Impact of home care on hospital days: a meta analysis
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Authors' objectives
To examine the impact of home care on hospital days.

Searching
MEDLINE, Dissertation Abstracts and PsycINFO databases were searched using the keywords 'home care', 'hospice' and 'healthcare for the elderly'. The search was limited to articles published between 1964 and 1994, which corresponds to the period of greatest growth in home care. Papers referenced in two existing reviews of home and community-based services were also obtained. The bibliographies of retrieved studies were reviewed for additional references.

Study selection
Study designs of evaluations included in the review
Studies which used a comparison group or a pre-post design were included in the review. Studies which did not report research findings, such as literature reviews, historical and theoretical articles, were excluded. Studies comparing the efficacy of two different home care models were excluded, since the studies did not include comparisons with customary care.

Specific interventions included in the review
Studies which evaluated the use of generic home care, specifically-skilled home care models (10 studies), homemaker/home health aide programmes (7 studies) and hospice programmes (3 studies), were included in the review. Studies were required to empirically compare home care to customary care, with home care defined as the delivery of either nursing, medical, or support services in patients' homes. Studies which examined home and community-based services’ case management programmes were excluded, as were those which examined paediatric home care or psychiatric home care, as they were felt to address populations with special characteristics and outcomes.

Participants included in the review
In general, the populations studied were either elderly or terminally ill patients. Only 4 studies specified diagnostic criteria other than terminal illness for their samples, including congestive heart failure, arthritis, chronic obstructive pulmonary disease and stroke.

Outcomes assessed in the review
The primary outcome of the review was number of hospital days following initiation of home care. Only articles which examined the impact of home care on hospital use or cost following reception of home care were included.

How were decisions on the relevance of primary studies made?
Each article was assessed independently by five reviewers used a standard review form. Disagreements among the reviewers regarding the characteristics of publications were settled during team meetings.

Assessment of study quality
The authors do not state that they assessed validity.

Data extraction
Data were extracted from the studies using a standard review form. This recorded the date of the study, country of origin, characteristics of the population studied (age, primary diagnosis, terminal status etc.), design and outcome measures.
Methods of synthesis
How were the studies combined?
Experimental and control group means and a measure of variance (either standard deviation and/or values for tests of significance) were used to calculate effect sizes. In 4 studies, means were reported but standard deviations were not. In these cases, standard deviations were estimated based on the average ratio of means to standard deviations from the studies that reported both statistics. Since the observed means to standard deviations ratio was approximately 1:1 for 4 studies, means for the treatment and control groups were used as proxies for standard deviations. Effect sizes and homogeneity measures were calculated using Dstat software. Effect sizes were weighted for sample size and averaged across the 20 studies to obtain an overall mean.

How were differences between studies investigated?
The variability of effect sizes for the complete set of studies, and within subsets of studies categorised by pre-defined independent variables, was examined using a formula for the homogeneity measure. A non-significant value for the homogeneity of variance measure for the complete set of studies indicates that the difference between treatment and control groups across studies is uniform, and no other explanatory variables are needed to explain the variability of the effect sizes. Conversely, a significant value for the homogeneity measure suggests that other factors influence the variability of the effect sizes.

The independent variables considered were: country of origin (US vs. non-US), study design (RCT vs. quasi-experimental design), characteristics of the sample (terminally vs. non-terminally ill), length of follow-up (six month or less vs. more than six months) and use of an actual versus estimated variance component in calculating effect size. The impact of using estimated variance was tested by comparing effect sizes for studies with estimate variance to effect sizes for studies for which the effect size was calculated based on reported significance values and sample size. Given the small number of studies in the sample, the mean effect sizes by independent variable were contrasted with each other, but the interactions between them were not investigated. In addition, since the time of measurement was always six months or less for studies with terminally-ill patients, the comparison of studies by time of follow-up was limited to non-terminal studies only. The meta-analysis was also conducted both with and without data from the largest study, which enrolled over 4000 patients, thereby disproportionately affecting the cumulative effect size.

Results of the review
A final pool of 22 studies which reported hospital days and/or cost of rehospitalisation were considered for the meta-analysis. Authors who reported only costs, or who did not report means and standard deviations of readmission days or values for significance tests, were contacted for further information. This data was found to be unavailable for 2 of the studies, which were then excluded from further analysis. The use of home care was evaluated in 7256 participants and customary care in 5237 participants.

A significant reduction in hospitalisation days across studies due to home care was demonstrated, with a cumulative effect size of -0.38 (CI, -0.42 to -0.34, p=0.001). This translates into the standardised difference between treatment and control groups of approximately 0.4 of a standard deviation. However the index of within-sample variability (test for homogeneity) was also significant, indicating that effect sizes were not homogeneous across studies.

The test for homogeneity revealed significant differences for comparisons between studies with terminally-ill versus non-terminally ill samples (p<.001); studies with estimated versus non-estimated variances (p<.001); and quasi-experimental versus randomised experimental designs (p<.001). The effect of home care on reduction of hospital days tended to be larger in studies involving terminally-ill patients, in studies with estimated variances and in quasi-experimental studies. There was also a significant difference in effect size for studies measuring the impact at six months or less versus those measuring impact at greater than six months (p<.001), although not when only studies of non-terminally ill patients were considered (p=.46).

When the meta-analysis was conducted without data from the largest study, the cumulative effect size was still found to be significant (d = -0.16, p<0.001), although smaller in magnitude than that for the complete set of studies.

Cost information
Based on the American National Hospital Panel Reports, the average inpatient expense per hospital day was $1,060 in 1994. Using this figure, the average savings in inpatient expenses would range from $2,650 to $6,360 per home care patient, based on reductions of 2.5 or 6.0 hospital days, respectively. In order to break even, or produce a mean net cost saving, the cost of home care per patient would need to be equal to or less than $2,650 to $6,360.

**Authors' conclusions**
Home care has been shown to reduce acute hospital days significantly in the period of time most proximal to the active reception of care. While the effect sizes reported are not overwhelmingly large, the consistent reduction in number of hospital days across studies suggests that home care had a significant impact on an important and costly outcome, and that home care for the terminally ill, in particular, has an unambiguous impact on this outcome.

**CRD commentary**
The literature search for the review was relatively clearly specified, data extraction was conducted by five independent reviewers using a standard form and the methodology used to pool the studies appears to have been appropriate. The study question was specified in the review abstract, although it was less clear in the text. There does not appear to have been any validity assessment of included studies. The study details provided were limited, and no details of the actual interventions compared, or the study designs of individual studies, was provided. This makes the reliability of the meta-analysis very suspect, especially if several observational studies have been pooled with no validity assessment. Further detail of the subgroup analyses would have been useful, especially regarding the number of studies included in each analysis.

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