Burden on family members. Caring for frail elderly: a meta-analysis of interventions

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Authors' objectives
To assess the effectiveness of group and individual interventions on decreasing the burden of caregivers of the frail elderly, and to identify factors with potential influence on the magnitude of the effects.

Searching
MEDLINE, CINAHL, PsycLIT, Dissertation Abstracts International, and Social Work Abstracts were searched from 1980 to 2000 using the following keywords: 'caregiver burden or strain', 'group support or group intervention/treatment', 'individual and/or family intervention/treatment', 'dementia', 'frail or impaired elderly' and 'Alzheimer's disease'. Additional information was found through relevant review articles and an ancestry search. With the exception of dissertations, unpublished reports were excluded.

Study selection
Study designs of evaluations included in the review
Studies that included true experimental (with random assignment of participants into treatment and control groups) and quasi-experimental designs with a control group (convenient group assignment) were eligible for inclusion in the review. Studies with a single-group pre-test post-test design were excluded from the review.

Specific interventions included in the review
Any strategy or intervention (group or individual) that was aimed at providing support or respite care to caregivers of frail elderly people was eligible for inclusion in the review. These included: education; psychoeducational teaching skills; professionally led social skills including family consultation to provide individualised training and assistance; counselling; stress management and problem solving; respite care; group support and multi-media training groups, including education, family support and skills training; a PREP system of intervention that included expanded in-home services, an advice line, and a keep-in-touch system provided by trained nurses; social work home visits; cognitive-behavioural intervention (videotapes and 'Nurseline' support programme to assist caregivers individually; clinic and home cognitive stimulation training sessions; and individual professional and peer counselling. The duration of group interventional programmes ranged from 2 weeks to one year, and the duration of the interventions from one session to 8 months. Studies that compared two different interventions, rather than an intervention with a traditional no intervention control, were excluded.

Participants included in the review
The participants in the review were family caregivers of elderly people, including spouses. The mean age of the participants was 60.1 years and 78.8% were women. Almost all (99.2%) identified themselves as primary caregivers of the elderly, and 86.4% were white. An average of 80.3% lived in the same household as the care receivers.

Outcomes assessed in the review
The outcomes assessed were measures of caregiver burden. This included multiple concepts (subjective and objective burden) or assessments of caregiver burden over time (repeated measures).

How were decisions on the relevance of primary studies made?
A single reviewer conducted the searches and publications deemed irrelevant on the basis of the title and/or abstract were discarded.

Assessment of study quality
A coding form was developed to record the methodological and substantive characteristics recognised as being essential for meta-analysis. While a study quality rating scale was not developed, the study design, attrition rate, instruments measuring caregiver burden, and reliability of the instrument were coded whenever the information was available.
Although not stated explicitly, it is inferred that two reviewers divided the coding between them.

Data extraction
The authors do not state explicitly how the data were extracted for the review or by whom, except that the inter-rater reliability for the coding process was assessed using a random sample of five articles and that there were no disagreements between the two raters for either the effect sizes or other coded variables. Data were extracted on the main outcome defined as caregiver burden, measured either as multiple concepts or burden over time. Data were also extracted into three categories.

1. Variables related to study design, e.g. sample size, type of intervention, duration and frequency of the intervention, method of assignment, type of instrumentation, time of post-tests, and study site.

2. Characteristics of the study samples, e.g. the proportion of primary caregivers in the group, proportion of care receivers who had Alzheimer's, mean age for caregivers and care receivers, proportion of male caregivers, proportion of white caregivers, and years of providing care.

3. Characteristics of the researchers who conducted the study, e.g. characteristics of the group leader, number of authors, publication year and source. For studies that reported F-test results or p-values, if the tests were appropriate for the study designs, the r effect size was calculated. For studies that used inappropriate tests for their study designs, or for studies without report of inferential statistics, the post-test mean and standard deviation for each group were used to calculate the effect size. When caregiver burden was measured as multiple concepts (subjective and objective burden) or burden over time (repeated measures), a separate effect size was calculated for each measurement and the average was taken to represent the study's effect size. If neither statistical nor descriptive information were provided in the article, the necessary information was requested from the authors.

Methods of synthesis
How were the studies combined?
The studies were pooled statistically in a meta-analysis. All effect sizes were transformed to d-statistics, and the mean was calculated along with 95% confidence intervals (CIs). The weighted integration method was used in the analysis, instead of a random-effects model, because only a limited number of studies provided reliability information on the instrument. The fail-safe N was computed to address the possible sampling bias.

How were differences between studies investigated?
A Q statistic homogeneity analysis was undertaken to examine whether the effect sizes varied among studies and, if so, what sources of variation could be identified. This analysis was performed for the entire sample, as well as for some selected subgroups based on the study characteristics. Following a heterogeneity finding of the whole sample, a cluster analysis was carried out to look for possible explanations for the heterogeneity. Regression analyses were used to find potential significant moderators of the treatment effect, using the effect size as the dependent variable, the study characteristics as the independent variables, and the number of participants in each study as the weighting factor.

Results of the review
Eighteen studies (n=1,970) of group interventions were included in the review, of which 12 were randomised controlled trials (RCTs) and 6 were non-randomised controlled trials. There were 8 studies (n=472) of individual interventions, of which 5 were RCTs and 3 were non-randomised trials.

For the group interventional studies, the d effect sizes ranged from -0.51 to +1.32; negative effects indicated that participants in the control group improved more on the outcome measure than those in the intervention group. The weighted mean effect size for all group interventional studies was 0.41 (95% CI: 0.32, 0.51), indicating a moderate but significant positive treatment effect of the group interventions on caregiver burden. However, the Q statistic for the entire sample was highly significant (P<0.0001), indicating that there were variations in effect sizes that might be attributable to study characteristics. The race of the caregiver was significantly associated with the effect size (P<0.0001): the effect size was smaller when the percentage of white carers was larger in the group interventional study, indicating that treatment was more effective for nonwhite caregivers. There was a non significant tendency for an
increased treatment effect of group interventions for female caregivers (P>0.004).

The results of the cluster analysis showed that in 11 RCTs the positive effect size was smaller (mean:0.26, 95% CI: 0.15, 0.37). The Q statistic indicated a homogeneous group (P<0.96).

Five of the 6 quasi-experimental studies (non-RCTs) had a d effect size of 0.89, (95% CI: 0.68, 1.10). This subgroup was also homogeneous (P<0.85).

For individual interventions, a moderate positive treatment effect was found; the weighted mean effect size was 0.48 (95% CI: 0.30, 0.67). The Q statistic indicated a homogeneous group (P<0.773). The fail-safe N calculation indicated that 19 studies with zero intervention effect were required to bring the mean effect size down from 0.41 to 0.20 (the conventional cut-off for 'small' effect size).

**Authors' conclusions**
The available evidence supported the premise that both group and individual interventions reduce perceived burden. However, this evidence was inconclusive. When only randomised clinical studies were considered for group interventions, the effect size was small. Further experimental studies of large-scale and high-quality designs are needed to produce more definitive conclusions about the real strength of various interventional strategies.

**CRD commentary**
The review question and the study selection criteria were stated clearly. The literature review seemed reasonably comprehensive, although it was unclear whether any language restrictions were applied. The authors do not seem to have used a standard validity assessment instrument, and it is unclear how the results of the coding method used affected the review and its findings. The statistical tests employed seem to have been appropriate for the analyses undertaken, and the findings of these were reported clearly, both graphically and within the text.

The authors' conclusions seem appropriate in the light of the data presented.

**Implications of the review for practice and research**
Practice: The authors did not state any implications for practice. Research: The authors state that further experimental studies of large-scale and high-quality designs are needed to produce more definitive conclusions about the real strength of various interventional strategies.

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