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Body Fat and Health: How Can I Tell if I am at Risk for Health Problems?[1]

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It is splashed across the news and is often called an epidemic. What is it? Obesity. Obesity is called an epidemic because there is a high rate of obesity in the United States. In fact, over 30% of all US adults were obese as of 2012, and more than two-thirds are either overweight or obese (State of Obesity 2016) . This is concerning because excess body fat is linked to poor health and chronic diseases, such as diabetes and heart disease (Bhurosy and Jeewon 2013). The amount of excess body fat a person has is commonly sorted into weight status categories using Body Mass Index.

What is Body Mass Index?

Body Mass Index (BMI) is used as a marker of body fatness. It is calculated by dividing a person's weight (in kilograms) by the square of their height in meters (kg/m^2). BMI is an indirect measure of body fat because it measures weight in relation to one's height rather than actual excess fat. Still, BMI has been shown to be fairly well aligned with direct measures of body fat, though some populations need further evaluation (e.g., older adults, high muscularity, gender/ethnic differences) (DHHS and CDC 2015).

For adults 20 years and older, BMI values are often grouped into weight status categories (Table 1).

Table 1. BMI and weight status of adults.

BMI	Weight Status
Below 18.5	Underweight
18.5–24.9	Normal
25.0–29.9	Overweight
30.0 and Above	Obese

Advantages and Disadvantages of BMI

Because BMI relies only on height and weight, it is simple to calculate and understand. It is also low cost and noninvasive. In addition, people can calculate their own BMI easily (Harvard School of Public Health 2016). A BMI above 30 kg/m^2 is a fairly good marker of excess body fatness and related health problems. Since a higher amount of centrally located body fat is tied to higher health risk, a measure of waist circumference or waist-to-hip ratio (waist measurement divided by hip measurement) can be used along with BMI to more clearly assess excess body fatness and its potential health risks (Bhurosy and Jeewon 2013; DHHS and CDC 2015).

There are limitations to using BMI as a measure of body fatness. Certain factors such as age, ethnicity, gender, and the amount of muscle one has can affect its accuracy. This means that BMI should be used with caution (Bhurosy and Jeewon 2013; Kok, Seidell, and Meinders 2004). For

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example, the average BMI for a player in the NFL is 31 kg/m^2. This fits into the obese group. However, players in the NFL have a lot of muscle and therefore a higher body weight. Their higher BMI may not represent their true body fatness or associated health risk.

Older adults are apt to have more body fat than younger adults with the same BMI. For those aged 70 or older, death risk is lower for those who are classified as overweight by BMI than for those who are classified as normal weight (Bhurosy and Jeewon 2013). Women tend to have higher amounts of body fat than men with a similar BMI (DHHS and CDC 2015). These differences in body fatness related to age and sex are largely biological—for example, to support a potential pregnancy and changes in cellular muscle repair with aging—but they can also be related to differences in activity and eating behaviors over the years. Different ethnicities also tend to have different amounts of body fat. For instance, Asian individuals tend to have lower body weight and BMIs, but they tend to have higher amounts of body fat at the same BMI as non-Asians (Rush, Freitas, and Plank 2009). This means that the health risk for Asian populations may be underestimated by the BMI categories in Table 1 (Bhurosy and Jeewon 2013).

Other Measures of Body Fat

Is there a more accurate way to measure body fat? How can we truly know if we have health risks due to our amount of body fat? Newer formulas, such as a body shape index (ABSI) and body roundness index (BRI), have been suggested as better methods for assessing certain health risks, but they may not be any more accurate than BMI (Maessen et al. 2014).

Other methods that are used to measure body fatness include

- skinfold measurements (http://www.cdc.gov/nchs/video/nhanes3_anthropometry/skinfolds/skinfolds.htm),
- bioelectrical impedance (http://nutrition.uvm.edu/bodycomp/bia/bia-video2.html),
- air-displacement plethysmography (BodPod) (https://www.youtube.com/watch?v=SGHf_mze1RA),
- dual energy X-ray absorptiometry (DEXA) (http://nutrition.uvm.edu/bodycomp/dexa/dexa-video2.html), and
- underwater weighing (http://nutrition.uvm.edu/bodycomp/uww/uww-video2.htm).

If performed correctly, these methods provide a more direct and accurate measurement of body fatness when compared to BMI. The downsides of each method vary, but are generally more costly, less convenient, and more intrusive.

Also, much of our knowledge about obesity-related health risks is tied to the link between BMI—not directly measured body fatness—and those health risks. This means that even if other methods are more accurate than BMI for measuring body fatness, they may not provide the same information about those health risks (DHHS and CDC 2015).

The Bottom Line

Given its low cost, ease of measurement, accessibility, and widespread use, BMI can be used as a starting point to estimate body fatness and its associated health risks. However, keeping in mind its limits, BMI should not be used as a diagnostic tool and must be followed up with additional tests to determine one's health risks. Other methods for assessing health risk, such as blood tests, should be discussed with your doctor.

References

Bhurosy, T. and R. Jeewon. 2013. "Pitfalls of using body mass index (BMI) in assessment of obesity risk." *Curr Res Nutr Food Sci Jour.*1(1):71–76.

Department of Health and Human Services and Centers for Disease Control and Prevention (DHHS and CDC). "Body mass index: considerations for practitioners." http://www.cdc.gov/obesity/downloads/BMIforPactitioners.pdf. Accessed March 2, 2016.

Harvard School of Public Health. 2016. "Measuring obesity." http://www.hsph.harvard.edu/obesity-prevention-source/obesity-definition/how-to-measure-body-fatness/. Accessed March 2, 2016.

Kok, P., J.C. Seidell, and A.E. Meinders. 2004. "The value and limitations of the body mass index (BMI) in the assessment of the health risks of overweight and obesity." *Ned Tijdschr Geneeskd* 148(48):2379–2382.

Maessen, M.F., T.M. Eijsvogels, R.J. Verheggen, M.T. Hopman, A.L. Verbeek, and F. de Vegt. 2014. "Entering a new era of body indices: the feasibility of a body shape index and body roundness index to identify cardiovascular health status." *PLoS One* 9(9):e107212. doi: 10.1371/journal.pone.0107212

Rush, E.C., I. Freitas, and L.D. Plank. 2009. "Body size, body composition and fat distribution: comparative analysis of European, Maori, Pacific Island, and Asian Indian adults." *The British Journal of Nutrition* 102(4):632–641.

The State of Obesity. 2016. "Obesity Rates & Trends Overview. "http://stateofobesity.org/obesity-rates-trends-overview/. Accessed March 2, 2016.