The costs of nonsurgical and surgical weight loss interventions: is an ounce of prevention really worth a pound of cure?

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The study compared a diet and exercise intervention with gastric bypass (GBP) surgery for the treatment of obesity. The diet/exercise intervention, which followed a commercial weight loss programme comprising hour-long weekly meetings for 2 years, was addressed at 18-year-old women with a body mass index (BMI) of 33 kg/m2. The GBP surgical intervention was addressed at 40-year-old women with a BMI greater than 40 kg/m2.

Type of intervention
Treatment.

Economic study type
Cost-utility analysis.

Study population
As this was a modelling study, the target population comprised a hypothetical cohort of morbidly obese white women. Further inclusion criteria were not provided.

Setting
The setting was not explicitly reported. However, it appears to have been the community and secondary care. The economic study was carried out in the USA.

Dates to which data relate
The epidemiological and effectiveness data were derived from sources published between 1999 and 2003. Resource use and cost data were derived from studies and official national sources published between 1999 and 2004. The price year was 2004.

Source of effectiveness data
The clinical parameters associated with diet/exercise and the GBP programme included the probability of losing weight and the average expected weight loss. The mortality rate due to GBP and life expectancy depending on age and BMI were also included. From the graphical representation of the model it would appear that immediate complications for both alternatives were also accounted for, but the authors did not provide relevant information.

Modelling
The authors constructed a decision tree to determine the clinical outcomes and costs associated with each of the interventions. The costs and health outcomes were calculated for each year and summed. The time horizon of the model, health states, model parameters and their sources, along with a number of modelling assumptions, were reported.
Sources searched to identify primary studies
The clinical effectiveness data were derived from two published studies. Although details of the study population were provided, details of the study methodologies and designs were not. Life expectancy estimates were derived from large national studies.

Methods used to judge relevance and validity, and for extracting data
The process used to identify the data was not reported. No inclusion criteria for any parameters were specified. The method used to select the estimates was neither reported nor discussed.

Measure of benefits used in the economic analysis
The measure of benefit used was the quality-adjusted-life-years (QALYs). Quality of life weights were derived from a published study (Hakim et al. 2002, see ‘Other Publications of Related Interest’ below for bibliographic details). It was reported that this study used time trade-off methods to estimate the individuals' utilities. Although the time horizon was the patients' lifetime, benefits were not reported to have been discounted.

Direct costs
The direct costs were included in the analysis. These covered a session of the diet/exercise programme, GBP intervention costs, costs of complications related to GBP, and caregiver time. The costs of the GBP intervention included the operating room, nursing, equipment, anaesthesia, pharmaceuticals and diagnostic tests. Costs and quantities were reported separately only for the diet/exercise intervention. With the exception of cost data and resource use for GBP complications, which were based on authors' assumptions, such data were derived from published studies. Adjustments for inflation and the price year (2004) were reported. Although the time horizon of the model exceeded 2 years, the costs were not reported to have been discounted.

Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
Productivity costs were for the diet/exercise programme only. These referred to patients' time for attending the programme and travelling time to the programme site. The costs and the quantities were reported separately. Adjustments for inflation were carried out and the costs were reported for the price year 2004. Discounting, although relevant given the time horizon of the analysis, was not reported.

Currency
US dollars ($).

Sensitivity analysis
Parameter uncertainty appears to have been investigated through a one-way sensitivity analysis. However, the parameters varied, the ranges over which they were tested, and the methods used to derive them were not explicitly reported. The authors reported that details of the sensitivity analysis were given in Table 1, but that table only contains details of the costs of surgical intervention.

The authors also performed a sensitivity analysis to investigate the impact of variation of the assumption around the weight trajectory after the end of the interventions. In the base-case analysis it was assumed that patients with weight loss at the end of the follow-up period continued to gain weight at the same rate with the general population. A “worst case” scenario assumed that all weight lost through the intervention was regained within 3 years, while a “best case” scenario assumed that all patients remained at the same BMI achieved through the intervention.
Estimated benefits used in the economic analysis
The benefits were not reported for each of the interventions under study. The authors only reported that women in the GBP group had 0.61 years of additional life expectancy. However, incremental QALYs were not explicitly reported.

Cost results
As with the benefits, the total costs were not reported for each of the interventions under study. It was only reported that the GBP intervention resulted in an additional cost of $4,600 compared with the diet/exercise programme.

Synthesis of costs and benefits
It appears that an incremental cost-utility ratio has been calculated, but it is not entirely clear.

The base-case analysis demonstrated that GBP resulted in a cost of $7,126 per QALY.

The authors reported that the results were most sensitive to variations in the discount rate, but no discounting was reported in the paper in the base-case analysis. The results were also sensitive to variations in the cost of immediate complications, but GBP resulted in a cost below $20,000 per QALY in all cases. Even in the worst-best case scenario analysis the cost-utility ratio was below $35,000 per QALY.

Authors’ conclusions
"Gastric bypass (GBP) surgery is a worthwhile investment that provides the greatest amount of quality-adjusted life-years (QALYs) for the invested dollar."

CRD COMMENTARY - Selection of comparators
A justification was provided for the comparators used. GBP seems to represent the most commonly used surgical intervention among weight loss surgeries in the authors' setting. You should decide if this is a widely used technology in your own setting.

Validity of estimate of measure of effectiveness
The parameters were derived from published research. The authors did not report any search methods or inclusion criteria, nor did they provide any justification for their selection of the estimates. The author did not provide any information on the study designs or the study methodology employed in the primary studies that provided the effectiveness evidence. An objective assessment of the validity of the data used in the model is therefore not possible given the limited information reported in this paper.

Validity of estimate of measure of benefit
The estimation of health benefits (QALYs) was modelled using the decision model. The utility weights were taken from a published paper. The benefits were not reported separately for each of the interventions, and incremental benefits were not explicitly provided. Although discounting was relevant given the time horizon of the analysis, it was not reported to have been performed.

Validity of estimate of costs
The authors stated that a societal perspective was adopted. However, productivity costs were not considered for the GBP intervention. The unit costs and resource use were reported separately only for the diet/exercise intervention. The costs were treated deterministically and it was unclear which costs, if any, were investigated in the sensitivity analysis. The sources of the costs were quoted. The cost of complications was assumed and a range was tested in the sensitivity analysis, although the range was not reported. As with the benefits, the costs were not reported for each of the interventions under study. Although it would appear that discounting was performed, it was not reported in the paper. This lack of detail in the costing analysis will limit the generalisability of the authors' results and their internal validity.
Other issues
It would appear that the cost-effectiveness was determined using an incremental cost-utility ratio, but this was not entirely clear. The results were badly reported, and consequently it is not possible to confirm the authors’ conclusions from the results reported. The authors did not compare their findings with those from other studies, so it is not possible to assess how far their results agree with other published results. The issue of the generalisability of the results to other settings was not addressed. In addition, the results were only presented for the GBP strategy, while neither the costs nor benefits were reported for the diet/exercise intervention. Although the authors did not present their sensitivity analysis in sufficient detail, they do not appear to have presented their results selectively. The authors did not report any limitations to their study.

Implications of the study
The authors did not make any recommendations for changes in policy or practice, or for further research. However, the shortfalls of the study, discussed in the commentary section, highlight areas where more research-based information is needed.

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Other publications of related interest
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MeSH
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