Menarche

From Wikipedia, the free encyclopedia

Menarche (/mɪˈnɑːrkiː/ *mə-**NAR**-kee*; Greek: μήν *mēn* "month" + ἀρχή *arkhē* "beginning") is the first menstrual cycle, or first menstrual bleeding, in female humans. From both social and medical perspectives, it is often considered the central event of female puberty, as it signals the possibility of fertility.

Menarche	
Classification and external resources	
Specialty	Gynecology
ICD-10	E30 (http://apps.who.int/classifications/icd10/browse/2016/en#/E30)

Girls experience menarche at different ages. The timing of menarche is influenced by female biology, as well as genetic and environmental factors, especially nutritional factors. The average age of menarche has declined over the last century, but the magnitude of the decline and the factors responsible remain subjects of contention. The worldwide average age of menarche is very difficult to estimate accurately, and it varies significantly by geographical region, race, ethnicity and other characteristics. Various estimates have placed it at 13.[1] Some estimates suggest that the *median* age of menarche worldwide is 14, and that there is a later age of onset in Asian populations compared to the West.[2] The average age of menarche is about 12.5 years in the United States,[3] 12.72 in Canada,[4] 12.9 in the UK[5] and 13.06 ± 0.10 years in Iceland.[6] A study of girls in Istanbul, Turkey, found the median age at menarche to be 12.74 years.[7]

Contents

Physiology

Puberty

Menarche is the culmination of a series of physiological and anatomic processes of puberty:

- Attainment of a sufficient body mass (typically 17% body fat).[8]
- Disinhibition of the GnRH pulse generator in the arcuate nucleus of the hypothalamus.
- Secretion of estrogen by the ovaries in response to pituitary hormones.
- Over an interval of about 2 to 3 years, estrogen stimulates growth of the uterus (as well as height growth, breast growth, widening of the pelvis, and increased regional adipose tissue).
- Estrogen stimulates growth and vascularity of the endometrium, the lining of the uterus.
- Fluctuations of hormone levels can result in changes of adequacy of blood supply to parts of the endometrium.
- Death of some of the endometrial tissue from these hormone or blood supply fluctuations leads to *deciduation*, a sloughing of part of the lining with some blood flow from the vagina.

No specific hormonal signal for menarche is known; menarche as a discrete event is thought to be the relatively chance result of the gradual thickening of the endometrium induced by rising but fluctuating pubertal estrogen.

The *menstruum*, or *flow,* consists of a combination of fresh and clotted blood with endometrial tissue. The initial flow of menarche is usually brighter than mature menstrual flow. It is often scanty in amount and may be very brief, even a single instance of "spotting." Like other menses, menarche may be accompanied by abdominal cramping.

Relation to fertility

In most girls, menarche does not mean that ovulation has occurred. In postmenarchal girls, about 80% of the cycles were anovulatory in the first year after menarche, 50% in the third and 10% in the sixth year.[9] Regular ovulation is usually indicated by predictable and consistent intervals between menses, predictable and consistent durations of menses, and predictable and consistent patterns of flow (e.g., heaviness or cramping). Continuing ovulation typically requires a body fat content of at least 22%. An anthropological term for this state of potential fertility is nubility.

On the other hand, not every girl follows the typical pattern, and some girls ovulate before the first menstruation. Although unlikely, it is possible for a girl who has engaged in sexual intercourse shortly before her menarche to conceive and become pregnant, which would delay her menarche until after the end of the pregnancy. This goes against the widely held assumption that a woman cannot become pregnant until after menarche. A young age at menarche is not correlated with a young age at first sexual intercourse.[10]

Onset

When menarche occurs, it confirms that the girl has had a gradual estrogen-induced growth of the uterus, especially the endometrium, and that the "outflow tract" from the uterus, through the cervix to the vagina, is open.

In very rare instances, menarche may occur at an unusually early age, preceding thelarche and other signs of puberty. This is termed ***isolated premature menarche***, but other causes of bleeding must be investigated and excluded. Growth is usually normal.[11] Isolated premature menarche is rarely the first manifestation of precocious puberty.

When menarche has failed to occur for more than 3 years after thelarche, or beyond 16 years of age, the delay is referred to as primary amenorrhea.

Timing

Chronic illness

Certain systemic or chronic illness can delay menarche, such as undiagnosed and untreated celiac disease (which often occurs without gastrointestinal symptoms), asthma, diabetes mellitus type 1, cystic fibrosis and inflammatory diseases, among others.[12][13][14][15] In some cases, because biochemical tests are not always discriminatory, underlying pathologies are not identified and the girl is classified as constitutional growth delay.[16] Short stature, delayed growth in height and weight, and/or delayed menarche may be the only clinical manifestations of coeliac disease, in absence of any other symptoms.[14][17][18][19]

Effects of stress and social environment

Some of the least understood environmental influences on timing of puberty are social and psychological. Nearly all of the research on these effects has concerned girls, partly because female puberty requires greater physiological resources and partly because menarche involves a clear threshold event that makes survey research into female puberty much simpler than male. In most of these studies menarche was specifically examined, assuming it to be a valid "proxy" for the more general process of puberty. In comparison with the effects of genetics, nutrition, and general health, social influences are small, shifting timing by a few months rather than years. The most important part of a child's psychosocial environment is the family.

Some of the aspects of family structure and function reported to be independently associated with earlier menarche [antenatal and early childhood]

- Are non-white[20]
- Experienced pre-eclampsia in the womb[20]
- Are singletons[20]
- Had a low birthweight[20]
- Were not breast-fed[20]
- Were exposed to smoking[20]

- Absence of father from the home from early childhood[21]
- High-conflict family relationships[22]
- The increased incidence of childhood obesity.[20]
- Lacked exercise in childhood[20]

Other research has focused on the effect of childhood stress on timing of puberty, especially female. Stress is a vague term and studies have examined conditions ranging from family tensions or conflict to wartime refugee status with threat to physical survival. The more dire social conditions have been found to be associated with delay of maturation, an effect that may be compounded by dietary inadequacy. There is more uncertainty and mixed evidence as to whether milder degrees of stress or early-life under-nutrition can accelerate puberty in girls as would be predicted by life history theory and demonstrated in many other mammals.

The understanding of these environmental effects is incomplete and the following observations and cautions are relevant:

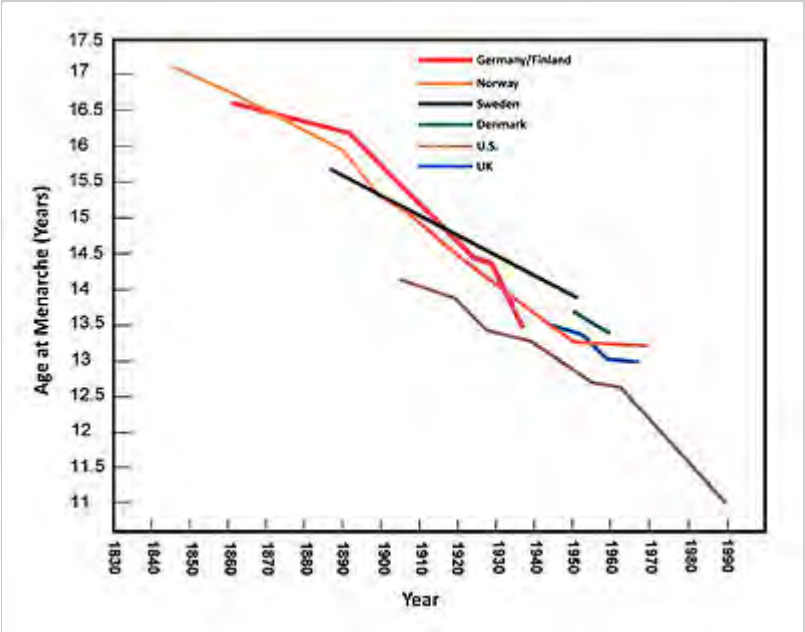
- Mechanisms of these social effects are unknown, though a variety of physiological processes, including pheromones, have been suggested based on animal research.
- Most of these "effects" are statistical associations revealed by epidemiologic surveys. Statistical associations are not necessarily causal, and a variety of secondary variables and alternative explanations can be possibly intervening. Effects of such small size can never be confirmed or refuted for any individual child.
- Despite the small magnitude of effect, interpretations of the data are politically controversial because of the ease with which this type of research can be used for political advocacy. Accusations of bias based on political agenda sometimes accompany scientific criticism.
- Correlation does not imply causation. While correlation can be objectively measured, causation is statistically inferred. Some suggest that childhood stress is caused by precocious puberty recognized later, rather than being the cause of it.[23]

Changes in time of average age

There were few systematic studies of timing of menarche before the later half of the 20th century. Most older estimates of average timing of menarche were based on observation of a small homogeneous population not necessarily representative of the larger population, or based on recall by adult women, which is also susceptible to various forms of error. Most sources agree that the average age of menarche in girls in modern societies has declined, though the reasons and the degree remain subjects of controversy. From the sixth to the fifteenth centuries in Europe, most women reached menarche on average at about 14, between the ages of 12 and 15.[25] A large North American survey reported only a 2-3 month decline from the mid-1970s to the mid-1990s.[26] A 2011 study found that each 1 kg/m^2 increase in childhood body-mass index (BMI) can be expected to result in a 6.5% higher absolute risk of early menarche (before age 12 years).[27]

Fewer than 10% of U.S. girls start to menstruate before 11 years of age, and 90% of all US girls are menstruating by 13.75 years of age, with a median age of 12.43 years. This age at menarche is not much different (0.34 years earlier) than that reported for U.S. girls in 1973. Age at menarche for non-Hispanic

black girls was significantly earlier than that of white girls at 10%, 25%, and 50% of those who had attained menarche, whereas Mexican American girls were only slightly earlier than the white girls at 25%.[28]



Secular trend in decrease in age of menarche in Western European and North American girls

After: Boaz (1999)[24]

Culture

Menstruation is a cultural as well as scientific phenomenon as many societies have specific rituals and cultural norms associated with it. These rituals typically begin at menarche and some are enacted during each menstruation cycle. The rituals are important in determining a status change for girls. Upon menarche and completion of the ritual, they have become a woman as defined by their culture.

For young women in many cultures, the first menstruation is a marker that signifies a change in status. Post-menarche, the young woman enters a stage called maidenhood, the stage between menarche and marriage.[29] There are cultures that have in past centuries, and in present, practiced rites of passage for a girl experiencing menarche.[30]

Celebratory ceremonies

In some cultures, a party, or celebration is thrown to show the girl's transition to womanhood. This party is similar to the quinceañera in Latin America, except that a specific age marks the transition rather than menarche. In Morocco, the girl is thrown a celebration. All of her family members are invited and the girl is showered with money and gifts.

When a Japanese girl has her first period, the family sometimes celebrates by eating red-colored rice and beans *(sekihan)*. The color of blood and the red of *sekihan* are not related. All the rice of ancient times of Japan was red. Since rice was precious in ancient Japan (usually, millet was eaten), it was eaten only during the celebration. *Sekihan* is the tradition of an ancient custom. The celebration is kept a secret from extended family until the rice is served.[31]

In some Indian communities, young women are given a special menarche ceremony called Ruthu Sadangu.[32]

The Mescalero Apaches place high importance on their menarche ceremony and it is regarded as the most important ritual in their tribe. Each year there is an eight-day event celebrating all of the girls who have menstruated in the past year. The days are split between feasting and private ceremonies reflecting on their new womanly status.[33]

Sekihan, a traditional Japanese dish of sticky rice steamed with azuki beans is sometimes served after menarche.

Religious rituals and/or ceremonies

In Nepal, Kumaris are girls worshiped as goddesses by Hindus and some Buddhists. At the onset of menarche it is believed the goddess spirit vacates her body and she is returned to ordinary life after a series of rituals.[34]

Rituals of learning

In Australia, the Aborigines treat a girl to "love magic". She is taught the ways of womanhood by the other women in her tribe. Her mother builds her a hut to which she confines herself for the remainder of her menses. The hut is burned and she is submerged in the river at the end of menstruation. When she returns to the village, she is paired with a man who will be her husband.[31]

In the United States, public schools have a sex education program that teaches girls about menstruation and what to expect at the onset of menarche (often this takes place during the 4th grade). Historically menstruation has been a social taboo and girls were taught about menarche and menstruation by their mothers or a female role model. Then, and to an extent now, menstruation was a private matter and a girl's menarche was not a community phenomenon.[35]

Rituals of cleansing or purification

The Ulithi tribe of Micronesia call a girl's menarche *kufar*. She goes to a menstrual house, where the women bathe her and recite spells. She will have to return to the menstruation hut every time she menstruates. Her parents build her a private hut that she will live in until she is married.[31]

In Sri Lanka an astrologer is contacted to study the alignment of stars when the girl experiences menarche because it is believed that her future can be predicted. The women of the family then gather in her home and scrub her in a ritual bathing ceremony. Her family then throws a familial party at which the girl wears white and may receive gifts.[31]

In Ethiopia, Beta Jewish woman were separated from male society and sent to menstruation huts during menarche and every menstruation following as the blood associated with menstruation in the Beta Jewish culture was believed to be impure. The Beta Jews built their villages surrounding and near bodies of water specifically for their women to have a place to clean themselves. The menstruation huts were built close to these bodies of water.[36]

Rituals of transformation and scarification

In Nigeria, the Tiv ethnic group cut four lines into the abdomen of their girls during menarche. The lines are supposed to represent fertility.[31]

Rituals of strength

The Navajo have a celebration called *kinaalda* (kinn-all-duh). Girls are expected to demonstrate their strength through footraces. The girls make a cornmeal pudding for the tribe to taste. The girls who experience menarche wear special clothes and style their hair like the Navajo goddess "Changing Woman".[31]

The Nuu-chah-nulth (also known as the Nootka) believe that physical endurance is the most important quality in young women. At menarche the girl is taken out to sea and left there to swim back.[31]

See also

- Adrenarche
- Delayed puberty
- Gonadarche
- Lina Medina, who had her menarche at age 8 months and is the youngest mother in history
- Menopause, the equivalent opposite change at the end of the child-bearing years
- Pubarche
- Spermarche
- Thelarche

References

1. Shawky, S.; Milaat, W. (2000). "Early teenage marriage and subsequent pregnancy outcome" (PDF). *Eastern Mediterranean Health Journal*. **6** (1).
2. "Risk Factors for Breast Cancer in India: an INDOX Case-Control Study". INDOX Cancer Research Network. Retrieved 2013-05-20.
3. Anderson SE, Dallal GE, Must A (April 2003). "Relative weight and race influence average age at menarche: results from two nationally representative surveys of US girls studied 25 years apart". *Pediatrics*. **111** (4 Pt 1): 844–50. doi:10.1542/peds.111.4.844. PMID 12671122.
4. Al-Sahab B, Ardern CI, Hamadeh MJ, Tamim H (November 2010). "Age at menarche in Canada: results from the National Longitudinal Survey of Children & Youth". *BMC Public Health*. **10**: 736. doi:10.1186/1471-2458-10-736. PMC 3001737. PMID 21110899.
5. Hamilton-Fairley, Diana (2004). *Obstetrics and Gynaecology* (PDF) (2nd ed.). Blackwell. p. 29. ISBN 1-4051-2066-5. Retrieved 2013-11-09.
6. Magnússon, T.E. (May 1978). "Age at menarche in Iceland.". *American Journal of Physical Anthropology*. **48** (4): 511–4. doi:10.1002/ajpa.1330480410. ISSN 0002-9483. PMID 655271.
7. Atay, Z.; Turan, S.; Guran, T.; Furman, A.; Bereket, A (2011-06-13). "Puberty and Influencing Factors in Schoolgirls Living in Istanbul: End of the Secular Trend?". *Pediatrics*. **128** (1): e40–5. doi:10.1542/peds.2010-2267. PMID 21669888.
8. Frisch RE (August 1987). "Body fat, menarche, fitness and fertility". *Human Reproduction*. **2** (6): 521–33. PMID 3117838.

9. Apter D (February 1980). "Serum steroids and pituitary hormones in female puberty: a partly longitudinal study". *Clinical Endocrinology*. **12** (2): 107–20. doi:10.1111/j.1365-2265.1980.tb02125.x. PMID 6249519.
10. Marino, J. L.; Skinner, S. R.; Doherty, D. A.; Rosenthal, S. L.; Cooper Robbins, S. C.; Cannon, J.; Hickey, M. (2013). "Age at Menarche and Age at First Sexual Intercourse: A Prospective Cohort Study". *Pediatrics*. **132**: 1028–1036. doi:10.1542/peds.2012-3634.
11. R. Stanhope; C. Traggiai (2006). "Isolated Menarche". *Precocious Puberty (Complete, Partial)*. Armenian Health Network. Retrieved 2006-11-26.
12. Umławska W, Krzyzanowska M (2009). "Puberty in certain chronic illness". *Pediatr Endocrinol Diabetes Metab* (Review). **15** (3): 216–8. PMID 20384185.
13. Traggiai C, Stanhope R (Feb 2003). "Disorders of pubertal development.". *Best Pract Res Clin Obstet Gynaecol* (Review). **17** (1): 41–56. doi:10.1053/ybeog.2003.0360. PMID 12758225.
14. Leffler DA, Green PH, Fasano A (Oct 2015). "Extraintestinal manifestations of coeliac disease". *Nat Rev Gastroenterol Hepatol* (Review). **12** (10): 561–71. doi:10.1038/nrgastro.2015.131. PMID 26260366.
15. Tersigni C, Castellani R, de Waure C, Fattorossi A, De Spirito M, Gasbarrini A, Scambia G, Di Simone N (2014). "Celiac disease and reproductive disorders: meta-analysis of epidemiologic associations and potential pathogenic mechanisms". *Hum Reprod Update* (Review). **20** (4): 582–93. doi:10.1093/humupd/dmu007. PMID 24619876.
16. Wei C, Crowne EC (Sep 9, 2015). "Recent advances in the understanding and management of delayed puberty". *Arch Dis Child* (Review). archdischild-2014-307963: 481–8. doi:10.1136/archdischild-2014-307963. PMID 26353794.
17. Mearin ML (Jun 2015). "The prevention of coeliac disease". *Best Pract Res Clin Gastroenterol* (Review). **29** (3): 493–501. doi:10.1016/j.bpg.2015.04.003. PMID 26060113.
18. Guandalini S, Assiri A (Mar 2014). "Celiac disease: a review". *JAMA Pediatr*. **168** (3): :272–8. doi:10.1001/jamapediatrics.2013.3858. PMID 24395055.
19. Levy J, Bernstein L, Silber N (Dec 2014). "Celiac disease: an immune dysregulation syndrome". *Curr Probl Pediatr Adolesc Health Care* (Review). **44** (11): 324–7. doi:10.1016/j.cppeds.2014.10.002. PMID 25499458.
20. D.H. Morris; M.E. Jones; M.J. Schoemaker; A. Ashworth; A.J. Swerdlow (2010). "Determinants of age at menarche in the UK: analyses from the Breakthrough Generations Study". *British Journal of Cancer 10.1038/sj.bjc.6605978*. **103** (11): 1760–4. doi:10.1038/sj.bjc.6605978. PMC 2994234. PMID 21045834.
21. Surbey, Michele K. (1990). "Family composition, stress, and the timing of human menarche" (PDF). *Socioendocrinology of Primate Reproduction*. New York: Wiley. pp. 11–32. ISBN 978-0-471-56757-8.
22. Belsky, J., Steinberg, L., Houts, R., & Halpern-Felsher, B. (2010). The development of reproductive strategy in females: Early maternal harshness->early mearche->increased sexual risk taking" *Developmental Psychology* 46, 120-128.
23. The Australian, 3 April 2013. Early onset puberty causes emotional issues at preschool age (http://www.theaustralian.com.au/news/health-science/early-onset-puberty-causes-emotional-issues-at-preschool-age/story-e6frg8y6-1226611493370) Archived (https://web.archive.org/web/20130416032021/http://www.theaustralian.com.au/news/health-science/early-onset-puberty-causes-emotional-issues-at-preschool-age/story-e6frg8y6-1226611493370) April 16, 2013, at the Wayback Machine.
24. Boaz N. T. (1999): Essentials of biological anthropology. Prentice Hall, New Jersey, ISBN 0-13-080793-1.
25. Amundsen Darrel; Dreis Carol Jean (1973). "The Age of Menarche in Medieval Europe". *Human Biology*. **45**: 363–368.
26. Anderson SE, Dallal GE, Must A (April 2003). "Relative weight and race influence average age at menarche: results from two nationally representative surveys of US girls studied 25 years apart". *Pediatrics*. **111** (4): 844–850. doi:10.1542/peds.111.4.844. PMID 12671122.
27. Mumby, HS; Elks, CE; Li, S; Sharp, SJ; Khaw, KT; Luben, RN; Wareham, NJ; Loos, RJ; Ong, KK (2011). "Mendelian Randomisation Study of Childhood BMI and Early Menarche". *Journal of obesity*. **2011**: 180729. doi:10.1155/2011/180729. PMC 3136158. PMID 21773002.
28. Chumlea WC, Schubert CM, Roche AF, et al. (January 2003). "Age at menarche and racial comparisons in US girls". *Pediatrics*. **111** (1): 110–3. doi:10.1542/peds.111.1.110. PMID 12509562.
29. *School-age Pregnancy and Parenthood: Biosocial Dimensions*. New York: Aldine De Gruyter. 1986. pp. 273–275. ISBN 0-202-30321-7.
30. Hartman, Holly. *Girlwonder: Every Girl's Guide to the Fantastic Feats, Cool Qualities, and Remarkable Abilities of Women and Girls.* Boston: Houghton Mifflin, 2003.

31. Siegel, Alice (1995). *Information Please Girls' Almanac*. Houghton Mifflin Harcourt. ISBN 0395694582. Retrieved 2013-11-09.
32. Chockalingam, K. *Census of India, 1971: A. General report*. Retrieved 2013-11-09.
33. Crawford O'Brien, Suzanne J. (2005). *American Indian religious traditions: an encyclopedia, Volume 2*. ABC-CLIO. ISBN 9781576075173. Retrieved 2013-11-09.
34. Narayan, Purkayastha, Anjana, Bandana. *Living Our Religions: Hindu and Muslim South Asian-American Women Narrate Their Experiences*. Kumarian Press. ISBN 1-56549-270-6. Retrieved 2013-11-09.
35. Freidenfelds, Lara (2009). *The Modern Period: Menstruation in Twentieth Century America*. JHU Press. ISBN 0801892457. Retrieved 2013-11-09.
36. Tal, Ilana (2004). *Exploring the Meaning of Becoming a Woman in Non-Western Culture: A narrative Analysis of First Menstruation Stories of Ethiopian Jewish Women*. ProQuest Information and learning Company. p. 64.

Further reading

- Quinlan, R (2003). "Father absence, parental care, and female reproductive development" (PDF). *Evolution and Human Behavior*. **24** (6): 376–390. doi:10.1016/S1090-5138(03)00039-4.

External links

- For mothers supporting their daughters as they come of age (http://ritesforgirls.com/first-blood/)
- Gluckman, PD; Hanson, MA (January 2006). "Evolution, development and timing of puberty". *Trends in endocrinology and metabolism*. **17** (1): 7–12. doi:10.1016/j.tem.2005.11.006. ISSN 1043-2760. PMID 16311040.
- Discusses some of the social influences (http://www.livescience.com/4143-girl-period-depends-lives.html)

Retrieved from "https://en.wikipedia.org/w/index.php?title=Menarche&oldid=750151795"

Categories: Developmental biology | Menstrual cycle | Pediatrics | Puberty | Sexuality and age | Human female endocrine system

---