Cost-effectiveness of hearing aids in the hearing-impaired elderly: a probabilistic approach

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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
The aim was to evaluate the cost-effectiveness of the use of hearing aids in patients who were aged between 50 and 80 years and had hearing impairment. The authors concluded that hearing aids were cost-effective for hearing-impaired elderly patients. The methods and the reporting of the study were good and the results appear to be reliable.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The objective was to evaluate the cost-effectiveness of the use of hearing aids for patients who were aged between 50 and 80 years and had hearing impairment.

Interventions
The use of a hearing aid after a consultation with an audiologist was compared with no hearing aid.

Location/setting
Taiwan/secondary care.

Methods
Analytical approach:
The authors used a state-transition model, with a cycle length of one year, to compare the costs and effects of using hearing aids compared with no hearing aid, over a 30-year period. The authors stated that the perspective was societal.

Effectiveness data:
The probabilities of hearing decline or stability were from a systematic review of the published literature. The probability of going to visit a physician was from one study, as was the probability of patient satisfaction. The probability of using a hearing aid after a consultation with the audiologist was from observational data that were appropriate to the setting. The key data were assigned distributions for a Bayesian analysis.

Monetary benefit and utility valuations:
The utility estimates were derived from a systematic review of published studies that used the visual analogue scale or the Hearing Handicap Inventory for the Elderly.

Measure of benefit:
The measure of benefit was quality-adjusted life-years (QALYs) gained and these were discounted at a rate of 3% per annum.

Cost data:
The costs included those of visits to a physician about hearing loss and to evaluate hearing status, hearing aids and consultation, and maintenance of hearing aids, such as battery replacement and repair. The costs of consultations were from the National Health Insurance reimbursements schedule for Taiwan and those of hearing aids were estimated from observational data on patients who were using hearing aids. The indirect costs of lost productivity, from the gross national product per capita in Taiwan, and travel (an arbitrary estimate) were also included. The costs were in US dollars ($) and in Euros (EUR), in 2004 values, and discounted at a rate of 3%.
Analysis of uncertainty:
The impact on the results of variations in the key model parameters, across ranges identified in the literature, was assessed using probabilistic sensitivity analysis.

Results
For men, the mean cost was $5,466 with a hearing aid and $33 without a hearing aid. For women, the cost was $6,014 with a hearing aid and $24 without. The incremental costs were $5,433 for men and $5,990 for women.

For men, the mean hearing-related QALYs increased to 14.89 with a hearing aid, from 14.33 without, while, for women, they increased to 15.12 with a hearing aid, from 14.68 without. The incremental QALYs were 0.56 for men and 0.44 for women.

The incremental cost per QALY with a hearing aid, compared with without one, was $9,702 for men and $13,615 for women.

At a willingness-to-pay of $20,000 per QALY, the probability of a hearing aid being cost-effective was 67% for women and 78% for men.

Authors' conclusions
The authors concluded that the use of a hearing aid was cost-effective for hearing-impaired elderly patients.

CRD commentary
Interventions:
The intervention was well described and the comparator was no use of a hearing aid, which was the status quo.

Effectiveness/benefits:
The details of all the parameters and their sources were reported. The systematic review and the selection of some studies was appropriate and it is likely that all the relevant data was considered. The Bayesian approach should assess any uncertainty in the parameters and show their reliability. It appears that the best available evidence was used and full details of the systematic review were available in Chao, et al. 2009 (see 'Other Publications of Related Interest' below for bibliographic details).

Costs:
The authors reported the study perspective and they appear to have included all the relevant costs. The cost estimates were also relevant to the study population and setting, and the future costs were appropriately discounted. Some of the resource use data were presented, with their unit costs, but generally the costs were not broken down into individual items and this may hinder transferability of the results to other settings.

Analysis and results:
The analytic approach was well described, with a diagram of the model. The sensitivity analyses were appropriate and the probabilistic analysis appears to have been sufficient to fully capture the parameter uncertainty. The use of triangular distributions might not be widely accepted as the gold standard, but this is unlikely to have changed the overall conclusion. The authors acknowledged and highlighted the key limitations and assumptions of their study.

Concluding remarks:
The methods and the reporting of the study were good and the results appear to be reliable.

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Bibliographic details