

Maternal stress leads to overweight in children

January 9 2019



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Overweight is unhealthy. Yet more and more people in Germany are overweight, particularly children. As part of the LiNA mother-child study coordinated by the Helmholtz Centre for Environmental Research

(UFZ), researchers were able to identify mother's perceived stress during the first year of the child's life as a risk factor for developing overweight in infancy. According to the study recently published in the *BMC Public Health* specialist magazine, researchers from the UFZ, the University of Bristol and the Berlin Institute of Health found this to have long-lasting effects on girls' weight development in particular.

In Germany, nearly ten percent of children aged two to six are overweight, of which three percent are classified as obese. High-caloric diets and too little exercise are known to be [risk factors](#) for obesity. "Maternal stress is also thought to contribute to the development of obesity in children," explains nutritionist Dr. Kristin Junge from the Department of Environmental Immunology at the UFZ. "In terms of child development, the period between pregnancy and the first years of life is particularly sensitive to external influences, which may lead to illness or obesity." And this may include psychological influences such as maternal stress. In their current study, UFZ researchers are investigating whether and how perceived maternal stress during pregnancy and the first two years of life, affects the child's weight development up to the age of five. To do so, they analysed data available from the LiNA mother-child study.

LiNA is a long-term study in which sensitive childhood development phases are investigated with special consideration given to lifestyle, environmental pollution and the subsequent occurrence of allergies, respiratory diseases and obesity. Since 2006, UFZ researchers in cooperation with the Städtisches Klinikum St. Georg in Leipzig, and more recently with the Universitätsklinikum Leipzig, have been following several hundred mother-child pairs from pregnancy onwards to investigate the effects of environmental influences and lifestyle habits on health and well-being. As part of the research, regular surveys are completed, pollutant measurements are taken in the living environment, and the mothers and children undergo clinical examinations. The current

UFZ study is based on data from 498 mother-child pairs from the LiNA study. Using the data for height and weight, the researchers determined the children's Body Mass Index (BMI) and standardised the results by age and gender. Mothers' perceived stress was assessed by validated questionnaires and included topics such as worries and fears, feelings of tension, general satisfaction as well as coping with daily demands. "We compared the data on mothers' perceived stress during pregnancy and in the first two years of the child's life with the child's BMI development up to the age of five, and investigated whether there was a correlation," explains biochemist Dr. Beate Leppert, the study's lead author.

First year of life particularly influential

And the study results show: There is actually a correlation. If mothers' perceived stress was high during the child's first year of life, there was a high probability that her child would develop a higher BMI in the first five years of their life. "The effects of maternal stress seem to have a long-term impact," says Kristin Junge. The correlation between perceived maternal stress in the child's first year of life and an increased BMI was especially evident in girls. "It seems that daughters of stressed mothers in particular are at increased risk of becoming overweight," says Dr. Saskia Trump, senior author of the current study, who now works at the Berlin Institute for Health Research. "There are studies that demonstrate that psychological factors such as perceived maternal stress may be experienced less intensely or may be better compensated by boys." Perceived maternal stress during pregnancy or during the child's second year of life showed little evidence for an effect on the weight development of either gender. "The first year of life seems to be a sensitive phase and a characteristic factor for the tendency to be overweight," says Dr. Junge. After all, mothers and children usually spend the entire first year together – a lot of time in which the mother's perceived stress and/or associated behaviour is experienced by the child. "During this time, special attention should therefore be paid to the

mother's condition," adds Dr. Trump.

Identified stress factors

But what causes perceived maternal stress in the first place? To answer this question, researchers examined further data from the mother-child study and searched for possible influencing factors, such as household income, level of education, and the quality of the living environment. The results showed that mothers with a considerably higher perceived stress level were often exposed to high levels of traffic or noise, had poor living conditions or had a low household income. Maternal stress caused by difficult living conditions or an unfavourable living environment can lead to children becoming overweight in the long term. "Stress perceived by mothers should be taken seriously," says Dr. Junge. "Midwives, gynaecologists, paediatricians and GPs should be particularly attentive to signs of [stress](#) in the first year following the child's birth." After all, if mothers are helped early on or are offered support, we may be able to kill two birds with one stone: To improve maternal well-being and also prevent their [children](#) becoming overweight. Following from this study, the UFZ team will continue to investigate whether the effects of perceived [maternal stress](#) also extend beyond the age of five.

More information: Beate Leppert et al. Early maternal perceived stress and children's BMI: longitudinal impact and influencing factors, *BMC Public Health* (2018). [DOI: 10.1186/s12889-018-6110-5](https://doi.org/10.1186/s12889-018-6110-5)

Provided by Helmholtz Association of German Research Centres

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