Cost-effectiveness of lifestyle modification in diabetic patients

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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.

CRD summary
This study examined the cost-effectiveness of lifestyle interventions, including self-management, education, diet, and exercise, that were intended to reduce cardiovascular risk in patients with type 2 diabetes. The authors concluded that the implementation of lifestyle interventions was potentially cost-effective, but there was a lack of reliable long-term data, which should be assessed in future studies. The methods appear to have been valid and the study was generally well presented. The authors’ conclusions are robust.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost-effectiveness of lifestyle interventions, including self-management, education, diet, and exercise, that aimed to reduce the cardiovascular risk in patients with type 2 diabetes.

Interventions
A variety of interventions were considered for diabetic patients, including a six-hour self-management education programme, a 12-week self-management course, a one-year intensive lifestyle intervention for overweight patients, a six-month lifestyle programme for post-menopausal women followed by two different maintenance programmes, a six-week structured self-management education programme, a one-year moderate-intensity lifestyle intervention for overweight patients, and a two-year structured counselling intervention to promote physical activity. Each programme was compared against the usual care.

Location/setting
Netherlands/primary care.

Methods
Analytical approach:
The analysis used a computer-based Markov simulation model, called the Chronic Diseases Model, which was developed at the Dutch National Institute for Public Health and the Environment. A lifetime horizon was considered for the Dutch diabetic population. The authors stated that the analysis was conducted from the perspective of the health care system.

Effectiveness data:
The clinical data on the treatment effect came from a review of the literature that included only randomised controlled trials (RCTs) with a minimum follow-up of 12 months and at least 100 participants. The inclusion criteria were reported in an online appendix and seven RCTs met these criteria and were included in the analysis. The key input was the intervention efficacy, which was defined as a significant change in the risk-factor outcomes. The long-term impact of changes in risk-factor outcomes was based on published observational studies and these data were already included in the Chronic Diseases Model.

Monetary benefit and utility valuations:
Not reported.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary benefit measure and they were discounted at an annual rate of

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Cost data:
The economic analysis included the intervention costs (contacts with health care professionals and materials), diabetes-related costs, and the costs of unrelated diseases, such as dementia and mental illness. The details of the unit costs and most of the resource quantities for each intervention and the comparator were presented in the appendix. Other costs were from published studies. They were in Euros (EUR) and were discounted at an annual rate of 4%. The price year was 2007.

Analysis of uncertainty:
A series of one-way sensitivity analyses was carried out on the discount rates, time horizon, and additional long-term intervention costs. A probabilistic sensitivity analysis was also undertaken, considering the uncertainty in the intervention effects, long-term maintenance, and intervention costs.

Results
Compared with usual care, the additional cost of the interventions ranged from EUR 30 to EUR 1,128 and the QALYs gained per participant ranged from 0.01 to 0.14.

In the base case, the incremental cost per QALY gained over usual care was EUR 32,000 with the six-hour self-management education programme; EUR 12,000 with both the 12-week self-management course and the one-year intensive lifestyle intervention for overweight patients; EUR 33,000 with the six-month lifestyle programme for post-menopausal women; EUR 10,000 with the six-week structured self-management education programme; EUR 39,000 with the one-year moderate-intensity lifestyle intervention for overweight patients; and EUR 10,000 with the two-year structured counselling intervention to promote physical activity.

The probability of being below the threshold of EUR 20,000 per QALY, for the four interventions with the lowest cost-utility ratios, was above 85% and their cost-effectiveness was maintained even in the unfavourable scenarios that were considered in the sensitivity analysis.

Authors' conclusions
The authors concluded that the implementation of lifestyle interventions was potentially cost-effective, but there was lack of reliable long-term data, and this should be assessed in future studies.

CRD commentary
Interventions:
The selection of the comparators was appropriate as each intervention was compared against the relevant usual care. Some of the details of these comparators were reported in the online appendix.

Effectiveness/benefits:
A literature review is generally considered to be a valid way to identify the relevant evidence. The inclusion of RCTs with required follow-up times, timing of assessments, and sample sizes, identified reliable evidence, but the databases searched and the search criteria were not reported, which makes it unclear whether the review was systematic. The key details of the trials were extensively presented in the appendix, supporting the validity of the clinical estimates. The long-term estimates were appropriately based on observational studies with long follow-ups, but no further details of these studies were given as they were already incorporated in the decision model. The benefit measure was appropriately selected, but the approach used to derive the utility weights for the calculation of the QALYs was not reported.

Costs:
The categories of costs were appropriate for the health care system perspective. Extensive information on the calculation of the intervention costs was provided in the appendix. These were all from the same clinical trials that were used for the efficacy evidence. The disease-related and unrelated-disease cost details were not given, and their sources were not clearly reported, limiting the transparency of the analysis. The costs were varied in the sensitivity analyses. The price year was reported and the discount rate was recommended by Dutch guidelines.
Analysis and results:
The results were clearly reported and the findings for the subgroup of elderly patients were presented in the appendix, together with a diagram of the model. The issue of uncertainty was well addressed, but only limited results were presented. The authors acknowledged that some long-term outcomes and complications were not included, but these should not have dramatically altered the results. Each trial included different populations in terms of age or other baseline characteristics (e.g. weight), and results for each lifestyle intervention cannot be compared with those of the other interventions.

Concluding remarks:
The methods appear to have been valid and the study was generally well presented. The authors’ conclusions are robust.

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