study was conducted to identify the age pattern at menarche.

Methods

This study was a descriptive study, which was part of The Puberty Survey by faculty members

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Table 1 The Distribution of Age at Menarche across Generations

| Age of Menarche (years) | Generations (Number of Respondents) | | | | | |
|-------------------------|-------------------------------------|-----------|-----------|-----------|-----------|-----------|
| | 1963 and Earlier | 1964–1973 | 1974–1983 | 1984–1993 | 1994–2003 | 2004–2013 |
| 9 | 0 | 0 | 0 | 0 | 0 | 2 |
| 10 | 0 | 0 | 0 | 0 | 0 | 6 |
| 11 | 0 | 0 | 0 | 1 | 0 | 27 |
| 12 | 0 | 2 | 1 | 6 | 1 | 65 |
| 13 | 0 | 0 | 3 | 10 | 7 | 56 |
| 14 | 0 | 0 | 1 | 5 | 2 | 16 |
| 15 | 1 | 1 | 2 | 17 | 2 | 2 |
| 16 | 3 | 1 | 2 | 5 | 0 | 0 |
| 17 | 0 | 0 | 1 | 1 | 0 | 0 |
| Total | 4 | 4 | 10 | 45 | 12 | 174 |

of Faculty of Medicine Universitas Padjadjaran. The study was approved by Health Research Ethics Committee Faculty of Medicine Universitas Padjadjaran. This puberty survey was conducted from April–September 2013 in Jatinangor.

The population of this study consisted of all female students from Elementary School (*Sekolah Dasar*, SD), Junior High School (*Sekolah Menengah Pertama*, SMP), and Senior High School (*Sekolah Menengah Atas*, SMA). The school locations were randomly selected; those were SDN Cibeusi, SDN Cikopo II, SMP PGRI 1 Jatinangor, SMP AL-MASOEM, SMK PGRI Jatinangor, SMA PGRI Jatinangor, and MTS (Islamic Junior High School) MAARIF. Moreover, the female family members of the selected students were also included in this study (female siblings, mother, and grandmother). The inclusion criteria were all of the female respondents who experienced menarche, and the exclusion criteria were those who had not experienced menarche. A total of 249 female respondents were obtained

after inclusion and exclusion criteria. The age of menarche commonly referred as the age in which a female obtains her first onset of menstruation was taken to be analyzed for each individual. From the data obtained, the year of onset of menarche was calculated giving a range of 1960's and earlier until 2013. The data were then classified into 6 groups based on the year of onset at menarche with 10 years gap range in each group. The mean age, range age, and common age at menarche in each group were identified and analyzed using computer.

Results

Data from 249 people aged 11–70 years old from the 7 participating schools were taken to be analyzed in this study.

The onset of menarche in 2004–2013 showed that most girls attained their menarche at the age of 12 (n=65, 37.4%). However, compared to the previous years of menarche onset, 1963 and earlier, 1984–1993 and 1994–

Table 2 The Range and Mean Age at Menarche according to Generations

| | Generation | | | | | |
|-----------------------|------------------|-----------|-----------|-----------|-----------|-----------|
| | 1963 and Earlier | 1964–1973 | 1974–1983 | 1984–1993 | 1994–2003 | 2004–2013 |
| Mean Age of Menarche | 15.75 | 13.75 | 14.40 | 14.11 | 13.42 | 12.28 |
| Range Age of Menarche | 15–16 | 12–16 | 12–17 | 11–17 | 12–15 | 9–15 |

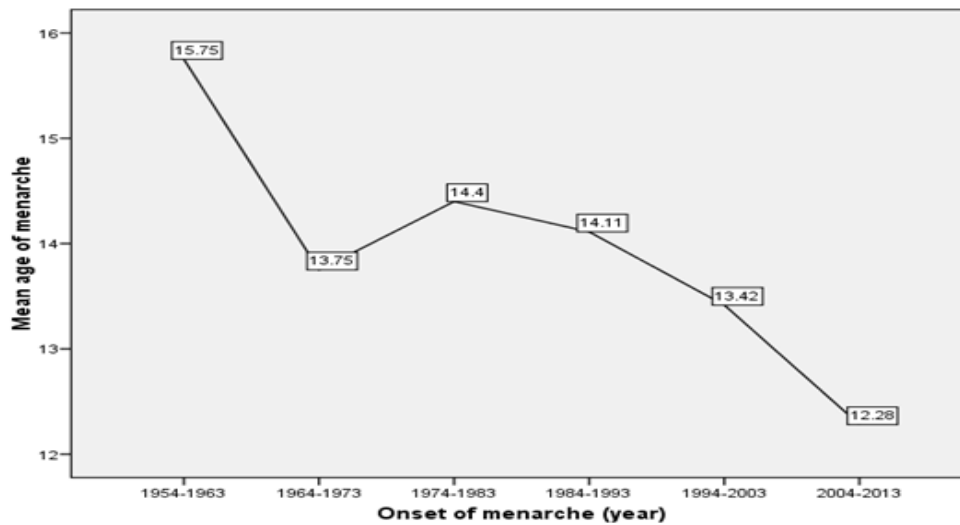


Figure 1 The Pattern of Menarche Age between Generations

2003, most girls attained their menstruation at the age of 16 (n=3, 75%), 15 (n=17, 37.8%) and 13 (n=7, 58.3%) respectively (Table 1).

The current generation with year onset of menarche, 2004–2013 has the lowest mean age of menarche with value of 12.28 compared to the previous years (Table 2).

Furthermore, the age range of menarche in female respondents in Jatinangor (aged 11–70 years old) from early 1960–2013 was 9–17 years old (Table 1). There were 2 (0.8%) female respondents with precocious puberty in the current generation (Table 1).

There was a clear drop in the mean age of menarche in the year onset of menarche, 1964–1973 which was at 13.75 years followed by an increase in the mean age in the subsequent generation, year onset of menarche 1974–1983 with a mean age of 14.40. This rapid decline in the menarche age could be due to insufficient data obtained from the puberty survey. The age of menarche had reduced over time (Figure 1).

Discussion

The current generation (year onset of menarche 2004–2013) has an early onset of menarche with a mean age of menarche of 12.28 years old and with most number of respondents obtaining menarche at age of 12 years old (37.4%) compared to previous generations. This data can be supported with another woman health survey conducted in

California⁵ in 2008 which showed that Asians ethnicity in the 20th century has an onset of menstruation, 50.9% at the age of 12–13 years old. However, from another study conducted in Bogor Indonesia⁶, in 2007, among elementary school children showed that children of the current generation have menarche onset at the age of 10–11 years old. The difference between these data could be due to the difference in geographical location or the environmental condition.

For the mean age of menarche, the respondents who obtained menarche in year range of 1963 and earlier had an older age of onset compared to the other generations, which was at the mean age of 15.75 years. The females in this group were born in 1945–1946. According to a research in Korea⁷, women born in 1945–1949 had a mean age of 15.84 (1.85). Furthermore, with a value of 12.28, the current mean age of menarche in Jatinangor population was younger compared to the mean age of menarche of females in Indonesia⁴ based on a multicenter survey conducted in 1992–1995, which showed a value of 12.96 years old. This earlier onset of menarche can be due to the genetics or changes in environmental factors such as poor nutritional status (obesity), psychological stress, or poor economic status to maintain lifestyle. However, this current mean age of menarche in Jatinangor is similar to a study conducted in Jakarta⁸ in 2009 among 57 high school students who had a mean menarche age of 12.2 (0.9).

The presence of 2 female respondents with menarche age at 9 in the current generation indicated precocious puberty. This early onset of puberty can be due to hormonal imbalances, mainly due to abnormal Gonadotropin-releasing hormone (GnRH) secretions or presence of increased gonadal hormones, androgen and estrogen secretions without direct involvement of GnRH. The presence of disorders such as tumors, infection, underlying syndrome, or genetic influence can lead to the conditions above.⁹ This 2 female respondents should be notified to seek medical attention, to avoid probability presence of underlying pathologic disorder, unless the early onset of menarche is genetically inherited. High level of estrogen in precocious puberty can stimulate early and increased maturation of skeletal system which can lead to compromised adult height, a long term complication.¹⁰ In addition, children with precocious puberty also may experience hormonal changes and early pubertal development compared to those of same age and sex, leading to psychosocial disorder.¹¹

The limitation of this study was the low number of respondents participating in the survey which led to the uneven sample size in each group. The feedback from the students and siblings was high (73.1%), because the data were collected on the spot by the interviewer. However, the data from the mother and grandmother were very limited (23.7% and 3.2%, respectively) due to the poor return rate of questionnaires brought back by the students to be filled at home. Some of the questionnaires were also not filled up completely, thus the data could not be used in this study.

In conclusion, the females in current generation in Jatinangor have an earlier onset of menarche compared to the females from the older generations, at a most common age of 12 years old. The changes on the age at menarche can be due to genetic factors or changes in the environmental factors; however, this age is within the normal range of age of menarche

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