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Severe obesity in childhood can halve life expectancy, global modeling study finds

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New research being presented at the [European Congress on Obesity](#) (ECO) in Venice, Italy (12-15 May) has for the first time quantified the impact of different aspects of childhood obesity on long-term health and life expectancy.

The modeling by stradoo GmbH, a life sciences consultancy in Munich, Germany, presented by Dr. Urs Wiedemann, of stradoo, and colleagues at universities and hospitals in the UK, Netherlands, France, Sweden, Spain, U.S. and Germany, found that age of onset, severity and duration of obesity all take their toll on [life expectancy](#).

The development of obesity at a very young age was found to have a particularly profound effect.

For example, a child living with severe obesity (BMI Z-score of 3.5) at the age of four, who doesn't subsequently lose weight, has a life expectancy of 39 years—about half of the average life expectancy.

Dr. Wiedemann says, "While it's widely accepted that childhood obesity increases the risk of cardiovascular disease and related conditions such as type 2 diabetes (T2D), and that it can reduce life expectancy, evidence on the size of the impact is patchy. A better understanding of the precise magnitude of the long-term consequences and the factors that drive them could help inform prevention policies and approaches to treatment, as well as improve health and lengthen life."

To learn more, the researchers created an early-onset obesity model that allowed them to estimate the effect of childhood obesity on cardiovascular disease and related conditions such as type 2 diabetes (TD2), as well as life expectancy.

Four key variables were included: age of obesity onset, obesity duration, irreversible risk accumulation (a measure of irreversible risks of obesity—health effects that remain even after weight loss) and severity of obesity.

Severity of obesity was based on BMI Z-scores. A widely used measure of weight in childhood and adolescence, BMI Z-scores indicate how strongly an individual's BMI deviates from the normal BMI for their age and sex, with higher values representing higher weight.

For example, a 4-year-old boy with an average height of 103 cm and a "normal" weight of about 16.5 kg will have a BMI Z-score of 0. A boy of the same age and height who weighs 19.5 kg will have a BMI Z-score of 2, which is just in the obese range, and one who weighs 22.7 kg will have a BMI Z-score of 3.5, which indicates severe obesity.

Data came from 50 existing clinical studies on obesity and obesity-related comorbidities, such as type 2 diabetes, cardiovascular events and fatty liver. The studies included more than 10 million participants from countries around the world, approximately 2.7 million of whom were aged between 2 and 29 years.

The model shows that earlier onset and more severe obesity increase the likelihood of developing related comorbidities.

For example, an individual with a BMI Z-score of 3.5 (which indicates severe obesity) at age 4 and who doesn't go on to lose weight has a 27% likelihood of developing T2D by the age of 25 and a 45% chance of developing T2D by the age of 35.

In contrast, an individual with a BMI Z-score of 2 at age 4 will have a 6.5% chance of T2D by the age of 25 and 22% chance by the age of 35.

The early-onset obesity model also shows that a higher BMI Z-score at an early age leads to a lower life expectancy.

For example, a BMI Z-score of 2 at age 4 without subsequent weight reduction decreases average life expectancy from approx. 80 to 65 years. Life expectancy is further reduced to 50 years for a BMI Z-score of 2.5 and 39 years for a BMI Z-score of 3.5.

In contrast, a BMI Z-score of 3.5 at age 12 without subsequent weight reduction yields an average life expectancy of 42 years.

Comparisons with data from studies not included as input for the model and the opinions of leading experts confirmed the model's accuracy.

It was also possible to model the effect of weight loss on life expectancy and long-term health. For example, an individual living with severe early-onset obesity (BMI Z-score of 4 at age 4) who doesn't subsequently lose weight has a life expectancy of 37 years and a 55% risk of developing type 2 diabetes at age of 35. Weight loss that results in a BMI Z-score of 2 (just in the obese range) at age of 6, will increase the life expectancy to 64 and reduce the risk of type 2 diabetes to 29%.

The modeling also shows that earlier weight loss returns more years of life than later weight loss.

Dr. Wiedemann says, "The early-onset obesity model shows that weight reduction has a striking effect on life expectancy and comorbidity risk, especially when weight is lost early in life."

The model's limitations include not taking into account the cause of obesity, genetic risk factors, ethnic or sex differences, as well as not factoring in how different co-morbidities interact with each other.

Dr. Wiedemann concludes, "The impact of childhood obesity on life expectancy is profound. It is clear that childhood obesity should be considered a life-threatening disease. It is vital that treatment isn't put off until the development of type 2 diabetes, high blood pressure or other 'warning signs' but starts early. Early diagnosis should and can improve quality and length of life."

More information: This is based on abstracts 0738 and 0739 at the European Congress on Obesity (ECO).

Provided by European Association for the Study of Obesity

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