

# New study says obese and overweight children at risk of iron deficiency

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Children and young people who are overweight or obese are at significantly higher risk of iron deficiency, according to a study by nutritional scientists at the University of Leeds.

Researchers from the School of Food Science and Nutrition examined thousands of [medical studies](#) from 44 countries involving people under the age of 25 where levels of iron and other vitamins and minerals had been recorded alongside weight.

They found that iron deficiency was associated with both underweight and overweight children and adolescents.

By contrast, zinc and vitamin A deficiencies were only observed in children who were undernourished, leading researchers to conclude that iron deficiency in overweight children is probably due to inflammation disrupting the mechanisms that regulate iron absorption.

The research is [published](#) in the journal *BMJ Global Health*.

Iron deficiency in children has a negative effect on [brain function](#), including attention, concentration and memory, and can increase the risk of conditions, such as autism and ADHD. It is already recognized as a problem in adults living with obesity, but this research is the first to look at the association in children.

Lead author Xiaomian Tan, a Doctoral Researcher in the University of Leeds' School of Food Science and Nutrition said, "The relationship between undernutrition and critical micronutrients for childhood growth and development is well established, but less is known about the risk of deficiencies in iron, vitamin A and zinc in children and adolescents who are overweight or obese, making this a hidden form of malnutrition.

"Our research is hugely important given the high prevalence of obesity in children. We hope it will lead to increased recognition of the problem by health care practitioners and improvements in clinical practice and care."

## Hidden hunger

Historically the problem has been linked to malnutrition and is a particular concern for lower- and middle-income countries where hunger may be the leading cause of mortality for young children.

Increasingly though it is being recognized that vitamin and mineral deficiencies can also occur in people who are overweight and obese and who have a nutrient-poor but energy-dense diet, something which has been described as "hidden hunger."

In [high-income countries](#), it is associated with ultra-processed foods that are high in fat, sugar, salt, and energy but in lower- and [middle-income countries](#), obesity is often associated with poverty and monotonous diets with limited choices of staples such as corn, wheat, rice, and potatoes.

Many developing countries are now facing a double burden of malnutrition alongside overnutrition due to the rapid increase in the global prevalence of obesity in recent decades, especially in children aged between five and 19.

## **Undernutrition versus overnutrition**

The research also highlights differences in focus between higher income countries and developing nations, with most studies in Africa and Asia focusing on undernutrition and those from North America and Europe focusing entirely on overnutrition.

The researchers say this is particularly concerning as both Africa and Asia are experiencing the highest double burden of malnutrition due to [economic growth](#) and the transition to a western-style high-sugar, high-fat diet.

Between the years 2000 and 2017, the number of overweight children

under the age of five in Africa increased from 6.6 to 9.7 million, and in Asia that figure rose from 13.9 to 17.5 million. At the same time, there was an increase in the number of stunted children under 5, from 50.6 to 58.7 million in Africa.

Research supervisor Bernadette Moore, Professor of Nutritional Sciences in Leeds' School of Food Science and Nutrition, said, "These stark figures underscore the fact that the investigation of micronutrient deficiencies in relation to the double burden of malnutrition remains critically important for child health.

"By the age of 11 here in the UK, one in three children are living with overweight or obesity, and our data suggests that even in [overweight children](#) inflammation leading to [iron deficiency](#) can be an issue.

"Iron status may be the canary in the coal mine, but the real issue is that prolonged inflammation leads to heart disease, diabetes and fatty liver."

Increasing [physical activity](#) and improving diet have been shown to reduce inflammation and improve iron status in children and the researchers are now calling for further studies into the effectiveness of these interventions.

They also believe that more research is needed into micronutrient deficiencies and the double burden of malnutrition and overnutrition in countries where there are currently gaps in data.

**More information:** Xiaomian Tan et al, Overnutrition is a risk factor for iron, but not for zinc or vitamin A deficiency in children and young people: a systematic review and meta-analysis, *BMJ Global Health* (2024). [DOI: 10.1136/bmjgh-2024-015135](https://doi.org/10.1136/bmjgh-2024-015135)

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