Sugar-sweetened beverage consumption and age at menarche in a prospective study of US girls


Abstract

**STUDY QUESTION** Is sugar–sweetened beverage (SSB) consumption associated with age at menarche?

**SUMMARY ANSWER** More frequent SSB consumption was associated with earlier menarche in a population of US girls.

**WHAT IS KNOWN ALREADY** SSB consumption is associated with metabolic changes that could potentially impact menarcheal timing, but direct associations with age at menarche have yet to be investigated.

**STUDY DESIGN, SIZE, DURATION** The Growing up Today Study, a prospective cohort study of 16,875 children of Nurses’ Health Study II participants residing in all 50 US states. This analysis followed 5,583 girls, aged 9–14 years and premenarcheal at baseline, between 1996 and 2001. During 10,555 person-years of follow-up, 94% (n = 5,227) of girls reported their age at menarche, and 3% (n = 159) remained premenarcheal in 2001; 4% (n = 197) of eligible girls were censored, primarily for missing age at menarche.

**PARTICIPANTS/MATERIALS, SETTING, METHODS** Cumulative updated SSB consumption (composed of non–carbonated fruit drinks, sugar–sweetened soda and iced tea) was calculated using annual Youth/Adolescent Food Frequency Questionnaires from 1996 to 1998. Age at menarche was self–reported annually. The association between SSB consumption and age at menarche was assessed using Cox proportional hazards regression.

**MAIN RESULTS AND THE ROLE OF CHANCE** More frequent SSB consumption predicted earlier menarche. At any given age between 9 and 18.5 years, premenarcheal girls who reported consuming >1.5 servings of SSBs per day were, on average, 24% more likely (95% confidence interval (CI): 13, 36%; P-trend: <0.001) to attain menarche in the next month relative to girls consuming ≤2 servings of SSBs weekly, adjusting for potential confounders including height, but not BMI (considered an intermediate). Correspondingly, girls consuming >1.5 SSBs daily had an estimated 2.7–month earlier menarche (95% CI: −4.1, −1.3 months) relative to those consuming ≤2 SSBs weekly. The frequency of non–carbonated fruit drink (P-trend: 0.03) and sugar–sweetened soda (P-trend: 0.001), but not iced tea (P-trend: 0.49), consumption also predicted earlier menarche. The effect of SSB consumption on age at menarche was observed in every tertile of baseline BMI. Diet soda and fruit juice consumption were not associated with age at menarche.

**LIMITATIONS, REASONS FOR CAUTION** Although we adjusted for a variety of suspected confounders, residual confounding is possible. We did not measure SSB consumption during early childhood, which may be an important window of exposure.

**WIDER IMPLICATIONS OF THE FINDINGS** More frequent SSB consumption may predict earlier menarche through mechanisms other than increased...
reduce SSB consumption.

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**Key words** diet menarche sugar-sweetened beverage

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