

Overweight and obesity in childhood associated with lower birth rates in later life

30-second summary:

Women with an overweight or obese BMI trajectory in childhood were less likely to give birth than those with a normal/average BMI trajectory, according to this prospective, population-based study of nearly 61 000 Danish women published in *JAMA Network Open*. The study linked clinician-measured BMI data at age 6–15 years to childbirth at age 18–45 years. Overall, 3.8% of the cohort had an obese BMI trajectory in childhood, mainly comprising children from later cohorts. These women were 22% less likely to give birth at age 25–29 years and 44% less likely to give birth at age 30–34 years than women with an average childhood BMI trajectory. In addition, 12% of women had an overweight trajectory in childhood, and this group was also less likely to give birth from their mid-20s onwards compared to those with an average weight trajectory. Infertility rates for women who sought specialist treatment were also explored but did not show an association with childhood BMI trajectory. Although these data suggest that weight may impact on future reproductive health from an early age, the authors stress that this was a cohort study and, therefore, these are associations only.



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Globally, fertility rates are decreasing, with only an average 2.2 children born per woman in 2021 compared to 4.4 per woman in the 1950s. In many parts of the world, rates are below 2.1, the threshold for population maintenance. Although around 20% of Western European women remain childless in their lifetime, only about 5% of women do not intend to have children, meaning that most childlessness is involuntary.

Although higher BMI in adult women is known to be associated with a lower likelihood of successful pregnancy, the impact of early-life BMI on childlessness has not been studied significantly. In the present study, published in *JAMA Network Open*, [Pedersen and colleagues](#) sought to identify whether BMI trajectories in childhood were associated with childlessness in Danish women during their reproductive period.

The study

In this prospective, population-based cohort study of 60 864 Danish women, the authors used clinician-measured data from the Copenhagen School Health Records Register for children born between 1950 and 1989. Most children had at least three data sets, allowing calculation of BMI trajectory.

BMI trajectories in childhood (age 6–15 years) were divided into five categories, ranging from below average to obese. For each participant, national registry data were used to determine whether they gave birth at age 18–24, 25–29, 30–34 or 35–45 years or remained childless.

Results

BMI trajectories in childhood were categorised as follows:

- Below average (22% of the cohort).
- Average (37%).
- Above average (25%).
- Overweight (12%).
- Obese (4%).

Women with overweight or obese BMI trajectories were more likely to be in later cohorts than those with an average BMI trajectory.

Overall, 47 669 women (78.3%) gave birth, at a median age of 27.2 years. After adjusting for factors such as birth cohort and highest achieved educational level, hazard ratios showed that women with an overweight or obese BMI trajectory in childhood were less likely to give birth than those with an average childhood BMI trajectory.

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Compared with women with an average BMI trajectory at age 6–15 years, women in the overweight trajectory were:

- 9% less likely to give birth at age 25–29 years.
- 26% less likely to give birth at age 30–34 years.
- 18% less likely to give birth at age 35–45 years.

Women in the obese trajectory were:

- 22% less likely to give birth at age 25–29 years.
- 42% less likely to give birth at age 30–34 years.
- 44% less likely to give birth at age 35–45 years.

As expected, there was a declining likelihood of birth in older women, but this study suggests that having an obese or overweight BMI trajectory in childhood contributes as well as aging. There was no associated impact of childhood BMI trajectory on pregnancy rates at age 18–24 years.

In women with an above-average BMI trajectory in childhood, a reduced likelihood of giving birth was only seen at ages 30–34 and 35–45 years; the odds of giving birth at ages 18–24 and 15–29 years were similar to those with an average BMI trajectory.

Those with a below-average BMI trajectory had similar hazard ratios to the average trajectory group at all ages.

A sensitivity analysis amongst ever-married women showed similar associations between overweight and obese childhood BMI trajectories and childlessness; although they were attenuated, they remained statistically significant. Although other studies have suggested that women living with obesity during childhood have a lower likelihood of marriage, this sensitivity analysis suggests that difficulties forming relationships did not fully explain the findings in this study.

Infertility analysis

Diagnoses of infertility for women who sought specialist treatment were also assessed as an outcome. In total, 6961 women were diagnosed with any infertility and 5381 with primary infertility (defined as an infertility diagnosis while nulliparous).

There were no associations between childhood BMI trajectories and diagnosis of primary or any infertility, but it was not possible to identify numbers presenting to primary care. Since there are tight BMI restrictions on who can receive infertility treatments in Denmark and children

with obesity are more likely to have obesity in adulthood, this may have influenced the associations with infertility diagnoses.

Discussion

Early findings from the study were presented in May 2026 at the European Congress on Obesity in Istanbul. The lead author, Dorthe Pedersen (Copenhagen University Hospital), concluded that less favourable BMI patterns as children may be associated with an increased risk of childlessness from mid-20s onwards. Dr Pedersen highlighted that although advancing age is known to have a major impact on successful pregnancy rates, and hence delayed parenthood is likely to be impacting women aged 30–34 years, their data suggest that childhood overweight and obese BMI trajectories appear to further increase the risk of involuntary childlessness, through mechanisms that may include effects on egg quality and hormonal disturbances.

The results are supported by two previous, smaller, cohort studies (Polotsky et al, 2010; Laru et al, 2021).

Study strengths included:

- A large, population-based cohort including nearly every child attending school in Copenhagen.
- BMIs were calculated from weight and height measured by trained clinicians.
- All childbirths and hospital-based infertility diagnoses were captured using three national health registers and one nationwide cohort.

Study limitations included:

- Women with lower educational attainment may be less likely to seek infertility investigation.
- Adult BMI measurements were not available, so the impact of obesity at time of attempted conception could not be considered.
- These findings demonstrate an association only, as this is a cohort study, and thus cannot establish a causal relationship between childhood BMI trajectories and childlessness.

Implications for practice

Children with overweight and obesity are at increased risk of developing long-term health conditions, such as early-onset type 2 diabetes, metabolic dysfunction-associated steatotic liver disease and obstructive sleep apnoea, as well as

decreased quality of life. In addition, the present findings suggest that body size in childhood may be associated with reproductive outcomes in women from their mid-20s onwards. The data are particularly concerning since at least one in three school-aged girls in Europe are currently living with overweight or obesity and, therefore, may be impacted (Garrido-Miguel et al, 2019).

The known impact of advancing age on successful pregnancy outcomes, and the tendency to postpone parenthood for a variety of reasons, raise concerns when combined with the associations found in this study. Not only were the overweight and obese childhood BMI trajectories associated with a 26% and 44% lower chance, respectively, of giving birth at age 30–34 years compared to those with an average childhood BMI trajectory, but those in the above-average BMI trajectory group (25% of this Danish cohort) also had lower hazard ratios of giving birth at ages 30–34 and 35–45 years compared to those with an average BMI trajectory.

The National Child Measurement Programme in England measures the height and weight of all school children in Reception and Year 6, and age- and sex-specific childhood BMI centile charts are used to classify children as overweight (above the 91st centile) or obese (above the 98th centile).

We in primary care can also opportunistically identify children with overweight and obesity

at all ages and help support families with early prevention, management and referral for specialist weight management. The NHS BMI calculator for children and teenagers aged 2–17 years is open-access and available at <https://bit.ly/4w4w8EB>. It calculates the centile automatically, helping us make a diagnosis of overweight or obesity. Childhood BMI calculators are also built into some electronic record systems. Since the calculator is designed for public use, it shares whether the results are in the underweight, healthy weight or overweight range, and prompts primary care discussion if in the latter, facilitating discussions.

We may need to tread carefully when offering to weigh and measure children when they present for other conditions, but this is important in raising awareness and identifying those who may benefit from intervention at any age. ■

Garrido-Miguel M, Caverro-Redondo I, Álvarez-Bueno C et al (2019) Prevalence and trends of overweight and obesity in European children from 1999 to 2016: A systematic review and meta-analysis. *JAMA Pediatr* **173**: e192430

Laru J, Nedelec R, Koivuaho E et al (2021) BMI in childhood and adolescence is associated with impaired reproductive function – a population-based cohort study from birth to age 50 years. *Hum Reprod* **36**: 2948–61

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