Improving oral health in institutionalised elderly people by educating caregivers: a randomised controlled trial
Frenkel H, Harvey I, Newcombe R G

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 use of an oral health care education (OHCE) programme for nursing home caregivers, aimed at improving the clients' oral health. A health promoter with 15 years' experience presented the intervention. The intervention consisted of sessions lasting approximately one hour, covering the role of plaque in oral disease and including demonstrations of cleaning techniques for dentures and natural teeth. Caregivers demonstrated the practice of these techniques using a manikin head, models and other teaching aids.

Type of intervention
Other: caregiver education programme.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised institutionalised elderly people, wearing dentures or having natural teeth. Patients were not eligible if they presented with significant cognitive impairment.

Setting
The setting was a nursing home. The economic study was carried out in the UK.

Dates to which data relate
The period during which the data were collected was not reported. The costs referred to 1999 to 2000 prices.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
The costing was undertaken prospectively on the same patient sample as that used in the effectiveness analysis.

Study sample
Power calculations (95% confidence) indicated that 120 denture-wearing clients (97% power) and 45 dentate clients (95% power) were required in each group to detect clinically significant differences (20% improvement) in the primary outcomes across the study groups. A sample of 22 nursing homes with between 20 and 40 beds was selected. Of the 607 residents, 431 were eligible and 412 participated into the study. There were 201 residents in the intervention group and 211 in the control group. The mean age in the intervention group was 84.9 (+/- 8.2) years, and
81.1% were women. The mean age in the control group was 84 (+/- 8.3) years and 75.8% were women. The baseline characteristics of the groups were reported in detail.

**Study design**
This was a single-blind, randomised controlled trial, which was carried out in 22 nursing homes registered with Avon Health Authority. The unit of randomisation was the nursing home. An independent researcher carried out the block randomisation. The participating staff concealed their group allocation from the examiner. The patients were assessed by a single examiner at baseline (visit 1) and at months 1 (visit 2) and 6 (visit 3). At visit 2, 34 patients were lost to follow-up (30 died, 3 moved and 1 withdrew), leaving 178 patients in the intervention group and 200 in the control group. At visit 3, 30 participants were lost in the intervention group (27 died, 1 moved, 1 was ill and 1 withdrew) and 32 in the control group (26 died, 3 moved, 2 were ill and 1 withdrew). Therefore, 155 patients in the intervention group and 182 in the control group completed the trial.

**Analysis of effectiveness**
It was stated that the analysis of the clinical study was conducted on an intention to treat basis, but the data analysis was restricted to clients who provided data at baseline and at follow-up (i.e. 178 clients in the intervention group and 200 in the control group). Adjustments were made for the clustering nature of the data and scores at first visit. The primary health outcomes referred to the status of oral hygiene. These were assessed using standardised scores that reflected the conditions of denture plaque, denture-induced stomatitis, dental plaque and gingivitis. The higher scores indicated worse states. The secondary health outcomes were calculus, root caries and tooth mobility, which were measured on a binary scale as present or absent. The comparability of the study groups was acceptable for key variables, although there were some imbalances in terms of gender, mobility, and time since last dental attendance. The authors stated that it was unlikely that these imbalances resulted in important distortions of the study results.

**Effectiveness results**
The difference (intervention minus control) in denture plaque scores was -1.15 (95% confidence interval, CI: -0.83 - -1.47; p<0.001) at visit 2, and -1.47 (95% CI: -1.13 - -1.80; p<0.001) at visit 3.

The difference (intervention minus control) in dental plaque scores was 0.41 (95% CI: 0.18 - 0.65; p<0.001) at visit 2, and 0.34 (95% CI: 0.14 - 0.53; p<0.001) at visit 3.

The difference (intervention minus control) in gingivitis scores was 0.17 (95% CI: 0.01 - 0.35; p=0.06) at visit 2, and 0.28 (95% CI: 0.15 - 0.42; p<0.001) at visit 3.

The denture-induced stomatitis levels showed a difference between the control and intervention at visit 3, (p <0.0001), and at visit 2, (p <0.025), both in favour of intervention.

**Clinical conclusions**
The effectiveness analysis showed that the OHCE programme was effective in improving health hygiene in both denture-wearing and dentate elderly patients.

**Measure of benefits used in the economic analysis**
The health outcomes were left disaggregated and no summary benefit measure was used. A cost-consequences analysis was therefore carried out.

**Direct costs**
Discounting was not carried out as the time horizon of the study was only 6 months. The unit costs and the quantities of resources were reported separately. The costs included in the analysis referred to programme implementation and were for the fixed and variable costs of the study. The fixed costs were for the technique demonstration models and
visual aids, and the programme preparation time. The variable costs were for travelling and presentation time, toothbrushes, and workbooks for the participants. The cost/resource boundary adopted was that of the NHS provider. The source of the cost data was not reported. The quantities of resources were estimated using data derived from the 22 nursing homes in the trial. These were then extrapolated to a hypothetical sample of 100 nursing homes. The costs referred to 1999 to 2000 prices.

**Statistical analysis of costs**
No statistical analysis of the costs was carried out.

**Indirect Costs**
The indirect costs were not included.

**Currency**
UK pounds sterling (€).

**Sensitivity analysis**
Sensitivity analyses were not performed.

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

**Cost results**
The total fixed costs of the programme were 203.68, while the variable cost per home was 66.90. The total costs for delivering the OHCE programme to 100 nursing homes amounted to 6,717.67.

It was estimated that the additional caregiver time arising from the programme would be 30 minutes, and the minimum basic hourly wage was 3.00 for persons aged 18 to 21 years and 3.70 for persons aged 22 years and over.

**Synthesis of costs and benefits**
Not relevant.

**Authors' conclusions**
From the perspective of the NHS, the oral health care education (OHCE) programme was effective in improving the oral hygiene of institutionalised elderly patients at a modest cost. However, it has to be noted that the final levels of the residents' oral health were quite low, although a significant improvement was obtained in patients in the intervention group.

**CRD COMMENTARY - Selection of comparators**
The rationale for the choice of the comparator was clear. No OHCE programme was selected as it represented the usual care in nursing homes. You should assess whether a OHCE programme or other technology is currently implemented in your own setting.

**Validity of estimate of measure of effectiveness**
The effectiveness analysis used a single-blind, multi-centre, randomised controlled trial. The internal validity of the
analysis was further enhanced by sample size calculations, performed in the planning phase of the study. A single examiner was used to minimise any source of variation during the assessment. The study sample appears to have been representative of the study population, baseline characteristics having been presented. However, the study groups were not entirely comparable at baseline, and although there was some statistical control for this, it might not have been sufficient.

Validity of estimate of measure of benefit
No summary benefit measure was used in the economic analysis, and the health outcomes were left disaggregated. Hence, a cost-consequences analysis was carried out. An issue would be that the increase in costs to implement the intervention cannot easily be valued in comparison with other possible allocations of resources.

Validity of estimate of costs
The study was conducted from the perspective of the NHS. It would appear that all the categories of cost relevant to the programme implementation were included in the analysis. The price year was given. In addition, the unit costs and the quantities of resources were reported separately. However, the costs and resources were treated deterministically. The source of the cost data was not reported. It might have been useful to have included the costs avoided, due to the prevention of problems that could require future treatment.

Other issues
The authors did not compare their findings with those from other studies. The issue of the generalisability of the study results to other settings was not addressed, and sensitivity analyses were not carried out. Therefore, the external validity of the analysis may be low. The study considered institutionalised elderly patients, excluding those with severe cognitive impairment, and this was clearly reflected in the authors' conclusions. The results were reported in full.

Implications of the study
The authors suggest that further studies should focus on the implication of OHCE programmes, specifically in the population of patients with severe cognitive impairment. The authors noted that "the persistence of high dental plaque scores seems to reflect the greater reluctance of caregivers to carry out intra-oral hygiene for another person”.

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