

A model approach to obesity

In Australia over 65% of men and 53% of women are overweight or obese. Obesity is associated with many other diseases and risk factors. This means that at least one in two patients in general practice are likely to present with excess bodyweight as a comorbidity, if not a primary cause of disease. Addressing lifestyle issues is the first and most important problem to deal with in the treatment of obesity.

GARRY EGGER MPH, PhD

ANDREW BINNS BSc, MB BS, DRCOG, DA, FACRRM

Dr Egger is Adjunct Professor of Health Sciences at Deakin University in Melbourne and Scientific Director of the GutBusters men's 'waist loss' program in Sydney.

Dr Binns is a General Practitioner from Lismore, NSW, with a special interest in obesity.

As most people in their fourth or fifth decade of life can testify, gaining weight is insidious. It creeps up on you. Just when you think you have earned the right to relax and enjoy the fruits of your earlier toils you become plagued by middle-age spread. This is now a problem for more than half of the population of Australia, and the prevalence of overweight and obesity is increasing by around 1% per year.

Of course Australians haven't always been fat. The older among us remember our parents as being normal weight, even thin. Certainly changes in lifestyle and physiology with advancing age make it harder to beat the battle of the bulge, but over the last two to three decades the battle has become an unfair fight. This is not a problem confined to the ageing. Up to 30% of adolescents and 20% of juvenile Australians (under 12 years of age) are now overweight or obese.¹ The question is why has this happened and can anything be done about it at the clinical level?

IN SUMMARY

- Over 50% of all Australians are classified as overweight or obese and this is increasing by approximately 1% of the population per year.
- Obesity is linked with a range of health ailments including type 2 diabetes, heart disease and some cancers.
- Recommending a change of lifestyle is an effective way for GPs to assist overweight patients.
- Even modest reductions in weight can lead to significant improvements in health.
- Waist circumference is now regarded as the simplest and best measure of dangerous obesity.
- A high carbohydrate intake can be useful in a weight loss program.
- Clinicians should be encouraged to involve allied health professionals in dealing with overweight patients.

continued



Motivation is an important determinant of weight loss success.

In searching for a reason for the obesity epidemic, many people reach for their genes.

‘My mum and dad were big,’ they say; the implication being that it is a foregone conclusion that they, too, are destined for corpulence. Yet one look at the family pet would show that genes cop more than their fair share of the blame. If the family dog or cat is fat, the probability increases that it is lifestyle, rather than genetics, which is at the root

of the problem. This is demonstrated by a recent New Zealand study of obese cats published in an international veterinary journal.² In a novel door-to-door sample of urban cats, researchers found that cats who share a house with a dog are much less likely to be fat than those who have the house to themselves. If you think about why, you’ll come close to the cause of obesity in people.

Fat and survival

Humans, like animals, have always had the capacity to store fat. We’ve had to have – it’s our evolutionary survival ticket for times of scarcity. Competition (with other species) and work (for food and shelter) have largely kept the amount of stored fat to a minimum. Like the cat surrounded by dogs, a healthy amount of concern for survival kept hunter-gatherers on their toes – literally! All that changed, first with the industrial revolution of the late 19th century, and more recently with the technological revolution of the late 20th century. Food no longer has to be laboured for, at least in developed countries. It is readily available in large fatty chunks at every corner store. Physical work has been minimised, even for manual workers. Every advance in technology is aimed at increasing efficiency and decreasing the energy (calories) we expend.

Causes and consequences

All changes in bodyweight come from one or both of only two things – an increase in energy intake (predominantly fat in food) and/or a decrease in energy output (predominantly physical activity). The evidence suggests that the first of the modern epidemic, beginning around 1970, came from the former; the second phase, from around 1990 onward has come from the latter. Ronald McDonald might take some of the blame for the initial fattening of the western world, but Bill Gates could be the culprit for keeping us there.

Advances in research technology have taught us that the ‘physics’ formula of ‘fat = energy in minus energy out’ is no longer adequate to explain obesity. There is little doubt that dietary fat is the major component of excess energy in the modern diet, even though total energy is still the limiting component. Similarly, not all forms of exercise are effective for reducing body fat (e.g. more vigorous anaerobic exercise is less ‘fat burning’), hence activities that are mild to moderate in intensity and weight-bearing, like walking, are best. Energy intake and expenditure are in turn influenced by a range of external factors, and physiological moderators, and these give rise to an alternative, ecological approach to dealing with obesity.³

Dealing with obesity

As with all epidemics, a solution needs to encompass all aspects of causality. The epidemiological triad (Figure 1), which was derived from actions such as John Snow’s removal of the handle of the Broad Street pump in London to stop the cholera epidemic of 1856, shows the importance of dealing with the environment, as well as the host and vector.

More recently, Dr William Haddon, an engineer from the New York Health Department revolutionised thinking in injury prevention by applying the triad to behavioural, as well as organic, causes

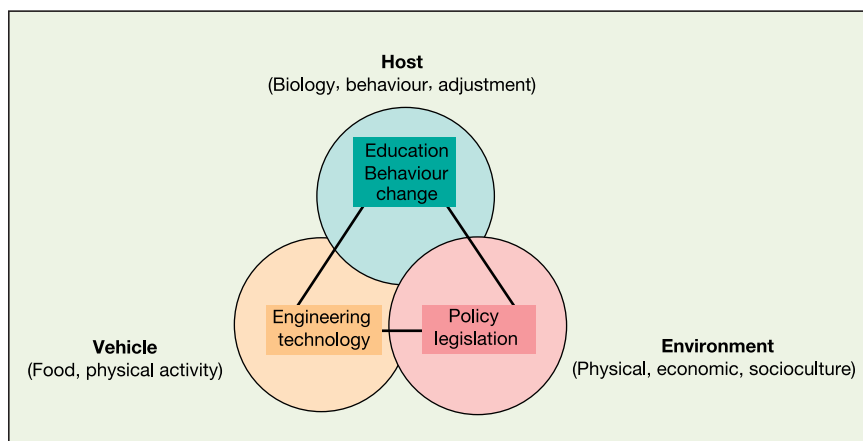


Figure 1. The epidemiological triad and intervention approaches.

of disease. A cursory glance at obesity shows this type of approach is also necessary if we are to have an impact on one of the world's fastest growing epidemics.

Changing the 'obesogenic' environment is likely to be crucial to success, as it has been in reducing smoking and injury, as well as infectious diseases. Modifying the vehicle (food and physical activity) is a second prong to the attack. Both are essential, although not really the role of the clinician. These have also been dealt with elsewhere³ and are beyond the scope of this article. Instead a model for dealing with the host will be presented.

Treatment goals

Although patient goals for weight loss are often in the order of 35% of current weight,⁴ this is generally impractical due to the physiological adaptations that occur with weight loss and which in turn serve to prevent further losses. Losses of 5 to 10%, however, have been shown to have significant effects in improving metabolic health, and it is losses of this order that should be set as a main goal. Increasing fitness, through increased mild to moderate level physical activity, can improve metabolic health (e.g. better blood sugar control for diabetics) even in the absence of any weight loss.

A model for treatment

Figure 2 shows a three-step level of intervention for dealing with overweight (regarded as a body mass index [BMI] of $>25 \text{ kg/m}^2$) and obesity (BMI >30). The bottom step represents perhaps the largest section of the population in a modern 'obesogenic' environment. The main intervention is education, and the type of patient is usually one who has been passively influenced by modern lifestyle and who has insufficient knowledge and/or motivation to counteract this.

The second step is one which requires something more than education. In the case of many women with a history of dieting and weight cycling, for example,

lack of knowledge is not the issue. Psychological factors such as habits, cognitive structuring, reactions to stress and the influences of 'externality' need to be added to knowledge about nutrition and physical activity which, in these people, is often better than that of any clinician or dietitian. The type of assistance at the clinical level is thus psychological, as much as educational.

The third step generally involves the morbidly obese, with a lifetime history of failure in weight loss and possibly associated psychopathologies. This also includes the rare genuine cases of genetic and endocrine disorders, such as Prader-Willi's, and Cushing's syndrome, which require specialist attention. Although medical intervention, such as surgery and very low calorie diets (VLCDs), may be the appropriate form of intervention at this level, lifestyle change should still be seen as the underlying basis of all currently effective interventions.

Step 1: Education

While the published success rate of most weight loss interventions is low, this does not typically take account of those who act independently in changing their diet and activity levels. It also does not consider the sections of the population

Measuring overweight

- Body mass index (BMI) should be accompanied by a waist circumference (WC) measure, at least for those people with a BMI of $<35 \text{ kg/m}^2$.
- Waist circumference (WC) measured at the mid-point between the lower rib and iliac crest is now regarded as the simplest and best measure of dangerous central obesity.

Cut-offs for increasing risk are:

- Males $>102 \text{ cm}$
- Females $>88 \text{ cm}$

This needs to be lowered by approximately 10 cm for Indians and Asians and may also vary for other ethnic groups, although this is currently unknown.

- A 1% 'waist loss' can be expected over the first one to two months of an effective weight loss program. This usually equates to 0.5–1 kg/week.
- Bodyweight and WC can be used in combination to assess changes in fatness where fat loss may come from areas other than the trunk.

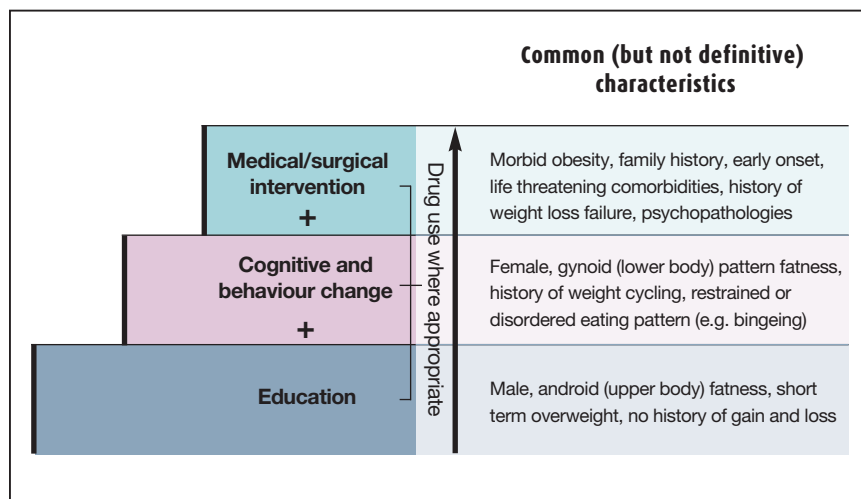


Figure 2. A model for weight loss interventions.

likely to seek formal treatment. Male 'waist loss' programs such as GutBusters, for example, report a good rate of success over two years in achieving and maintaining an initial weight loss goal.⁵ It is well known that male pattern (upper body) fat is more labile and therefore easier to lose than premenopausal female (lower body) fat, and hence success amongst this former 'soft' target group is likely to be better than with those at the 'more difficult' end of the scale.

There is little doubt that in many cases an increase in knowledge is sufficient to effect weight loss in well motivated individuals.⁶ These are likely to be those who have gained weight, primarily on the upper body, over the short term, who have no family history of obesity, who do not have a history of gain and loss and who carry little cognitive 'baggage' associated with eating and physical

activity. The question in dealing with patients at this level is whether clinicians are equipped with the latest knowledge in the area. Space limits the systematic detailing of this here (see the box below for some examples), but interested practitioners are referred to other articles and a number of recent texts in the area. GPs can now also avail themselves of special education in this area and of care-sharing with established commercial programs to ensure they have the most up-to-date information. Information about one such program – DOCS (Doctors in Obesity Care-Sharing) can be obtained from the GutBusters website (www.gutbusters.com.au).

Motivation is obviously also an important determinant of weight loss success at this level. Clinicians may find the techniques of motivational interviewing helpful.⁷

Step 2: Cognitive and behaviour change

In many cases, overweight and obesity are not the consequence of a simple lack of knowledge. As with many health-related behaviours, there are social, emotional and other factors that can over-ride what may be correct information.

At one end of a spectrum of factors influencing this are simple learned habits associating external factors with cues for eating or inactivity. Having a piece of cake with a cup of tea, or associating an ad break on TV with visiting the fridge are examples. In these cases, increasing awareness of behaviour, by encouraging self-monitoring of eating and other behaviours, is often sufficient to lead to behaviour change. In other cases, more complex cognitive processes, such as associating decreased self-esteem with failure on tasks in a weight loss program,

Changing views on obesity

BMI is a poor measure of fat

While BMI (weight/height²) is a reasonable measure of overweight in populations, it is not necessarily in some individuals. BMI discriminates against males, those of mesomorphic build, and the aged. A combination of weight or BMI and waist circumference is a better individual indicator (see the box on page 41).

Fat in food leads to fat on the body

The predominant nutrient leading to obesity in the western world is fat. Fat is not only more energy-dense compared with carbohydrate and protein (9 kcal/g compared with 4), but is passively overconsumed, is stored with less energy loss in the body and can increase total energy intake.

From carbs to fat

While humans have the ability to convert carbohydrate to fat (the process in the liver known as *de novo* lipogenesis), unlike most animals they do it only after excessive carbohydrate intake over a prolonged period. Hence, while gorging on low fat foods is not recommended, a high complex carbohydrate (low glycaemic index) intake can be useful in a weight loss program.

Exercise? Or movement?

Recommendations for exercise during the 1970s and 1980s came largely from sport scientists whose main aim was increasing the performance of top level athletes. A re-evaluation of the early data shows that accumulated movement, rather than intense exercise, is sufficient for weight loss and metabolic health.

Alcohol not the cause

Of the three biochemical pathways for alcohol metabolism, none lead to its deposition as fat. Hence, it is what accompanies alcohol (peanuts, chips etc), rather than the alcohol, that causes fat sparing and the 'beer gut', not the alcohol *per se*.

The futility of 'dieting'

Going on a diet means typically 'coming off' it at some stage. As obesity is a chronic, lifetime disorder, only changes in eating *that can be sustained over a lifetime* should be considered in a weight loss program.

Issues relating to gender

Because premenopausal females typically store fat in resistant lower body fat stores as an energy reserve for pregnancy, weight gain is easier and loss more difficult than in males with typical upper body (particularly abdominal) fat stores.

can perpetuate the issue, maintaining negative eating and exercise behaviours. This is often seen in women who have a history of dieting and weight loss maintained in a psychological context of negative behaviours, such as eating disorders. Binge eating is the most common of these and is known to affect between 30 and 50% of obese women. Binge eating typically stems from a history of early dietary restraint and rarely occurs before age 18. In some cases it may manifest as a more complex eating disorder such as bulimia or anorexia. Other eating disorders such as night eating, seasonal affective disorder (SAD) and the effects of early and traumatic experiences can also have a role in obesity.

Stress and depression are also important issues often associated with a vicious cycle of eating disorders (see Figure 3). Although stress can have variable effects on energy intake and expenditure in different individuals, it is often a key factor in disinhibiting restrained eating, leading to uncontrolled bingeing. Studies of successful weight loss maintainers have shown that having techniques for dealing with stress is one of the three predictors of long-term weight loss success along with a regular low fat food intake and a lifetime program of physical activity.

Dealing with these more complex psychological issues often involves multidisciplinary networking. The new enhanced primary care (EPC) program under the Medical Benefits Scheme now makes this feasible. Obesity is a chronic disorder that should fulfill the criteria for GPs to develop a care plan with the assistance of at least two other allied health providers.

Step 3: Surgery and very low calorie diets

At the extremes of weight management, there are those individuals who are morbidly obese (i.e. with a BMI >40), with a lifetime history of failure, a possible genetic predisposition to obesity and/or psychopathologies leading to excessive

energy balance. Where there are comorbidities in particular, VLCDs and/or surgery may be indicated. In the case of the former, nutritionally balanced commercial formulations have been found to be successful in establishing large, quick weight losses. In most cases these are discouraged because of the tendency for rebound weight gain as a result of rapid physiological adjustment. However, a recent meta-analysis has shown that success is possible provided strict supervision is maintained to ensure a long term and permanent lifestyle change.⁸ For general practitioners, this usually implies working in a team, which is sometimes provided by commercial producers of medically prescribed formulae.

Because of the expense and risk, surgical intervention usually represents a last resort in weight loss therapy. In the past, a range of stapling, bypass and mechanical processes have been used,

all with limited success. More recently, laparoscopic banding, which necessitates modifications to food intake through adjustment of an expandable cuff around the lower oesophageal sphincter, has become the most common procedure, with good long-term (five year) outcomes, but this is still in the presence of a structured lifestyle program and ongoing supervision. Specialists in these techniques can now be found in most major cities.

Pharmaceutical use

Drugs might be useful at all stages of intervention – if they were available. However, of all those that have been tried over the years, only orlistat (Xenical), can currently be confidently recommended. As a gastric lipase inhibitor it prevents the digestion of around 30% of dietary fat. If more than 60 g of fat is consumed per day, a proportion of this fat is excreted and may produce the side

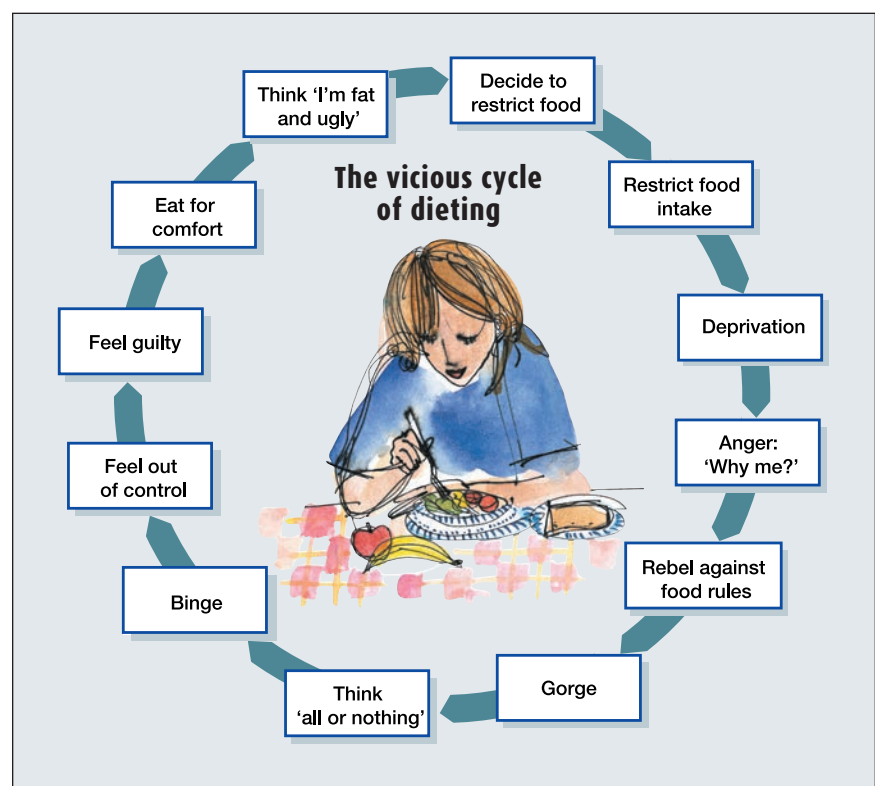


Figure 3. The vicious cycle of dieting.

Implications for the clinician

- Tailor the weight loss treatment to the patient's individual needs.
- Use a combination of measures to assess absolute and relative effects of obesity.
- Provide information and ongoing support where knowledge about nutrition and exercise appears to be lacking.
- If necessary, refer patients with more complex psychological issues associated with bodyweight to appropriate associated professionals.
- Consider the use of care-sharing with established weight loss programs (where possible) to provide greater patient support.
- Recommend surgery and very low calorie diets as a last resort or when all other measures have failed and there may be life-threatening comorbidities.

effects of oily stools, faecal soiling and gastrointestinal cramping. Orlistat thus acts as a form of behaviour modification in teaching patients to avoid fatty food. Use of orlistat results in an average weight loss of around 3 to 3.5 kg more than controls and may be useful in establishing appropriate long-term lifestyle habits in some patients.

Appetite suppressants have had a chequered history, with dexfenfluramine and then the fen-phen combination being withdrawn. Sibutramine, an appetite suppressant that influences the serotonergic and noradrenergic systems, has been rejected for listing twice in Australia, but may be available some time in the future. Over-the-counter herbal mixes are not only expensive, but a recent review of these shows no evidence for the effectiveness of any known product.⁹

A surprising new area of adjunct weight loss medication is currently coming from

the effects of some of the new generation of serotonin reuptake inhibitors (SSRIs). Fluoxetine and sertraline (Zoloft), for example, have been found to have benefits in some people. In contrast, some antidepressants cause weight gain. Limited studies to date have shown that in well selected cases the use of an appropriate antidepressant may have significant benefits in the early stages of a weight loss program, in those people who are depressed. Bupropion (Zyban), another new generation anti-depressant, has been found to be useful in helping smokers quit with less weight gain than occurs in controls. As with all successful weight loss therapies, however, drugs can only be expected to work by changing energy balance through food intake or energy expenditure. Hence while medication remains a long-term hope for dealing with individual components of the obesity epidemic, lifestyle change remains the core of all weight loss interventions.

Conclusion

Obesity is a rapidly escalating problem in modern societies. It has a complex genetic, environmental and behavioural aetiology for which there is no simple, or single, solution. At one level, it may be effectively managed through the educational and motivational skills of the practitioner, often in conjunction with established weight loss programs. However, in many cases this is insufficient, and additional psychological and medical resources are required. Although new drugs to deal with the problem are anticipated in the future, there are currently few effective pharmaceutical approaches to dealing with what is essentially a modern 'disease of civilisation'. Underpinning all effective current interventions is a change in behaviour and lifestyle, and this represents a challenge for all GPs. MT

A list of references is available on request to the editorial office.

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