

Five regular meals a day reduce obesity risk among adolescents

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A regular eating pattern may protect adolescents from obesity, according to a Finnish population-based study with more than 4,000 participants. When eating five meals - breakfast, lunch, dinner and two snacks - a day, even those with a genetic predisposition to obesity had no higher body mass index (BMI) than their controls.

The collection of the data on the study population began prenatally, and the participants were followed up until the age of 16. The aim was to identify early-life [risk factors](#) associated with [obesity](#), to investigate the association between meal frequencies, obesity and metabolic syndrome, and to examine whether meal frequency could modulate the effect of common genetic variants linked to obesity. The genetic data comprised eight single nucleotide polymorphisms at or near eight obesity-susceptibility loci.

According to the results, a regular five-meal pattern was associated with a reduced risk of overweight and obesity in both sexes and with a reduced risk of [abdominal obesity](#) in boys. Moreover, the regular five-meal pattern attenuated the BMI-increasing effect of the common genetic variants. Conversely, skipping breakfast was associated with greater BMI and waist circumference.

Obese parents increase the risk

Maternal weight gain of more than seven kilograms during the first 20 weeks of pregnancy increased the risk of obesity in the offspring.

However, [maternal obesity](#) before pregnancy was a more important risk factor than [weight gain](#) during pregnancy.

Paternal obesity before pregnancy was nearly as important as maternal pregravid obesity as a risk factor for the offspring obesity during adolescence. The risk of obesity was strikingly high in adolescents whose both parents had a BMI of 25 or over throughout the 16-year follow-up period.

"These findings emphasise the importance of taking an early whole-family approach to childhood obesity prevention. Furthermore, it is important to be aware that the effects of predisposing genotypes can be modified by lifestyle habits such as regular meal frequency," says Ms Anne Jääskeläinen, MHSc, who presented the results in her doctoral thesis at the University of Eastern Finland. The original articles were published in *International Journal of Obesity*, *International Journal of Obstetrics and Gynaecology*, *Nutrition, Metabolism & Cardiovascular Diseases*, and *PLOS One*.

The study population was derived from the prospective, population-based Northern Finland Birth Cohort 1986.

More information: IV Jääskeläinen A, Schwab U, Kolehmainen M, Kaakinen M, Savolainen M, Froguel P, Cauchi S, Järvelin M-R and Laitinen J. Meal frequencies modify the effect of common genetic variants on body mass index in adolescents of the Northern Finland Birth Cohort 1986. *PLOS ONE* 8: e73802, 2013.

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