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Learning objectives

After reading this article, the participant should be able to:

1. Describe how to assess and define overweight and obesity, and identify those at greatest risk.
2. Discuss the management of obesity including lifestyle advice, diet, exercise, pharmacotherapy and bariatric surgery.
3. Outline the members of the multidisciplinary team and each of their roles in managing obesity.

Key words

- Bariatric surgery
- Diet
- Multidisciplinary team
- Obesity
- Pharmacotherapy

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Lifestyle advice and management of obesity in diabetes

Matthew Capehorn

Obesity is accompanied by an increased risk of hypertension, coronary heart disease and type 2 diabetes, and its management should be individualised and delivered by a multidisciplinary team. This module describes management options, including pharmacotherapy and surgery, and the ideal multidisciplinary obesity service, with a focus on treating people with type 2 diabetes.

Obesity in adults is an important risk factor for a number of chronic conditions including hypertension, coronary heart disease, stroke, type 2 diabetes and some cancers (Kopelman, 2007). Furthermore, obesity is also directly related to increased mortality and lower life expectancy (Lee et al, 1993; Adams et al, 2006). In the UK, it is estimated that obesity is responsible for more than 30 000 deaths each year (6% of all deaths; National Audit Office, 2001).

Evidence suggests that weight loss in obese and overweight people produces a variety of health benefits (Avenell et al, 2004). Clinical benefits include improvements in osteoarthritic pain, respiratory conditions and obstructive sleep apnoea (Goldstein, 1992), and a delay or prevention of type 2 diabetes in high-risk individuals (Tuomilehto et al, 2001; Knowler et al, 2002). Obesity increases the risk of developing type 2 diabetes by 12.7 times in women and by 5.2 times in men (National Audit Office, 2001). Studies have shown reductions in mortality in overweight individuals with type 2 diabetes associated with intentional weight loss (Aucott, 2008).

As the prevalence of obesity increases, it is expected that the associated medical problems will also increase. Long-term weight loss after bariatric surgery for severe obesity has also been associated with decreased overall mortality (Adams et al, 2007; Sjöström et al, 2007).

Defining obesity and identifying risk

If a person expresses an interest in adopting a healthy lifestyle and losing weight, the first step should be to measure height, weight and waist circumference to establish whether he or she currently has a problem relating to weight and degree of risk.

Body mass index

The World Health Organization (WHO, 2000) standardised the definitions of weight and obesity with its well-established classification based on BMI (Table 1). However, particularly muscular people can have a BMI that suggests they are obese by this classification, when in fact they may be particularly healthy, with no dangerous central or visceral fat, and not at significant risk of cardiometabolic conditions.

The role of the adipocytokines released by the fat cell (now established as a highly metabolically active organ) and their link in the development of insulin resistance, inflammatory markers and dyslipidaemia is becoming clearer. Genetic and environmental factors clearly play a part in the development of insulin resistance, but they may also have a role in appetite regulation, exercise tolerance and metabolic efficiency, causing an indirect effect on levels of adiposity (McCarthy, 2008). Excess fatty acids and the adipocytokines released by the adipose tissue will impair the action of insulin. This visceral fat will cause low-grade inflammation, with oxidative

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stress, in particular pancreatic beta-cell stress, leading to further insulin resistance. A cycle will then develop with further beta-cell dysfunction, resulting in excess glucose production, impaired glucose uptake and utilisation, and ultimately further insulin resistance, impairment of glucose homeostasis and the development of type 2 diabetes (Brewster, 2008). One way to break this cycle is to prevent the development of the central adiposity.

Waist circumference

Evidence supports a strong correlation between increasing waist circumference and the dangerous central, or visceral, fat that sits in and around central organs (as distinct from subcutaneous fat) that increases cardiometabolic risk (Pischon et al, 2008). Furthermore, for every 5 cm increase in waist circumference there is a 17% increased relative risk of death for men and 13% for women that is independent of BMI (Pischon et al, 2008). However, more recent analyses of prospective studies suggest that the “pear” shape may not convey any lower risk than the “apple” shape, which implies that waist circumference should supplement but not replace other indicators of risk (Emerging Risk Factors Collaboration, 2011; Huxley and Jacobs, 2011).

Therefore, until affordable tools for measuring visceral fat become available, a simple waist circumference measure is a useful indicator of risk from excess fat and should be used in addition to BMI. Further considerations on waist circumference are presented in the first version of this module (Capehorn, 2011).

Ethnicity-specific cut-offs

In short, the best assessment of a healthy weight in the Caucasian population is considered to be a BMI of 18.5–25.0 kg/m², and a waist circumference of ≤80 cm in women and ≤94 cm in men. As Hill (2013) has observed, however, the “evidence to give specific cut-points for BMI and waist circumference for individual ethnic minority groups is still not available.” For the time being, Hill notes, 23 kg/m² can be applied as a BMI cut-off point across high-risk ethnic minority group.

Obesity prevalence

The *Health Survey for England* report (Joint Health Surveys Unit, 2012) showed that in 2011, 26%

Table 1. Definition of obesity by BMI (World Health Organization, 2000).

World Health Organization classification	BMI (kg/m ²)	Risk of comorbidity
Underweight	<18.5	Low (but risk of other clinical problems increased)
Healthy weight	18.5–24.9	Average
Overweight	25.0–29.9	Mild increase
Obese	≥30.0	Moderate or higher increase
Grade 1 obesity	30.0–34.9	Moderate increase
Grade 2 obesity	35.0–39.9	Severe increase
Grade 3 (morbid) obesity	≥40.0	Very severe increase

of women and 24% of men aged 16 or over were classified as obese (BMI >30 kg/m²). In total, 59% of women and 65% of men were classified as either overweight (a BMI of 25–30 kg/m²) or obese. This suggests that the majority of the population, and the people that are seen in primary care on a daily basis, are more likely to have a weight problem than be of a healthy weight. If current trends continue then projections made by the Foresight (2007) report suggest that by 2050, nine out of every 10 adults will be overweight or obese, and 50% of adults will be classified as obese by BMI.

It is important to appreciate that obesity is a chronic relapsing condition, whether it is due to genetic predisposition, learnt behaviour or the obesogenic environment. Instead of focusing on managing the consequences of obesity, the causes should be tackled and the person who is motivated to address any unhealthy weight issues should be appropriately managed.

Management of obesity

Comprehensive guidance on the prevention and management of overweight and obesity in adults and children was published by NICE in 2006.

Many people may feel uncomfortable about raising and discussing the issue of body weight, but because it is such an important health concern it may fall to the clinician to broach the subject. Individuals should ideally be managed by a multidisciplinary team (MDT).

Lifestyle advice

The WHO (2000) report on obesity states that a sedentary lifestyle and consumption of high-fat, energy-dense diets are fundamental causes of the obesity epidemic. Whenever possible, weight loss

Page points

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Page points

1. Whenever possible, dictating to a person what food he or she must eat should be avoided, to encourage adherence, and an individual's food preferences should be taken into account..
2. Any change in diet that results in lower calorie consumption, whether due to reduced portion size or less calorie-dense foods, will result in weight loss..
3. A change in diet may have significant impact on the treatment regimen of a person with type 2 diabetes, especially when they are taking numerous medications (particularly oral medications or insulin regimens associated with a risk of hypoglycaemia).

intervention should therefore, in order for total energy intake to be less than energy expenditure, use a combination of: diets that are low in fat, calories or both; increased physical activity; and behaviour modification. Lifestyle changes should be tailored to the individual. In my opinion, encouraging people to make small, manageable changes to their lifestyle is likely to be more successful than attempts to radically alter their diet and physical activity.

Diet

Diets should be tailored to the individual. Whenever possible, dictating to a person what food he or she must eat should be avoided, to encourage adherence, and an individual's food preferences should be taken into account. In most people, avoiding unhealthy food options will improve weight loss efforts greatly. A hypocaloric diet that has a 500–600 kcal/day deficit below a person's daily requirement (as predicted by the Harris–Benedict or Schofield equations, or by the use of specialist equipment) or that reduces calories by lowering the fat content (low-fat diets), or total carbohydrate intake, in combination with support and follow-up, is recommended for sustainable weight loss (NICE, 2006).

Questions have recently been raised concerning what macronutrients are most responsible for obesity, and indeed what constitutes a “healthy” balanced diet. There is current debate among experts as to whether sugar consumption is more responsible than fat for causing the obesity epidemic, with sound clinical arguments (Taubes, 2013; Watts, 2013). Furthermore, a recent meta-analysis and systematic review of 72 studies (45 cohort studies and 27 controlled trials) demonstrated that with the exception of trans fats, which were associated with increased coronary disease risk, and in contrast to current dietary recommendations, there was no evidence to suggest that saturated fat increases the risk of coronary disease or that polyunsaturated fats have a cardio-protective effect (Chowdury et al, 2014). However, current UK guidelines remain unchanged (men should consume no more than 30 g of saturated fat per day, and women no more than 20 g per day; NHS Choices, 2013). Clearly, further research is required to establish the macronutrient composition for a healthy balanced diet, but it should be remembered that fat is still

calorie dense (9 kcal/g) and that eating too much of it will lead to obesity, which will increase risk of coronary heart disease, among other comorbidities.

The use of very-low-calorie diets (VLCDs; often referred to as very-low-energy diets [VLEDs]), which reflect a calorie intake of 450–800 kcal/day, is supported by NICE (2006) and the National Obesity Forum (NOF, 2010). The short-term use of a VLCD is very effective in rapidly improving glycaemic control and promoting substantial weight loss in obese people with type 2 diabetes (Capstick et al, 1997). The NHS Commissioning Board (2013) policy document for bariatric surgery recommends that during the 12–24 months prior to referral for weight loss surgery, non-surgical medical management should include consideration of VLCDs. In my opinion, this will be more effective with full MDT support, and we may see use of the diet increasing over the next few years. However, at the time of writing, no commissioners of weight management services currently fund their use in the NHS setting.

Meal replacements and total food replacement programmes represent alternative dieting options, and these are covered in the first version of this module (Capehorn, 2011).

Any change in diet that results in lower calorie consumption, whether due to reduced portion size or foods that are less calorie-dense, will result in weight loss. It is common for this weight loss to plateau for several reasons. Ultimately, as weight decreases, so do energy requirements, and eventually calorie intake (that previously equated to a calorie deficit) may become equal to energy requirements. However, an individual may drift back into bad habits, and fall susceptible to the influences of the obesogenic environment. When weight loss does not plateau, the diet will need to be adjusted again, once a healthy weight has been achieved, in favour of one that is nutritionally balanced and sustainable in the long term without fear of weight regain.

A change in diet may have significant impact on the treatment regimen of a person with type 2 diabetes, especially when they are taking numerous medications (particularly oral medications or insulin regimens associated with a risk of hypoglycaemia). This will require careful consideration and perhaps an MDT approach involving the diabetes specialist nurse and the dietitian.

Understanding calories

Management should still start with looking for obvious problems, such as lack of understanding of the effects of: a “day off the diet”; portion control; changing snacks to less calorie-dense options; and alcohol and high-calorie low-fat foods. Various considerations relating to calorie understanding are covered in the module’s first version (Capehorn, 2011).

Physical activity

Physical activity is thought to be crucial to the maintenance of weight loss (Hill et al, 2005). The current government recommendation in England is for a minimum of 30 minutes of moderate intensity physical activity on at least 5 days per week for general health, but for weight loss or maintenance of reduced weight, physical activity should be increased to 60–90 minutes on at least 5 days per week (NICE, 2006). The level, and type, of physical activity will depend on what is achievable for the individual and should focus on what is acceptable within his or her normal lifestyle in order to improve adherence.

Being aware of the obesogenic environment in which we live may also be beneficial. Encouraging individuals to take the stairs instead of a lift or escalator, and parking further away from the entrance to the supermarket, for example, can be as beneficial as planned physical activity. More walking should be encouraged, especially instead of short distances normally travelled by car, as should reduced sedentary behaviour such as watching television.

A meta-analysis of controlled trials performed in 2001 showed that exercise training reduces HbA_{1c} levels by an amount that should decrease the risk of diabetes complications, although the precise metabolic changes and effects attributable to the exercise are still not yet fully understood. No significantly greater change in body mass was found when exercise groups were compared with control groups and there was insufficient evidence to define any dose–response effect of acute exercise on glucose metabolism (Boulé et al, 2001).

Behaviour therapy and “talking therapies”

Behaviour therapy involves changing diet and physical activity patterns to those that promote a more healthy lifestyle. Behavioural therapy strategies have varying levels of adherence and effectiveness, but include recording diet and exercise patterns in a

diary, identifying and avoiding high-risk situations (such as having high-calorie foods in the house, or mid-morning snacks with work colleagues when not really hungry), and changing unrealistic goals and false beliefs about weight loss and body image to realistic and positive ones.

When used in combination with other weight-loss approaches, behaviour therapy provides additional benefits in assisting people in losing weight (Shaw et al, 2005). The collective term “talking therapies” includes life-coaching, cognitive behavioural therapy, neuro-linguistic programming, emotional freedom techniques and hypnotherapy.

Although there does not yet exist convincing evidence that these techniques offer equivalent effectiveness to that of other interventions (high-quality randomised controlled trials will be required to assess their true role), there is no doubt that some people with diabetes prefer these approaches, and treatment should be tailored to the individual.

Pharmacotherapy

Weight-loss pharmacotherapy should be considered as part of a comprehensive strategy of obesity management. At present the only licensed medication in the UK is orlistat, which is a gastrointestinal lipase inhibitor that prevents absorption of around 30% of dietary fat. It is taken orally with meals and should be prescribed only as part of an overall plan for managing obesity in adults with a BMI of 28.0 kg/m² or more with associated risk factors, or a BMI of ≥30.0 kg/m² (electronic Medicines Compendium, 2013). Factors relating to prescribing the agent are described in more detail in the first version of this module (Capehorn, 2011).

The efficacy of weight-loss pharmacotherapy should be evaluated after the first 3 months. NICE suggests that the adult target for weight loss should be to lose 5–10% of the original weight (NICE, 2006), but obesity consensus guidelines conclude that a target loss of 5% of the baseline body weight was appropriate, although individualised targets may well be less (Barnett et al, 2009).

There are many medications that have been associated with weight gain, including diabetes therapies. Even diabetes drugs that are not directly associated with weight gain may indirectly contribute if they result in excess circulating insulin, as insulin promotes adipogenesis and weight gain (Kahn et

Page points

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Page points

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al, 2006). NICE (2009) recommends metformin as first-line treatment for people with type 2 diabetes, providing there are no contraindications to its use, and studies have shown metformin to be weight neutral (Nathan et al, 2009). However, sulphonylureas, thiazolidinediones, meglitinides and insulin have all been shown to promote weight gain (Nathan et al, 2009).

There are newer classes of diabetes medications that are more weight friendly, and although not licensed for weight loss, their use should be considered if weight is an issue. Dipeptidyl peptidase-4 inhibitors are weight neutral, and glucagon-like peptide-1 receptor agonists and sodium–glucose cotransporter 2 inhibitors promote weight loss (Nathan et al, 2009; NICE, 2009; Munro et al, 2013).

Bariatric surgery

Bariatric surgery is the collective name for operations intended to induce weight loss. The two most common bariatric procedures are laparoscopic adjustable gastric banding and gastric bypass. In terms of weight loss and resolution of comorbidities, results with laparoscopic gastric bypass are superior to laparoscopic gastric band surgery (Tice et al, 2008). However, the choice of bariatric procedure will depend on several factors including the degree of obesity, the presence of any comorbidities, and dietary habits. An improvement in glycaemic control is often achieved within days, and is therefore not merely a result of weight loss, but rather an unidentified metabolic result of bypassing part of the small bowel. However, for people who have undergone gastric bypass, nutritional supplementation is essential (Fujioka, 2005). For those who have undergone gastric banding, regular adjustments will be required, and monitoring is essential to identify any mechanical problems with the band and its position.

NICE (2006) guidelines advise that people with a BMI >40 kg/m², or >35 kg/m² with a significant comorbidity such as diabetes, should be considered for surgery, if they are clinically appropriate and have tried and failed with all other weight-loss interventions. Furthermore, those with a BMI >50 kg/m² could be considered for bariatric surgery as first-line treatment because of the risk to health associated with such a level of obesity.

The NHS Commissioning Board (2013) produced new recommendations for the provision

of bariatric surgery, and now access criteria should be the same anywhere in England and meet NICE recommendations. However, those individuals with a BMI >50 kg/m² must also fulfil the other criteria listed in these recommendations. Most notably this document recommends 12–24 months of non-surgical medical management in an MDT setting prior to referral. The minimum acceptable period recommended is 6 months. This MDT will be led by a professional with a specialist interest in obesity and includes a physician, specialist dietitian, nurse, psychologist and physical exercise therapist.

There must now also be evidence of attendance, engagement and full participation in medical management, and there is a much greater emphasis on the evaluation of psychological factors relevant to obesity, eating behaviour and physical activity. Only gastric bypass, gastric band, sleeve gastrectomy and duodenal switch will be available on the NHS. It is also suggested that people who lose sufficient weight through medical management to fall beneath the NICE recommended values should not be considered appropriate for surgery.

Regrettably, this new policy document highlighted the lack of tier 3 medical MDTs, and the postcode lottery for the management of severe and complex obesity remains. Owing to limited access to comprehensive weight-loss services with an MDT approach, it could be argued that many people referred for consideration of bariatric surgery have not tried all other interventions.

Conversely, there are health-economic arguments suggesting that not enough people are proceeding to the bariatric surgery stage. If only 25% of those who meet NICE criteria, who have also tried other interventions, who are clinically appropriate for surgery and who are willing and able to proceed actually had the procedure, the direct and indirect saving to the NHS and wider society would total £1.3 billion within 3 years. With appropriate patients, the surgery could potentially pay for itself within a year (Office of Health Economics, 2010).

Regrettably, because of the initial costs of the bariatric surgery, and current financial pressures, most clinical commissioning groups will find it difficult to find the resources to invest in long-term health gains even though the health-economic case is so strong. In 2010, half of primary care trusts used only “elements” of NICE guidelines regarding

bariatric surgery, and one in 10 ignored the guidance completely (Office of Health Economics, 2010).

Bariatric surgery may be a potential treatment for obese people with type 2 diabetes who are resistant to other forms of intervention. A number of studies looking at the rates of resolution of type 2 diabetes following bariatric surgery have shown that procedures such as gastric bands, or gastric bypass, result in 50–80% resolution of diabetes (Dixon, 2009). The mechanism for this is not yet fully understood and more long-term data to ensure sustainability and safety are required. Another recently published trial shedding light on the area is that of Schauer et al (2014), who found that among obese people with uncontrolled type 2 diabetes, 3 years of intensive medical therapy plus bariatric surgery led to an HbA_{1c} target of 42 mmol/mol (6%) being achieved significantly more frequently than medical therapy alone. Body weight, use of antidiabetes medications and quality of life all also showed comparatively favourable results at 3 years in the group undergoing bariatric surgery.

In my opinion, bariatric surgery is a cost-effective clinical option for the morbidly obese person, but the success will be dependent on appropriate pre- and postoperative counselling provided within an MDT. The surgical techniques should be considered a tool to facilitate rapid, and large, amounts of weight loss without experiencing the hunger that can be associated with extreme calorie deficits. However, individuals still require the motivation and will-power to eat less in order to avoid problems such as vomiting or “pouching” of the stomach, and so a careful assessment of eating patterns is required. In this situation, talking therapies are as important as the skill of the surgeon. The surgery will not be effective if this will-power, and any underlying comfort and habit-eating patterns, are not addressed, nor will it be successful if the individual’s diet consists of food that can be easily digested (e.g. liquid calories or chocolate). Stewart et al (2010) suggested that up to 30% of individuals begin to regain weight after 2 years following bariatric surgery because of binge eating, emotional eating, triggers, strategies and their environment. The National Confidential Enquiry into Patient Outcome and Death (2012) report *Too Lean A Service* highlighted the need for more psychological support before and after surgery to reduce the prevalence of subsequent weight regain.

An MDT approach to weight management

NOF (2007) promotes that best-practice specialist weight management interventions are based on an MDT approach. A case example of results achieved under the care of a MDT are described in *Box 1*.

This specialist tier of intervention for adults and children with weight problems should consist of a team of specialists that can deliver different approaches to weight loss. This will ideally include dedicated obesity specialist nurses (OSNs), healthcare assistants (HCAs), dietitian input for complex dietary needs, “Cook & Eat” for cooking skills education, talking therapies providing psychological input and support, exercise therapists who can provide personalised training programmes, and a GP with a special interest in obesity for any medication issues. There should also be facilities for group work in relation to exercise, talking therapies and nutritional advice.

The specialist MDT service could also provide the triage and assessment for all people being considered for further interventions, which may include bariatric surgery in adults or the attendance at residential weight management camps for children.

As with all consultations, a good history and examination is vital. All people should be initially assessed for parameters including blood pressure, weight, height, BMI, waist circumference and, where possible, fat composition using bio-impedance scales. The use of bio-impedance measurements helps to dispel some of the myths that people have that they are “big-boned”, that it is “all muscle”, or that it is “just fluid”. Furthermore, as individuals increase their level of physical activity and hopefully increase their lean muscle mass, bio-impedance measurements can demonstrate that even in the absence of any actual overall weight loss, visceral fat (and waist circumference) may be coming down as it is being replaced by muscle which is more dense. However, an effective weight management clinic can be run with just a height measure, some accurate scales and a tape measure.

If no recent blood tests have been performed, these should be taken to exclude previously undiagnosed metabolic conditions, such as diabetes and pre-diabetes states, underactive thyroid or other associated risk factors. Standard blood tests in nearly all individuals should include fasting plasma glucose or HbA_{1c} level, thyroid function tests, liver function tests and lipid profile.

Box 1. Case report.

Mr S (now aged 63 years) led an unhealthy and sedentary life as a taxi driver. He had been diagnosed with type 2 diabetes, had high blood pressure and was the main carer for his wife.

He first attended the Rotherham Institute for Obesity (RIO) in 2010, when his measurements included: height, 179 cm; weight, 126.8 kg; BMI, 39.6 kg/m²; waist circumference, 139 cm; total fat, 36.6%; muscle mass, 76.5 kg; blood pressure, 136/84 mmHg on medication (medications included metformin, gliclazide, candesartan, simvastatin, lansoprazole, sennoside and as-needed analgesics); and HbA_{1c}, 46 mmol/mol (6.4%). He fully engaged with the RIO multidisciplinary team, accessing the health trainer, nursing team, on-site gym and “Cook & Eat” team.

Follow-up measurements taken in June 2012 were: weight, 88.9 kg; BMI, 27.7 kg/m²; waist circumference, 106 cm; total fat, 18.7%; muscle mass, 68.5 kg; weight loss, 37.9 kg (29.9% of baseline weight loss and 81.2% of excess weight lost); blood pressure, 118/68 mmHg off anti-hypertensives (medications now metformin and simvastatin); last recorded HbA_{1c}, 32 mmol/mol (5.1%). He still attends the gym, is still losing weight and, subjectively, feels much healthier. His weight loss has resulted in his blood pressure being much better controlled, and he has reduced his diabetes medications.

Mr S said: “Being overweight had affected my self-confidence and left me feeling very self-conscious. It also meant that I bought very few clothes as I struggled to find shops that carried sizes big enough, not to mention that larger clothes were much more expensive. I am now fitter, more confident and healthier; I’m a different person – my blood pressure is also on the way down.”

“The obesity epidemic needs to be tackled by provision of sufficient resources and by sharing best practice to develop local, regional and national strategies that can reverse current trends.”

In addition, it should be the role of the tier 3 specialist MDT to assess the individual for comorbidities such as obstructive sleep apnoea, with not only suitable questionnaire-based screening but also overnight oximetry testing. Those shown to have a high apnoea–hypopnoea index should be referred to a local specialist sleep centre for consideration of an appropriate treatment (e.g. continuous positive airway pressure), in conjunction with ongoing weight management.

Individuals should be triaged by an OSN to assess which, if not all, of the services offered by the MDT are required, and appointments made as appropriate.

All individuals should receive further basic dietary and nutritional advice as well as lifestyle and exercise education throughout the length of time they are in the weight management service. The basic nutritional information may be delivered by the OSN, appropriately qualified HCAs or, where available, the facilitators in cooking skills sessions. It may not be effective to deliver nutritional information if the person does not know how to implement this owing to an inability to cook from natural raw ingredients.

Individuals should be invited to see any or all appropriate members of the MDT as often as they may need to. However, they should only be weighed and measured every 4 weeks. This is specifically to overcome the effect of hormonal fluid retention that can occur, and the confusing effect that it can have on monitoring weight.

It is important to consider weight as a modifiable risk factor of disease. If the health of a person is to be improved, fat loss needs to be concentrated on visceral fat rather than chasing the numbers on scales that only reflect overall weight. This figure will not accurately reflect fluid retention or lean muscle changes. Having looser-fitting clothing may be a better indication of successful weight loss.

It is also important that, when appropriate, more intensive input and education is offered from other members of the MDT. This is described in the first version of this module (Capehorn, 2011).

Conclusion

Obese people unable to achieve significant weight loss by themselves should be offered a range of help within a specialist service. Obesity should be treated as a chronic relapsing condition and prevention of weight regain must be part of all obesity treatment

programmes. The obesity epidemic needs to be tackled by provision of sufficient resources and by sharing best practice to develop local, regional and national strategies that can reverse current trends. ■

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Online CPD activity

Visit www.diabetesonthenet.com/cpd to record your answers and gain a certificate of participation

Participants should read the preceding article before answering the multiple choice questions below. There is ONE correct answer to each question. After submitting your answers online, you will be immediately notified of your score. A pass mark of 70% is required to obtain a certificate of successful participation; however, it is possible to take the test a maximum of three times. A short explanation of the correct answer is provided. Before accessing your certificate, you will be given the opportunity to evaluate the activity and reflect on the module, stating how you will use what you have learnt in practice. The new CPD centre keeps a record of your CPD activities and provides the option to add items to an action plan, which will help you to collate evidence for your annual appraisal.

- According to the National Audit Office, what is the estimated INCREASE in risk for obese women developing type 2 diabetes? Select ONE option only.

A. 2-fold
B. 7-fold
C. 13-fold
D. 21-fold
E. 36-fold
- A 42-year-old Caucasian man has a BMI of 24 kg/m².

Which ONE of the following is the most appropriate classification of his BMI? Select ONE option only.

A. Underweight
B. Healthy weight
C. Overweight
D. Obese (grade 1)
E. Obese (grade 2)
- According to the 2012 Health Survey for England Report, what approximate proportion of men had a BMI of 25 kg/m² or more? Select ONE option only.

A. 10%
B. 25%
C. 33%
D. 50%
E. 65%
- A 47-year-old woman with type 2 diabetes chooses a short-term very-low-calorie diet as part of the management of her obesity.

Which is the MOST appropriate MAXIMUM daily calorie intake (in kcal/day) to advise her? Select ONE option only.

A. 600
B. 800
C. 1000
D. 1200
E. 1400
- When advising obese people to lose weight, which ONE of the following would be the LEAST appropriate behavioural therapy strategy? Select ONE option only.

A. Avoid having any high-calorie foods in the house
B. Avoid mid-morning snacks at work
C. Avoid changing false beliefs about body image
D. Record dietary patterns in a diary
E. Record exercise patterns in a diary
- A 51-year-old woman with newly diagnosed type 2 diabetes is obese. She is determined to try a hypocaloric diet that is 500 kcal less than her estimated daily requirements.

If she adhered to this plan EVERY DAY for 12 months, what approximate weight loss (in kg) does this calorie deficit equate to? Choose ONE option only.

A. 6
B. 12
C. 18
D. 24
E. 30
- According to NICE guidance, for maintenance of reduced weight, what is the MINIMUM recommended amount of moderate-intensity physical activity per week? Select ONE option only.

A. 0 months
B. 3 months
C. 6 months
D. 12 months
E. 24 months
- What approximate proportion of dietary fat is prevented from being absorbed by orlistat? Select ONE option only.

A. 30%
B. 45%
C. 60%
D. 75%
E. 90%
- Which ONE of the following has been linked to weight gain? Select ONE option only.

A. DPP-4 inhibitors
B. GLP-1 receptor agonists
C. SGLT 2 inhibitors
D. Metformin
E. Sulphonylureas
- A 39-year-old man with type 2 diabetes and a BMI of 42 kg/m² requests referral for bariatric surgery. He has tried multiple diets in the past.

According to 2013 guidance, what is the MINIMUM acceptable time period, if any, of medical management in an MDT BEFORE recommending a referral for bariatric surgery? Select ONE option only.

A. 0 months
B. 3 months
C. 6 months
D. 12 months
E. 24 months