Tackling of unhealthy diets, physical inactivity, and obesity: health effects and cost-effectiveness

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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 population-based interventions to tackle the global burden of obesity by encouraging healthier diets and increased physical activity. Health information, making unhealthy food more expensive and healthy food cheaper, improving nutrition information, and preventing marketing of unhealthy food to children, were cost-effective. A package of measures was very cost-effective. The cost-effectiveness approach was conventional and the results appear to be robust, but the data sources and some methods were not clearly presented.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost-effectiveness of various population-based interventions designed to tackle the global burden of obesity by encouraging healthier diets and increased physical activity.

Interventions
The interventions were school-based health promotion, work site health promotion, mass media campaigns, counselling of individuals at risk in primary care, fiscal measures altering the prices of fruit and vegetables and foods high in fat, regulation of food advertising to children, and compulsory food labelling. A combination of a mass media campaign, fiscal measures, food advertising regulation, and food labelling was considered. These interventions were compared against no preventive policy.

Location/setting
UK, Brazil, China, India, Mexico, Russia, and South Africa/primary care and community.

Methods
Analytical approach:
The analysis was based on a micro-simulation model that was developed jointly by the Organisation for Economic Co-operation and Development (OECD) and the World Health Organization (WHO). This chronic disease prevention model included distant risk exposures (several steps away from disease in causation), as well as proximate risk exposures (more closely connected). A lifetime horizon (100 years) was considered. The authors did not explicitly state the perspective adopted.

Effectiveness data:
The clinical data were from a variety of sources; national health surveys, published studies, the WHO, the United Nations Food and Agriculture Organization, the International Agency for Research on Cancer, the US National Health and Nutrition Examination Survey, and the Health Survey for England. The epidemiological data were generally from local sources and varied between countries. The impact of reduced obesity on cancer, ischaemic heart disease, and stroke was assumed to be the same for all countries and was from large published cohort studies. The most important input was the effect of the interventions in reducing obesity and its consequences; the incidence of ischaemic heart disease and stroke, and, to a lesser extent, the incidence of cancer. This information was from a WHO review of published studies.

Monetary benefit and utility valuations:
Measure of benefit:
Disability-adjusted life-years (DALYs) were the summary benefit measure and they were discounted at an annual rate of 3%. The life-years saved and the reduction in events, such as cancer, stroke, and ischaemic heart disease, were reported.

Cost data:
The economic analysis included the per person costs of health services (hospital or primary care visits, prescribed drugs, and diagnostic tests) and the programme costs (administration, training, mass media, and other activities). All economic data were from published sources or official listings in each country. The costs were presented in US dollars ($) and the price year was 2005. A 3% annual discount rate was applied.

Analysis of uncertainty:
The results were presented for time horizons of 20 and 50 years. A probabilistic sensitivity analysis was carried out, and the analysis and results were reported in an online appendix.

Results
In Brazil, over 50 years, the projected DALYs were 170 with school-based intervention, 3,323 with work site intervention, 1,803 with mass media campaigns, 5,483 with fiscal measures, 7,163 with physician counselling, 988 with food advertising regulation, and 3,259 with food labelling.

The incremental cost-utility ratios were $93,350 with school-based intervention, $3,541 with work site intervention, $1,994 with mass media campaigns, cost saving with fiscal measures, $5,156 with physician counselling, cost-saving with advertising regulation, and cost-saving with food labelling. The cost-effectiveness threshold (three times the gross domestic product per head) was $15,000, in Brazil.

The expected DALYs, costs, and incremental cost per DALY avoided, over no intervention, varied in the other countries, but all interventions were generally cost saving or within the cost-effectiveness threshold, except for school-based interventions, in all countries. Fiscal measures provided the greatest value for money. Food labelling was cost saving in many countries. Regulation of food advertising to children and mass media campaigns had very favourable cost-utility ratios, in most countries.

The combination strategy was estimated to be cost saving in about half the countries examined, and was cost-effective in the other countries after a maximum of 15 years.

The probabilistic sensitivity analysis showed that the results for the most cost-effective interventions were quite stable to variations in the model parameters.

Authors’ conclusions
The authors concluded that strategies that included health information to improve population awareness of the benefits of healthy eating and physical activity, fiscal measures to increase the price of unhealthy food and reduce it for healthy foods, and regulatory measures to improve nutrition information or prevent the marketing of unhealthy food to children, were cost-effective. A package of measures was very cost-effective.

CRD commentary
Interventions:
The authors provided a justification for their selection of the interventions. These were chosen on the basis of the available published evidence on their effectiveness. Interventions for which evidence of effectiveness was scarce were not considered.

Effectiveness/benefits:
Little information was provided on the sources of for the clinical inputs. Epidemiological data were from appropriate local sources and should reflect the differences between countries. Other data were from official sources, such as the
WHO or the United Nations Food and Agriculture Organization, which are likely to have provided valid estimates, but the remaining published sources were not described. The clinical estimates were varied in the probabilistic sensitivity analysis. The main benefit measure (DALYs) was appropriate, as it takes account of the effects of various diseases on mortality and morbidity. The source of the utility weights was not clearly reported.

Costs:
The authors did not explicitly state the perspective, and the cost categories were presented as totals that included the intervention and events avoided. It is likely that the perspective of the third-party payer was adopted. The resource use and unit costs were generally from local sources, which appear to have been appropriate, but they were not presented separately and little information was given. The costs were treated stochastically in the sensitivity analysis. Details, such as the price year and discount rate, were reported.

Analysis and results:
The results were extensively presented for all countries, but the analysis focused on the incremental impact of each strategy over no intervention, rather than compared with each other. The uncertainty was appropriately investigated in a probabilistic analysis, which was presented in the online appendix. The impact of single items on the cost-effectiveness results was not investigated. The authors acknowledged some limitations of their analysis, and these mainly related to the need for assumptions for the long-term effects of the interventions. The analysis was conducted in low- and middle-income countries, as well as in the UK, and the results might be transferable to other countries with similar income and epidemiological characteristics.

Concluding remarks:
The cost-effectiveness approach was conventional and the results appear to be robust, but the data sources and some methods were not clearly presented.

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