Evaluating community-based programs for dementia caregivers: the cost implications of adult day services

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 provision of adult day centres for the care of dementia patients was examined. The centres provide out-of-home services, including therapeutic activities, health monitoring, socialising, transportation and medical care. Adult day services were used for at least 2 days and 8 hours per week. The day service was compared with normal family care.

Type of intervention
Palliative care.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised dementia patients who received some form of care from a primary caregiver.

Setting
The setting was the community and day care centres. The economic study was carried out in New Jersey and Ohio, USA.

Dates to which data relate
All the resource use and cost data were obtained in 1993. The price year was 1993.

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

Link between effectiveness and cost data
The cost data were collected prospectively from the same sample of patients that provided the effectiveness data.

Study sample
Patients eligible to be included in the study were those diagnosed with dementia. Primary caregivers were considered only if they had not utilised adult care centres or more than 8 hours of formal services per week. Only patients and caregivers who were prepared and able to use adult day services were included. Patients in the treatment group were recruited from adult day services in New Jersey, whilst patients in the control group were taken from Ohio. These two locations were chosen because of the similarities in their sociodemographic indicators (e.g. income, age and ethnicity).

During the course of the study, patients were excluded if they were discharged from an adult day programme, were lost
to follow-up or were institutionalised. They were also excluded if they had a late interview, did not use enough adult day services, or used the adult day service or a comparable community-based programme. Thus, of the caregivers in the treatment (259) and control (289) groups, respectively, 347 were excluded (179 in the treatment group and 168 in the control group) by the end of the study.

In the short-term study, 154 patients were included in the treatment group (T-ST) and 213 in the control group (C-ST). In the long-term study, 80 patients were included in the treatment group (T-LT) and 121 in the control group (C-LT). No power calculation to determine the sample size was performed.

**Study design**
This was a multi-centre double cohort study that was carried out using two different scenarios. The first scenario considered the 3-month effects of adult day care services, whilst the second examined the one-year effects. No method of randomisation into each cohort was used. No method of blinding at any level was reported. At the end of the 3-month follow-up period, 17 patients in the T-ST group and 22 in the C-ST group were lost to follow-up. Over the full one-year period of this study, the numbers lost to follow-up increased to 33 in the T-LT group and 54 in the C-LT group.

**Analysis of effectiveness**
The analysis was performed on treatment completers only. The patients in the treatment group were recruited from existing centres, whilst the those in the control group were taken from another city where the availability of adult care centres was poor. The characteristics of each cohort were similar in most respects. However, they differed in the likelihood of the patient living with a relative (more likely in the treatment group), family income (higher in the treatment group) and hours spent in primary care (more in the treatment group).

The effectiveness measures used in the study were based on the caregivers rather than the patients. The caregivers were asked to respond to questions determining their quality of life. Specifically, these measured the degree to which the caregiver felt overwhelmed by the responsibilities of caring, and the level of depression experienced by the caregiver.

The degree of stress was measured by how often the carer felt overwhelmed in seven different items. This ranged from degrees of "never" (1 point) to "some of the time" (2 points), "most of the time" (3 points) and "all the time" (4 points). The sum of these could range from a minimum of 7 points (all responses "never") to a maximum of 28 points (all responses "all the time").

Depression was measured similarly but using a 20-item questionnaire. The carers stated how often they had felt a certain way in the last week. This ranged from "less than one day" (0 points) to "one to two days" (1 point), "three to four days" (2 points), and "five to seven days" (3 points). The sum of these ranged from 0 to a maximum of 60 points.

**Effectiveness results**
In the short-term study, the T-ST group experienced a mean level of role-overload of 20.14 points, compared with 21.32 points in the C-ST group. The mean score for depression was 19.96 points in the T-ST group and 21.28 points in the C-ST group. These differences were statistically significantly for both effectiveness measures, (p<0.05).

In the long-term study, the mean role-overload was 19.96 points in the T-LT group and 21.28 points in the C-LT group. The mean score for depression was 12.77 points in the T-LT group and 15.74 points in the C-LT group.

**Clinical conclusions**
Use of the adult day centre was likely to reduce the level of stress and depression experienced by the dementia caregiver in both the short (3 months) and long term (one year).

**Measure of benefits used in the economic analysis**

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*NHS Economic Evaluation Database (NHS EED)*
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No summary measure of benefit was used in the analysis. See 'Effectiveness Results' section.

**Direct costs**
Information on resource utilisation was obtained directly from the caregivers. The formal service costs included the rates at which caregivers used paid support (e.g. in-home help), based on the national average cost of home health care services. The other costs included in the study were derived using the value of lost productivity and lost income (see 'Indirect Costs' section). The costs were not discounted because the time horizon of the study was only one year. The costs were reported at 1993 prices.

**Statistical analysis of costs**
Differences between cohort costs were analysed using one-way ANOVA and chi-squared techniques. In addition, ANCOVA models were used to adjust for attrition bias.

**Indirect Costs**
The costs to the caregiver (both the primary caregiver and other family members) were for work and leisure time lost due to caring. These were valued at the same cost as the formal costs, since that is what the carer would have needed to pay in order to forgo the caring. In addition, the carers were asked if they had made changes to their daily and/or weekly work hours as a result of their caring. If this was the case, then the value of lost wages was calculated using the average hourly wage. The costs were reported in 1993 figures, and were not discounted since the time horizon of the study was one year.

**Currency**
US dollars ($).

**Sensitivity analysis**
No sensitivity analysis was performed.

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

**Cost results**
In the short-term study (3 months), the daily cost was $54.32 in the T-ST group versus $46.79 in the C-ST group, (p<0.05).

In the long-term study (one year), the average daily cost was $47.10 for the T-LT group and $41.15 for the C-LT group, (p<0.05).

The results suggested that the costs are significantly higher for those patients using the adult day centres.

**Synthesis of costs and benefits**
The authors combined the costs and benefits to report the cost per 'step' on the scales of depression and overload (see 'Effectiveness Results' section).

In the short term (3 months), changing from ordinary care to adult day services costs $6.38 to alleviate one 'step' on the overload scale (i.e. to move from "all the time" to "most of the time").

The cost per 'step' on the depression scale was $2.90 (i.e. to improve from "depressed for one to two days" to
"depressed for less than one day").

In the long term (one year), the cost per overwhelmed 'step' was $4.51 and the cost per depression 'step' was $2.20.

Authors’ conclusions
The provision of day centres for patients with dementia helps to improve the quality of life of the primary caregiver in both the short and long term. This is achieved at a relatively modest daily cost.

CRD COMMENTARY - Selection of comparators
The costs and benefits of adult day care centres were compared with those of normal care (i.e. home care). This is a reasonable comparator, as it is currently the standard form of treatment.

Validity of estimate of measure of effectiveness
The study used an ordinal scale for the measure of effectiveness (i.e. feeling overwhelmed "never", "some of the time", "most of the time" and "all the time"). Since the results are reported as the cost per 'step' alleviated, it is assumed that the measure uses an interval scale. That is, the authors assume that the magnitude of benefit is equal between any two adjacent descriptions. This is a highly contestable assumption, particularly as the descriptions appear to have been selected arbitrarily.

The nature of the study means that a certain level of bias might be evident in the selection of cohort groups. For example, the treatment group consisted of patients and caregivers who had chosen to utilise adult day care centres. If these patients were more likely to require higher levels of care, then the results could favour the treatment group. The authors acknowledged that attrition problems existed within the sample. The fact that a high number of patients and caregivers did not complete the treatment may suggest that there is a lack of encouragement and support in this area. This possibility should be addressed in full, rather than omitted from the analysis.

While the control and treatment groups were chosen from regions that had similar sociodemographic indicators, there were some differences between the groups at baseline. For instance, the role overload and depression scores at baseline were statistically significantly lower in the control group. Baseline variables that were found to differ significantly were included as covariates in the ANCOVA analysis.

Validity of estimate of measure of benefit
The authors did not use a summary measure of benefit. The depression and overload quality of life scores could have been converted into quality-adjusted life-year (QALY) values, and the cost per QALY gained reported. This would have allowed comparisons to be made with other studies examining the cost-effectiveness of methods for dementia care.

Validity of estimate of costs
The costs included in the study were reasonable and reflected the true costs to the caregiver. Since the costs were estimated using self-reported data, there is a possibility that these are susceptible to biases. The authors acknowledged this, and argued that other studies have found 95% concurrence rates between claim records and self-reported estimates. No hospital or medication costs for either the patient or caregiver were included in the study. These may be significant and could, potentially, differ substantially between the two groups. Consequently, the cost results of this study should be used with caution.

Other issues
The authors addressed the issue of quality of life for the caregiver rather than that of the patient. It was assumed that the patient did not experience any difference in life quality as a result of the intervention.
Implications of the study
The authors suggested that future researchers should address the possibility that benefits from adult day programmes could be hindered by cost-containment measures such as limiting service duration. Due to the study's relatively small sample, it is recommended that policy makers should await further research before drawing conclusions.

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