

Age of Menarche and Related Factors

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Received date: September 07, 2017; Accepted date: November 22, 2017; published date: November 30, 2017

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Abstract

The time of first menarche is an important milestone in female sexual maturation. Some studies have shown that menarche is occurring earlier in previous decades. The onset of menarche depends on many factors including genetic, social, and environmental and ethnicity. In recent years, obesity defined the factor in menarche age. The possible contribution of prenatal factors has not been adequately explored. Data on the timing of menarche among Armenian girls is not available. The present study examines the menarche age among adolescent girls in Yerevan city.

Dates regarding gestational age, birth weight and height, chronological age of onset of menarche, anthropometric dates of menarche time were collected.

Mean age of onset of menarche was 11.3 ± 0.8 years old for the total group of 450 girls. Age of menarche was negatively correlated with weight at menarche and positively correlated with height. There is a reversal relation between age of menarche and Body Mass Index (BMI) at menarche. All of the analyses show a consistent and significant relationship of infant size at birth to age at menarche. Girls who were relatively long and light at birth attain menarche earlier.

Keywords: Menarche; Age; Height; Weight

Introduction

The time of first menarche is an important milestone in female sexual maturation. Menarche usually occurs about two years after the first changes of breast development (thelarche). Some studies have shown that menarche is occurring earlier in previous decades [1,2]. In Europe, the median age at menarche decreased by 2 to 3 months per decade from 16.5 years in 1840 to about 13.0 years in the 1960s, with a variation of 0.5 years between countries [3,4]. Also the some epidemiological studies (PROS study) from the USA show an earlier sexual maturation in girls, confirming previous findings [5].

Exact causes of this trend have not been identified. The onset of menarche depends on many factors including genetic, social, and environmental and ethnicity [6]. In recent years, obesity defined the factor in menarche age. The possible contribution of prenatal factors has not been adequately explored. Dates of some studies have shown that earlier age of menarche can pose a health risk, for example, early menarche may be associated with obesity and cardiovascular disease, as well as certain cancers [7-9].

Data on the timing of menarche among Armenian girls is not available. The present study examines the menarche age among adolescent girls in Yerevan city. The analysis takes into account a factor that are likely to affect age at menarche, including premenarcheal body composition, weight, height, BMI. Also we aimed to find any relationship between birth weight and age of menarche.

Materials and Methods

Dates regarding gestational age, birth weight and height, chronological age of onset of menarche, anthropometric dates of menarche time were collected between the years 1997 and 2015 from the medical records from "Muratcan" University Outpatient clinic. Menstrual status data were collected from 450 girl's medical records.

Height was measured in a standing position with bare feet, using a portable measuring device (SEGA). Height measurements were repeated twice, and the mean value was calculated. A portable scale sensitive to 0.1 kg was used for weight measurements (SEGA), which were conducted with children in minimal underclothes. All measurements were performed by nurses. BMI was calculated as weight (kg)/height (m^2). All girls were observed by gynecologist during their prophylactic investigation at the age of 15 years old.

Statistical Analyses

In this study, the descriptive statistics were collected and a probity analysis was applied to estimate mean \pm SD age at menarche. The relationship with the menarche age and the anthropometric measurements were evaluated with the independent t-test. The SPSS 16.0 program was used for statistical analysis. A p-value less than 0.05 were considered as statistically significant.

Results and Discussion

Four hundred fifty ($n=450$) girls were included in this study. Mean age of onset of menarche was 11.3 ± 0.8 [9.6-14.9] years old for the total group of 450 girls. Mean height and weight at onset of menarche

were 156.4 ± 6.5 cm, 50.8 ± 11.3 kg and BMI was 20.9 ± 4.2 kg/m² respectively.

In Table 1, the menarche related factors and the anthropometric measurements are discussed.

Anthropometric measurements (n=450)	Mean \pm SD	p	r
Height	156.4 ± 6.5 cm	0	$r=0.2$
Weight	50.8 ± 11.3 kg	0	$r=-0.3$
BMI	20.9 ± 4.2 kg/m ²	0	$r=-0.3$
Birth weight	3.01 ± 0.41 kg	0.12	
Birth height	49.2 ± 1.9 cm	0	$r=0.2$

Table 1: Menarche age related factors.

We found than high percentage of girls including to this study had menarche at age between 9.6-13.0 (n=352(78.2%)), and lower percentage 98 (21.8%) had menarche at age between (14-15). We found that the mean for age of menarche decrease steadily from (14.3; 13.7 to 11.3) years as the BMI increase from (15-19, 20-25, to >25) respectively.

Mean birth weight (n=450) was 3.01 ± 0.41 kg, Birth length 49.2 ± 1.9 cm. We found that there was no significant relationship of birth weight or small size for gestational age to age at menarche. $p>0.05$ except when birth length was taken into consideration ($p<0.05$).

Environmental changes, improved nutrition, and resultant physical development owing to the rapid improvement of social and economic factors may have caused the menarche age to decrease. There have been many studies on the impact of height, weight, and body structure on menarche age [10,11]. The relationship between the anthropometric measures and menarche age is Important [12,13]. We found that menarche age had positive relationship with height. That means the height increases until menarche.

It was done that weight, BMI at menarche are negatively correlated with menarche age. However, since puberty often causes weight gain, it is difficult to determine whether obesity causes early puberty or vice versa.

All of the analyses show a consistent and significant relationship of infant size at birth to age at menarche. Girls who were relatively long and light at birth attain menarche earlier.

The information about the tempo of puberty can only be obtained by longitudinal studies. To our knowledge, this is the first study to

report the age of onset of menarche, relationship between age of menarche onset and anthropometric parameters in Armenian girls. Further longitudinal studies are needed for investigation the age of puberty onset, final height correlation with age of menarche, to investigate the factors may have caused the menarche age to decrease.

References

1. Danubio ME, Sanna E (2008) Secular changes in human biological variables in Western countries: an updated review and synthesis. *J Anthropol Sci* 86: 911-12.
2. Price N, Hawkins K (2001) Young people's sexual and reproductive health: towards a framework for action. In: Tremayne S, (editor) *Managing reproductive life: cross-cultural themes in fertility and sexuality*. New York: Berghahn Books.
3. Gohlke B, Woelfle J (2009) Growth and puberty in German children: is there still a positive secular trend. *Dtsch Arztebl Int* 106: 377-82.
4. Cabanes A, Ascunce N, Vidal E, Ederra M, Barcos A, et al. (2009) Decline in age at menarche among Spanish women born from 1925 to 1962. *BMC Public Health* 9: 449.
5. Herman-Giddens ME, Slora EJ, Wasserman RC, Bourdony CJ, Bhapkan MV, et al. (1997) Secondary sexual characteristics and menses in young girls seen in office practice: a study from the Pediatric Research in Office Settings network. *Pediatrics* 99:505-512.
6. Karapanou O, Anastasios P.(2010) Determinants of menarche. *Reprod Biol Endocrinol* 8: 115.
7. Bourguignon JP (2004) Control of the onset of puberty. In: Pescovitz OH, Eugster EA, eds. *Pediatric Endocrinology*. Philadelphia, Baltimore, NewYork: Lippincott Williams and Wilkins 285-298.
8. Feng Y, Hong X, Wilker E, Li Z, Zhang W, et al.(2008) Effects of age at menarche, reproductive years, and menopause on metabolic risk factors for cardiovascular diseases. *Atherosclerosis* 196: 590-597.
9. Shrestha A, Olsen J, Ramlau-Hansen CH, Bech BH, Nohr EA (2011) Obesity and age at menarche. *Fertil Steril*; 95: 2732-2734.
10. Hsieh CC, Trichopoulos D, Katsouyanni K, Yuasa S (1990) Age at menarche, age at menopause, height and obesity as risk factors for breast cancer: associations and interactions in an international case-control study. *Int J Cancer*; 46: 796-800.
11. Clavel-Chapelon F (2002) E3N-EPIC group European Prospective Investigation into Cancer. Evolution of age at menarche and at onset of regular cycling in a large cohort of French women. *Hum Reprod* 17: 228-232.
12. Hosokawa M, Imazeki S, Mizunuma H, Kubota T, Hayashi K (2012) Secular trends in age at menarche and time to establish regular menstrual cycling in Japanese women born between 1930 and 1985. *BMC Womens Health* 12: 19-13.
13. Lee SE, Yang JY, Lee JH, Kim HW, Kim HS, et al. (2013) Relationship of age at menarche on anthropometric index and menstrual irregularity in late adolescent girls in Seoul. *Ann Pediatr Endocrinol Metab* 18: 116-121.