

Systematic review of the long-term effects and economic consequences of treatments for obesity and implications for health improvement

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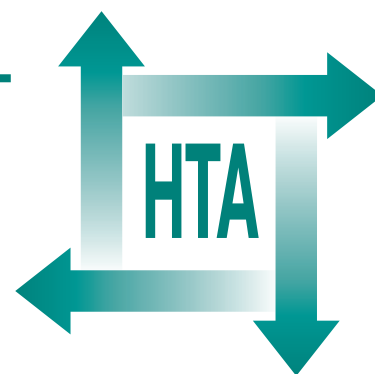
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Executive summary

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Executive summary

Background

Obesity is increasing in adults in the UK. In 1980 6% of men and 8% of women in England were obese, by 2000 these figures were 21% for both men and women. Obesity is associated with increased risk of cardiovascular disease (CVD), type 2 diabetes mellitus, hypertension, cancer and osteoarthritis. In 1998 the UK National Audit Office estimated that obesity cost the NHS in England £480 million.

This is a systematic review of the long-term effects of obesity treatments, not only on body weight, but also on risk factors for disease, and most importantly health.

Objectives

1. To review systematically obesity treatments in adults to identify therapies that impact by achieving weight reduction, risk factor modification or improved clinical outcomes.
2. Based on a systematic review of epidemiological data, to model the impact of moderate weight reduction on reducing the burden of obesity-associated disease.
3. To review systematically health economic evaluations of obesity treatments and assess costs to the NHS of these treatments.
4. To integrate the findings from the above objectives.

Methods

For the systematic review of obesity treatments in adults, the methods of the Cochrane Collaboration were adopted, in which randomised controlled trials (RCTs) with a follow-up of at least 1 year were evaluated.

For the systematic epidemiological review, studies were sought on long-term (at least 2 years, or 5 years for surgery) effects of weight loss on morbidity and/or mortality, and examined through epidemiological modelling.

The systematic economic review sought reports with both costs and outcomes of treatment. Recent reports assess the cost-effectiveness of

pharmaceutical and surgical interventions. A Markov model was adopted to examine the cost-effectiveness of a low-fat diet and exercise intervention in adults with obesity and impaired glucose tolerance.

Conclusions are presented by integrating the above three components.

Results

Limitations in the evidence available for the reviews, particularly inadequate sample size and reporting, lack of long-term follow-up and few quality of life data, mean that most results should be interpreted with caution.

First, regarding the addition of drugs to the diet, orlistat was associated with a weight change of -3.26 kg [95% confidence interval (CI) -4.15 to -2.37 kg] after 2 years, and beneficial changes in risk factors. Sibutramine was associated with a weight change of -3.40 kg (95% CI -4.45 to -2.35 kg) after 18 months for people on a weight maintenance diet and beneficial changes in risk factors apart from diastolic blood pressure. Metformin was associated with decreased mortality and myocardial infarction-related mortality in the UK Prospective Diabetes Study after 10 years.

Low-fat diets (which included 600 kcal/day deficit diets) were associated with the prevention of type 2 diabetes, and improved control of hypertension. These diets were associated with a weight loss after 12 months of -5.31 kg (95% CI -5.86 to -4.77 kg) and improvements in risk factors, with weight loss continuing for 3 years. Insufficient evidence was available to assess putative benefits of low-calorie or very low-calorie diets.

Studies combining low-fat diets and exercise, with or without behaviour therapy, suggested improved control of hypertension and type 2 diabetes. The addition of an exercise programme to diet was associated with improved weight loss and risk factors for at least 1 year. The addition of a behaviour therapy programme to diet was also associated with improved weight loss for at least

1 year. It was unclear whether both exercise and behaviour therapy together further enhanced the effect of diet. Family therapy was associated with improved weight loss for up to 2 years compared with individual therapy. However, there was insufficient evidence to conclude that individual therapy was more beneficial than group therapy.

Second, women with obesity-related illnesses, who had intentional weight loss, irrespective of the amount of weight lost, had an associated reduced risk of death, CVD death, cancer and diabetes-related death. Weight loss appeared more beneficial if achieved within 1 year. Men with general illness who lost weight intentionally appeared to have a reduced risk of diabetes-related death, but there was no demonstrable effect on CVD mortality, and cancer mortality appeared increased.

Long-term weight loss was associated with reduced risk of developing type 2 diabetes and improved glucose tolerance in men and women, especially after surgery for obesity.

A weight loss of 10 kg was associated with a fall in total cholesterol of 0.25 mmol/l and a fall in diastolic blood pressure of 3.6 mmHg. A weight loss of 10% was associated with a fall in systolic blood pressure of 6.1 mmHg.

Third, targeting high-risk individuals with drugs or surgery was likely to result in a cost per additional life-year or quality-adjusted life-year (QALY) of no more than £13,000. There was also suggestive evidence of cost-saving from treatment of people with type 2 diabetes with metformin. Targeting surgery at people with severe obesity and impaired glucose tolerance was likely to be more cost-effective, at £2329 per additional life-year.

Economic modelling of diet and exercise over 6 years for people with impaired glucose tolerance was associated with a high initial cost per additional QALY, but by the sixth year the cost per QALY was £13,389. Results were sensitive to the quality of life weights, for which there were very limited data. Results did not include cost savings from diseases other than diabetes, and therefore may be conservative.

The cost of diet and exercise together appear comparable to treatments, for example drugs, in obese individuals with risk factors, such as impaired glucose tolerance.

Conclusions

Implications for healthcare

Orlistat, sibutramine and metformin appear beneficial for the treatment of adults with obesity. Exercise and/or behaviour therapy appear to improve weight loss when added to diet. Low-fat diets with exercise, with or without behaviour therapy, are associated with the prevention of type 2 diabetes and hypertension.

Long-term weight loss in epidemiological studies was also associated with reduced risk of developing diabetes, and may be beneficial for cardiovascular disease.

Low-fat diet and exercise interventions in individuals at risk of obesity-related illness, such as diabetes, are of comparable cost to drug treatments.

Recommendations for research

- RCTs and epidemiological studies are needed in high-risk populations, particularly people with co-morbidities, cardiovascular risk factors or body mass index $> 40 \text{ kg/m}^2$.
- RCTs are needed in primary care in high-risk groups.
- Drug trials should include lifestyle interventions, in addition to dietary advice.
- Exercise or behaviour therapy alone for obesity management should be reviewed.
- Further exploration of treatments for obesity should examine which type of exercise or behaviour therapy is best.
- A systematic review of treatments to prevent obesity should be undertaken.
- Research is needed to provide a clearer understanding of the incremental cost-effectiveness of different treatments for subgroups of high-risk individuals.
- Future RCTs should be adequately powered and adhere to the CONSORT statement for reporting. Guidelines are also required for the conduct and reporting of epidemiological studies.
- Research and funding bodies should be committed to structured long-term follow-up strategies so that the long-term effects of short-term interventions can be assessed accurately.

Publication

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NHS R&D HTA Programme

The research findings from the NHS R&D Health Technology Assessment (HTA) Programme directly influence key decision-making bodies such as the National Institute for Clinical Excellence (NICE) and the National Screening Committee (NSC) who rely on HTA outputs to help raise standards of care. HTA findings also help to improve the quality of the service in the NHS indirectly in that they form a key component of the 'National Knowledge Service' that is being developed to improve the evidence of clinical practice throughout the NHS.

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The HTA programme commissions research only on topics where it has identified key gaps in the evidence needed by the NHS. Suggestions for topics are actively sought from people working in the NHS, the public, consumer groups and professional bodies such as Royal Colleges and NHS Trusts.

Research suggestions are carefully considered by panels of independent experts (including consumers) whose advice results in a ranked list of recommended research priorities. The HTA Programme then commissions the research team best suited to undertake the work, in the manner most appropriate to find the relevant answers. Some projects may take only months, others need several years to answer the research questions adequately. They may involve synthesising existing evidence or designing a trial to produce new evidence where none currently exists.

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