# iOWNA WHEALTH

# Obesity part 1 - Measures and Causes

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## — What is it?

Obesity is defined as excessive fat accumulation that may diminish health. It is an increasingly common condition which heightens your vulnerability to other problems, such as cardiovascular disease, cancer, diabetes and musculoskeletal disorders.

Your fat distribution can in part determine your health risk. Internally stored fat is referred to as visceral fat and is located around our organs. It is more metabolically active and therefore more threatening. In general, an android body shape (apple shape), where the majority of weight is around the midriff is associated with this form of fat, please refer to *Nugget 1*. Conversely, externally stored fat is called subcutaneous fat. This is found just under the skin and is believed to be less dangerous than visceral fat. Fat accumulated in the lower body, giving a gynoid body shape (pear shape), is largely subcutaneous. Several factors such as genetics and hormones can influence where fat is stored.

### iOWNA Nugget 1

**Visceral vs. Subcutaneous Fat**
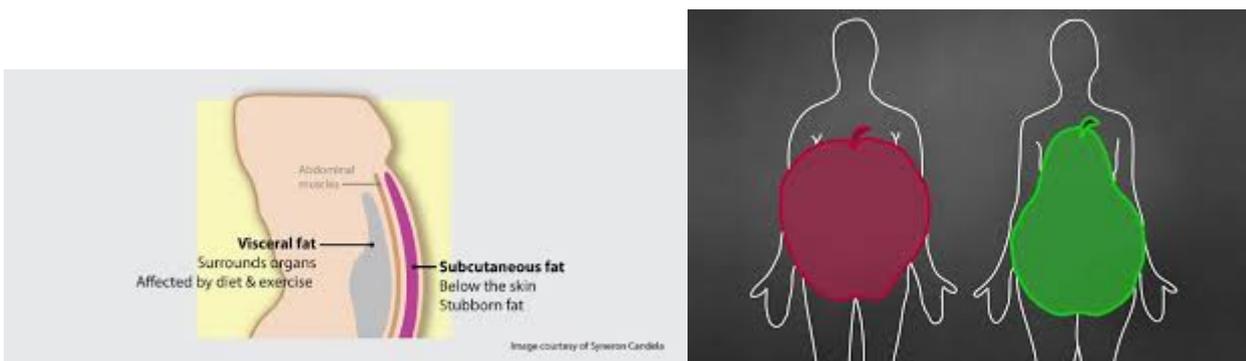


### ◈ iOWNA Gem 1

*The fat stored internally, visceral fat, is named after the viscera - the internal organs of the body. The gold standard for measuring total body fat is a total body fat composition study which is a simple scan that takes no more than 5 minutes to complete.*

# Measures of Obesity

## DEXA scan

A dual-energy X-ray absorptiometry (DEXA) scan can precisely measure body composition using low dose X-rays. Fat mass and lean mass (alongside bone density) are mapped, with fat areas highlighted in yellow and the lean areas in green. This will enable you to see where the majority of your fat is stored. The android/ gynoid fat ratio provided by a DEXA scan will give you a good idea of your body shape. A ratio >1 indicates an android shape, whereas <1 would mean a gynoid shape.

## Skinfold caliper

A convenient, though arguably less accurate measure is done by using a special caliper to record the thickness of a pinch of skin and fat in certain parts of the body. A body fat percentage can thereby be estimated using these values.

## Waist circumference

Waist circumference is another measure which can help diagnose whether you are living with obesity and determine your risk of developing other conditions, such as type 2 diabetes. In general, a circumference of 94cm or more for men and 80cm or more for women raises the likelihood of developing obesity-related health issues. However, this can vary with ethnicity and should be lower in Asians and orientals; the cut off points for South Asian, Chinese and Japanese is 90cm for men and 80cm for women.

World Health Organisation cut-off points and risk of metabolic complications:

| Indicator | Cut-off points | Risk of metabolic complications |
| --- | --- | --- |
| Waist circumference | > 94 cm (M); > 80 cm (W) | Increased |
| Waist circumference | > 102 cm (M); > 88 cm (W) | Substantially increased |
| Waist-hip ratio | ≥ 0.90 cm (M); ≥ 0.85 cm (W) | Substantially increased |

Find your size by wrapping a tape measure around your waist, midway between the top of your hips and the bottom of your ribs. Remember to exhale naturally before reading your measurement. This value can also be used in the form of a height to weight ratio, a simple test which can be done by dividing your waist circumference by your height. A ratio of higher than 0.9 for males and 0.85 for females suggests abdominal obesity.

## BMI

A common and reasonable estimate of body fat can be provided by your body mass index (BMI). This is found by dividing your weight in kilograms by your height in metres squared; a BMI of 30 or higher indicates obesity. Calculate your BMI 🔗 here.

The concept of this measure was first introduced in the 1830s by a Belgian statistician called Adolf Quetelet. His fascination with the notion of the average (ideal) man, what he called 'l'homme moyen', led him to be the first to come up with what is now the body mass index, previously known as Quetelet's index. This idea was later picked up again and popularized in 1972, when it was given the name body mass index

by Ancel Keys and his colleagues. Through an analysis of over 7,400 men in 5 countries, they claimed it to be superior to other indices such as skin calipers and underwater weighing (body density).

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*iOWNA Nugget 2*

**NHS BMI ranges - calculate your BMI** 🔗 *here*

| BMI | Range |
|---|---|
| < 18.5 | Underweight |
| 18.5 - 24.9 | Healthy weight |
| 25 - 29.9 | Overweight |
| 30 - 39.9 | Obese |

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However, using BMI as a measure has limitations; it is simply an indication of your size and does not identify health or illness, nor give any clue as to how fat is stored. For example, a bodybuilder can have a very high BMI, making them appear overweight, despite having very little fat. Also, the index was developed based on a well-defined, small group of mainly white, caucasian males. This means it works reasonably accurately for that cohort, but not equally so on others due to variation in different body compositions.

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💎 *iOWNA Gem 2*

*It is important to have the right levels of visceral fat in your body; people with low visceral fat are at risk of osteoporosis and people with high levels are at risk of cardiovascular diseases and diabetes*

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## Who gets it?

Obesity has reached epidemic proportions and is still on the rise; according to the World Health Organisation it is estimated that by 2025 1 in 5 adults will be obese. The condition can affect anyone but it is generally more common in women than men and most prevalent in individuals aged 40 to 59.

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*iOWNA Nugget 3*

*The shocking prediction that 'almost half the world's adult population will be overweight or obese by 2030' was made by the McKinsey Global Institute in 2014 and is referenced in international bestselling book 'Homo Deus'.*

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# Causes

Obesity is a complex condition which is caused by a combination of factors including familial propensity, diet and lifestyle but can be influenced by a variety of factors such as certain underlying medical conditions and medications.

## You are what you eat!

The main cause of obesity is your diet. When you take in more calories than you burn off through physical activity, the excess is stored as fat. The cheap availability of energy dense food and the progressively inactive lifestyles which people are leading is a key factor in the rise of global obesity. The NHS predicts that by 2022/23 they will treat up to 1,000 more children yearly for serious difficulties associated with the condition.

## Nature vs Nurture?

Although genetic change in our population is not fast enough to be solely responsible for the obesity epidemic, your genes do play a role in developing the condition. They can affect where body fat is distributed, the amount you store, your appetite and how your body turns food into energy. Your genes can make losing weight more difficult, but not impossible.

There are three categories that genetic causes of obesity can be broadly grouped into:

- Monogenic causes - rare and involve a single gene mutation e.g. MC4R deficiency which leads to an increase in appetite

- Syndromic obesity - associated with other conditions such as Prader-Willi syndrome (PWS)

- Polygenic obesity - caused by multiple genes and amplified by lifestyle

Encouragingly, your genetics are not the only cause of obesity. Although the condition commonly runs in families, this is not so much due to the genes which family members share but as the eating and activity habits. You cannot change your genes, but you can change your lifestyle and diet!

## Medicines & other comorbidities

Alongside underlying medical conditions, such as Prader-Willi syndrome (as mentioned above), some medicines can contribute to weight gain. These include steroids, antidepressants, antipsychotics, diabetes and epilepsy medications among others. Your doctor will be able to let you know whether any of these conditions might be responsible for you developing obesity.

# Useful links and references

🔗 NHS - Obesity

🔗 NHS - Why is my waist size important?

🔗 Tremmel, M., Gerdtham, U., Nilsson, P. and Saha, S., 2017. Economic Burden of Obesity: A Systematic Literature Review. International Journal of Environmental Research and Public Health, 14(4), p.435.

🔗 World Health Organisation - Waist Circumference and Waist-Hip Ratio

## Acknowledgements