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Cognitive reframing for carers of people with dementia (Review)

Vernooij-Dassen M, Draskovic I, McCleery J, Downs M



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[Intervention Review]

Cognitive reframing for carers of people with dementia

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ABSTRACT

Background

The balance of evidence about whether psychosocial interventions for caregivers of people with dementia could reduce carers' psychological morbidity and delay their relatives' institutionalisation is now widely regarded as moderately positive (Brodaty 2003; Spijker 2008). Multi-component, tailor-made psychosocial interventions are considered to be particularly promising (Brodaty 2003; Spijker 2008). These interventions involve multiple mechanisms of action. In this review we focused solely on the effectiveness of one element within psychosocial interventions, cognitive reframing. Cognitive reframing is a component of cognitive behavioral therapy (CBT). In dementia care, cognitive reframing interventions focus on family carers' maladaptive, self-defeating or distressing cognitions about their relatives' behaviors and about their own performance in the caring role.

Objectives

The objective of this review was to evaluate the effectiveness of cognitive reframing interventions for family carers of people with dementia on their psychological morbidity and stress.

Search strategy

The trials were identified by searching (5 April 2009) the Cochrane Dementia and Cognitive Improvement Group Specialized Register, which contains records from major healthcare databases: *The Cochrane Library*, MEDLINE, EMBASE, PsycINFO, CINAHL and LILACS, ongoing trial databases and grey literature sources. For more detailed information on what the Group's specialized register contains and to view the search strategies see the [Cochrane Dementia and Cognitive Improvement Group](#) methods used in reviews.

The Cochrane Library, MEDLINE, EMBASE, PsycINFO, CINAHL, LILACS and a number of trial registers and grey literature sources were also searched separately on 5 April 2009.

Selection criteria

Randomised controlled trials of cognitive reframing interventions for family carers of people with dementia.

Data collection and analysis

Three assessors (MVD, ID, JmC) independently judged whether the intervention being studied was documented in a trial; two assessors assessed trial quality.

Main results

Pooled data indicated a beneficial effect of cognitive reframing interventions on carers' psychological morbidity, specifically anxiety (standardised mean difference (SMD) -0.21; 95% confidence interval (CI) -0.39 to -0.04), depression (SMD -0.66; 95% CI -1.27 to -0.05), and subjective stress (SMD -0.23; 95% CI -0.43 to -0.04). No effects were found for carers' coping, appraisal of the burden, reactions to their relatives' behaviors, or institutionalization of the person with dementia.

Authors' conclusions

Cognitive reframing for family carers of people with dementia seems to reduce psychological morbidity and subjective stress but without altering appraisals of coping or burden. The results suggest that it may be an effective component of individualised, multi-component interventions for carers. Identifying studies with relevant interventions was a challenge for this review. The impact of cognitive reframing might be higher when used alongside other interventions because this offers better opportunities to tailor cognitive reframing to actual everyday carer problems.

PLAIN LANGUAGE SUMMARY

Cognitive reframing for carers of people with dementia

There is some evidence that cognitive reframing interventions for family carers of people with dementia are effective.

Dementia care is challenging for family carers. We studied whether they could be helped by cognitive reframing interventions. Cognitive reframing is intended to reduce carers' stress by changing certain of their beliefs, such as beliefs about their responsibilities to the person with dementia, their own need for support, and why their relatives behave as they do. We found that cognitive reframing has the potential to reduce anxiety, depression and stress. It did not affect carers' coping or sense of being burdened. This review concludes that cognitive reframing might be useful to improve the mental health of informal carers of people with dementia.

BACKGROUND

Dementia is primarily a disease of older people, particularly those over 80 years. The number of people with dementia in Europe is currently 7.7 million and will double by the year 2050 (EuroCoDe 2009). Dementia is now recognized as a major public health issue. According to the World Health Organization (WHO), Alzheimer's disease and other dementias are rated as the fourth leading cause of burden of disease in high-income countries (WHO 2008). Dementia has a significant economic impact on health and social care services (Wimo 2007). The costs to social and healthcare organizations and the impact on families are expected to escalate in the coming decades. Preventing or minimizing the effects of family carer burden and stress are key government priorities. Family carers of people with dementia experience more burden than family carers of other people with chronic illness (Draper 1992), and they are at greater risk of developing depression (Joling 2010). Carer burden is associated with patients' behavioral problems (Machnicki 2008; van den Wijngaart 2007; Vernooij-Dassen 1997) and is a strong predictor of institutionalization (Gaugler 2008; Vernooij-Dassen 1997).

The balance of evidence about whether psychosocial interventions for caregivers of people with dementia could reduce carers' psychological morbidity and delay their relatives' institutionalization is now widely regarded as moderately positive (Brodaty 2003; Spijker 2008). Psychosocial interventions for family carers are more successful when they are tailor-made, include the person with dementia as well as the caregiver, offer a choice of interventions and are intensive (Brodaty 2003; Spijker 2008). However, these kinds of interventions involve multiple mechanisms of action. It is timely to try to identify the key ingredients responsible for the efficacy.

A key problem in dementia care is understanding and responding to the patient's behavior. Family carers often struggle to understand the cognitive decline and changing behavior of their loved one, often ascribing a negative meaning to their relative's behavior and blaming the person rather than the disease. Today we know that a person's behavior is often the result of an unmet (physical or psychosocial) need or a function of their interaction with a challenging physical or psychosocial environment. Not understating why their relative with dementia is behaving differently often leads family carers to experience distressing emotional states such

as anger, anxiety, guilt and depression. While people can change the meanings or attributions they ascribe to situations, this often does not happen spontaneously. The positive effects of cognitive therapy, including cognitive restructuring, on a variety of stress-related disorders (Gale 2000; Tolin 2010) suggest that it has potential for addressing the similar psychological morbidity of family carers of people with dementia. When used in psychosocial interventions for family carers, cognitive reframing focuses on changing self-defeating or distressing cognitions into those cognitions that support adaptive behaviour and reduce anxiety, depression and stress.

The theoretical framework of 'symbolic interactionism' is helpful in explaining how cognitive reframing might work. It states that the meaning people ascribe to a situation, in this case caring, is crucial to understanding how they will react. People tend to act upon the meaning they attribute to that situation. One of the assumptions of this theoretical perspective is that people are able to reflect on these attributions and to change them (Blumer 1969). This theoretical framework offers a perspective which when viewed alongside the work of Lazarus (Lazarus 1984) and Bandura (Bandura 1977) enables us to describe the mechanism whereby psychological morbidity develops in carers and, consequently, to identify ways to alleviate it.

Cognitive reframing focuses on altering maladaptive, self-defeating or distressing cognitions and makes them more adapted to the situation. This, in turn, is assumed to improve coping, reduce burden and psychological morbidity, improve quality of life and reduce healthcare costs. Thus cognitive reframing is hypothesized to:

- improve family carers' coping and self-efficacy, reduce family carers' burden, change family carers' appraisal of their relatives' behaviors;
- reduce family carers' psychological morbidity (including depression and anxiety) and stress;
- increase family carers' quality of life;
- reduce healthcare costs, particularly by preventing or delaying institutionalization.

The review aimed to clarify the effectiveness of cognitive reframing and thus provide a clear evidence base for clinical practice.

OBJECTIVES

- To evaluate the effectiveness of cognitive reframing interventions with carers of people with dementia
- To indicate the nature and quality of the evidence available

- To contribute to providing an evidence base for clinical practice

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials. No restrictions were applied as to length of the trial and number of measurements and assessments.

Types of participants

The participants were family carers taking care of a person with any type of dementia. The relationship of the family carer to the person with dementia was spouse, child, other family member or friend. Only interventions involving family carers of community-dwelling people with dementia have been considered for inclusion.

Types of interventions

An intervention was accepted as 'cognitive reframing' if the authors specified the main goal of the intervention as being the reduction of caregiver problems, as named above, by means of the identification and modification of some or all of the following:

- family carers' beliefs about their own responsibilities to the people with dementia;
- family carers' beliefs about their own need for support and assistance;
- family carers' interpretations of the behaviors of the people with dementia.

The interventions could be provided in a group or individual setting. No restrictions with regard to types of control interventions (usual care or placebo intervention) have been made.

Types of outcome measures

The outcomes were divided into the following.

1. Psychological morbidity and distress of the family carers, including depression and anxiety.
2. Quality of life of the family carers.
3. Family carers' appraisal of their role performance including burden, coping and self-efficacy, and appraisal of problem behaviors.
4. Healthcare utilisation outcomes of the person with dementia, including admission to residential care or number of general practice visits.

Search methods for identification of studies

The trials were identified from a search of the Cochrane Dementia and Cognitive Improvement Group Specialized Register on 5 April 2009. This register contains records from the following major healthcare databases: *The Cochrane Library*, MEDLINE, EMBASE, PsycINFO, CINAHL and LILACS; and many ongoing trial databases and other grey literature sources. For more detailed information on what the Group's specialized register contains, and to view the search strategies used to retrieve records, see the [Cochrane Dementia and Cognitive Improvement Group methods used in reviews](#).

The Cochrane Library, MEDLINE, EMBASE, PsycINFO, CINAHL, LILACS and a number of trial registers and grey literature sources were also searched separately on 5 April 2009. The search strategies used to identify relevant controlled trials for this review can be found in [Appendix 1](#).

Data collection and analysis

Selection of studies

Two review authors (MVD, ID) screened titles and abstracts and eliminated those clearly not relevant to this review. When the title and abstract did not provide all the information concerning the criteria, full paper copies were retrieved and screened. Authors of studies were contacted when additional information was required to assess whether the studies met the criteria for inclusion. Three review authors (MVD, ID and JMcC) screened the remaining studies for their eligibility and discussed them in accordance with the above defined criteria. Any disagreements about the selection of a trial were resolved by consensus. For one study, no agreement could be reached. Therefore, this study was independently assessed by Professor Linda Teri, acting as a contact editor of the Cochrane Dementia and Cognitive Improvement Group. Reasons for excluding any trial are detailed in the 'Characteristics of excluded studies'. Trials were not assessed blind as we knew the author's name and institution and the source of publication.

Data extraction and management

We extracted data from published reports using a standard form. The data used to measure outcomes in clinical trials of dementia and cognitive impairment were often ordinal. Where the rating scales used in the trials had a reasonably large number of categories (four or more) the data were treated as continuous and arising from a normal distribution. Summary statistics (n, mean and standard deviation) were required for continuous outcomes, for both the treatment and the control groups in each trial. Where possible, the outcomes were changes from baseline.

When change from baseline results were not reported, we calculated the required summary statistics from the baseline and assessment time group means and standard deviations, assuming a 0.4 correlation between the measurements at baseline and follow-up assessment. This method overestimates the standard deviation of the change from baseline. Such a conservative approach is preferable in a meta-analysis (<http://ims.cochrane.org/revman/documentation/rm5userguide.pdf>). The baseline assessment is defined as the latest available assessment prior to randomisation, but no longer than two months prior. For dichotomous outcomes, the number with the outcome of interest, such as institutionalization, was extracted for the treatment and control groups.

For each outcome measure, we sought data on every patient randomised. To allow an intention-to-treat analysis, the data were sought irrespective of compliance and whether or not the patient was subsequently deemed ineligible or otherwise excluded from treatment or follow-up.

Assessment of risk of bias in included studies

Quality assessment

The internal validity of trials is related to how successfully selection, performance, attrition and detection biases are eliminated. The methodological quality of the included studies was assessed and reported according to the methods set out in section 7 of the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins2009), which recommends the evaluation of selection bias, performance bias, detection bias and attrition bias. Each source of potential bias was assessed with respect to the following quality elements: randomisation, sequence generation and baseline comparability (selection bias); blinding of participants or providers, or both (performance bias); blinding of outcome assessors (detection bias); reporting of attrition rate, and the use of intention-to-treat analyses (attrition bias). Each parameter of trial quality was graded: A (adequate); B (unclear); C (inadequate).

In most quality rating scales blinding is evaluated on several levels, such as blinding of patients and therapists or care providers. These scales are often used to test the quality of placebo-controlled medication studies. However, it is nearly impossible to blind the participants in a psychosocial intervention trial to the intervention to which they have been assigned and obviously impossible to blind the therapists to the intervention that they are delivering, but detection bias can be prevented by blinding of outcome assessors. Thus, blinding of patients and therapists was not included as one of the quality criteria but blinding of outcome assessors was included.

Two review authors (MVD, ID) and a research assistant (FB) independently assessed the methodological quality of the selected studies. One review author (ID) and a research assistant (FB) extracted the data, checked for discrepancies and processed the data

as described in Higgins 2005 (Higgins 2005). All studies were included in the initial analysis and if at risk of bias then excluded in the sensitivity analysis.

Process analysis

In practice, compliance with the intervention protocol might be problematic. The specific intervention activities and the actual exposure of the therapists and patients to these activities may influence results and effectiveness (Hulscher 2003). Therefore we also assessed whether or not a process analysis had been performed (Hulscher 2003).

Measures of treatment effect

Meta-analysis requires the combination of data from trials that may not use the same rating scale or test to assess an outcome. To accommodate this heterogeneity, the measure of the treatment difference for any outcome was the weighted mean difference when the pooled trials used the same scale, and the standardised mean difference (the absolute mean difference divided by the standard deviation) when they used different scales. For binary outcomes such as institutionalization or no institutionalization, we used either the odds ratio or the risk difference to measure treatment effect and calculated a weighted estimate of the typical treatment effect across trials.

Unit of analysis issues

The level at which the randomisation occurs must be taken into account. In most circumstances the number of observations will match the number of 'units' that were randomised. Cluster randomised trials were only considered if the reported analysis correctly accounted for the clustering. If a trial included repeated measurements, then care was taken not to include multiple measurements from the same trial in a single analysis. For crossover trials, only data from the first treatment period were included.

Dealing with missing data

When changes from baseline results were not reported, we calculated the required summary statistics from the baseline and assessment time treatment group means and standard deviations. In this case we assumed a 0.4 correlation between the measurements at baseline and assessment time.

Assessment of heterogeneity

Heterogeneity refers to the variability among the studies included in the systematic review. We considered heterogeneity among participants (for example age and relationship with patient), interventions and outcomes. As these factors varied between studies,

they may affect the study effects. We performed tests for heterogeneity using a standard Chi^2 statistic and an I^2 statistic. Studies were considered heterogeneous if $P \leq 0.05$. In general, this meant $I^2 > 50\%$.

Assessment of reporting biases

The extent of publication bias was to be assessed through visual inspection of asymmetry. All studies were included in the initial analysis and then excluded in sensitivity analyses if at risk of bias.

Data synthesis

We presented overall estimates of the treatment difference. In all cases our aim was to present the overall estimate from a fixed-effect model. Where there was substantial heterogeneity of the treatment effect between trials ($I^2 > 50\%$) then we either: 1) pooled only homogeneous results; or 2) used a random-effects model (in which case the confidence intervals would be wider than those of a fixed-effect model).

Subgroup analysis and investigation of heterogeneity

Analyses of groups of different types of participants distinguished in the included studies were reported. Since most psychosocial intervention studies had low numbers of participants, it was not possible to extract sufficient comparable data to undertake a meaningful subgroup analysis.

Sensitivity analysis

As stated in Module 14 of the Cochrane Collaboration open learning material (<http://www.cochrane-net.org/openlearning/HTML/mod14-2.htm>), sensitivity analyses involved comparing the results of two or more meta-analyses calculated using different assumptions in order to assess the robustness of the results to the method used. The assumptions may concern a study's poorer quality, doubtful eligibility, outlier studies, imputed missing information, size of the trial, etc. We performed sensitivity analysis where in doubt.

RESULTS

Description of studies

See: [Characteristics of included studies](#); [Characteristics of excluded studies](#).

Eleven trials were identified that met inclusion criteria. See the 'Characteristics of included studies'.

Participants

Participants were family carers of people with dementia. Family carers' ages ranged from 19 to 84 years; the average age was 59 years. The relationship to the person with dementia was spouse (40.2%), adult child (28.1%) and other (6.7%). For 25% of the carers no relationship to the person with dementia was specified.

Interventions and theoretical models used

The included studies used the following theoretical models: the stress coping model (Beauchamp 2005; Farran 2007; Hebert 2003; Hepburn 2005), the stress management model (Zarit 1987) and the cognitive behavioral therapy (CBT) model (Akkerman 2004; Chang 1999; Coon 2003; Gallagher-Thompson 2007; Marquez-Gonzalez 2007; Marriott 2000).

In the stress coping model, individuals faced with a stressor make two appraisals, referred to as the primary and secondary appraisal. The primary appraisal involves an assessment of how stressful or threatening the situation is. The secondary appraisal involves the individual's assessment of his or her ability to cope, including an assessment of personal and physical resources. This secondary appraisal is often equated to Bandura's concept of self-efficacy (Bandura 1977). Once an individual has appraised the situation, he or she then employs his or her coping skills. These coping skills can include emotion-focused approaches (for example avoidance, magical thinking), problem-focused strategies (changing behaviors), and utilization of social support systems. According to the stress coping model (Lazarus 1984), the application of coping skills results in an outcome that prompts new appraisals, sparks new applications of skills, and so on. In this way coping is conceptualized not as a static event but as a process that unfolds in a cyclic pattern.

In the stress management model, treatment is oriented toward changing specific aspects of the carer situation that have been linked with carer stress, namely increasing their understanding of the patient's disease, improving their management of problem behaviors, and helping them to identify and use more informal and formal supports.

Process analysis or intervention dosage has been conducted by a few authors, which indicates whether the intervention has actually been carried out as intended. Only Chang 1999 (registration of telephone call) and Zarit 1987 (a supervision meeting in which an audiotape of a session with a caregiver was reviewed) reported process analyses.

Outcome measures

1. Anxiety

The interventions based on CBT typically include cognitive reframing as part of the intervention. In this context, the cognitive reframing element focuses on family carers' maladaptive, self-defeating or distressing cognitions about their relatives' behaviors and their own performance in the caring role. It aims to alter these cognitions directly, making them better adapted to the situation. The differences in the theories underlying these three approaches are minor. CBT is the most structured model. The CBT interventions were psycho-educational in nature and included: targeted skill training (teaching, and helping carers to practise distinct self-management skills) (Coon 2003); skills to cope with caring stress (Gallagher-Thompson 2007); cognitive behavioral family intervention (Marriott 2000); modification of dysfunctional thoughts about care (Marquez-Gonzalez 2007) and didactic training skills to address physical, cognitive and behavioral components (Akkerman 2004).

The interventions based on the stress coping model included: web-based, multi-media interventions such as interactive videos (Beauchamp 2005), a video-assisted modeling program with a cognitive and a behavior modeling aspect (Chang 1999), a programme to improve caregivers' ability to cope with sources of stress associated with caring (Hebert 2003), targeted skill building (Farran 2007) and psycho-education (Hepburn 2005). The intervention based on the stress management model used family counselling and support groups (Zarit 1987).

Risk of bias in included studies

All included studies were randomised controlled trials, but the randomisation technique was only mentioned by three authors (Hebert 2003; Hepburn 2005; Marriott 2000). Baseline data were compared in all studies except in Zarit 1987. As argued earlier, performance bias is difficult to prevent in psychosocial intervention trials but detection bias can be prevented by blinding of outcome assessors. This was reported in nearly 50% of the studies. The attrition rate was reported in nearly all studies. Intention-to-treat analysis was rarely used. The results are shown in Table 1.

1. State-Trait Anxiety Inventory (STAXI) asks participants how anxious they feel 'right now' by using a 4-point Likert scale, from 3 (very much) to 0 (not at all).

2. The Hamilton Anxiety Scale (HAMA) is a clinician-rated interview used to assess the presence or absence of symptoms associated with anxiety. The measure contains 14 separate interview items evaluating the level of anxiety experienced over the past month through the use of a 5-point severity scale (i.e. none, mild, moderate, severe, and very severe; range 0 to 56).

3. The Brief Symptom Inventory (BSI) (Derogatis 1982) is composed of 53 items that assess the frequency with which subjects have experienced various psychiatric symptoms during

the previous seven days. Each item of the BSI is rated on a 5-point scale of distress (0 to 4), ranging from 'not-at-all' to 'extremely'. The anxiety subscale was used.

2. Depression

1. The Center for Epidemiological Studies Depression scale (CES-D) (Radloff 1977) is a 20-item self-report measure that assesses the frequency of depressive symptoms (affective, psychological, and somatic) in the past week through the use of a 4-point scale. The scores range from 0 to 60. Lower scores indicate fewer depressive complaints.

2. The Multiple Affect Adjective Checklist (MAACL) Depression subscale (Zuckerman 1965) consists of a list of 132 positive and negative mood adjectives. Participants read the list and select those descriptive of how they have felt in the past week. Examples of Hostility subscale items include 'mad', 'disagreeable', and 'tender'; and examples of Depression subscale items include 'sad', 'blue', and 'happy'.

3. Beck Depression Inventory (BDI) (Beck 1988) consists of 21 items assessing depression through a 4-point scale (range 0 to 63); the total score is derived.

4. BSI (see above), the depression subscale was used.

3. Stress

1. Revised Burden Interview (BI) (Zarit 1982): the BI consists of 22 items that assess the caregiver's perception of the impact the involvement with the patient has had on his or her own life. Prior studies have demonstrated good reliability and validity of this instrument (Zarit 1982).

2. 10-item Perceived Stress Scale, derived from the 14-item scale (Cohen 1983), measures overall appraisals of stress in the past month. It has been psychometrically tested and used in many studies with family carers of people with dementia. It assesses how unpredictable, uncontrollable, and overloaded respondents find their lives. Items are rated on 5-point Likert scales (0: never, and 4: very often).

3. Two studies (Beauchamp 2005; Hepburn 2005) used investigator-developed stress or distress scales.

4. Carer burden

1. The Zarit Burden Interview (Zarit 1985), also referred to as the Revised Burden Interview (BI) (Zarit 1982), is a 22-item scale measuring the subjective load experienced by the caregiver by asking him or her how frequently (0: never, to 4: almost always) they feel various emotions in their relationship with their relative with dementia, for a total score out of 88. Scores between 8 and 17 represent a moderate burden, scores between 18 and 32 represent high burden, and scores over 32 represent severe burden. This measure provides a direct assessment of the carer's

appraisal of the impact that caring for their relative has had on his or her life.

2. Caregiver Strain Instrument was developed by the Benjamin Rose Research Institute (Bass 1998). Fourteen self-report questions begin with the stem "During the past 4 weeks, because of helping the patient, I felt . . .". Responses include items that assess carer health, relationship strain, and mastery of skills on a 5-point Likert scale, with answers ranging from 5 (strongly agree) to 0 (strongly disagree).

5. Coping or self-efficacy

1. The Ways of Coping Checklist-Revised (WCCL-R) (Vitaliano 1985). This measure produces subscales that reflect use of different coping strategies: 'Problem Solving', 'Count Your Blessings', 'Support Focused', 'Avoidance', 'Wishful Thinking', 'Blame Self', 'Blame Others', and 'Religious Coping'. The 'Positive Coping' subscale was used in the Coon 2003 study and 'Coping-total' in the Beauchamp 2005 study.

2. Ways of Coping. Caregiver coping was assessed using the 48-item coping scale (Moos 1992). The scale measures different types of coping, with eight subscales that measure approach (problem-solving) or avoidance (emotion-focused) coping responses. Higher scores indicate more frequent use of the response. Internal consistency in the present study was 0.77 for the total scale, 0.68 for problem-focused, and 0.65 for emotion-focused coping.

3. Caregiving Competence (Pearlin 1990). Caregivers responded to six brief scales reporting on their own perceptions of relational deprivation, role captivity, loss of self, caregiving competence, management of meaning, and caregiving mastery (the data are not reported for the last scale).

6. Revised Memory and Behavior Problem Checklist (RMBPC-reaction)

1. The Revised Memory and Behavior Problem Checklist, developed by Teri 1992, measures the frequency of behavioral and memory problems, and the reactions that these problems generate in the informal carer. The 24 items describe behaviors and participants score their frequency during the preceding week (on a scale from 0: never to 4: every day) and the extent to which this problem disturbed or upset them (on a scale from 0: not at all to 4: extremely).

7. Quality of life

Although several instruments have been developed to assess quality of life, these measures were not used in the included studies.

8. Healthcare utilization

For outcomes of the person with dementia, including residential care or number of general practice visits. The only healthcare utilization outcome in the included studies for the person with dementia was institutionalisation.

Effects of interventions

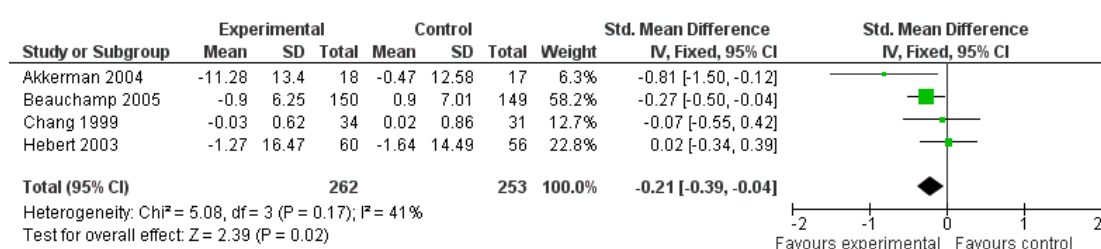
Analyses were performed on the combined results of the trials,

except for the healthcare utilization outcomes.

Anxiety

The combined results from the included trials (Akkerman 2004; Beauchamp 2005; Chang 1999; Hebert 2003) reporting change in anxiety indicated a significant benefit from treatment (standardised mean difference (SMD) -0.21; 95% confidence interval (CI) -0.39 to -0.04) in reducing anxiety (Figure 1).

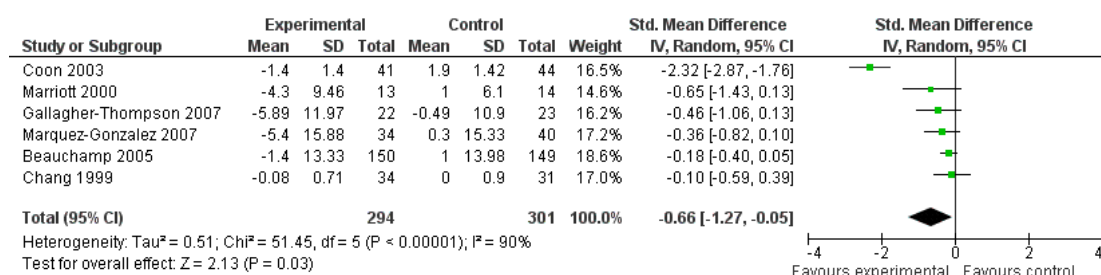
Figure 1. Forest plot of comparison: Anxiety



Depression

The combined results from the included trials (Beauchamp 2005; Chang 1999; Coon 2003; Gallagher-Thompson 2007; Marquez-Gonzalez 2007; Marriott 2000) reporting change in depression indicated a significant benefit from treatment (SMD -0.66; 95% CI -1.27 to -0.05) in reducing depression (Figure 2). There was considerable heterogeneity between the trials, with Coon's study showing the highest effect size but all studies favoring the intervention group. Therefore, we performed a subgroup analysis without the Coon 2003 study. The heterogeneity effect disappeared (Chi² = 2.53, df = 4, P = 0.64, I² = 0%) while the intervention effect remained significant (SMD -0.24; 95% CI -0.42 to -0.07).

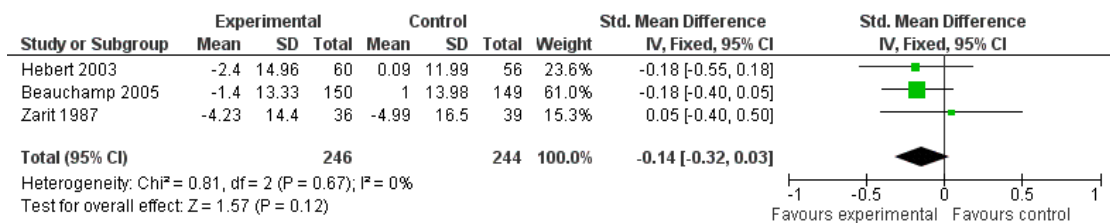
Figure 2. Forest plot of comparison: Depression.



Carer burden

Neither the combined result nor the individual studies (Beauchamp 2005; Hebert 2003; Hepburn 2005; Zarit 1987) showed a significant benefit from treatment in reducing burden (SMD -0.14; 95% CI -0.32 to 0.03) (Figure 3).

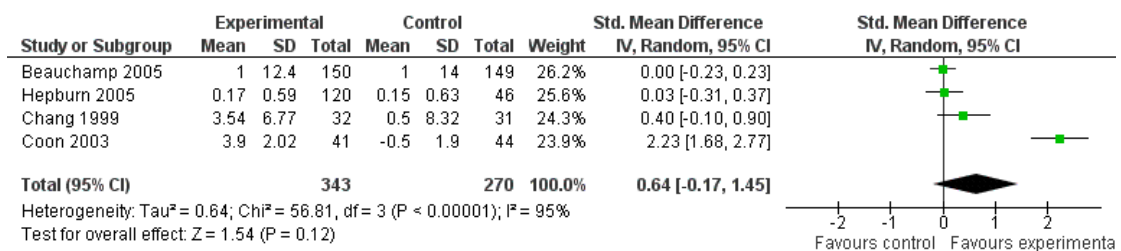
Figure 3. Forest plot of comparison: Burden.



Coping or self-efficacy

The combined results from the included trials (Beauchamp 2005; Chang 1999; Coon 2003; Hepburn 2005) showed no significant benefit from treatment on coping or self-efficacy (SMD 0.64; 95% CI -0.17 to 1.45) (Figure 4).

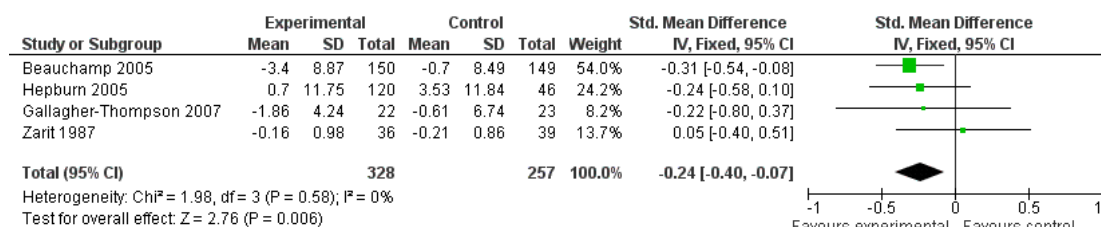
Figure 4. Forest plot of comparison: Coping and self-efficacy.



Stress or distress related to caregiving

The combined results from the included trials (Beauchamp 2005; Gallagher-Thompson 2007; Hepburn 2005; Zarit 1987) reporting change in stress or distress indicated a significant benefit from treatment (SMD -0.24; 95% CI -0.40 to -0.07) (Figure 5).

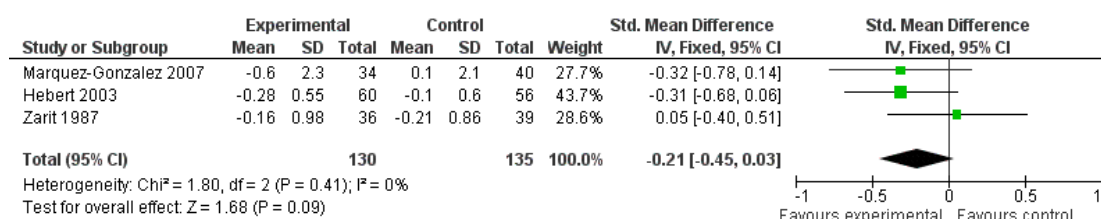
Figure 5. Forest plot of comparison: Stress or distress.



RMBPC-reaction Revised Memory and Behavior Problem Checklist (RMBPC-reaction)

The combined results from the included trials (Hebert 2003; Marquez-Gonzalez 2007; Zarit 1987) showed no significant benefit from treatment in RMBPC-reaction (SMD -0.21; 95% CI -0.45 to 0.03) (Figure 6).

Figure 6. Forest plot of comparison: RMBPC-reaction.



Institutionalization

The only available measure of healthcare utilization was institutionalization, and this appeared in only one study. No significant results of cognitive reframing on institutionalization were found.

DISCUSSION

This systematic review and meta-analysis of cognitive reframing for family carers of persons with dementia showed beneficial effects over usual care for psychological morbidity (anxiety, depression) and (dis)stress. No effects were found for coping or self-efficacy, carer burden, reaction to the relative's behavior and institutionalization.

Consistent with our hypothesis, a positive effect on psychological morbidity was found. This is in accordance with the findings of

Gale 2000. In contrast to our hypothesis, there is no evidence for the impact of cognitive reframing on burden or reaction to the relative's behavior, nor on coping or self-efficacy.

Focusing on the trials using a specific component of psychosocial interventions, in this case cognitive reframing, contributes to our knowledge of how psychosocial interventions work. Our data support the general cognitive reframing model, showing positive effects on psychological morbidity and (dis)stress. Our data help us to refine the results of other reviews which indicated that interventions producing positive effects generally are tailor-made and multi-component (Brodaty 2003; Spijker 2008) by suggesting the use of cognitive reframing as a valuable component in dealing with psychological morbidity and stress.

While process analysis could be used to examine how cognitive reframing interventions are actually used, and point to factors which prompt or impede their use, in the studies reviewed there was little evidence of process analyses having been conducted.

Ensuring the validity of trials examining the effectiveness of psychosocial interventions poses a greater challenge than ensuring the validity of pharmacological trials. There is a greater risk of contamination in psychosocial research as patients in the control group may become informed about the intervention and its content and be influenced by this information. The inclusion of studies using intention-to-treat analyses does not take into account the effect of attrition. It is useful to report findings from both the intention-to-treat analysis and analysis for just those people who were exposed to the intervention.

Following our inclusion criteria strictly, we excluded the study of [Whitlatch 1995](#) in which participants were differentiated by baseline scores, and more positive results were found. The different results arose because the investigators in this study ran analyses including only people who demonstrated significant levels of depression and burden at baseline. When participants who do not show significant levels of depression and burden are also included, there is less potential for the intervention to improve these outcomes.

Since there are several limitations to this review, our conclusions should be treated with caution. Although the quality of the studies is mainly satisfactory, as yet blinding of the assessor and intention-to-treat analysis are not common practice in psychosocial research. The number of included participants is modest, as is the number of included studies. Therefore, we might have missed true differences between subgroups. Heterogeneity exists regarding the participants' demographics (for example spouse or adult child carers), types of dementia in patients, intervention delivery methods, and outcome measures. However, the relatively low numbers of participants did not permit conclusions about differential effectiveness regarding relevant subgroups such as spousal and non-spousal carers.

The selection of studies remains a major issue for this review. None of the retrieved studies were specifically trials of cognitive reframing and selection of the studies for inclusion involved an element of subjective judgment about trials in which identifying and modifying participants' relevant beliefs was a specific, main aim of the intervention. We attempted to minimize this by having three authors assess the studies independently against a careful definition of 'cognitive reframing' and by having an external arbitrator de-

cide in cases of disagreement. However, we acknowledge that some of the excluded multi-component studies may have used similar components.

The most important strength of the present review is the homogeneity of the theoretical framework across the selected trials; all included studies utilized cognitive reframing as the main component in their intervention, be it informed by the stress coping model, the stress management model or the CBT model.

AUTHORS' CONCLUSIONS

Implications for practice

In clinical practice, cognitive reframing could be a useful additional tool in individualised support for carers of people with dementia. Cognitive reframing is individualised in the sense that it focuses on the personal attributions of the carer and stimulates personal change in appraisals. Although potentially influenced by many factors, a carer's change in appraisals is ultimately a personal process. Its individualised nature makes cognitive reframing applicable to a variety of caring situations and problems.

Implications for research

The present review adds further refinement to these conclusions in that it points to cognitive reframing as an effective underlying mechanism for reducing informal caregivers' psychological morbidity and stress. We hypothesize that cognitive reframing operates primarily through carers' attributions about personal strength and resilience. In future research this hypothesis can be empirically tested, thereby contributing to a systematic accumulation of knowledge on the mechanisms of action underlying psychosocial interventions. A challenge for future research is to further refine methodologies for trials of psychosocial interventions, including controlled designs with a lower risk of contamination.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Akkerman 2004

| | |
|---------------|---|
| Methods | RCT |
| Participants | <ul style="list-style-type: none"> - N=38, 86% female - Age M=58.1 (SD=13.8) - Drop out N=3 (7.9%) - Duration of caregiving (years) M=3.6 (SD=2.09) - Hours caregiving per week M=111 (SD= 59.4) - Referral through print media, brochures, online articles, community presentations, and paid radio announcement |
| Interventions | <ol style="list-style-type: none"> 1. CBT (cognitive-behavioural therapy). Didactic skills training using a multidimensional model to address physical, cognitive and behavioural components associated with caregiver anxiety. Two-hour weekly meetings for 9 weeks 2. Control: wait list |
| Outcomes | <p>Anxiety (BAI) Hamilton Anxiety Scale (HAMA)</p> |
| Notes | Treatment sessions in small groups: 4-8 caregivers. Follow-up: 10 weeks (post-intervention), 16w, 20w, 26w |

Beauchamp 2005

| | |
|---------------|--|
| Methods | RCT |
| Participants | <ul style="list-style-type: none"> - N=299, 73% female, 80% caucasian, 4% african american, 8% hispanic and 8% other - Age M=46.9 (SD=12.2; range 19.2-84.3); - Drop out N=8 - 90% completed college or trade school. - 33% primary caregiver, 27% shared caregiving, 40% not primary caregivers - 67% son or daughter, 7% spouse, 23% relative, 3% non-relative |
| Interventions | <ol style="list-style-type: none"> 1. Caregiver's Friend: Dealing With Dementia is a web-based multimedia intervention that provides text material and videos that model positive caregiving strategies 2. Control: usual care |
| Outcomes | <p>Stress Self-efficacy Ways of coping Caregiver strain Depressive symptoms State anxiety</p> |
| Notes | The stress and coping model by Lazarus and Folkman (1984) is used as theoretical basis. No process analysis |

Chang 1999

| | |
|---------------|---|
| Methods | RCT |
| Participants | <ul style="list-style-type: none"> - N=65; 100% female, 79.1% Caucasian Americans of European background, 16.3% African-American - Age M= 66.52 (SD= 11.96) - Drop out 25% - Duration caregiving (years) M=3.36 (SD=2.77) - Spouses: 88.6% - Referral through Alzheimer associations, Alzheimer clinics and local support groups |
| Interventions | <ol style="list-style-type: none"> 1. Treatment group (N = 34) - CBI - cognitive-behavioral intervention tailored to the specific deficits of persons with dementia (PWDs): a. videotapes demonstrating assisted modeling behavior; b. nurse line support programme to reinforce video information and to explore coping strategies 2. Control group (N= 31): attention only by telephone calls |
| Outcomes | <p>Coping strategies scale (Moos 1992)</p> <p>Somatic and emotional manifestations of depression, anxiety, and hostility - Brief Symptom Inventory (BSI)</p> |
| Notes | <p>Process analysis by registration of phone calls.</p> <p>The study is conceptualised using the stress and coping framework of Lazarus and Folkman (Lazarus 1984).</p> |

Coon 2003

| | |
|---------------|---|
| Methods | RCT |
| Participants | <ul style="list-style-type: none"> - N=169; 100% female - Age M=6.7 (SD 8.4) - 57% spouse - Drop out 23% (including institutionalisation) - Duration of caregiving (months) M=40.7 - Referral through variety of means, clinical and non-clinical, including newspapers |
| Interventions | <p>Anger management class, N = 41</p> <p>Depression management class, N = 45</p> <p>Wait-list control, N = 44</p> |
| Outcomes | <p>State anger (STAXI)</p> <p>MAACL Hostility subscale</p> <p>MAACL Depression subscale</p> <p>Negative and Positive Coping: Self-efficacy, Managing behaviors, Controlling thoughts (WCCL-R)</p> |
| Notes | <p>The cognitive behavioral model is used. There was a 4-month follow-up period and control variables were used</p> <p>No process analysis.</p> |

Farran 2007

| | |
|---------------|--|
| Methods | RCT |
| Participants | - N=143, 82.5% female, 81.1% white, 18.9% black - 51.8% non-spouse and 49.2% spouse - Participants were recruited from a variety of settings |
| Interventions | 1. Caregiver skill building treatment intervention 2. Information and support oriented therapies |
| Outcomes | Distress with behavioral symptoms Behavioral management skill |
| Notes | Group and individual telephone sessions were tape recorded and written summaries of all sessions were reviewed to maintain treatment integrity |

Gallagher-Thompson 2007

| | |
|---------------|--|
| Methods | RCT |
| Participants | - N = 45 - Age M=59.33 (SD = 12.23) - Drop out N = 10 - Years of education M=13.42 (SD = 20.93) - Years in the United States M=31.13 (SD = 20.93) - 14 spouses and 31 non-spouses - Duration of caregiving (months): 1. TSC(N=23), M=41.26 (SD=29.77), 2. IHBMP (N=22), M=48.32 (SD=42.86) |
| Interventions | 1. IHBMP - In-home behavioral management program for 4 months is comprised of six modules that focus on learning new skills to help the CG cope with caregiving stress: Introduction, Behavior management, Unhelpful thoughts, Communication issues, End-of-life (EOL), Pleasant events 2. TSC - the telephone support condition (comparison) |
| Outcomes | 1. Depressive symptoms, CES-D 2. Perceived Stress Scale 3. Conditional Bother Subscale (CBS) derived from the Revised Memory and Behavior Problems Checklist (RMBPC) - 24 items describing possible troublesome behaviors that the CR might engage in (e.g. wandering) 4. Self-efficacy. The revised self-efficacy scale (SE) is used, 15 items (5 on each subscale) measuring CGs' beliefs about their ability to handle situations in three domains: 1) obtaining respite from caregiving burdens; 2) responding effectively to disruptive behaviors; and 3) controlling upsetting thoughts while in the caregiving role |
| Notes | No process analysis. |

Hebert 2003

| | |
|---------------|---|
| Methods | RCT |
| Participants | <ul style="list-style-type: none"> - N=118; intervention group N=60 (80.0% women), control group N=58 (81.0% women) - Mean age 60 years - Drop out N = 40 - Years of education: 1. intervention group - M=11.77 (SD=3.80) , 2. control group M=12.19 (SD=4.39) - Duration of caregiving: 1. intervention group M= 2.90 (SD=2.23) , 2. control group M=2.74 (SD=2.00) - Spouses: 1. intervention group 61.7% , control group 60.3% |
| Interventions | <ol style="list-style-type: none"> 1. Experimental program aimed to improve the caregiver's ability to cope with the numerous daily sources of stress associated with caring for a person with dementia. Developed according to the Lazarus and Folkman (1984) transactional theory of stress and coping. It comprised two components: cognitive appraisal and coping strategies 2. Control group: referral to traditional support group Alzheimer Society |
| Outcomes | <ol style="list-style-type: none"> 1. Reactions to behavioral problems (RMBPC) frequency and upset 2. Burden 3. Psychological distress (Bradburn Revised Affect Scale) 4. Anxiety (STAI) 5. Personal efficacy (Bandura) |
| Notes | No control variables were used. Theory used: transactional model of stress and coping (Folkman 1991). No process analysis. |

Hepburn 2005

| | |
|---------------|--|
| Methods | RCT |
| Participants | <ol style="list-style-type: none"> 1. Day-to-day group (N=79): 77.2% female; age M=65.2 years; 68.4% of spouses are the primary caregiver 2. Decision making group (N=72): 77.8% female; age M=64.6 years; 61.2% of spouses are the primary caregiver 3. Control group (N=64) 71.9% female; age M=69.7 years; 67.2% of spouses are the primary caregiver <ul style="list-style-type: none"> - Drop out 20.9% |
| Interventions | <ol style="list-style-type: none"> 1. Day-to-day session focuses on developing strategies for everyday caregiving 2. Decision making session focuses on identifying and using values and preferences as a way to evaluate the options available in everyday caregiving 3. Control group |
| Outcomes | Caregiver Distress Measure |
| Notes | The programme and distress measure are tied to a stress mediation framework (Lazarus 1984). No process analysis. |

Marquez-Gonzalez 2007

| | |
|---------------|--|
| Methods | RCT |
| Participants | <ul style="list-style-type: none"> - N=74 1. Intervention group N=34, 82.4 % female - Age M=58.1 (SD=13.9) - Years of education M=10.6 (SD=6.3) - Duration of caregiving (months) M=52.8 (SD=45.6) - 55.3% spouse; 40% son, 6.7% other relative 2. Wait list control group (N=40), 77.5 % female - Age M=55.4 (SD=15.9); - Years of education M=9.2 (SD= 4.8) - Duration of caregiving (months) M=49.0 (SD=29.5) - 43.6% spouse, 51.3% son, 5.1% other relative |
| Interventions | <ol style="list-style-type: none"> 1. MDTC - Modification of Disfunctional Thoughts associated with Caregiving (CBT-based) 2. Waiting list control group (WL) |
| Outcomes | <ul style="list-style-type: none"> Depression Frequency of behavioural problems Appraisal of behavioural problems (transformed) Dysfunctional thoughts about caregiving |
| Notes | <p>No process analysis. Based on the CBT (cognitive behavioral therapy) adapted to the experience of caregiving model (Losada 2006).</p> |

Marriott 2000

| | |
|---------------|--|
| Methods | Prospective single blind RCT |
| Participants | <ul style="list-style-type: none"> - N = 42, 69% female - Age: 1. no interview control group (N=14), M=58.1 (SD=16.7), 2. interview control group (N=14), M=63.0 (SD=14.0), intervention group(N=14), M=69.6 (SD=15.2) - 53% spouse, 40% child - Drop out 45% - Referral through old age psychiatry service |
| Interventions | <ol style="list-style-type: none"> 1. Family intervention: in depth interview (CFI) and cognitive behavioral family intervention 2. Control 1 in depth interview 3. Control 2 no intervention |
| Outcomes | 2. Depression (BDI) |
| Notes | <p>Treatment: 14 sessions, two weeks interval, follow-up period 9 months and 12 months; no control variables used. Use of theoretical model (Tarrrier et al 1988). Single blinded study. No process analysis</p> |

Zarit 1987

| | |
|---------------|--|
| Methods | RCT |
| Participants | <ul style="list-style-type: none"> - N = 184 - Age M=62.2 (SD=12.8) - Years of education M=14.38 (SD=2.69) - 28% wife, 24% husband, 35% daughters, 6% sons, 7% others - 80% co-resident - Drop out 36% - Referral through local agencies and newspapers |
| Interventions | <ol style="list-style-type: none"> 1. Family counselling (N = 36) 2. Support groups (N = 44) 3. Wait list (N = 39) <p>Both treatment groups use stress management model: information, problem solving, identifying potential support</p> |
| Outcomes | <ol style="list-style-type: none"> 1. Burden Interview (ZBI) 2. Distress (MBPC) 3. BSI-total 4. Management of patient's behaviours (MBPC) upset |
| Notes | 8 Sessions. Process analysis by audiotapes and supervision sessions |

Characteristics of excluded studies [ordered by study ID]

| Study | Reason for exclusion |
|-----------------|---|
| Belle 2006 | Multi-component intervention |
| Boyle 2004 | Unobtainable |
| Brennan 1995 | Intervention does not involve cognitive reframing |
| Brodady 1989 | Dataset used in other included study |
| Brodady 1997 | Multi-component intervention |
| Brodady2003 | No RCT |
| Buchanan 2004 | Unobtainable |
| Buckwalter 1999 | Intervention does not involve cognitive reframing |
| Burgener 1998 | Incomplete and inadequate format data |
| Burgio 2003 | Multi-component intervention |

(Continued)

| | |
|-------------------------|---|
| Burns 2003 | Multi-component intervention |
| Burns 2005 | Intervention does not involve cognitive reframing |
| Chapman 2004 | No suitable outcomes |
| Chu 2000 | Intervention does not include cognitive reframing |
| Coles-Gale 2002 | No RCT |
| Done 2001 | Intervention does not involve cognitive reframing |
| Droes 2000 | No suitable outcomes |
| Drummond 1991 | Intervention does not include cognitive reframing |
| Dye 1999 | Unobtainable |
| Eloniemi 2001 | Intervention does not involve cognitive reframing |
| Fung 2002 | Intervention does not involve cognitive reframing |
| Gallagher-Th 1994 | Not meeting inclusion criteria for participants |
| Gallagher-Thompson 2003 | Multi-component intervention |
| Gaugler 2008 | Multi-component intervention |
| Gendron 1996 | Multi-component intervention |
| Gerdner 2002 | Intervention does not involve cognitive reframing |
| Gitlin 2002 | Unobtainable |
| Gitlin 2005 | Intervention does not involve cognitive reframing |
| Gitlin 2008 | Multi-component intervention |
| Goodman 1990 | Intervention does not include cognitive reframing |
| Graff 2007 | Multi-component intervention |
| Hebert 1994 | Multi-component intervention |
| Lopez 2008 | Multi-component intervention |
| Lovett | Not meeting inclusion criteria for participants |

(Continued)

| | |
|----------------------|---|
| Lowery | Unobtainable |
| Macdonald 1999 | Unobtainable |
| Mahoney 2003 | Intervention does not involve cognitive reframing |
| Martin-Carrasco 2008 | Multi-component intervention |
| Martin-Cook 2000 | Unobtainable |
| McClendon 1998 | No suitable outcomes |
| Mittelman 1993 | Multi-component intervention |
| Mittelman 1996 | Multi-component intervention |
| Mittelman 2004 | Multi-component intervention |
| Mittelman 2006 | Multi-component intervention |
| Mittelman 2007 | Multi-component intervention |
| Mittelman 2008 | Multi-component intervention |
| Mohide 1990 | Intervention does not involve cognitive reframing |
| Mohide 1992 | Unobtainable |
| Mohide et al.1993 | Unobtainable |
| Narayan 2000 | Unobtainable |
| Newcomer 1997 | Intervention does not include cognitive reframing |
| Nichols 2005 | Intervention does not include cognitive reframing |
| Nobili 2004 | Intervention does not involve cognitive reframing |
| Olshevski 1999 | Unobtainable |
| Ostwald 1999 | Multi-component intervention |
| Perraud 2004 | Intervention does not include cognitive reframing |
| Pillemer 2002 | No suitable outcomes |
| Quayhagen 2000 | Multi-component intervention |

(Continued)

| | |
|----------------------|---|
| Roberts 1999 | Unobtainable |
| Robinson 1994 | Multi-component intervention |
| Seltzer 1992 | Intervention does not include cognitive reframing |
| Shaji 2001 | No RCT |
| Steffen 2000 | Unobtainable |
| Stevens 2004 | Unobtainable |
| Teri 1994 | No RCT |
| Teri 1998 | No RCT |
| Thompson 2001/a | No suitable outcomes/unobtainable |
| Vernooy-Dassen 2000a | Multi-component intervention |
| Walton 1994 | Unobtainable |
| Whitlatch 1991 | No RCT |
| Whitlatch 1995 | No RCT |
| Winter 2006 | Multi-component intervention |
| Zimmer 1990 | Intervention does not include cognitive reframing |

DATA AND ANALYSES

Comparison 1. Outcomes of cognitive reframing interventions

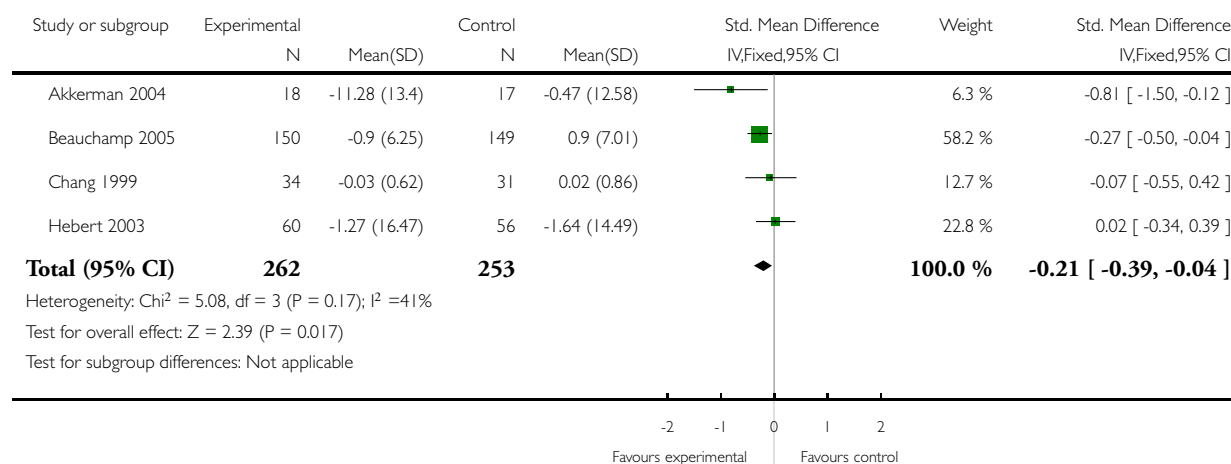
| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|---------------------------|----------------|---------------------|---|----------------------|
| 1 Anxiety | 4 | 515 | Std. Mean Difference (IV, Fixed, 95% CI) | -0.21 [-0.39, -0.04] |
| 2 Depression | 6 | 595 | Std. Mean Difference (IV, Random, 95% CI) | -0.66 [-1.27, -0.05] |
| 3 Burden | 3 | 490 | Std. Mean Difference (IV, Fixed, 95% CI) | -0.14 [-0.32, 0.03] |
| 4 Coping/self efficacy | 4 | 613 | Std. Mean Difference (IV, Random, 95% CI) | 0.64 [-0.17, 1.45] |
| 5 stress/distress | 4 | 585 | Std. Mean Difference (IV, Fixed, 95% CI) | -0.24 [-0.40, -0.07] |
| 6 RMBPC-reaction | 3 | 265 | Std. Mean Difference (IV, Fixed, 95% CI) | -0.21 [-0.45, 0.03] |

Analysis 1.1. Comparison 1 Outcomes of cognitive reframing interventions, Outcome 1 Anxiety.

Review: Cognitive reframing for carers of people with dementia

Comparison: 1 Outcomes of cognitive reframing interventions

Outcome: 1 Anxiety

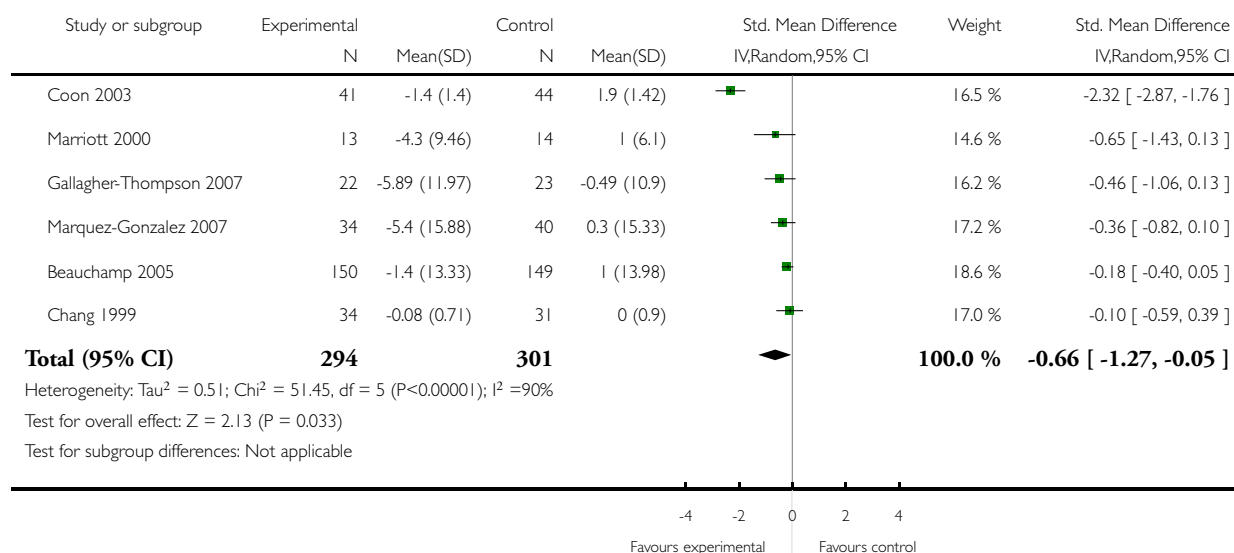


Analysis 1.2. Comparison 1 Outcomes of cognitive reframing interventions, Outcome 2 Depression.

Review: Cognitive reframing for carers of people with dementia

Comparison: 1 Outcomes of cognitive reframing interventions

Outcome: 2 Depression

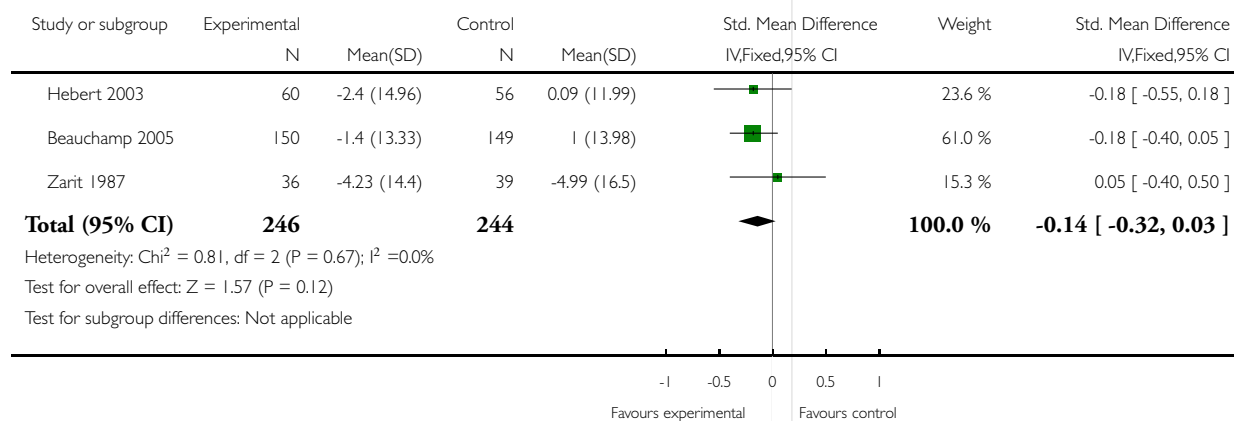


Analysis 1.3. Comparison 1 Outcomes of cognitive reframing interventions, Outcome 3 Burden.

Review: Cognitive reframing for carers of people with dementia

Comparison: 1 Outcomes of cognitive reframing interventions

Outcome: 3 Burden

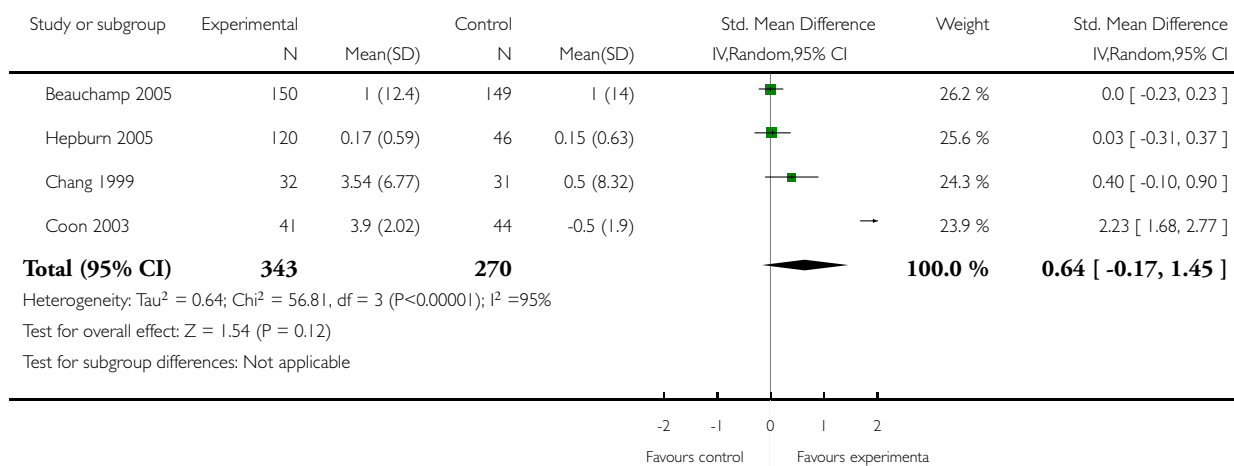


Analysis 1.4. Comparison 1 Outcomes of cognitive reframing interventions, Outcome 4 Coping/self efficacy.

Review: Cognitive reframing for carers of people with dementia

Comparison: 1 Outcomes of cognitive reframing interventions

Outcome: 4 Coping/self efficacy

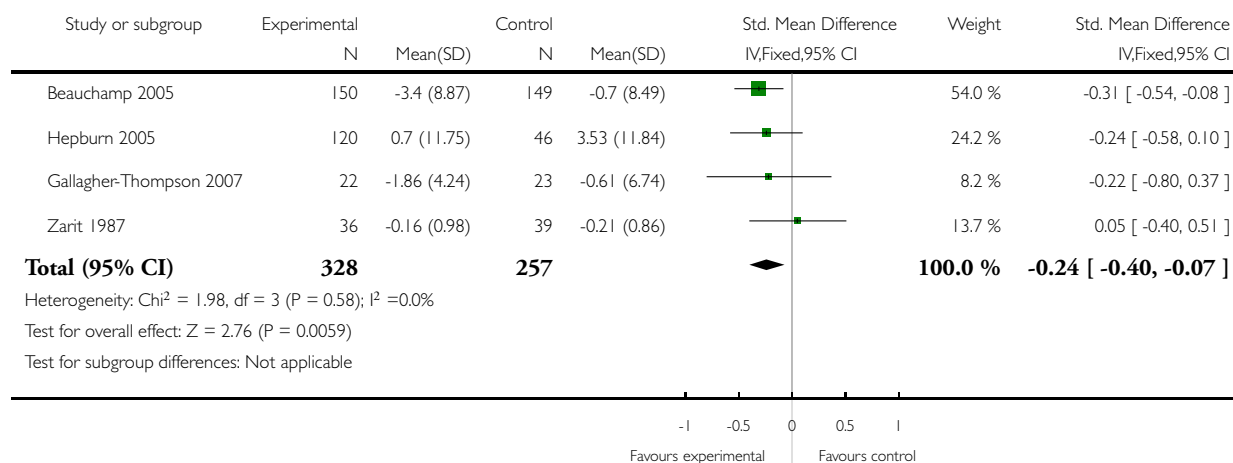


Analysis 1.5. Comparison 1 Outcomes of cognitive reframing interventions, Outcome 5 stress/distress.

Review: Cognitive reframing for carers of people with dementia

Comparison: 1 Outcomes of cognitive reframing interventions

Outcome: 5 stress/distress

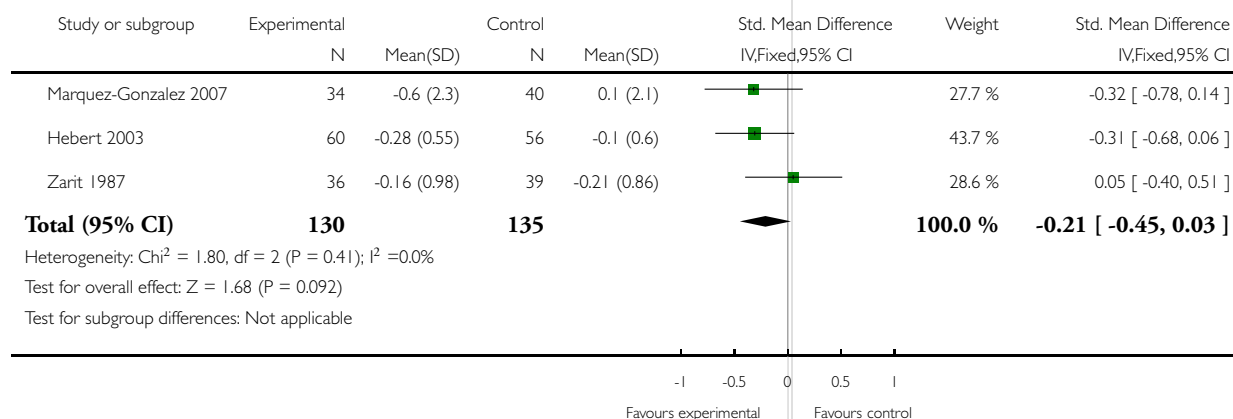


Analysis 1.6. Comparison 1 Outcomes of cognitive reframing interventions, Outcome 6 RMBPC-reaction.

Review: Cognitive reframing for carers of people with dementia

Comparison: 1 Outcomes of cognitive reframing interventions

Outcome: 6 RMBPC-reaction



ADDITIONAL TABLES

Table 1. Assessment of study quality

| Study | Sequence generation | Randomisation | Baseline comparability | Performance bias: blinding participant and/or provider | Detection bias: Blinding outcome assessors | Reporting attrition rate | Use of intention to treat analysis |
|----------------------------|---|---------------|------------------------|--|--|--------------------------|------------------------------------|
| 1. Akkerman 2004 | C | A | A | B | A | A | B |
| 2. Beauchamp 2005 | C | A | A | B | C | A | B |
| 3. Chang 1999 | C | A | A | B | C | A | B |
| 4. Coon 2003 | C | A | A | B | A | A | B |
| 5. Farran 2007 | B | A | A | B | A | B | B |
| 6. Gallagher-Thompson 2007 | C | A | A | B | C | A | B |
| 7. Hebert 2003 | A Minimization technique | A | A | B | A | A | A |
| 8. Hepburn 2005 | A Block design randomisation technique | A | A | B | C | A | B |
| 9. Marriott 2000 | A Random number tables | A | A | B | A | A | B |
| 10. Marquez-Gonzalez 2007 | A | A | A | B | B | A | A |
| 11. Zarit 1987 | C | A | C | B | C | A | B |

APPENDICES

Appendix I. Sources searched and search strategies used

| Source | Search strategy |
|------------------|---|
| MEDLINE (PubMed) | <p>#1 “skills therap*” OR “cognitive therap*” OR “behavior* therap*” OR “behaviour* therap*” OR “relaxation therap*” OR “psychosocial therap*”</p> <p>#2 “skills training” OR “cognitive training” OR “behavior* training” OR “behaviour* training” OR “relaxation training” OR “psychosocial training”</p> <p>#3 “support program*” OR “skills* program*” OR “cognitive program*” OR “behavior* program*” OR “relaxation program*” OR “behaviour* program*” OR “training program*” OR “psychosocial program*” OR “support group program*”</p> <p>#4 “cognitive-behavioral intervention*” OR “cognitive-behavioural intervention*” OR “home environment* intervention*” OR “cognitive-behavioral family intervention*” OR “cognitive-behavioural family intervention*” OR “structured intervention*”</p> <p>#5 “psychosocial support” OR “cognitive-behavioral support” OR “cognitive-behavioural support” OR “home environment* support” OR “cognitive-behavioral family support” OR “cognitive-behavioural family support” OR “structured support”</p> <p>#6 “case management” OR “support group*”</p> <p>#7 #1 OR #2 OR #3 OR #4 OR #5 OR #6</p> <p>#8 (carer* OR caregiv* OR care-giver OR spouse-caregiver*)</p> <p>#9 #7 and #8</p> |
| EMBASE (Ovid SP) | <p>#1 “skills therap*” OR “cognitive therap*” OR “behavior* therap*” OR “behaviour* therap*” OR “relaxation therap*” OR “psychosocial therap*”</p> <p>#2 “skills training” OR “cognitive training” OR “behavior* training” OR “behaviour* training” OR “relaxation training” OR “psychosocial training”</p> <p>#3 “support program*” OR “skills* program*” OR “cognitive program*” OR “behavior* program*” OR “relaxation program*” OR “behaviour* program*” OR “training program*” OR “psychosocial program*” OR “support group program*”</p> <p>#4 “cognitive-behavioral intervention*” OR “cognitive-behavioural intervention*” OR “home environment* intervention*” OR “cognitive-behavioral family intervention*” OR “cognitive-behavioural family intervention*” OR “structured intervention*”</p> <p>#5 “psychosocial support” OR “cognitive-behavioral support” OR “cognitive-behavioural support” OR “home environment* support” OR “cognitive-behavioral family support” OR “cognitive-behavioural family support” OR “structured support”</p> <p>#6 “case management” OR “support group*”</p> <p>#7 #1 OR #2 OR #3 OR #4 OR #5 OR #6</p> |

(Continued)

| | |
|--------------------|---|
| | <p>#8 (carer* OR caregiv* OR care-giver OR spouse-caregiver*) #9 #7 and #8</p> |
| PsycINFO (Ovid SP) | <p>#1 “skills therap*” OR “cognitive therap*” OR “behavior* therap*” OR “behaviour* therap*” OR “relaxation therap*” OR “psychosocial therap*” #2 “skills training” OR “cognitive training” OR “behavior* training” OR “behaviour* training” OR “relaxation training” OR “psychosocial training” #3 “support program*” OR “skills* program*” OR “cognitive program*” OR “behavior* program*” OR “relaxation program*” OR “behaviour* program*” OR “training program*” OR “psychosocial program*” OR “support group program*” #4 “cognitive-behavioral intervention*” OR “cognitive-behavioural intervention*” OR “home environment* intervention*” OR “cognitive-behavioral family intervention*” OR “cognitive-behavioural family intervention*” OR “structured intervention*” #5 “psychosocial support” OR “cognitive-behavioral support” OR “cognitive-behavioural support” OR “home environment* support” OR “cognitive-behavioral family support” OR “cognitive-behavioural family support” OR “structured support” #6 “case management” OR “support group*” #7 #1 OR #2 OR #3 OR #4 OR #5 OR #6 #8 (carer* OR caregiv* OR care-giver OR spouse-caregiver*) #9 #7 and #8</p> |
| CINAHL (Ovid SP) | <p>#1 “skills therap*” OR “cognitive therap*” OR “behavior* therap*” OR “behaviour* therap*” OR “relaxation therap*” OR “psychosocial therap*” #2 “skills training” OR “cognitive training” OR “behavior* training” OR “behaviour* training” OR “relaxation training” OR “psychosocial training” #3 “support program*” OR “skills* program*” OR “cognitive program*” OR “behavior* program*” OR “relaxation program*” OR “behaviour* program*” OR “training program*” OR “psychosocial program*” OR “support group program*” #4 “cognitive-behavioral intervention*” OR “cognitive-behavioural intervention*” OR “home environment* intervention*” OR “cognitive-behavioral family intervention*” OR “cognitive-behavioural family intervention*” OR “structured intervention*” #5 “psychosocial support” OR “cognitive-behavioral support” OR “cognitive-behavioural support” OR “home environment* support” OR “cognitive-behavioral family support” OR “cognitive-behavioural family support” OR “structured support” #6 “case management” OR “support group*” #7 #1 OR #2 OR #3 OR #4 OR #5 OR #6 #8 (carer* OR caregiv* OR care-giver OR spouse-caregiver*) #9 #7 and #8</p> |

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| LILACS (Bireme) | #1 “skills therap*” OR “cognitive therap*” OR “behavior* therap*” OR “behaviour* therap*” OR “relaxation therap*” OR “psychosocial therap*” #2 “skills training” OR “cognitive training” OR “behavior* training” OR “behaviour* training” OR “relaxation training” OR “psychosocial training” #3 “support program*” OR “skills* program*” OR “cognitive program*” OR “behavior* program*” OR “relaxation program*” OR “behaviour* program*” OR “training program*” OR “psychosocial program*” OR “support group program*” #4 “cognitive-behavioral intervention*” OR “cognitive-behavioural intervention*” OR “home environment* intervention*” OR “cognitive-behavioral family intervention*” OR “cognitive-behavioural family intervention*” OR “structured intervention*” #5 “psychosocial support” OR “cognitive-behavioral support” OR “cognitive-behavioural support” OR “home environment* support” OR “cognitive-behavioral family support” OR “cognitive-behavioural family support” OR “structured support” #6 “case management” OR “support group*” #7 #1 OR #2 OR #3 OR #4 OR #5 OR #6 #8 (carer* OR caregiv* OR care-giver OR spouse-caregiver*) #9 #7 and #8 |
| CDCIG SR | #1 “skills therap*” OR “cognitive therap*” OR “behavior* therap*” OR “behaviour* therap*” OR “relaxation therap*” OR “psychosocial therap*” #2 “skills training” OR “cognitive training” OR “behavior* training” OR “behaviour* training” OR “relaxation training” OR “psychosocial training” #3 “support program*” OR “skills* program*” OR “cognitive program*” OR “behavior* program*” OR “relaxation program*” OR “behaviour* program*” OR “training program*” OR “psychosocial program*” OR “support group program*” #4 “cognitive-behavioral intervention*” OR “cognitive-behavioural intervention*” OR “home environment* intervention*” OR “cognitive-behavioral family intervention*” OR “cognitive-behavioural family intervention*” OR “structured intervention*” #5 “psychosocial support” OR “cognitive-behavioral support” OR “cognitive-behavioural support” OR “home environment* support” OR “cognitive-behavioral family support” OR “cognitive-behavioural family support” OR “structured support” #6 “case management” OR “support group*” #7 #1 OR #2 OR #3 OR #4 OR #5 OR #6 #8 (carer* OR caregiv* OR care-giver OR spouse-caregiver*) #9 #7 and #8 |
| CENTRAL (<i>The Cochrane Library</i>) | #1 “skills therap*” OR “cognitive therap*” OR “behavior* therap*” OR “behaviour* therap*” OR “relaxation therap*” OR “psychosocial therap*” |

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| | <p>#2 “skills training” OR “cognitive training” OR “behavior* training” OR “behaviour* training” OR “relaxation training” OR “psychosocial training”</p> <p>#3 “support program*” OR “skills* program*” OR “cognitive program*” OR “behavior* program*” OR “relaxation program*” OR “behaviour* program*” OR “training program*” OR “psychosocial program*” OR “support group program*”</p> <p>#4 “cognitive-behavioral intervention*” OR “cognitive-behavioural intervention*” OR “home environment* intervention*” OR “cognitive-behavioral family intervention*” OR “cognitive-behavioural family intervention*” OR “structured intervention*”</p> <p>#5 “psychosocial support” OR “cognitive-behavioral support” OR “cognitive-behavioural support” OR “home environment* support” OR “cognitive-behavioral family support” OR “cognitive-behavioural family support” OR “structured support”</p> <p>#6 “case management” OR “support group*”</p> <p>#7 #1 OR #2 OR #3 OR #4 OR #5 OR #6</p> <p>#8 (carer* OR caregiv* OR care-giver OR spouse-caregiver*)</p> <p>#9 #7 and #8</p> |
| ISTP Conference Proceedings http://portal.isiknowledge.com/portal.cgi | (Alzheimer* OR dement*) AND (carer* OR caregiver*) |
| Australian Digital Theses Program http://adt.caul.edu.au/ | (Alzheimer* OR dement*) AND (carer* OR caregiver*) |
| Canadian Theses and Dissertations http://www.collectionscanada.ca/thesescanada/index-e.html | (Alzheimer* OR dement*) AND (carer* OR caregiver*) |
| WHO trials register | (Alzheimer* OR dement*) AND (carer* OR caregiver*) |
| Current Controlled trials: Meta Register of Controlled trials (mRCT) http://www.controlled-trials.com/ | (Alzheimer* OR dement*) AND (carer* OR caregiver*) |
| ISRCTN Register | (Alzheimer* OR dement*) AND (carer* OR caregiver*) |
| Netherlands Trial Register http://www.trialregister.nl/trialreg/index.asp | (Alzheimer* OR dement*) AND (carer* OR caregiver*) |
| ClinicalTrials.gov http://www.ClinicalTrials.gov | (Alzheimer* OR dement*) AND (carer* OR caregiver*) |
| IPFMA Clinical Trials Register www.ifpma.org/clinicaltrials.html | (Alzheimer* OR dement*) AND (carer* OR caregiver*) |
| UMIN Japan Trial Register http://www.umin.ac.jp/ctr/ | (Alzheimer* OR dement*) AND (carer* OR caregiver*) |

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(Alzheimer* OR dement*) AND (carer* OR caregiver*)

HISTORY

Protocol first published: Issue 2, 2005

Review first published: Issue 11, 2011

CONTRIBUTIONS OF AUTHORS

MV - all correspondence on protocol, assessment eligibility and methodological quality, drafting of protocol and review.

ID - assessment eligibility and methodological quality, meta-analyses, drafting of protocol and review.

JM - assessment eligibility and drafting of review.

MD - drafting of protocol.

Contact editor: Linda Clare

Consumer editor: Bernard Frijling

DECLARATIONS OF INTEREST

None known

SOURCES OF SUPPORT

Internal sources

- Centre for quality of care research / Alzheimer centre University Medical Centre Nijmegen, Netherlands.
- Bradford Dementia Group, Division of Dementia Studies, School of Health Studies, University of Bradford, BD5 0BB, West Yorkshire, UK.

External sources

- No sources of support supplied

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

The title has been changed, the original protocol was published under the title 'Cognitive and behavioural interventions for carers of people with dementia'.