A cost-effectiveness analysis of a health education programme for elderly persons with age-related macular degeneration: a longitudinal study

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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 study examined an activity-based health education programme (HEP) for elderly people with age-related macular degeneration. The HEP developed (“Discovering New Ways”) was designed to prevent or delay the onset of problems in daily activities among elderly persons with age-related macular degeneration. The programme also aimed to enable the early detection of persons with perceived insecurity in performing daily activities.

Type of intervention
Prevention and education.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised all persons referred by an ophthalmologist to rehabilitation for the first time. The inclusion criteria were a primary diagnosis of age-related macular degeneration, a distance visual acuity of the better eye with best correction no lower than 0.1, age 65 years or over, living at home, and ability to participate in group discussions.

Setting
The setting was tertiary care, specifically, a low-vision clinic (LVC) at a university-affiliated hospital. The economic study was carried out in Sweden.

Dates to which data relate
The effectiveness evidence was gathered from patients who were referred to the clinic between January 1996 and December 1997 (full follow-up lasted 28 months after completion of the intervention). Resources used were gathered simultaneously. The prices used in the analysis dated from 1996.

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

Link between effectiveness and cost data
The authors’ intention was to carry out a prospective costing on the same sample of patients as that used in the effectiveness study. However, in practice, many patients were lost to follow-up during the study.

Study sample
A total of 312 patients were referred during the study period and 229 (73%) agreed to participate. Of these, 109 patients were randomised to the HEP, while 120 were randomised to the IP. The most common reason for non-participation was reported as poor health. No patients were excluded from the study.

**Study design**
A randomised controlled trial design was used at the single Swedish LVC. The patients were randomised according to a "randomisation table". The occupational therapists who assessed patients were not blind to the composition of the groups but were not involved in the programme. Follow-up took place 1, 4, 16 and 28 months after the intervention was completed. Ninety-eight patients dropped out during the study. Of these, 15 (12 from the HEP and 3 from the IP) declined the allocated intervention after randomisation, 2 died (1 from each group died), and 81 (34 from the HEP and 47 from the IP) were lost to follow-up. The primary reason reported for loss to follow-up was "disease".

**Analysis of effectiveness**
The analysis was described as intention to treat, but in fact it was conducted only for the 131 patients (57% of randomised patients; 62 HEP and 69 IP) who participated in the 28-month assessment. Of these, 5 from the HEP and 9 from the IP had incomplete datasets because they missed one or two of the interim assessment visits. These incomplete data were imputed by the last value carried forward method. The non-participants differed statistically from the participants in their use of public transport (higher for non-participants). There were no statistically significant differences in other variables such as gender, age, living alone, home assistance service, perceived good health and visual acuity. The primary health outcome was perceived security in performing daily activities. This was measured using a questionnaire instrument comprising 7 areas of activity (meals, self-care and care of clothing, communication, cleaning, mobility, shopping and financial management), with a total of 28 items. Perceived security in each task was self-rated on a 4-point ordinal scale (instrument described in Dahlin et al. 2001, see 'Other Publications of Related Interest' below for bibliographic details).

**Effectiveness results**
At 28 months, there was a statistically significant difference in cases showing an improved level of security between the HEP and IP. Twenty-eight cases (45%) in the HEP showed an improved level of security (4 cases more than one step), compared with 7 cases (10%; 0 cases more than one step) in the IP (95% confidence interval: 21 to 49; p=0.0001).

There was also a statistically significant difference in the cases with a reduced level of security, 8 cases (13%) in the HEP (2 cases more than one step) versus 27 (39%; 3 cases more than one step) in the IP (95% CI: 12 to 40; p=0.001).

A total of 26 (42%) of cases maintained their level of security in the HEP, compared with 35 (51%) in the IP. This difference was non significant (95% CI: -8 to 26; p=0.326).

**Clinical conclusions**
The authors concluded that the HEP was "strikingly effective", both in developing cases with an improved level of security in daily activities and in preventing cases of reduced security 28 months after the intervention.

**Measure of benefits used in the economic analysis**
Cases of improved level of perceived security in daily activity were chosen as the effectiveness measure in the economic analysis.

**Direct costs**
A standard composite price for personnel time was set for all HEP participants, whether or not all sessions were attended. In the IP, the number of personnel visits made to the clinic by each person was recorded and a unit cost...
applied (set by the hospital administration). Additional visits, in either group, between follow-ups were costed in the same way as IP visits. Overhead costs in the LVC, which were common to both alternatives, were not included in the comparison. Data on prescribed glasses and assistive devices, and costs for housing adaptation paid by the city of Goteborg, were derived from each person's case record at the clinic. Visits to a physician, use of home assistance service, and any other costs external to the LVC, were documented via structured interview questionnaire at the follow-up visits. The unit costs for these resources were taken from estimates made by the civic administration of the city of Goteborg. Discounting at a rate of 5% was applied in a sensitivity analysis, but not to the base-case analysis. All costs were estimated according to 1996 prices.

Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
The price of informal home care (i.e. home assistance service performed by relatives and friends) was estimated as the cost of leisure time, 35% of the gross wage rate in Sweden. This resource use was collected via the visit questionnaire. Discounting at a rate of 5% was applied in a sensitivity analysis, but not to the base-case analysis. All costs were estimated according to 1996 prices.

Currency
Swedish kroner (SEK).

Sensitivity analysis
A sensitivity analysis was carried out only for cost discounting.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The authors reported the LVC costs and external costs separately. The former (LVC costs) included personnel and assistive device costs. The latter (external costs) included all other costs (i.e. a mixture of direct and indirect costs). Within these two categories, different types of costs were also reported separately and the statistical significance of any differences was investigated.

The mean total LVC costs per person were SEK 6,558 for the HEP and SEK 5,907 for the IP. The incremental difference was SEK 651 (11.3%), which was not statistically significant. With discounting, this difference was 11.5%.

The mean total external costs per person were SEK 21,446 for the HEP and SEK 30,434 for the IP. The incremental difference was SEK 8,988 (42%), which was not statistically significant.

The total per-patient costs (LVC costs plus external costs) associated with each programme over the study period were SEK 28,004 for the HEP and SEK 36,341 for the IP. The incremental difference was 30%, which was not statistically significant.

The authors noted that the pattern of external costs indicated that the divergence in costs grows over time.

Synthesis of costs and benefits
The authors reported that the HEP was more effective and less costly than the IP. The costs and benefits were also combined in average cost-effectiveness ratios, although an incremental cost-effectiveness analysis was not performed.
The authors reported the average cost per improved case for the HEP (SEK 14,522 for LVC costs only; SEK 62,010 for total costs) and for the IP (SEK 58,226 for LVC costs only; SEK 358,216 for total costs).

**Authors' conclusions**
The health education programme (HEP) was more effective in achieving the desired outcome and was less costly, from a social point of view, than the individual programme (IP).

**CRD COMMENTARY - Selection of comparators**
The comparator chosen was described as the standard intervention in this setting. You should decide whether it represents an adequate comparator in your own setting.

**Validity of estimate of measure of effectiveness**
The analysis was based on a longitudinal, randomised controlled trial design, with several interim data collection points, which was appropriate for the study question. However, randomisation was insufficiently described to judge its success. In addition, since concealment was not reported and blinding was not applied, it is likely that selection bias was not avoided. This is supported by the statistically significant difference found between non-participants and participants at baseline (though only in one variable, the use of public transport services). It was not clear whether the study sample was representative of the population, given that only one study centre was used, a convenience sample was assembled, and the likelihood of selection bias.

The patient groups were not shown to be comparable at baseline, making it difficult to ascribe all the results to the intervention given. Subsequently, there was a high loss to follow-up in the study, with only 57% of randomised patients completing the study at 28 months. The authors analysed data for these 131 patients. The analysis, although described as intention to treat, was in fact an available case analysis, because true intention to treat would have included all patients who were randomised, regardless of whether they received treatment or their outcomes were collected. Finally, the outcomes were assessed via a self-rating scale. The possible impact of events or characteristics other than the intervention studied was not investigated. In light of the extent of bias possibly introduced by the methodology, the analysis of effectiveness was not handled credibly enough to justify reliance on its results.

**Validity of estimate of measure of benefit**
The estimate of benefit was a proxy obtained directly from the effectiveness analysis. The choice of improved case was explained and justified appropriately.

**Validity of estimate of costs**
Although a societal perspective was reported, it was not clear whether all categories of costs were included. In addition, some relevant costs (clinic overheads) were omitted from the analysis because they were common to both therapies. This was inconsistent with an approach that applied clinic costs, to some extent, on the basis of the number of visits made by the patient, and it might have affected the results. It was unclear whether all the relevant costs were included in the resource use questionnaire because it would appear that information on only physician visits, ophthalmologist visits, and formal and informal home care was collected. It may be that other health care or social care resources (e.g. medication or social services) are relevant to this patient population. The unit costs were reported separately, whereas the quantities were not. The quantities were taken from the randomised controlled trial, while the costs came from the authors' setting and published sources. No statistical analysis was performed for either set of variables. In contrast, the authors calculated the budgetary impact of the different programmes if their results were extrapolated exactly from a single centre to the country of Sweden. The price year was reported and discounting was applied, but only in the sensitivity analysis.

**Other issues**
The authors did not make comparisons with other studies in drawing their conclusions. The issue of generalisability to
other settings was not addressed as they appear to have been exclusively concerned with the Swedish setting. The authors did not generally present their results selectively, although more details of the single sensitivity analysis should have been provided. The authors performed a meaningless average cost-effectiveness ratio analysis. The study enrolled patients from a single centre in a manner which was likely to introduce a biased sample, yet generalised conclusions across all elderly patients with age-related macular degeneration. The authors did not recognise any limitations in their study.

Implications of the study
The authors suggested that the implementation of an HEP is "obvious" from a social view, but that further research is needed into the value of assistive devices in an LVC. They noted also that implementation partly rests in the hands of the rehabilitation service, whose resource utilisation structure could act as a disincentive to reform.

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Other publications of related interest

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