Health Technology Assessment 1999; Vol. 3: No. 23 (Executive summary)

Executive summary

Economic evaluation of a primary care-based education programme for patients with osteoarthritis of the knee

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NHS R&D HTA Programme

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Objectives

This study is an economic evaluation of a general practice-based nurse-led education programme for patients with osteoarthritis of the knee. The objectives were:

- to measure the clinical effectiveness of the intervention over 1 year of follow-up
- to estimate the mean cost per participant of providing the intervention in the Osteoarthritis of the Knee (OAK) study
- to estimate the impact of the programme on the direct and indirect costs of health care related to knee arthritis over the year of follow-up.

Methods

The OAK study

In the OAK study, local general practices were randomised to an intervention or control group. Patients with confirmed knee osteoarthritis were recruited between November 1995 and May 1997, and were initially assessed by interview. Those in the intervention practices were then invited to take part in four 1-hour group sessions led by a research nurse. The sessions took place at weekly intervals at the general practitioners' (GPs') surgeries. The patients were assessed by postal questionnaire at 1, 3, 6 and 12 months. Health outcome measurement instruments included the Western Ontario and McMaster Universities Arthritis Index, the Arthritis Helplessness Index (AHI), the Short Form 36 (SF-36) and the General Health Questionnaire.

Economic analysis

Analysis was conducted on an intention-to-treat basis. Firstly, tests were carried out for differences in baseline characteristics by level of follow-up and by study group. Baseline values of each socio-demographic and outcome variable were regressed against a dummy follow-up variable and against a dummy study group variable. The significance of the relationships was tested using robust estimates of variance with adjustment for clustering by practice. Tests were then carried out for between-group differences in clinical outcomes at 1 year using (robust cluster-adjusted) linear regression with adjustment for the baseline value of the variable. Further explanatory variables were added to correct for baseline differences in practice or patient characteristics.

Additional information for the economic evaluation was collected from two sources: patients were re-interviewed at 1 year, and GP case notes were reviewed. Information was collected for each cost-generating event over a 2-year period (from 1 year before baseline to 1 year after). Events were excluded from the cost analysis if they were clearly not related to knee osteoarthritis. Total costs, including all relevant health care and the cost of the educational sessions, were then estimated for each patient for the 2 study years.

The unit costs used to estimate costs were derived from published national sources wherever possible. All costs are reported in 1996/1997 pounds sterling. The social direct cost of the OAK programme was estimated to be £240 per participant. This is based on the recruitment of 20 practices, 38 teaching groups and 174 patients – the numbers that could be expected to be recruited within a single health district in 1 year. If a nurse were to be employed to deliver an existing programme, the social direct cost would be about £140 per participant.

Patient costs were analysed in two ways. Firstly, between-group cost differences were tested for using robust cluster-adjusted linear regression, as for the outcome data. Secondly, confidence intervals for incremental costs were estimated by bootstrap regression with re-sampling of residuals. The effect of uncertainty over unit cost estimates was investigated through simple one-way and probabilistic sensitivity analyses.

Results

The control practices recruited significantly fewer patients than the intervention practices: 65 patients were recruited from 12 control practices, compared with 105 patients from ten intervention practices ($p = 0.02$). There were no significant differences between the control and intervention groups in follow-up rates at 1 year by questionnaire, interview or case-note review. Overall, 85% of patients

completed the questionnaire (full or brief version) at 1 year, 74% were interviewed at 1 year, and case notes were reviewed for 81%.

There was evidence of selective withdrawal from the trial, as patients with complete follow-up had higher AHI scores at baseline ($p < 0.001$).

Some differences in baseline characteristics remained after randomisation. The control practices had more partners ($p = 0.02$). A greater proportion of patients in the control group than in the intervention group came from non-white ethnic groups ($p = 0.007$), and the control group also had a greater proportion of patients who lived alone ($p = 0.005$). The control group had higher baseline scores for the physical dimension of the SF-36 ($p = 0.008$).

There were no significant differences between the control and intervention groups in health outcome at 1 year after adjustment for baseline scores and practice clustering. This remained so after further adjustment for initial patient and practice differences.

Over the year after baseline, costs were greater for the intervention group than for the control group. After adjusting for baseline costs and clustering, the mean difference in social direct costs was £239 ($p < 0.001$). The results of the cost analysis did not change after further adjustment for other baseline differences.

The results were also robust to changes in unit costs. The cost of the education programme had to fall to below £15 per participant before the significance of the difference in social direct cost was lost. The 95% confidence interval for incremental social direct costs was similar when estimated by parametric methods (£138 to £259) or non-parametric bootstrapping (£150 to £263). When probabilistic sensitivity analysis was introduced along with non-parametric bootstrapping, to include additional uncertainty due to unit costs, the 95% bias-corrected percentile uncertainty range was slightly wider (£133 to £274).

Conclusions

The OAK study failed to demonstrate improvements in knowledge, self-efficacy in arthritis management, or health outcomes after 1 year. Not only were the differences not statistically significant, they were not consistent in direction. Of course this does not mean that clinical equivalence has been proved. The study suffered from a number of limitations. There was a lack of statistical power, and some differences in patient and practice characteristics remained after randomisation. There was also evidence of selective loss to follow-up. Fortunately this was unlikely to introduce bias, since the study groups had similar follow-up rates.

The cost analysis showed a highly significant increase in costs for the patients randomised to receive the education programme. There was no evidence that the costs of the educational intervention were offset by reduced utilisation of other health services during the period of follow-up. These results were robust to the method of analysis, and to the level of unit costs.

This evidence lends support to the contention that general practice-based patient education programmes for knee osteoarthritis are not a cost-effective use of healthcare resources. However, further evidence is required before this can be confirmed. The study may have failed to detect significant clinical effects due to lack of power. The generalisability of the clinical and economic findings might be limited for a number of reasons. The study sample was drawn from a particular locality (an ethnically mixed urban population) that might not be representative of the wider UK population. Outcomes are likely to vary between patient groups, and better targeting of the intervention might have been beneficial. The effectiveness of such interventions is also likely to be sensitive to the specific content and mode of delivery.

Recommendations for further research

There are difficulties in designing studies to evaluate the cost-effectiveness of primary care-based patient education programmes for knee osteoarthritis. These include the selection of appropriate control groups and outcome measures, estimating the power of trials involving cluster randomisation, possible bias due to selective withdrawal, and the generalisability of the results to a wider population. Further research to address these issues and to confirm or contradict the findings of the study reported here would be valuable.

Publication

Lord J, Victor C, Littlejohns P, Ross FM, Axford JS. Economic evaluation of a primary care-based education programme for patients with osteoarthritis of the knee. *Health Technol Assess* 1999;**3**(23).

NHS R&D HTA Programme

The overall aim of the NHS R&D Health Technology Assessment (HTA) programme is to ensure that high-quality research information on the costs, effectiveness and broader impact of health technologies is produced in the most efficient way for those who use, manage and work in the NHS. Research is undertaken in those areas where the evidence will lead to the greatest benefits to patients, either through improved patient outcomes or the most efficient use of NHS resources.

The Standing Group on Health Technology advises on national priorities for health technology assessment. Six advisory panels assist the Standing Group in identifying and prioritising projects. These priorities are then considered by the HTA Commissioning Board supported by the National Coordinating Centre for HTA (NCCHTA).

This report is one of a series covering acute care, diagnostics and imaging, methodology, pharmaceuticals, population screening, and primary and community care. It was identified as a priority by the Primary and Community Care Panel and funded as project number 94/39/01.

The views expressed in this publication are those of the authors and not necessarily those of the Standing Group, the Commissioning Board, the Panel members or the Department of Health. The editors wish to emphasise that funding and publication of this research by the NHS should not be taken as implicit support for the recommendations for policy contained herein. In particular, policy options in the area of screening will be considered by the National Screening Committee. This Committee, chaired by the Chief Medical Officer, will take into account the views expressed here, further available evidence and other relevant considerations.

Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search, appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

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The editors have tried to ensure the accuracy of this report but cannot accept responsibility for any errors or omissions. They would like to thank the referees for their constructive comments on the draft document.

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http://www.hta.nhsweb.nhs.uk ISSN 1366-5278