Early life risk factors predict higher obesity and cardiometabolic risk

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Early life risk factors in the first 1,000 days cumulatively predict higher obesity and cardiometabolic risk in early adolescence, according to new research led by the Harvard Pilgrim Health Care Institute. The study is

the first to evaluate the combined influence of early life risk factors with direct measures of adiposity (body mass index, fat-mass index) and metabolic risk in early adolescence.

The findings were published November 12 in the *American Journal of Clinical Nutrition*.

The rapid rise in the global prevalence of childhood obesity, a strong predictor of metabolic syndrome and related diseases such as type 2 diabetes mellitus, is an important public health challenge. The first 1000 days, spanning from conception to age 24 months, represents an important period of risk for the development of later childhood obesity. Certain prenatal and postpartum factors encompassing this period, such as maternal smoking, excessive gestational weight gain, maternal gestational diabetes, maternal diet during pregnancy, short breastfeeding duration, and short infant sleep duration have been shown to be associated with subsequent risk of childhood obesity.

"Most of these factors are modifiable and may provide insight into intervention strategies for childhood obesity prevention in early life," said lead author Izzuddin Aris, Ph.D., Assistant Professor of Population Medicine at the Harvard Pilgrim Health Care Institute and Harvard Medical School. "Our study assesses the impact of these risk factors in combination, which is more relevant to real-life behavior, and could translate to a larger public health impact."

For this study, the research team studied 1,038 mother-child pairs in Project Viva, a prospective, observational pre-birth cohort study of gestational factors, pregnancy outcomes, and offspring health, based in eastern Massachusetts. They measured six modifiable risk factors: smoking during pregnancy; gestational weight gain; sugar-sweetened beverage consumption during pregnancy; breastfeeding duration; timing of complementary food introduction and infant sleep duration.

After adjusting for sociodemographic characteristics and parental body mass index, the researchers found increases in indicators of adiposity such as body mass index and fat-mass index as well as increases in metabolic risk markers such as triglyceride levels and insulin resistance with increasing number of risk factors. Children with 5-6 risk factors versus those with 0-1 risk factors also had the highest risk of overweight or obesity and being in the highest metabolic risk score quartile in early adolescence.

"Our study findings not only suggest targets for future early life interventions, they also indicate that interventions to prevent later obesity and cardiometabolic risk may be more effective if conducted early in the lifecourse and target multiple factors," said Emily Oken, Professor of Population Medicine at the Harvard Pilgrim Health Care Institute and Harvard Medical School and senior author of the study.

More information: Jiajin Hu et al, Longitudinal associations of modifiable risk factors in the first 1000 days with weight status and metabolic risk in early adolescence, *The American Journal of Clinical Nutrition*, nqaa297, doi.org/10.1093/ajcn/nqaa297

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