Economic analysis of physical activity interventions

Wu S, Cohen D, Shi Y, Pearson M, Sturm R

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 many interventions to increase physical activity for both adults and children. The authors concluded that most of the interventions provided good value for money and point-of-decision prompts were most cost-effective, but provided little benefit. The few high-quality trials indicated that increasing the population's physical activity was feasible. The clinical analysis was robust and was appropriately carried out and the authors’ conclusions appear to be valid.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study examined the cost-effectiveness of many interventions to increase physical activity for both adults and children.

Interventions
A total of 91 interventions were identified and they were grouped into six categories: point-of-decision prompts to encourage the use of stairs rather than elevators or escalators; community-wide education campaigns; individually adapted behaviour change programmes; social support in a community context; school-based physical activity interventions for children and adolescents; and creation of or enhanced access to places for physical activity.

Location/setting
USA/community.

Methods
Analytical approach:
The analysis was based on the synthesis of published evidence into a conventional cost-effectiveness framework. The time horizon was one year and the authors stated that the perspective of the public health system was considered.

Effectiveness data:
The sources of clinical data were identified by a systematic search of the literature in seven electronic databases. The inclusion criteria were reported; published trials with a sample size of at least 50 participants and other specific characteristics were selected. Two reviewers assessed the quality of the evidence, using nine dichotomous criteria. The mean estimates were calculated for each input except where there were fewer than five trials. Two published systematic reviews were also considered. The key input was the number of metabolic equivalent task (MET) hours gained. MET hours capture the time and the intensity of physical activity. The methods used to translate other outcome measures into MET hours gained were reported. Half an hour of moderate physical activity was equivalent to 1.5 MET hours.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
The benefits were measured in MET hours gained per person per day.

Cost data:
The economic analysis included the costs of the implementation of the programmes, which included items such as
personnel, supplies, materials, equipment, transport, travel for programme personnel, training, outside consultant services, and programme overheads. The costs and quantities were from published studies and other sources, such as the Bureau of Labor Statistics and authors' opinions. Trial authors were contacted for programme costs that were not reported in their publications. All costs were in US dollars ($) and the price year was 2007.

Analysis of uncertainty:
Not considered.

Results
The expected cost per person were $0.0025 with point-of-decision prompts; $0.14 to $55.86 with education campaigns; $55.27 with individual behaviour change; $107.15 with social support; $48.86 with school-based activity; and $5.07 to $137.46 with creation of or enhanced access to places for physical activity.

The MET hours gained per day per person were 0.0026 with decision prompts; 0.01 to 0.48 with education; 0.50 with behaviour change; 0.65 with social support; 0.48 with school activity; and 0.26 to 0.98 with places for physical activity.

The cost per MET hour gained per person was $0.07 with decision prompts; $0.009 to $1.90 with education; $0.41 with behaviour change (high intensity $0.84, low intensity $0.10); $1.14 with social support (high intensity $1.16, low intensity $0.47); $0.42 with school activity; and $0.17 to $4.47 with places for physical activity. The authors calculated a cost-effectiveness threshold considering the cost of sedentary behaviour and established a benchmark of $1.00 per MET hour per day per person.

The most cost-effective strategy was point-of-decision prompts (signs to prompt stair use), but these had small effects (0.2% of the recommended physical activity). School-based interventions ranked well producing an average of 16% of the recommended physical activity, while high-intensity individually adapted behaviour change and social support programmes were the least cost-effective, but had the largest effects (35% to 43% of the recommended physical activity).

Authors' conclusions
The authors concluded that there were cost-effective interventions in all six categories. Point-of-decision prompts were most cost-effective, but provided little benefit and were unlikely to increase physical activity to guideline levels on their own. The few high-quality trials provided evidence that increasing the population's physical activity was feasible.

CRD commentary
Interventions:
A very wide range of interventions to increase physical activity was appropriately considered. The authors grouped these interventions into six main categories, but the differences in costs and effects within these categories might have been relevant.

Effectiveness/benefits:
An appropriate approach was used to identify the relevant sources of evidence. The methods and conduct of the review were clearly stated and the inclusion of clinical trials should ensure the validity of the clinical evidence. Two systematic reviews were included in the analysis and this review was likely to have been comprehensive. The authors noted that trial quality was variable and most most of them used subjective measures of physical activity. The authors justified their selection of MET hours, which are specific to physical activity, as the summary benefit measure. They stated that quality-adjusted life-years (QALYs) might not have been appropriate because they involve assumptions about health benefits and do not adequately capture short-term benefits, such as mood improvement and improvements in musculoskeletal complaints. The methods used to translate other benefit measures into MET hours gained were reported in detail.

Costs:
The categories of costs were consistent with the perspective stated. The key cost items were reported for each group of interventions, rather than for each intervention, meaning that the individual cost items were not stated and their unit costs and quantities of resources were not reported. This was probably due to the extremely high number of
interventions compared. The price year was reported. Little information on the data sources was provided, but in general the authors used published estimates from implemented programmes.

Analysis and results:
The results were clearly presented. An average ratio rather than an incremental one was used, with each intervention presumably compared with no intervention rather than with each other. The authors estimated a threshold for cost-effectiveness to assess whether each group of interventions provided good value for money. The authors did not address the uncertainty and sensitivity analyses were not carried out. There was an online appendix, which might contain more cost-effectiveness results.

Concluding remarks:
The clinical analysis was robust and was appropriately carried out and the authors’ conclusions appear to be valid.

Funding
Supported by a grant from the National Cancer Institute.

Bibliographic details

PubMedID
21238863

DOI
10.1016/j.amepre.2010.10.029

Original Paper URL
http://www.ajpmonline.org/article/S0749-3797(10)00639-2/abstract

Indexing Status
Subject indexing assigned by NLM

MeSH
Cost-Benefit Analysis; Exercise; Female; Health Promotion /economics /methods; Humans; Male

AccessionNumber
22011000314

Date abstract record published
04/05/2011