

Including excess muscle in the scientific definition of obesity

May 3 2016



Researchers have determined that obesity involves excessive body weight (including fat and muscle) for a given height and not just excess body fat as was formerly believed.

The study was coordinated by Francisco B. Ortega, a Ramón y Cajal researcher at the Faculty of Physical Activity and Sports Sciences at UGR and published in the prestigious American journal *Mayo Clinic Proceedings*.

The researchers analyzed data of more than 60,000 people who were examined over an average of 15 years. The goal was to study how factors such as obesity can predict the risk of dying from cardiovascular disease.

An international study led by the University of Granada has "redefined" the conception that modern science has of obesity. It has determined that the disease involves a combination of excess [body weight](#) comprising [fat](#) and muscle for a given height and not just excess body fat alone.

The study, pioneering on a global scale, was coordinated by Francisco B. Ortega, a Ramón y Cajal researcher at the Faculty of Physical Activity and Sports Sciences at UGR and co-director of the PROFITH research team (profith.ugr.es). The team worked in collaboration with respected American researchers epidemiologist Steven N. Blair and cardiologist Charles J. Lavie. Their research has been published in the prestigious *Mayo Clinic Proceedings*.

The researchers worked with data from the Aerobics Center Longitudinal Study (ACLS) carried out by the Cooper Institute in Texas, USA. The study, which began in the 1970s, tracked more than 60,000 participants over an average of 15 years. The objective was to study how factors like obesity can predict the risk of dying from cardiovascular disease.

Unlike most longitudinal studies of this kind, the researchers in the present study measured not only the weight and height but also the amount of fat and muscle of the participants. The weight and height measurements allowed them to calculate the body mass index

($\text{BMI} = \text{weight (kg)} / \text{height (m)}^2$). To measure fat and muscle, they used skin fold measurements and, in a subsample of more than 30,000 participants, they used hydrostatic weight testing which is considered a gold-standard in the measurement of body fat.

A concept from 1832

The concept of BMI was first proposed in 1832 by Adolphe Quetelet and is used internationally to define when a person is overweight ($\text{BMI} \geq 25 \text{kg/m}^2$) or obese ($\text{BMI} \geq 30 \text{kg/m}^2$). It has now been used in more than 100,000 published scientific articles, making it the most widely used anthropometric index in the world.

"Nevertheless, BMI is subject to a great deal of heavy criticism due to its inability to discriminate whether a high body weight is due to the person having an excess of fat, muscle or both. Many authors propose using a percentage of fat rather than the BMI, especially when studying with regard to cardiovascular disease," explains UGR researcher Francisco B. Ortega.

In the study carried out at UGR, the authors considered whether an accurate measurement of body fat was a more powerful predictor of death from cardiovascular disease than the cheap, fast and simple BMI measurement. To the surprise of many, the result was just the opposite: BMI was significantly better than fat percentage in predicting future death from cardiovascular disease.

The best predictor of mortality

Furthermore, even when the analysis was restricted to half of the sample (30,000 people), measuring [body fat](#) through hydrostatic weight testing, which is an extremely complex and expensive method, BMI was still the

best predictor of mortality from cardiovascular causes.

How is it possible that BMI, which measures both fat and muscle relative to height, can predict cardiovascular disease better than accurate indicators of the amount of fat that a person has?

"We considered that a possible hypothesis could be that not only are large amounts of fat associated with greater risk, but also great amounts of muscle or other weight unrelated to fat," says Ortega.

Scientists at UGR tested the hypothesis with data from the study and it was confirmed. This would explain that BMI, which is the sum of fat and [muscle](#) relative to height, is a better predictor, at an epidemiological level, of future cardiovascular disease than indicators of the amount of fat alone. In the study, the authors offer different physiological elements that can help to explain the results.

The study offers significant new results which are nearly contradictory to existing beliefs. It also roundly supports the use of BMI in large epidemiological studies and contributes to a better understanding of obesity and its relationship to [cardiovascular disease](#).

More information: Francisco B. Ortega et al. Body Mass Index, the Most Widely Used But Also Widely Criticized Index, *Mayo Clinic Proceedings* (2016). [DOI: 10.1016/j.mayocp.2016.01.008](https://doi.org/10.1016/j.mayocp.2016.01.008)

Provided by University of Granada

Citation: Including excess muscle in the scientific definition of obesity (2016, May 3) retrieved 25 April 2024 from <https://medicalxpress.com/news/2016-05-excess-muscle-scientific-definition-obesity.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.