Healthy lifestyle interventions in general practice: Part 14: Lifestyle and obesity

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Abstract

Obesity is defined as an excessive amount of body fat or adiposity. It can be measured using the body mass index (BMI), and according to established criteria for adult men and women, overweight is defined as a BMI between 25-30 kg/m^2, and obesity as a BMI > 30 kg/m^2. Obesity is clinically associated with many serious co-morbidities, and is widely recognised as one of the leading health threats in most countries around the world. Weight loss is recommended for patients with a BMI > 25 kg/m^2. The goals of weight loss therapy are to reduce obesity-related co-morbidities and decrease the risk of future obesity-related medical complications. The management of obesity is multifactorial, and involves the use of combined lifestyle interventions, including regular physical activity and dietary and psychosocial intervention. Practical clinical advice regarding interventions in these important areas is provided in this article.

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Introduction

This article forms the fourteenth part of the series on the role of lifestyle modification in general practice, and has specific reference to patients with obesity. Chronic, non-communicable diseases account for over half of the global burden of disease, and overweight and obesity are recognised as the fifth leading risk for global deaths.[1,2] Nearly half of adult diabetes, more than 20% of ischaemic heart disease, and between 10-40% of certain types of cancers are attributable to overweight and obesity (http://www.who.int/mediacentre/factsheets/fs311/en/index.html) (see Table I).[3] Thus, it is clear that obesity is a major contributor to increased morbidity and health care costs in society.

Until relatively recently, obesity was considered to be an affliction of the wealthy. Indeed, early in the 20th century, most populations in which obesity became a public health problem were in the developed world, primarily the United States and Europe. Although few developing countries have nationally representative longitudinal data to assess trends, the available data show that the most dramatic recent increases in obesity are occurring in developing low- and middle-income countries.[2] According to the World Health Organization (WHO), global obesity has more than doubled since 1980. In 2008, 1.5 billion adults were overweight or obese, and nearly 43 million children under the age of five were overweight in 2010.[4] South Africa is no exception, with more than one in every two women, and one in every three men presenting with overweight or obesity.[5]

Table I: Medical complications associated with obesity[3]

System	Medical complications associated with obesity
Cardiovascular	Hypertension, coronary heart disease, congestive heart failure, dysrhythmias, pulmonary hypertension, ischaemic stroke, venous stasis, deep vein thrombosis, pulmonary embolus
Respiratory	Abnormal pulmonary function, obstructive sleep apnoea, obesity hypoventilation syndrome
Gastrointestinal	Gallstones, pancreatitis, abdominal hernia, non-alcoholic fatty liver disease (steatosis, steatohepatitis and cirrhosis), gastro-oesophageal reflux disease (possibly)
Endocrine/ metabolic	Metabolic syndrome, insulin resistance, impaired glucose tolerance, type 2 diabetes mellitus, dyslipidaemia, polycystic ovarian syndrome
Musculoskeletal	Osteoarthritis, gout, low back pain
Gynaecological	Abnormal menses, infertility
Genitourinary	Urinary stress incontinence
Ophthalmic	Cataracts
Neurological	Idiopathic intracranial hypertension
Cancer	Oesophagus, colon, gallbladder, prostate, breast, uterus, cervix, kidney
Postoperative events	Atelectasis, pneumonia, deep vein thrombosis, pulmonary embolus

More than 30% of adolescent girls, and nearly 10% of boys, are either overweight or obese. The pattern is much the same for primary school children with 22% of girls and 17% of boys being overweight or obese. In children under the age of 9 years, 17% are overweight or obese, 19% are

stunted, and the risk of obesity in stunted children is nearly twofold higher, with potentially long-term negative health consequences.[6-8]

Obesity may be defined as an excessive amount of body fat or adiposity. Body mass index (kg/m^2) is used as a crude, population-based health measure to classify overweight and obesity as health risk indicators. Using WHO BMI cutoffs, overweight is defined as a BMI between 25–30, and obesity as a BMI > 30 for adult men and women (see Table II).[4,8] Standard BMI charts are used for children, because of the variation of body mass with age. Overweight in children (ages of 2-18 years) is defined as between the 85th-95th percentile and obesity > 95th percentile. BMI provides the most useful population-level measure of overweight and obesity.[4] However, it should be considered a rough guide, because it may not correspond to the same degree of fatness in different individuals.[9]

Table II: Classification of obesity according to the BMI and waist circumference[3]

Classification	BMI (kg/m^2)	Obesity class	Disease risk (relative to normal weight and waist circumference)	
			Men ≤102 cm Women ≤ 88 cm	Men ≥ 102 cm Women ≥ 88 cm
Underweight	< 18.5		Increased	Increased
Normal	18.5-24.9		Normal	Normal
Overweight	25-29.9		Increased	High
Obesity	30.0-34.9	I	High	Very high
	35.0-39.9	II	Very high	Very high
Extreme obesity	> 40	III	Extremely high	Extremely high

Importantly, while excess accumulation of body fat and obesity are considered to be major cardiovascular disease risk factors based on the American College of Sports Medicine risk stratification criteria,[8] central adiposity or visceral fat accumulation is viewed as an independent risk factor. Central fat accumulation, or visceral fat, is one of the hallmark clinical signs of the metabolic syndrome, and is associated with increased risk of insulin resistance, hypertension, hyperlipidaemia and cardiovascular disease. Visceral adipose tissue or truncal fat is measured anthropometrically, using waist circumference. Men with a waist circumference greater than 102 cm, and women with a waist circumference greater than 88 cm, are considered to be at increased risk, independent of BMI.[8] (See Table II).

Aetiology and treatment goals in obesity

While obesity is a complex disease influenced by endocrine, hypothalamic, genetic, behavioural and environmental factors, the fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended.[3] Globally, there has been an increased intake of energy-dense foods that are high in fat, salt and sugars, but low in vitamins, minerals and other micronutrients, as well as a decrease in physical activity due to the increasingly sedentary nature of many forms of work, and changing modes of transportation resulting from urbanisation.

Weight loss is recommended for patients with a BMI > 25. The goals of weight loss therapy are to reduce obesity-related co-morbidities, and decrease the risk of future obesity-related medical complications. Treatment goals should also include that of weight maintenance, as opposed to weight loss alone. This implies the achievement of the best possible body weight, within the context of the patient's overall health. In certain circumstances, achieving ideal body weight, or percentage body fat, may not be appropriate, realistic or desirable. The lifestyle and age of the individual, as well as the severity of the existing obesity, will determine the complexity of successfully reducing body weight.

However, even a 5-10% loss of initial body weight is likely to lead to improved health outcomes in the short term. It does this by positively impacting on the co-morbidities associated with obesity. Therefore, the clinician plays an important role in assisting obese patients to accept more modest and achievable weight loss goals, as opposed to the often unrealistic goals set by individuals themselves.

Management of obesity is multifactorial, and involves the use of combined lifestyle interventions of regular physical activity, dietary and psychosocial intervention. For persons with a BMI of 27-35, and > 35, management strategies that result in a weight loss of about 0.2-0.45 kg, and 0.45-0.9 kg per week, respectively, are recommended by the National Institutes of Health (NIH).[10,11] These should continue for about six months, to result in a 10% body weight reduction.[10-12] The focus for the six months following the initial weight loss phase changes from weight loss to weight maintenance, after which further weight loss can considered. Realistic and individualised weight loss goals should be formulated thereafter.

Pharmacotherapy and surgical treatment of obesity are indicated in some patients. However, these interventions are beyond the scope of this publication, and the remainder of this article will focus on the abovementioned lifestyle interventions.[13,14]

Physical activity in obesity

Effects of physical exercise

Besides changes in the distribution of body fat, the benefits of regular physical exercise in obese individuals include improved insulin sensitivity, favourable changes in metabolic rate and lipid profile, reduced blood pressure and inflammatory markers, and an overall improvement in

co-morbidity risk.[15-18] Exercise training exerts a possible effect on the sensation of satiety, improves mood, and leads to the preservation of lean body mass, despite caloric restriction.[19,20]

Exercise prescription

While the health benefits of regular physical activity are well established, even for overweight and obese persons, the question as to how much exercise is necessary for weight loss, and how much is needed to prevent weight regain, is the subject of considerable recent debate. The American College of Sports Medicine recently published a revised position statement, which reviewed the best and most recent evidence concerning the recommendations for exercise to prevent weight gain, to effect clinically significant weight loss, and to prevent weight regain following weight loss.[14]

Full details of the exercise prescription are provided in Table III. In brief, the current recommendation of 150 minutes of moderate-to-vigorous physical activity, at least 10 minutes at a time on most, but preferably all, days of the week, may be sufficient to achieve substantial health benefits and reduce the risk of all-cause mortality. However, recent evidence suggests, that in the current "obesogenic" environment, between 150-250 minutes of at least moderate exercise is needed to prevent a weight gain of more than three per cent of body mass during adulthood. Moreover, to effect a clinically significant weight loss, between 225-420 minutes of activity (30-60 minutes, seven days per week) may be required. This depends, in part, on dietary energy intake, and the time spent in sedentary activity. There is now good evidence to suggest that not only exercise, but "lifestyle physical activity" and reduced sedentary time, will help to prevent weight gain. Finally, once clinically significant weight loss has been realised, the evidence would suggest that weight loss relapse, or the regain of lost weight, is inversely proportional to the amount of physical activity. From the available evidence, to be effective against weight regain, at least 200-300 minutes of physical activity per week are recommended.

Physical activity for weight loss is most effective when combined with moderate, and not severe dietary energy restriction. Furthermore, evidence suggests that endurance-type activities, combined with resistance training several times per week, are most effective in generating fat mass loss, retention of important fat-free mass, and reduction of abdominal fat.

The modality and intensity of exercise is an important consideration for the obese patient. Obese patients are at increased risk of musculoskeletal injury, as a result of biomechical alterations, increased ground reaction force and joint loading. Fear of injury and actual injury are two important factors which mitigate against adherence to and completion of an exercise intervention.

In addition, it has been shown that exercise intensity that is over and above the self-paced or self-selected preference of obese persons, will reduce the efficacy of the exercise bout and the enjoyment, which may result in lower adherence rates.

Practical clinical considerations in prescribing exercise for patients with obesity

- A full medical evaluation of the obese patient should be conducted prior to exercise initiation. This should include an assessment of all systems for the co-morbidities listed in Table I, and a detailed examination of the musculoskeletal system to evaluate risk factors for injury. Functional capacity and cardiovascular response to exercise should also be measured.
- Due to associated co-morbidities and increased risk of injury in obese patients, exercise prescription should be individualised, and progression should be gradual.
- Water-based exercise interventions and other low-impact or non-weight-bearing activities are advocated for obese patients with high risk of injury.
- Thermal neutral exercise environments should be offered to patients who have thermoregulatory dysfunction.
- Pharmacotherapy, if prescribed, should always be used in conjunction with exercise, dietary and psychosocial interventions.
- Some pharmacological agents that are used in the management of obesity, and particularly the appetite suppressants, might cause an excessive increase in exercising blood pressure and a predisposition to arrhythmia. For this reason, the cardiovascular response to exercise in obese patients ingesting these agents should be monitored.

Psychosocial and behavioural aspects of obesity

It is important that the clinician understand the psychosocial and behavioral aspects that contribute to obesity, as management of these disorders becomes an important component of lifestyle modification. Important contributors include chronic psychosocial stress and binge eating.

Psychosocial stress

The long-term impact of psychological stress on the propensity to gain and maintain weight, and the psychological dynamics underlying disordered eating, most especially binge eating, are significant contributors to obesity.

The hypothalamic-pituitary axis (HPA), the physiological regulator of the adaptive response to stressors, may become dysregulated over time with excessive or repeated stimulation, resulting in the dysregulation of glucocorticoids (GC), in particular. These hormones play an important role in appetite regulation, in that appetite is suppressed during and after acute stress via a number of neuropeptide interactions, ultimately affecting the brain. In the hours and

Table III: Exercise prescription for preventing weight gain, to promote clinically significant weight loss, and to prevent weight regain

Component		Recommendations to prevent weight gain		Recommendations to promote "clinically significant" weight loss		Recommendations to prevent weight regain	
Exercise prescription	**Frequency of training**	There is now sufficient evidence that between 150-250 minutes of moderate activity per week will prevent more than 3% weight gain in adults. This is the equivalent of 1 200-2 000 kcal/ week or 4.9-8.4 MJ/week.[14]	Preferably at least 5 days per week, but by increasing the frequency, or finding ways to increase daily lifestyle activity (steps per day), the duration of exercise will need to be less.[14,21-23]	Regular moderate-to-vigorous activity lasting at least 150 minutes per week may result in modest weight losses of only 2-3 kg, or less than 10% of body mass. To achieve more substantial weight losses, it is likely that individuals will need to spend at least 30-60 minutes per day, or between 225-420 minutes/week in moderate-to-vigorous activity. There is a dose-response relationship, and it is somewhat dependent on the degree of dietary energy restriction.[14,24-27]	Preferably at least 5 days per week, but by increasing the frequency, or finding ways to increase daily lifestyle activity (steps per day), the duration of exercise will need to be less.[14,28,29]	There is evidence to suggest that between 200-300 minutes of moderate-to-vigorous activity per week is required to maintain weight losses achieved through diet and activity intervention, or to reduce the likelihood of weight regain.[14]	Preferably at least 5 days per week, but by increasing the frequency, or finding ways to increase daily lifestyle activity (steps per day), the duration of exercise will need to be less.[14,28,29]
	Intensity of the training		Intensity should be moderate, between 40-60% of maximal capacity, or correspond to a feeling of exertion which is "light" to "somewhat hard".		Intensity should be at least moderate, between 40-60% of maximal capacity, or corresponding to a feeling of exertion which is "light" to "somewhat hard" (> 50% maximal capacity). Recent evidence suggests higher intensity exercise, even for a shorter duration, may impact directly on fat-free mass and abdominal fat distribution.[24]		Intensity should be at least moderate, between 40-60% of maximal capacity, or correspond to a feeling of exertion that is "light" to "somewhat hard" (> 50% maximal capacity). There is some indication that "more is better", and that greater levels of physical activity will have a dose-response effect in preventing weight regain.[14,30]
	Duration of a training session		Exercise duration, intensity and frequency may be combined or accumulated to a total of between 150-250 minutes/ week, in bouts of at least 10 minutes at a time.		Exercise duration, intensity and frequency may be combined or accumulated to a total of between 225-420 minutes/ week, in bouts of at least 10 minutes at a time.		Exercise duration, intensity and frequency may be combined or accumulated to a total of between 200-300 minutes/ week, in bouts of at least 10 minutes at a time.
Length of the programme		These studies suggest that exercise to prevent weight gain is a long-term commitment. These data were generated from cross-sectional and long-term studies. The amount of exercise required to prevent weight gain throughout the life-course will depend, in part, on energy intake.[14]		The duration of the intervention programme may be determined by rate of weight loss. However, it is likely to be a long-term commitment lasting more than several months. Once individuals have achieved recommended weight losses (a sustained weight loss of at least 10% results in substantial health benefits), they may adopt strategies to prevent weight regain.[14]		As energy requirements change with ageing or lifestyle, the physical activity requirements for maintaining a reduced weight are also likely to change. However, the data based on the literature thus far indicate that a programme of at least 2 years following weight loss is not unreasonable.	
Type (modality of the training)		Whole body exercise, including cardiorespiratory, endurance-type activities, such as walking, jogging, cycling, rowing, elliptical or stair climber training, swimming and dancing, is the primary modality. Resistance training alone is unlikely to prevent weight gain, but is an important component of health-related fitness, and should be included in any programme up to 3 times weekly. Even simple exercises using body weight as resistance are appropriate.[14]		Whole body exercise, including cardiorespiratory, endurance-type activities, such as walking, jogging, cycling, rowing, elliptical or stair climber training, swimming and dancing, is the primary modality. Resistance training alone has not been shown to result in clinically significant weight loss. However, resistance training combined with cardiorespiratory, endurance-type exercise may be more effective than either modality alone. Resistance training may improve fat-free or muscle mass, which may impact favourably on overall metabolic rate.[14]		Whole body exercise, including cardiorespiratory, endurance-type activities, such as walking, jogging, cycling, rowing, elliptical or stair climber training, swimming and dancing, is the primary modality. Resistance training combined with cardiorespiratory, endurance-type exercise may be more effective for maintaining weight loss, than either modality alone. Resistance training may improve fat-free or muscle mass, which may impact favourably on overall metabolic rate. In addition, resistance training may result in a specific loss of abdominal fat.[14,31-32]	

Component	Recommendations to prevent weight gain	Recommendations to promote "clinically significant" weight loss	Recommendations to prevent weight regain
Monitoring and progression of the exercise training	Monitoring of exercise training and progression may improve adherence. Self-monitoring devices that have been shown to be helpful include step counters or pedometers, or heart rate monitors.[33] Progression of an exercise programme will depend, in part, on the initial fitness of the individual, and his/her goals. However, adequate time should be allowed for adaptation to occur before increasing exercise. Ideally, increasing duration and frequency should take place first, after which the individual may increase intensity.[26]		
Special considerations for exercise in overweight and obese persons: • **Dietary intervention** • **Body composition and body fat distribution** • **Adherence and relapse prevention** • **Biomechanics and risk of musculoskeletal injury**	The progression of exercise should never exceed what is reasonable or feasible. In addition, exercise over and above an individual's preference or self-selected pace may reduce the enjoyment of exercise. Both of these strategies may initiate a cycle of relapse and non-adherence.[28] Reducing sedentary time and increasing incidental or daily physical activity, such as walking and taking the stairs, may be effective strategies to prevent weight gain in adults.[14, 29]	The modality and intensity of exercise is an important consideration for the obese patient. In particular, exercise intensity over or above a self-paced or self-selected preference will reduce the effect of the exercise bout and the enjoyment, and possibly result in lower adherence rates.[34] There is some indication that aquatic, water-based exercise may be an effective modality, particularly for obese persons suffering from osteoarthritis or similarly limiting musculoskeletal complaints. Water-based exercise, of similar duration and intensity to land-based exercise, also results in an improvement in body composition, and may place less overall strain on the musculoskeletal system, compared to land-based exercise.[35] Recommendations concerning physical activity for weight loss cannot be considered without also considering dietary recommendations. As a result, exercise dose-response may be modified, taking into account dietary energy intake. It has been shown that exercise training, without concomitant dietary intervention, results in overall lower weight losses, and a greater rate of relapse.[14,36] There is also some evidence that obesity results in "functional limitations" through load bearing on the musculoskeletal system without adequate support, which results in altered biomechanics and increased risk of musculoskeletal injury.[37] Obese individuals have increased ground reaction forces and knee-joint loads, when walking at a faster pace.[28] For this reason, it is important for overweight and obese individuals to receive basic instruction concerning correct posture, and core stabilisation prior to initiating an exercise programme. Furthermore, slower, self-paced walking may place them at lower risk of injury. Clinicians should be particularly mindful of the increased risk of injury, and biomechanical factors which may predispose these individuals to injury, and which may then result in potential relapse.	The modality and intensity of exercise is an important consideration for the obese patient. In particular, exercise intensity over and above a self-paced or self-selected preference will reduce the effect of the exercise bout and the enjoyment, and possibly result in lower adherence rates.[34]

days following a stressful situation, GC release results in stimulation of feeding, which is adaptive in the context of "storing" food in anticipation of another stressor. However, if the stressor becomes chronic, or with repeated hits of stress, GC can become chronically elevated, leading to chronically stimulated appetite, increased feeding and consequent obesity.[39]

GC also play a role in the regulation of lipid metabolism and homeostasis. In both animals and humans, excessive GC are associated with increased visceral fat deposition; a phenotype associated with increased risk of cardiovascular disease.[40] Chronic stress, and the resultant increased GC, can both predispose an individual to obesity, or exacerbate an existing obese phenotype.

There is compelling evidence that the intrauterine and neonatal environment may contribute to obesity in adults, and psychosocial stress at critical periods of development may be one of these factors. While pregnant women respond to stress with less of an increase in GC than non-pregnant women (an adaptation to protect the foetus), in severe or chronic maternal stress, GC may still affect the foetus. This may impact on foetal brain development, leading to alterations in the HPA, learning, memory, sensitivity to drug abuse, and obesity. For example, maternal bereavement, just before or during pregnancy, is associated with increased weight gain in childhood.[41] These data reinforce the importance of viewing the problem of obesity from a wider, systemic perspective.

Binge eating

Binge eating is characterised by eating (objectively) large amounts of food, accompanied by as sense of loss of control, in the absence of compensatory behavior, such as vomiting or laxative abuse. When this occurs frequently, i.e. more than twice weekly, and is associated with distress and loss of control, then binge eating disorder (BED) may be diagnosed. From a psychological point of view, binge eating is a common and serious problem, either contributing to, or worsening, existing obesity. More than one-third of obese individuals treated at weight-control programmes reported problems with binge eating (disordered eating), although fewer fulfill the criteria for BED, according the Diagnostic and Statistical Manual of Mental Disorders (DSM) criteria.[42-44]

Many factors contribute to the aetiology of binge eating. These factors do not directly induce binging, but rather predispose individuals to this behaviour. They include social (media portrayal and peer influences); familial (attachment disorders and family dynamics); interpersonal (abuse and neglect); and psychological (poor self-esteem, external loss of control and perfectionism). These findings are not unique to binge eating and are generalised, but do tend to cluster with other impulsive, escape behaviours such as alcoholism, self-harm, and risky sexual behaviour.

There is more convincing causal evidence for the immediate triggers of binge eating. Food restriction and negative emotional states trigger bingeing, and have their greatest impact when they coincide. In the early stages, physiological states (cravings, hunger and starvation) trigger binge eating, but this shifts towards affected states later on. Individuals use food and eating ("the food space") to block awareness of intolerable cognitive and emotional states, e.g. loneliness, anger and fear of abandonment, as well as the consequences of distressing or difficult interpersonal situations, e.g. the loss of a relationship. Binge eating is often referred to as "emotional" eating.

Psychological treatment of obesity

Psychological treatment of obesity includes psychotherapy for binge eating (most commonly in a group setting, but also individual interpersonal or cognitive behavioural therapy), management of co-morbid psychiatric disorders, e.g. depression, and behavioural programmes which address adherence to a healthy eating plan. This helps to develop relapse-prevention techniques, and to build coping skills to manage relapse crises. It is helpful to orientate patients to an overarching treatment philosophy, which includes the concept of a reasonable weight, and in which losing weight is one way in which individuals can improve health and well-being.[42,43,45]

Mindfulness eating awareness training is an emerging, integrative therapeutic approach. Conducted in group settings, these programmes comprise training in mindfulness meditation and its application in daily life. This helps cultivating of improved self-regulation of emotional states, making conscious food choices, and developing awareness of hunger and satiety cues. This is achieved through enhancing body awareness vs. body self-consciousness, and cultivating self-acceptance. Evidence supports the value of this approach in decreasing binge episodes, improving self-control in the food space, reducing weight and diminishing psychological distress.[46,47]

Dietary interventions for patients with obesity

A nutritionally balanced dietary regimen, in combination with physical activity and lifestyle modification, should be included as part of any weight-loss programme. The health risks and goals of the patient will determine the appropriate treatment strategy, which could comprise any of the following:

- Very low calorie diets, combined with increased physical activity and lifestyle modification.
- The above, combined with pharmacotherapy.
- Surgical intervention, in addition to a lifestyle modification programme, including dietary modification and physical activity.
- Weight gain prevention through optimisation of energy balance.

Restricted energy diets

A balanced, nutritionally adequate, decreased energy diet is most widely recommended for weight loss. A 500-1 000

calorie deficit is usually adequate to result in mobilisation of the fat stores to meet energy needs. The size and activities of the individual will determine the energy value. In daily energy intake, this usually ranges between 1 200-1 800 kcal. Nutrition education and physical activity should be emphasised, regardless of the level of calorie restriction.

The composition of the low-calorie diet (LCD), although individualised, should be as follows:

- 50-55% carbohydrates, with the emphasis on vegetables, fruit, wholegrains and beans.
- 15-25% lean protein.
- 30% fat, with the emphasis on unsaturated fats.

Selection of the best food choices in the above groups is advised.

Other recommendations include:

- Including extra fibre to assist with satiety, as this causes a delay in stomach emptying. Extra fibre should reduce the calorie density of the diet.
- Introducing the use of artificial sweeteners and/or fat substitutes for enhanced food acceptability for certain individuals.
- Suggesting the use of vitamin and mineral supplements, for age-related requirements, for diets that provide less than 1 200 kcal for women and less than 1 800 kcal for men.

On a more practical level, the principles of promoting weight management, as set out by the US Department of Agriculture and the US Department of Health and Human Services, in the *Dietary Guidelines for Americans 2010*, include the following:[11]

- Focusing on the total number of calories consumed.
- Monitoring food intake.
- Choosing smaller portions or lower calories options, when eating out.
- Preparing, serving and consuming smaller portions of foods and beverages, especially those that are high in calories.
- Eating a nutrient-dense breakfast.
- Limiting screen (television and gaming) time.

Fasting, extreme energy restriction and very low calorie diets

Fasting and starvation diets consist of fewer than 200 kcal per day, and are sometimes followed in a personal attempt at weight loss, or as part of a religious regimen or protest. The health effects of these diets can be serious, ranging from hypotension, gout and gallstones, to anorexia nervosa.

Very low calorie diets (VLCDs) provide between 200 and 800 kcal per day, are typically high in protein, providing 0.8-1.5 g protein/kg ideal body weight/day, and have the complete micronutrient, essential fatty acid and electrolyte requirements. Such diets are generally followed for 12-16 weeks, inducing rapid weight loss. They are generally reserved for individuals with a BMI > 30, who have not experienced success with other weight-loss programmes, of for individuals with a BMI of between 27-30, who also have disease risk factors and/or other co-morbidities.

When LCDs and VLCDs are compared, the latter usually result in greater initial weight loss. However, there are no significant differences with respect to long-term weight loss.[48] VLCDs also carry the risk of the energy deficit being too great, and of nutritional inadequacies developing in the absence of micronutrient supplementation.[1,4] Therefore, except in extreme circumstances, it is not warranted to advocate a VLCD over one that entails a more moderate energy restriction.

Alternative weight loss strategies

Low carbohydrate diets

Low carbohydrate diets restrict carbohydrate consumption. Foods that are high in digestible carbohydrates, e.g. bread and pasta, are limited to or replaced with foods containing a higher percentage of proteins and fats, e.g. meat, poultry, fish, shellfish, eggs, cheese, nuts, seeds, peanuts, and soy products, and other foods low in carbohydrates, e.g. most salad vegetables, although other vegetables and fruits, especially berries, are often allowed. The amount of carbohydrate allowed differs with various forms of these diets.

Evidence suggests that with respect to weight loss, low-carbohydrate diets are at least as effective as low-fat, energy-restricted diets in inducing weight loss for up to one year, although the longer term sustainability of such dietary practices has not been demonstrated.[49-52] Although these diets are popular, and more data are slowly becoming available, these diets are controversial, and are not recommended generally by major governmental and medical organisations at present, as consensus is lacking. The concerns regarding low-carbohydrate diets focus on possible nutritional deficiencies, metabolic abnormalities, and other health risks that may potentially develop if these diets are followed over a prolonged period of time.[53] Further research and consensus is needed in this important area.

Specialised diets

Often the goal of specialised diets (ready-to-use, portion-controlled foods and beverages, meal-replacement drinks, and the like), is to replace other foods that are likely to be higher in energy, and also provide structure to the diet. The composition of these products varies greatly, and often includes the addition of protein powder, fibre, and vitamins and minerals. If self-regulation or the control of portion sizes proves to be troublesome for certain individuals, meal replacements, such as calorie-controlled packaged meals, meal bars or liquid meals, could prove to be beneficial as part of a comprehensive weight management strategy. This could include the replacement of one or two meals or snacks daily.[10]

Commercial weight loss or self-help programmes

Many people turn to commercial weight loss or self-help programmes in an attempt to achieve weight loss. With increased access to the internet these, and other, weight management programmes, have significantly proliferated over the past few years. These programmes all vary considerably. Some provide varying elements of nutrition education, behavioural modification, personalised coaching and individualised feedback. In overweight adults with a BMI between 25-36, the use of the internet has been shown to deliver weight-loss programmes successfully, if weekly contact sessions with individualised feedback was included.[54] The importance of a tailored approach has been emphasised. However, currently evidence is lacking to support the majority of commercial and self-help weight-loss programmes.[55] Controlled clinical trials are warranted in order to assess the efficacy and cost-effectiveness of these programmes. The effects of treatment and drop-out rates, as well as success and maintenance data, need to be collected.[56] Most importantly, all weight-loss programmes need to be evaluated for sound dietary practices.

Natural weight-loss aids

The lure of products that promise a quick and easy solution to weight management has further resulted in a boom in the market of natural weight-loss aids, including products such as chromium, senna, chitosan, ma huang and many others. Some of these over-the-counter products may have already been proven to be ineffective in managing obesity, or may have serious negative health effects. Of the 50 common dietary supplements tested, none met the set criteria.[57,58]

Inflammation and comorbidities

In obese persons, there is an increased risk of metabolic abnormalities that are commonly associated with the metabolic syndrome, including cardiovascular disease, dyslipidaemia, type 2 diabetes, and hypertension. The cluster of these disorders is associated with a state of mild, chronic inflammation, where fat tissue metabolism is implicated.[59]

Given the strong link between inflammation and diet, dietary recommendations for protection against these metabolic derangements in the obese patient include a diet high in fibre-rich cereals, vegetables and fruit, fish, monounsaturated fats, such as olive oil, nuts, moderate wine intake, low meat and processed meat intake, and low intake of trans-fatty acids.[59]

Common challenges in dietary management

The plateau effect

The plateau effect is the stage where weight remains unchanged for a period of time. Essentially, energy input and expenditure remain the same. This is a common phenomenon for individuals on a weight-loss programme. Weight loss may even cease altogether. This may be due to a reduced resting metabolic rate resulting from a lower lean body mass as a consequence of weight loss, along with the reduced thermic effect of food, due to the reduced calories ingested. At this stage, a change has to be made, either to the patient's dietary intake, or to their physical activity. Timeous referral to a dietitian is warranted in these patients.

Weight cycling

This is also known as yo-yo dieting, and refers to repeated bouts of weight loss and weight regain. It occurs in both sexes, and in normal and overweight individuals. The associated undesirable metabolic effects include an increase in body fat and weight gain, in addition to adverse psychological effects. More research on the yo-yo effect in weight management is warranted.

Conclusion

This article has provided an overview of the basic lifestyle modifications that need to be considered in the management of obese patients. A multidisciplinary approach to exercise training, dietary modification and psychosocial intervention is important in patient management. General practitioners should be aware of the benefits of exercise and healthy nutritional and psychosocial interventions, in particular, and should assist their patients by suggesting adherence to accepted physical activity and nutritional guidelines. General practitioners should give their patients their time and interest. This will equip them to assist their patients in making well-informed choices with respect to their lifestyles, and in the promotion of their health and disease management.

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