
CHAPTER 1

What is overfatness?

Andrew P. Hills and Mark L. Wahlqvist

There is often considerable confusion among scientists, as well as in the wider community, over the use of terms in the area. The determination of ideal body shape is steeped in social and cultural values and is subject to individual judgement. Overfatness for most people is a perception determined by visual inspection. In recent times the idealized female body shape in Western societies has decreased in size considerably.³

The focus of this book is to address the consequences of overfatness rather than increased weight per se, and to consider the issue of overfatness in relation to physical activity.

Being attentive to body composition status is certainly far more meaningful than a preoccupation with body weight. This is extremely important for all individuals but particularly those involved in physical activity.

In the treatment of overfatness, dietary modification and exercise are often employed. The practice of dietary restriction in the absence of exercise can have serious drawbacks for the body composition of such individuals. Body weight may well be lost, but at a potentially high cost. There is the strong likelihood of a substantial reduction in lean tissue during weight loss programs, a trend that can be minimised with appropriate exercise.

There are numerous methods used in the measurement of different components of body composition and each method possesses a range of relative strengths and weaknesses. A comprehensive discussion of the common laboratory and field techniques used in body composition assessment is reserved for Chapter 14.

Obesity has been defined in a variety of ways and the exact level of fatness that determines the condition is somewhat imprecise. Obesity involves a body composition that is clearly dominated by the presence of an undesirable level of body fat.²

Overweight

A useful starting point is to make a distinction between overweight and obesity. *Overweight* means that the body weight has increased above a certain level or known standard for a particular height. For example, an individual who is heavier than the listed weight for his/her height would be considered as being overweight.

Such a deviation from published height/weight tables may or may not be the result of additional adipose tissue. For example, the lean and muscular sports person may be classified as overweight in relation to inappropriate standards.

Further difficulties with height/weight charts include the subjective assessment of frame size and the utilisation of charts derived from other populations.

Obesity

Obesity by comparison, means that an unacceptable level of total body weight is fat. Beyond this simple definition there are no hard and fast rules or universally accepted classification system.⁵ Rather, a variety of techniques are routinely used.

Body mass index

One of the more common methods for defining obesity is to calculate the Body Mass Index (BMI) or Quetelet's index which considers the relationship between height and weight. This index provides an acceptable overview of level of fatness without considering body components directly. Compared to other indices, BMI has the best correlation with body fat.¹

The BMI has been used extensively with adult groups⁵ but some contention surrounds its wider applicability, including with younger people. Nevertheless, supporters of the use of the index with children are many.^{4,6}

The BMI, like other indices, does have its drawbacks. These include the same concerns as for height/weight charts. The BMI is influenced by body size and body shape and may give misleading results with athletes who possess a high muscle mass (and high BMI) with a low adipose tissue mass.

Calculation of body mass index (BMI)

$$\text{BMI} = \text{Weight (kg)} \text{ divided by } \text{Height (m)}^2$$

A person who is 1.8 metres in height and weighs 79.5 kilograms would have a BMI of 24.5. In contrast, a person who is the same height but weighs 97 kilograms would have a BMI of 30 (Fig. 1).

Although fatness is not measured directly, the BMI score is a key indicator of health status. It is generally recognised that a BMI of 25–30 kg/m² or a body weight between the upper limit of normal and 20% above that limit constitutes overweight.¹ A BMI above 30 kg/m² would constitute obesity.

Other anthropometric techniques

Anthropometry has been routinely used to provide an indirect assessment of body fatness. In addition to the measures of height and weight mentioned above, body circumference and skinfold measures are common. These methods have the advantage of being quick and inexpensive, features that are attractive when large numbers are being measured.

Anthropometric techniques are quick and inexpensive

Skinfold thicknesses have been used to predict body fat content, assuming that a large proportion of body fat is located subcutaneously and also that there is a fairly consistent relationship between abdominal and visceral fat.

Skinfold measurements are meaningful if taken at standardised sites by an experienced tester using calipers of a known standard. Skinfold values are then often incorporated in a range of equations, formulae and tables in order to calculate a percent body fat value. Such a procedure is far less meaningful than using the sum of skinfolds

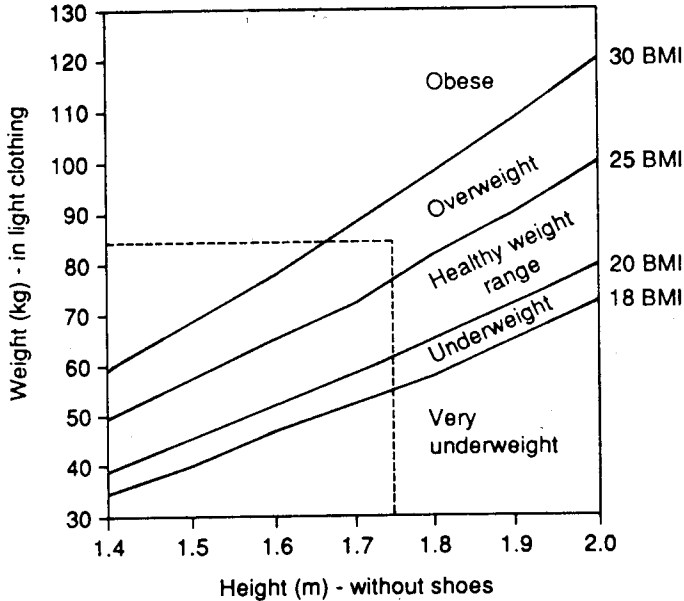


Figure 1. The Australian Nutrition Foundation weight for height chart (for men and women from 18 years onward), based on a body mass index (BMI) of 20–25 $\text{kg} \cdot \text{m}^{-2}$ (weight/height²) for the healthy weight range.

at each of the sites recorded. Comparisons can then be made of repeated measures of the same sites.

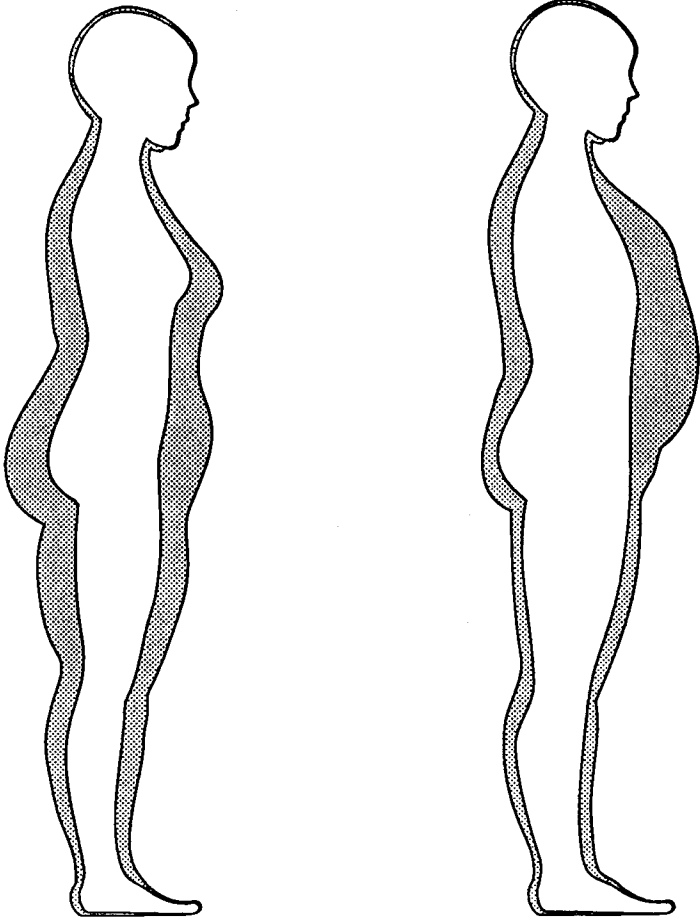
When evaluating level of fatness, a knowledge of the exact amount of body fat is not as useful as knowing something of the distribution of body fat. As Jean-Pierre Després identifies in Chapter 8, upper body fat accumulation is far more predictive of the metabolic consequences of obesity than total body fat.

Of similar value to skinfold measurements in the assessment of relative health risk are the measurements of waist and hip circumference expressed as a waist-to-hip ratio (WHR). The waist circumference tends to increase disproportionately in individuals with an accumulation of upper body fat. The android or 'apple' shape is characterised by an excess of fat on the trunk and abdomen. The apple shape is more common in males.

An excess of fat in the lower half of the body such as the lower abdomen, hips, buttocks and thighs is more common in women and is referred to as the gynoid or 'pear' shape although there is considerable overlap in types between the sexes.

Relative health risk

Figure 2 demonstrates android versus gynoid shape. A higher WHR is indicative of the android type of fat patterning and higher risk if disease. The reverse characterises the gynoid type, indicative of lower health risk.



GYNOID

**(Excess gluteo-femoral fat
more common in females).
Less risk of illness**

ANDROID

**(Excess subcutaneous
truncal-abdominal fat. Upper
body overfatness. More
common in males).
Higher risk**

Figure 2. Types of obesity.

References

- 1 Black, D., James, W.P.T., Besser, G.M. et al. (1983) A Report of the Royal College of Physicians. *J. Royal Coll. Physicians Lond.* 17:5-65.
- 2 Bray, G.A. (1985) Obesity: definition, diagnosis and disadvantages. *Med. J. Aust.* 142:S2-S8.
- 3 Garner, D.M., Garfinkel, P.E., Schwartz, D. & Thompson, M. (1980) Cultural expectation of thinness in women. *Psychol. Rep.* 47:483-491.
- 4 Hitchcock, N.E., Maller, R.A. & Gilmour, A.I. (1986) Body size of young Australians aged 5-16 years. *Med. J. Aust.* 145:368-372.
- 5 Parry-Jones, W.L. (1988) Obesity in childhood and adolescence. In: Burrows, G.D., Beumont, P.J.V. & Casper, R.C. (eds) *Handbook of eating disorders, Part 2: Obesity.* Amsterdam: Elsevier.
- 6 Storlien, L.H., Bird, J.E. & Silva, P.A. (1987) Assessment of obesity in early childhood. *Aust. Ped. J.* 23:131-135.