Ten key facts about obesity in type 2 diabetes

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Introduction

Obesity is strongly linked to the development of type 2 diabetes and may be difficult to manage in primary care. This article summarises what primary healthcare professionals need to know about the risks of obesity in relation to the development of type 2 diabetes and suggests strategies for managing patients with type 2 diabetes and obesity successfully in primary care settings.

Obesity is now recognised as a major risk factor for ill health and the development of diabetes. As the prevalence of obesity in the population rises, so too will the prevalence of type 2 diabetes, with major implications for the provision of care within our communities, in terms of managing the increasing numbers of patients with type 2 diabetes and its complications.

FACT 1: Most people with type 2 diabetes are overweight or obese

More than 75% of people with diabetes are overweight at diagnosis in the US (Krentz and Bailey, 2001). Obesity is defined in terms of body mass index (BMI): a BMI of 25–29.9 is overweight and ≥30 is obese (WHO, 1998). For South Asians, however, the WHO considers a BMI of 18.5–22.9 to be normal, 23–24.9 to be overweight and ≥25 to be obese. It is important to appreciate this difference, given the increased cardiovascular risk in this group (Cappuccio et al, 2003).

Aiming for a 5–10% weight loss is a realistic target in people with type 2 diabetes, and has real benefits for the patient in terms of glycaemic control, lipid levels, etc.

FACT 2: Central obesity is a key component of the insulin resistance syndrome and a predictor of cardiovascular risk in type 2 diabetes

Central obesity (obesity concentrated around the abdomen) is one of the key components of the insulin resistance syndrome. Obesity is accompanied by a reduced number of insulin receptors as well as insulin resistance. Insulin resistance precedes type 2 diabetes by many years, and is the key factor in the increased cardiovascular morbidity and mortality associated with diabetes (Mead, 2003). By targeting obesity, health professionals can help patients with diabetes increase their insulin sensitivity and reduce their cardiovascular risk.

FACT 3: People with type 2 diabetes should have their waist circumference measured regularly to monitor central obesity

Because central obesity is associated with insulin resistance and cardiovascular risk, waist circumference should be measured routinely in people with type 2 diabetes. Waist circumference has been shown to predict diabetes independently of BMI in both men (Chan et al, 1994) and women (Carey et al, 1997). It is a better indicator of the relationship between abdominal obesity and diabetes than waist:hip ratio (Chan et al, 1994; Carey et al, 1997). People with central obesity (waist circumference >102 cm for men and >88 cm for women) are at significant risk of both diabetes and cardiovascular events.

A waist circumference of ≥94 cm (37 inches) in men and ≥80 cm (32 inches) in women still increases the risk of coronary heart disease (Scottish Intercollegiate Guidelines Network [SIGN], 1996). Both BMI and waist circumference should be measured when assessing patients and targeting risk reduction in type 2 diabetes.

FACT 4: Reducing obesity will lower the incidence of type 2 diabetes

The relative risk of developing type 2 diabetes

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for women with a BMI of 29.9, compared with women with a BMI of 20.1, is 11.2 (SIGN, 1996). An obese man has a more than five times greater risk of developing diabetes than a man of normal weight (Department of Health [DoH], 2001). Colditz et al (1990) found that the relationship between BMI and risk of diabetes was continuous and not associated with family history. Even in women with an average BMI of 23–23.9, the relative risk of developing diabetes compared with women with a BMI of < 22 is 3.6.

By targeting obesity, health professionals can prevent some people from developing type 2 diabetes. If successful, this is a cost-effective option in healthcare. The problem is the difficulty in achieving weight loss by diet and lifestyle change alone.

FACT 5: A 5% weight loss will have a substantial impact on improving diabetes outcome

People do not have to lose a lot of weight to achieve substantial health benefits. A weight loss of 10% of body weight will result in a decrease of:

- 30–40% in diabetes-related deaths
- 30–50% in fasting glucose levels
- 15% in glycosylated haemoglobin (HbA_{1c}) levels
- 15% in low-density lipoprotein cholesterol levels
- 30% in triglyceride levels.

In addition, high-density lipoprotein cholesterol will increase by 8% (Royal College of Physicians, 1998).

A modest 5% weight loss will also have significant long-term benefits for these clinical endpoints. Wing et al (1990) found that more

Figure 1. Clinicians may underestimate the value of diet and weight loss programmes in people with well-established diabetes.

than a 5% reduction in body weight in people with type 2 diabetes produced significant improvements in HbA_{1c} values at one year.

FACT 6: People who have had diabetes for a long time derive as much benefit from weight loss as those who have recently been diagnosed

In clinical practice we spend time advising people who have been newly diagnosed with diabetes about diets and weight loss programmes. However, we may under-estimate the value of weight loss in those with well-established diabetes (*Figure 1*).

Wing et al (1990) tried to identify sub-groups of obese patients with type 2 diabetes who would benefit most from a behavioural weight loss programme. They looked at weight loss at the end of a 12–20 week weight loss programme and one year later. The only variable that was significantly related to weight loss at either time point was gender: men lost more weight than women (presumably due to differences in percentage of body fat). Patients with long-duration diabetes achieved as much weight loss (and improved glycaemic control) as those newly diagnosed with diabetes.

FACT 7: Hypoglycaemic therapy may cause weight gain in diabetes

Treatment of diabetes with oral hypo-glycaemic agents, particularly sulphonylureas, may contribute to weight gain and make it even more difficult for people with type 2 diabetes to lose weight. Patients on sulphonylureas usually gain about 2–4 kg, but may gain more than 10 kg in weight.

There are now excellent reasons to support starting overweight (and normal weight) patients with type 2 diabetes on metformin, provided that there are no contraindications. Metformin targets insulin resistance, reduces cardiovascular risk, and is not associated with the weight gain seen with the sulphonylureas (UKPDS, 1998). A fundamental change in our approach to initiating insulin therapy in people with type 2 diabetes is needed.

FACT 8: Modification of diet and behaviour need to be tailored to the patient to achieve weight loss

We need to target weight reduction in people with obesity by reducing food intake

(particularly fat intake). Weight loss is a goal in addition to specific dietary change in terms of the food eaten.

People with diabetes should have a healthy balanced diet rather than an exclusion diet. Nutritional recommendations for people with diabetes should be individualised, with consideration given to usual eating habits and other lifestyle factors (American Diabetes Association, 2000). Dietitians can tailor diets to the patient's lifestyle, ensuring better compliance, and answer specific questions. Diabetes UK is an excellent source of information on diet in diabetes and is usually the first point of call for patient information.

The SIGN guidelines *Management of Diabetes* (2001) advise that clinical interventions aimed at dietary change are more likely to be successful if a psychological approach based on a theoretical model is also included. Behaviour modification is essential to success in achieving weight loss in the long term.

FACT 9: People with type 2 diabetes should be encouraged to exercise

Regular exercise reduces the risk of developing type 2 diabetes. The greater the frequency of activity, the greater the protection from diabetes (SIGN, 2001). The length of time to achieve this protective effect is greater than one year and, on current evidence, is a minimum of 4 years (SIGN, 2001).

The SIGN guidelines (2001) suggest that the first stage is to encourage sedentary patients to partake in moderate physical activity for 30 minutes on most days of the week. Those who are more motivated can then be encouraged to engage in more vigorous activity at least three times a week. The overall advice was for people with type 2 diabetes to perform exercise at least every second or third day to maintain improvements in glycaemic control.

The most appropriate exercise is that incorporated into everyday life, i.e. walking, gardening and stair climbing. People who take insulin and oral antidiabetic drugs, particularly sulphonylureas, may be at risk of hypoglycaemia during exercise. They should be counselled accordingly about reducing their insulin dose before exercise and adjusting their carbohydrate intake.

FACT 10: Drug therapy for obesity for people with type 2 diabetes is a valid option for achieving weight loss

Safe and effective anti-obesity drugs are now available. Some patients may require drug therapy to achieve a 5–10% weight loss and maintain that weight loss.

Two agents are currently available: sibutramine and orlistat. Sibutramine has a central mode of action in the brain, reducing food intake by enhancing satiety. Patients feel fuller after eating smaller meals, so they eat less, change their eating habits and lose weight. The change in behaviour is important in encouraging maintenance of weight loss in the longer term. Orlistat acts by reducing the absorption of dietary fat. The fat passes out unabsorbed with the stool.

Fujioka et al (2000) conducted a 24-week study of people with type 2 diabetes and BMI $\geq$27. Participants were randomised to sibutramine or placebo groups. A weight loss of $\geq$5% and 10% was achieved by 33% and 8% of sibutramine patients, respectively, but not by participants in the placebo group. The sibutramine group participants who lost 5% and 10% of their weight achieved a 0.53% and 1.65% reduction in their HbA$_{1c}$ levels and a reduction of 1.4 mmol/l and 3.8 mmol/l in fasting plasma glucose levels.

Hollander and colleagues (1998) carried out a one-year trial of orlistat in people with type 2 diabetes and BMI 28–40 who were clinically stable on oral sulphonylureas. The study group were given 120 mg orlistat three times daily and a control group were given placebo. The orlistat group lost 6.2% of their initial body weight compared with 4.3% in the placebo group. The weight loss was associated with improvements in glycaemic control (with a decrease in HbA$_{1c}$ of 0.28% at 52 weeks compared with a increase of 0.18% in the placebo group), and a reduction in total and low-density lipoprotein cholesterol and triglyceride levels.

The results of such trials show that HbA$_{1c}$ levels decrease progressively with increasing weight loss. The studies also demonstrate (in the placebo groups) how difficult it is for people with type 2 diabetes to lose any weight and maintain weight loss.

Conclusion
Obesity is an important determinant of

outcome in type 2 diabetes and we need to address the subject with the seriousness it deserves. Even a 5% weight loss will have a substantial impact on improving outcomes. Strategies to target obesity include the use of a dietitian, behaviour modification, exercise programmes and drug therapy for obesity. Practices and PCTs need to structure their diabetes care to take into account the risks posed by obesity and how to reduce these risks. ■

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