

# What I tell my patients about obesity and renal disease

People who are obese have an excess amount of body fat (more than 25% for men and 30% for women). Although a relatively crude tool, the body mass index (BMI) has become the established method of testing for obesity, and is calculated from a person's weight and height. For most people, an optimal BMI is between 20 and 25 kg/m<sup>2</sup>. Those with a BMI between 25 and 30 kg/m<sup>2</sup> are considered 'overweight', while a BMI greater than 30 kg/m<sup>2</sup> usually indicates obesity.

However, it is not simply the amount of fat that a person carries that is important, but also how the fat is distributed around the body. Women typically collect fat around their hips (below their waists, giving them a 'pear shape'), while men put on fat around their abdomen (above and around their waists, giving an 'apple shape'). For both sexes, it is fat developing around the waist that is particularly likely to predispose to health problems.

## The health risks of obesity

The risk to an individual's overall health can be estimated from the combination of their BMI and waist circumference measurements. The risk to an overweight person's health begins to increase once their waist circumference exceeds 94 cm (37 inches) for men or 80 cm (31 inches) for women. All obese individuals are at an increased risk of health problems; risk increases further with increasing waist circumference.

There is an epidemic of obesity across the world. The number of obese people in the UK has almost doubled in the last ten years, so that nearly a quarter of all adults are obese. There are a number of reasons for this rise in obesity. Obesity often runs in families, suggesting that people's genes may partly dictate their tendency to put on weight. Some medical conditions, such as hypothyroidism (an underactive thyroid gland), also predispose to weight gain. However, it is widely believed that it is lifestyle changes evident over the last few decades that are driving the global obesity epidemic. In most individual cases, it is a person's lifestyle (primarily their diet and pattern of physical exercise) that confers the

strongest influence on their BMI score. Modern Western lifestyles increasingly encourage overconsumption and a more sedentary lifestyle, with less energy expenditure resulting from reduced physical exercise.

Obesity is now recognised by the World Health Organization (WHO) as one of the top ten global health problems. Obese people suffer higher rates of a host of related medical conditions, including high blood pressure (hypertension), type 2 diabetes, high cholesterol levels, heart problems (such as angina and myocardial infarctions), stroke, colon cancer, sleep apnoea and osteoarthritis. It is now also clear that obesity is a major risk factor for the development and progression of kidney disease.

## The effects of obesity on the kidneys

Obese women are over 12 times more likely to develop type 2 diabetes than non-obese women, while obese men have a fivefold increase in risk. Type 2 diabetes was previously far more common in people over 45, but with the increasing rates of obesity, this form of diabetes is becoming more common in younger people. As diabetes is the most common cause of chronic kidney disease (CKD), this too is becoming more common, and is developing in younger patients.

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Health risks begin to increase once waist circumference exceeds 94 cm (in men) or 80 cm (in women)

The kidneys of obese people have a tendency to retain salt, inducing hormones that promote fluid retention. Consequently, obese people are also more likely to suffer from high blood pressure. Obese women are over four times more likely than non-obese women to develop high blood pressure, while the risk in obese men is more than doubled. High blood pressure is the second most common cause of CKD.

Obesity leads to structural changes within the kidney, predisposing to a particular form of intrinsic kidney disease called focal and segmental glomerulosclerosis (FSGS). Half of all patients with FSGS due to obesity will eventually progress to advanced renal failure.

Kidneys damaged by obesity leak protein into the urine ('proteinuria'). This occurs through a variety of mechanisms, including glomerular hyperfiltration (an increased blood flow to the filters within the kidneys of obese patients), the promotion of high cholesterol levels, and alterations in the levels of certain hormones, such as leptin. Persistent proteinuria leads to scarring of the kidneys. This scarring exacerbates the problem of high blood pressure, and this in turn damages the kidneys further.

Obesity promotes diabetes, hypertension and proteinuria. These in turn cause kidney disease. Obesity leads to the development of CKD, and also worsens kidney disease that may already be present due to other causes (see Figure 1). Obesity has also been linked to increased risk of kidney cancers (renal cell carcinoma).

### Obesity and its effect on renal replacement therapies

In addition to contributing to the development and progression of the earlier stages of CKD, obesity also complicates the management of the disease's later, irreversible, stages (stage 5 CKD or 'end-stage renal disease') when either dialysis or

transplantation becomes necessary. Obesity can cause practical problems for people on dialysis. Overweight people have larger arms and this can make the creation of fistulae – the preferred method of access to the veins for haemodialysis – problematic. Furthermore, these fistulae may then be difficult for the dialysis staff to 'needle'. Peritoneal dialysis is also less likely to work well in obese people.

Obesity can make kidney transplantation technically difficult and many units will only accept patients onto the transplant list if they are below a certain BMI. Furthermore, transplanted kidneys do not survive as long in obese patients. In comparison to non-obese transplant recipients, obese patients are more likely to develop complications at the time of the surgery and to develop diabetes after the operation.

### The benefits of losing weight

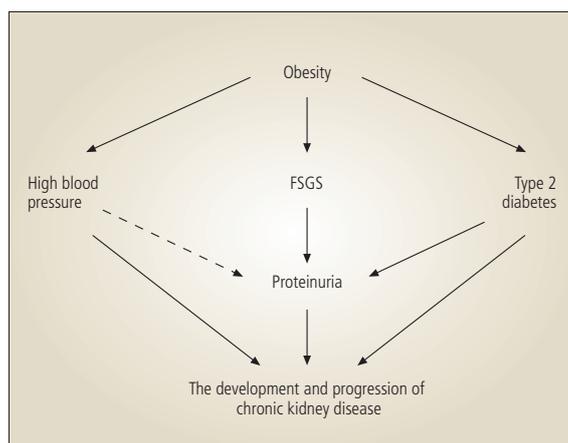
There is strong evidence that weight loss in overweight and obese individuals reduces their overall risk of health problems. Alongside other interventions, such as the use of angiotensin-converting enzyme (ACE) inhibitors and statins, weight reduction early in the course of renal disease is believed to improve the outcomes of patients with obesity-related renal diseases.

### General principles in treating obesity

An overweight or obese individual should usually aim to lose a maximum of 0.5–1 kg per week, with an initial target loss of 5–10% of their baseline weight. A personal weight management programme should be devised to suit the individual's preferences, initial fitness, health status and lifestyle. Long-term follow-up should then be available to individuals attempting to lose weight. These services are often provided by dietitians affiliated to renal units, community dietitians and family practices. However, weight-loss programmes are also available through commercial groups, books or websites.

In most cases, weight-loss programmes combine a number of different interventions (see Box 1). Dietary modifications, alterations in physical activity patterns and behavioural therapy techniques are the cornerstones of most weight-loss programmes. All patients should also have attendant risk factors for cardiovascular disease assessed and treated. Weight-loss medications and surgery are generally reserved for more severe cases.

**Figure 1. The pathways by which obesity can encourage renal disease**



## Dietary modifications

A balanced diet confers many health benefits, even when it does not lead directly to weight loss, and is integral to an effective weight-loss programme. People trying to lose weight require a structured eating plan that encompasses regular, well-balanced meals, with careful consideration given to the size of the portions of food (people eating to excess, even of 'healthy' foods will still struggle to lose weight). Snacking should be moderated; high-calorie processed snacks must be avoided, and fruit and low-calorie foods chosen in their place.

People should follow a varied diet, including at least five portions of fruit and vegetables each day. To help people appreciate how much of what they eat should come from each food group, the Food Standards Agency developed the eatwell plate ([www.eatwell.gov.uk/healthydiet/eatwellplate/](http://www.eatwell.gov.uk/healthydiet/eatwellplate/)). Meals should be based around starchy foods rich in fibre, such as oats, wholegrain rice and pasta. Peas, beans, lentils and other legumes are a good source of soluble fibre and should also be included regularly. Foods that contain high levels of fat and sugar (such as fried foods, 'fast foods', sweets and fizzy drinks) should be replaced with healthier alternatives. Finally, people trying to lose weight should watch out for 'hidden' calories (alcohol, for example, contains large amounts of calories). Figure 2 shows the ideal proportions of each food group in daily intake.

Where patients with renal disease have been advised to follow specific diets, such as diets low in potassium or phosphate, they should continue to do so. The support of a renal dietitian will help to ensure that their diet is nutritionally adequate. In order to lose weight, the total daily energy intake must be less than the daily energy expenditure. It is possible to achieve this with a modest reduction of 600 kcal daily. Such a diet must be planned for the individual, taking into account their age, gender, weight and level of physical activity.

### Box 1. Individual aspects of the management of obesity

1. Dietary modification
2. Altering physical activity patterns
3. Behavioural therapy patterns
4. Assessment and treatment of other cardiovascular risk factors
5. Weight-loss medication
6. Weight-loss surgery

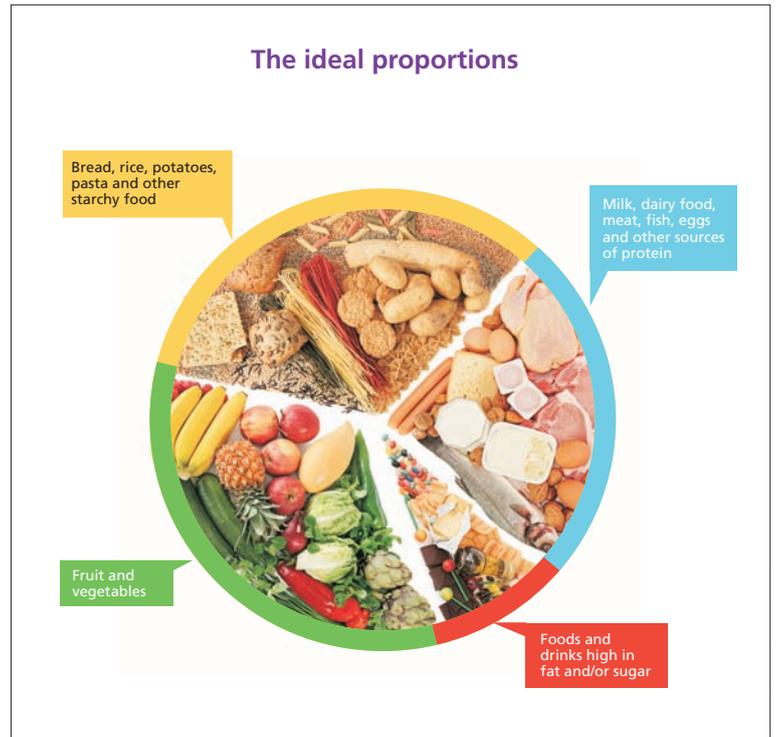


Figure 2. The ideal balance of food intake: the majority of your diet should be fruit, vegetables, and starchy foods

As a rough guide, overweight individuals should aim for a well-balanced diet providing approximately 1,500–1,800 kcal a day. Although daily energy requirements are very much variable from individual to individual, it is not advisable to lower the calorie intake below 1,200 kcal a day. Very low-calorie diets (providing under 1,000 kcal per day) are not advisable, as they are more likely to be deficient in nutrients. For renal patients already on dietary restrictions, very low-calorie diets are discouraged.

In general, people aiming to lose weight should reduce their total calorie intake and, in particular, the amount of fat they eat (fat is the most energy-dense nutrient in the diet). The quality of fat is also important; saturated fats should be reduced, in order to enhance the lowering of low density lipoprotein cholesterol. Quality fats rich in mono- or polyunsaturates should be included in moderation. Ideally, fats should provide no more than 30% of the total energy intake.

## Altering physical exercise patterns

Alongside appropriate dietary modifications, an increase in physical activity is an important component of weight-loss therapy. Even when physical activity does not bring about a reduction in weight, it still has other health benefits, such as reducing the risk of diabetes and heart disease.



Current government recommendations for healthy living are that adults should achieve a total of at least 30 minutes of physical exercise of moderate (or high) intensity on five or more days of each week. Moderate intensity activity can be achieved through activities such as walking, cycling, swimming, gardening and various sports. Less than a quarter of the population currently achieves these guidelines. However, most people need to exercise for at least 45–60 minutes most days of the week in order to actually lose weight. People who have successfully lost weight may need to do 60–90 minutes of exercise most days to avoid regaining the weight.

Sustained physical activity is most helpful in weight reduction. Exercise should usually be initiated slowly and the intensity gradually increased by achievable goals. During exercise, patients should aim to increase their pulse and respiratory rates beyond their resting levels. Patients should be encouraged to incorporate physical activity into their daily lives; for example, by cycling to work rather than driving, or by taking the stairs rather than the lift.

### Behavioural therapies

Behavioural therapies are strategies, based on learning principles such as reinforcement, that can be used to enable individuals to overcome the difficulties they experience in trying to adhere to dietary restrictions or physical exercise programmes. For example, such therapies may help a person to learn to recognise and control things that make them want to eat, even when they are not hungry.

### Weight-loss medications

In carefully selected patients, the use of appropriate medications can augment the combined benefits of dietary modification, physical activity and behavioural therapies to help achieve weight loss. Such medications should only be considered after other approaches have been maintained for about six months, and are usually reserved for patients who have not reached their target weight loss (10% of their original weight), or when weight loss has reached a plateau.

Clear guidelines exist for doctors prescribing these medications. Treatment is only indicated for obese patients, or those with slightly lower BMIs

(27–28 kg/m<sup>2</sup>), alongside other cardiovascular risk factors (for example, diabetes or high cholesterol levels). Treatment is usually for three months in the first instance and should only be continued beyond this period if the patient has lost more than 5% of their starting bodyweight (although this is less strict in patients with diabetes, who typically lose weight more slowly). The two most common weight-loss medications are orlistat (Xenical<sup>®</sup>, Roche, UK) and sibutramine (Reductil<sup>®</sup>, Abbot, UK). Orlistat can be continued beyond a 12-month period, while sibutramine is only licensed for treatment up to one year. The two drugs should not be used together.

### Weight-loss surgery

Weight-loss ('bariatric') surgery may be considered for obese people if their BMI is above 40 kg/m<sup>2</sup>, or between 35 and 40 kg/m<sup>2</sup> if the patient has other significant diseases (such as diabetes or high blood pressure) that might be expected to improve if they lost weight. Surgery is usually only considered in patients in whom all other weight-loss measures have failed over at least a six-month period ■

### Key points

- The body mass index (BMI) is the standard tool for measuring weight. A BMI score of 30 or greater indicates obesity.
- Obesity is linked to a range of health problems, including diabetes, high blood pressure, heart conditions, stroke and kidney disease.
- Obesity can cause changes to the kidneys, lead to excretion of protein in urine (proteinuria) and chronic kidney disease, and increase the risk of kidney cancer.
- Sensible weight loss is best achieved by dietary modification and a sustainable exercise programme.
- Surgical and medicinal weight-loss strategies are only used when other weight-loss approaches have failed.



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