Cost savings and clinical effectiveness of an extension service diabetes program  
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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 "Diabetes: Stepping Up to the Plate" education programme was under evaluation. The programme comprised seven 75-minute classes to assist people with diabetes, or at risk of developing diabetes, with the aim of improving nutritional knowledge, food portion skills, haemoglobin A1C (A1C) and anthropometric indices. The first and final sessions consisted of an evaluation of food portioning skills, nutrition knowledge and anthropometric measurements. Three of the five remaining sessions were core sessions on portion control, label reading and adjusting recipes. The remaining two sessions were chosen from options including cooking for special occasions, planning meals on a limited budget and eating out.

Type of intervention
Primary and secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised people with diabetes or at risk of developing diabetes.

Setting
The setting was the community and primary care. The economic study was carried out in Utah State, USA.

Dates to which data relate
The dates to which the effectiveness data referred were not reported. The resource use data were taken from a study published in 1997. The price year was 1997.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
There was insufficient detail of the methods used in the cost estimation. Therefore, it was not possible to infer whether the costing was performed on the same study sample as that used in the clinical analysis.

Study sample
People were recruited to the programme through newspaper advertisements, community newsletters and flyers placed in public county buildings. Consequently, the sample was self selecting. A total of 155 participants were recruited, although only approximately half of them completed the data collection (78 was the maximum for some of the
outcomes assessed). The authors did not compare the characteristics of the people recruited into the programme and the wider population with diabetes or at risk of diabetes.

**Study design**
No sample size or power calculations were reported. The study was a within-group comparison study that was performed at a single centre. The patients were followed up for the duration of the programme. The number of patients lost to follow-up was not reported in the paper.

**Analysis of effectiveness**
The following measures were used to monitor the effectiveness of the programme:

- the written knowledge score;
- the food portioning skills score, based on memory (scale: 1 - 5);
- the food portioning skills score using a book (scale: 1 - 5);
- A1C level (biochemical measure);
- the body mass index;
- weight;
- waist circumference, hip circumference and waist-to-hip ratio.

Several tests were performed before and after the implementation of the education programme in order to obtain the effectiveness outcomes. The results were reported for all participants, as well as independently for the sub-groups of participants with diabetes and without diabetes. As the study compared the sample before and after the programme, the comparability of the groups was not an issue.

**Effectiveness results**
The results obtained for all participants were as follows.

For the written knowledge skills test, the pre-programme mean score was 49.67% (standard deviation, SD=16.31) and the post-programme mean score was 59.56% (SD=16.31), \((p=0.004)\).

For the food portioning skills test based on memory, the pre-programme mean score was 2.564 (SD=1.105) and the post-programme mean score was 3.662 (SD=1.241), \((p=0.151)\).

For the food portioning skills test using a book guide, the pre-programme mean score was 2.43 (SD=1.02) and the post-programme mean score was 4.29 (SD=1.09), \((p=0.023)\).

The mean A1C was 7.16% (SD=1.35) during the pre-programme period and 6.43% (SD=1.11) during the post-programme period, \((p<0.001)\).

The mean body mass index was 32.60 kg/m² (SD=7.78) during the pre-programme period and 31.78 kg/m² (SD=6.83) during the post-programme period, \((p<0.001)\).

The mean weight was 202.58 lb (SD=45.46) during the pre-programme period and 199.74 lb (SD=45.10) during the post-programme period, \((p<0.001)\).

The mean waist circumference was 42.43 inches (SD=6.41) during the pre-programme period and 41.16 inches (SD=6.08) during the post-programme period, \((p<0.001)\), while the mean hip circumferences were 45.96 inches.
Further effectiveness results for the sub-analyses of diabetic and non-diabetic participants were presented in the paper.

**Clinical conclusions**
The "Diabetes: Stepping Up to the Plate" education programme significantly improved anthropometric measurements and A1C control, as well as food portioning skills (only if a book guide were used and not if relying on memory).

**Measure of benefits used in the economic analysis**
No summary measure of health benefits was used in the economic analysis. The study was therefore categorised as a cost-consequences analysis.

**Direct costs**
This study identified the costs of hospitalisation avoided because of improvements in A1C measurements. The cost data appear to have been taken from another study (Gilmer et al. 1997, see 'Other Publications of Related Interest' below for bibliographic details). No details of the methods used to identify and obtain the data, or to estimate the costs, were reported in this paper. The costs were adjusted for inflation at a rate of 3% per annum. The price year was 1997.

**Statistical analysis of costs**
The cost data were treated deterministically.

**Indirect Costs**
No indirect costs were included in this study.

**Currency**
US dollars ($).

**Sensitivity analysis**
No sensitivity analysis was undertaken.

**Estimated benefits used in the economic analysis**
Not relevant since a cost-consequences analysis was undertaken. See the 'Effectiveness Results' section.

**Cost results**
The paper reported that $94,010 hospitalisation costs were avoided because of the education programme.

**Synthesis of costs and benefits**
Not relevant given the cost-consequences approach undertaken.

**Authors' conclusions**
The "Diabetes: Stepping Up to the Plate" education programme improved nutrition knowledge, anthropometric measures and glucose control whilst saving hospitalisation costs.
CRD COMMENTARY - Selection of comparators

This study compared people before and after participation in an education programme on nutrition and food portioning skills for people with diabetes or at risk of developing diabetes. The comparator was the current practice before the implementation of the educational programme, which relied on the initiative of the clinicians to educate patients about portioning food. You should consider usual practice in your setting prior to applying the results of this study.

Validity of estimate of measure of effectiveness

The effectiveness data used in this study were taken from a within-group comparison study. This introduced an inherent problem to the study: it does not take changes that would have occurred over time irrespective of the intervention into consideration. However, as the time period of this study appears to have been relatively short, the impact of this on the study results is unlikely to have altered the study findings. The study sample was not compared with the population with diabetes or at risk of diabetes, therefore it was not possible to identify whether it was representative. The study sample was self selected. This means that it is likely to have been biased towards those who take an active role in their disease management. A randomised controlled trial would have provided a more robust assessment of the impact of the programme. The authors appear to have assumed that the improved outcomes would be maintained after the end of the education programme, but did not provide any evidence that this is likely to be the case.

Validity of estimate of measure of benefit

No summary measure of health benefit was considered in the economic analysis as a cost-consequences approach was undertaken. The reader is therefore referred to the comments in the 'Validity of estimate of measure of effectiveness' field (above), as health benefits are reflected in the disaggregated effectiveness outcomes reported.

Validity of estimate of costs

The economic perspective of this study appears to have been that of the health care payer. It identified the reduction in hospitalisation costs due to improved biochemical markers following completion of the education programme. The paper reported that it is likely that cost-savings in outpatient care would also be found, but these were not included in this study. This means that the cost-savings to the health care payer were likely to have been underestimated. The reduction in hospitalisation costs was calculated using data from an earlier paper, but no details of the calculations were provided. This means that it is not possible to comment on the quality of these data.

The unit costs and resource use were not reported separately, thus hindering reflation exercises to other settings. No timescale for the cost-saving identified was provided, which makes it impossible to clearly assess the economic impact of the intervention. The costs of running the education programme do not seem to have been included in the economic analysis, thus limiting the validity of the costing considerably. The paper reported that a small fee was charged for the education programme, but it was unclear who paid this fee or whether it was included in the economic analysis. No statistical or sensitivity analysis was undertaken, thus it was not possible to identify the extent of uncertainty around the cost data. The price year was 1997.

Other issues

The authors did not present their study data comprehensively. The total number of people included in the sample and the timescale of the costs were not reported, which makes it impossible to make a clear assessment of the economic implications of the education programme. The authors did not compare their findings with other economic studies, only with some other studies evaluating the effectiveness of education programmes for diabetes. Also, they did not consider how their study could be generalised to other settings.

Implications of the study

The authors did not make any recommendations for changes to practice or further research. However, the study presented relevant caveats (highlighted already) that must be considered when interpreting the study results.
Source of funding
None stated.

Bibliographic details

Other publications of related interest

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