Atherosclerosis may start in childhood: New data tie obesity to early vascular damage

A study of 130 children between the ages of 6 and 11 conducted by researchers at the Federal University of São Paulo (UNIFESP) in Brazil has identified that obesity alone can cause immediate damage to children's cardiovascular health. This damage increases the risk of diseases such as atherosclerosis, heart attack, and stroke as early as childhood.

The study identified early signs of inflammation and dysfunction in the endothelium, the layer that lines blood vessels, in overweight and obese children.

"The results of the study reinforce the seriousness of childhood obesity, showing that it needs to be reversed early on. We also warn about the need for public policies to reduce obesity in childhood, especially in socioeconomically vulnerable populations," says Maria do Carmo Pinho Franco, a professor at UNIFESP and one of the authors of the study published in the ***International Journal of Obesity*.**

Franco explains that obesity promotes chronic, low-grade inflammation in adults and children that keeps the immune system on constant alert. This generates a succession of false alarms for the body's defense system and consequently causes premature aging of immune cells. In the endothelium, the focus of the study, the researchers found that this inflammatory process causes cell damage, even in children, which worsens childhood obesity.

"It was already known that overweight or obese children tend to become adolescents and adults with the same problem, which increases the risk of developing cardiovascular and cardiometabolic diseases in the future. But this effect isn't only cumulative. The study found that overweight or obese children already show signs of inflammation and endothelial dysfunction, indicating that the process of cardiovascular disease begins in childhood, even before other risk factors appear," says Franco.

"These children don't smoke, drink, or have decades of bad habits considered risk factors for cardiovascular disease. They're also a prepubescent population, meaning they aren't influenced by sex hormones. The only factor present is excess weight. Therefore, the analysis showed that obesity alone is sufficient to initiate a chronic low-grade inflammatory process with a direct impact on vascular health," she adds.

What the study found

In the study, the researchers found elevated gene expression of the inflammatory cytokine TNF-alpha and increased circulating levels of apoptotic endothelial microparticles (EMPs) in blood samples from overweight or obese children. Both of these markers may indicate endothelial cell damage and contribute to endothelial dysfunction. Since the endothelium is considered the orchestrator of vascular health, Franco explains that the early damage to

blood vessels detected in the children's examination could lead to diseases such as atherosclerosis, heart attack, and stroke.

The study also measured indicators such as body mass index (BMI), waist circumference, blood pressure, and microvascular endothelial function. Overweight and obese children performed worse on the Reactive Hyperemia Index (RHI), which assesses microvessel health. They also had higher TNF-alpha gene expression, which correlated with elevated EMP levels and worsened endothelial function.

Another important aspect of the study is that it was conducted with children who were treated at a youth center in São Paulo. BMI, waist circumference, blood pressure, and peripheral arterial tonometry were assessed on site with the help of volunteer nutritionists, doctors, and nurses.

Laboratory analyses, including RNA extraction and quantification of inflammatory markers by PCR (qRT-PCR), were performed at the Department of Biophysics at the São Paulo School of Medicine (EPM-UNIFESP).

Awareness and training activities were also carried out with school cooks and caregivers. They were taught to replace ultra-processed foods in children's menus with healthy foods.

The researchers emphasize the urgent need to expand and strengthen public policies to prevent childhood obesity, particularly in socioeconomically vulnerable communities.

"In addition to all the individual problems, without early intervention, these children tend to become adults with cardiovascular and metabolic diseases, which represents a worrying impact on public health and the sustainability of the Brazilian health system," Franco warns.

Publication details

Fernanda Thomazini et al, Whole blood TNF-α expression and apoptotic endothelial microparticles reveal early vascular injury in pediatric obesity, *International Journal of Obesity* (2025). DOI: 10.1038/s41366-025-01954-8

Journal information: International Journal of Obesity

-medicalxpress.com, February 11, 2026