Screening using body mass index alone may miss every second preschooler with excess stomach fat

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When assessing whether preschoolers are overweight, health professionals should use other measures such as waist-to-height ratio in addition to the Body Mass Index (BMI). A study published in the Springer Nature-branded journal *Pediatric Research* shows that this is because measuring the BMI of younger children often fails to identify those with excess stomach fat and possible associated health problems. Lead author Annelie Lindholm of Halmstad University and the Research and Development Center Spenshult in Sweden says that adequate screening is important, given that people with excess stomach fat are known to have a greater risk of developing metabolic syndrome and subsequent heart problems—even from a very young age onwards.

The number of overweight or obese children worldwide has increased significantly in past decades. According to a recent study, one in every ten children already suffers from metabolic syndrome, which has been traditionally only been found in adults. Metabolic syndrome is linked to being overweight (especially around the stomach area, which is referred to as abdominal adiposity), hypertension, being insulin resistant or glucose intolerant. Overall, being overweight increases a person's chances of developing cardiovascular disease and type 2 diabetes. Worryingly, these risk factors are increasingly found in preschool children. There is therefore a need to identify at risk children so that they can make potentially life-saving lifestyle changes early on.

BMI is a screening tool that combines a person's weight and height. It has been criticized for not adequately screening people at risk of developing cardiometabolic disease and for not distinguishing between fat mass and fat free mass, or specific parts of the body where fat is located. Because abdominal adiposity is a common indication that someone might, in future, develop cardiovascular disease, measurements like the waist-to-height ratio (WHtR) have been developed. This screening method incorporates a person's waist circumference together with his or her height.

In this study, Lindholm and her colleagues compared whether BMI or WHtR was better able to identify preschool children who had increased waist circumference in relation to their height. For this purpose, the researchers analyzed data from 1540 five-year old children who were part of the Swedish Halland Health and Growth Study. Their body measurements were taken at regular intervals, and factors that could influence their health and growth were noted as part of the initial study.

The researchers found that the BMI viewed 55 per cent of five-year olds who had a higher than normal waist-to-height ratio, and therefore carried more fat around their stomachs than children with normal WHtR, as being of normal weight.

"The BMI missed every second child who had a waist to height measurement greater than 0.5 by the age of five years old," says Lindholm. "Therefore, if only the BMI is used as a screening method, children who might need further investigation for cardiometabolic risk factors could be missed despite having an elevated waist-to-height ratio."

Lindholm explains that the measurements and calculations needed for WHtR are easily made and reproduced as well as being cost effective. "But since WHtR is not routinely used for screening children today, more research is needed specifically focusing on this age group before these findings can be implemented," she says.

More information: Annelie Lindholm et al, Body

mass index classification misses to identify children with an elevated waist-to-height ratio at 5 years of age, *Pediatric Research* (2018). DOI: 10.1038/s41390-018-0188-4

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