Evidence in Context

Issue: Supporting the Independence of Persons with Dementia
Released : October 2015

Health research — synthesized and contextualized for use in Newfoundland & Labrador

Supporting the Independence of Persons with Dementia *in* Newfoundland and Labrador

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ONLINE COMPANION DOCUMENT

Newfoundland & Labrador Centre for
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Companion Document

"What interventions are most effective in preventing or delaying the admission of people with dementia to long-term care?"

A. Research Design & Publication Dates

Our synthesis includes two types of research articles:

1. Systematic reviews, meta-analyses or health technology assessments published between January 2010 and December 2014, inclusive. To be considered "systematic," a given review had to provide three things:
    - i. a documented search strategy and inclusion criteria for identifying and selecting relevant primary studies;
    - ii. citation info for all included studies; and
    - iii. an aggregate description of included study characteristics that included participants, setting, intervention, outcomes.

2. Randomized controlled trials (RCTs) published between March 2014 and February 2015, inclusive.

B. Selection Criteria

The research team collectively agreed on the following inclusion criteria for selection of articles:

Intervention:

1. RCTs/systematic reviews were selected if they attempted to assess the safety and/or effectiveness of an intervention or model designed to meet the care needs of persons with dementia.

2. RCTs/systematic reviews were **NOT** selected if they attempted to assess
    - a. particular medications or categories of medications (however, articles on prescription medication review and/or modification *were* eligible for inclusion)
    - b. particular nutritional supplements or categories of nutritional supplements (however, articles on nutritional review and/or monitoring *were* eligible for inclusion)
    - c. surgical procedures

Setting:

3. An RCT was selected if
    - a. neither the intervention(s) nor the evaluation/measurement/observation were carried out in a long-term care (LTC) setting, defined as an institution where LTC is provided by professional care workers for residents requiring nursing care , i.e., people with ≥ level 3 care needs. Examples include:
        - ○ nursing homes
        - ○ long-term hospital units
        - ○ complex continuing care
        - ○ extended care
        - ○ protective care
        - ○ group dwelling units or personal care homes intended for residents with severe dementia or severe cognitive impairment

      OR
    - b. in the case of a multi-site study, interventions delivered in settings other than LTC were analyzed and evaluated separately from interventions delivered within LTC, such that we could discern a finding or findings specific to interventions delivered in settings other than LTC

4. A systematic review was selected if
    a. 100% of its included studies satisfied criterion #3, **OR**
    b. included studies that satisfied condition #3 were analyzed separately from the others, such that we could discern a finding or findings specific to interventions delivered in settings other than LTC – e.g., subgroup analysis in the case of meta-analyses.

Population:

5. An RCT was selected if
    a. Study participants had been clinically assessed as having some form of dementia, **OR**
    b. study participants were family/informal caregivers of the population described above, **OR**
    c. in the case of a study with multiple study populations, interventions delivered exclusively to a population such as those described in #5 a & b were analyzed and evaluated separately from the others, such that we could discern a finding or findings specific to interventions for people with dementia and/or their informal caregivers

6. A systematic review was selected if
    a. 66% of its included studies satisfied both conditions #5 & 6, **OR**
    b. included studies that satisfied both conditions #5 & 6 were analyzed separately from the others, such that we could discern a finding or findings specific to interventions for people with dementia and/or their informal caregivers – e.g., subgroup analysis in the case of meta-analyses.

Outcome

RCTs/systematic reviews were selected if they employed any measure or set of measures that enabled them to draw a discernible conclusion about an intervention's effectiveness in helping people with dementia to remain living outside of a long-term care setting; specifically, articles were selected if they measured (a) a proximate outcome like delayed institutionalization, or (b) *at least one* of the following distal outcomes: activities of daily living, functional decline, caregiver burden, and safety of the care recipient.

C. Search Strategy & Article Selection

To identify relevant articles we searched PubMed, CINAHL and EMBASE. Our search was limited to articles published in English. The following tables illustrate how the searches were constructed and provide the detailed search strings with the number of results obtained for each search.

PubMed Search Strategy

Systematic Reviews	
Limits	Abstract available; Publication date from 2010/01/01 to 2015/01/01; English
Search string	((("Dementia/nursing"[Majr] OR "Dementia/therapy"[Majr] OR "Dementia/rehabilitation"[Majr] OR "Dementia/diet therapy"[Majr] OR "Dementia/organization and administration"[Majr] OR "Dementia/prevention and control"[Majr]) OR (dementia[Majr] AND (health services for the aged[Majr] OR community health services[Majr] OR psychotherapy[Majr] OR rehabilitation[Majr] OR "caregivers/education"[Majr] OR self-help groups[Majr])) OR ((dementia[title] OR (alzheimers[title] OR alzheimer's[title] OR alzheimer[title])) AND (interventions[title] OR intervention[title] OR program[title] OR programs[title] OR programme[title] OR programmes[title] OR programming[title] OR train[title] OR training[title] OR trainer[title] OR trainers[title] OR therapy[title] OR therapies[title] OR therapeutic[title] OR counselling[title] OR counseling[title] OR counsellor[title] OR counsellors[title] OR counselor[title] OR counselors[title] OR non-pharmacological[title] OR nonpharmacological[title] OR non-pharmacologic[title] OR nonpharmacologic[title] OR psychosocial[title] OR community[title] OR carer[title] OR carers[title] OR caregiver[title] OR caregivers[title])))) AND (meta analysis[Publication Type] OR meta analysis[Title/Abstract] OR meta analysis[MeSH Terms] OR review[Publication Type] OR search*[Title/Abstract] OR "systematic review"[Title] OR systematic [sb])
Results	1639 on January 21, 2015
Development	6. (#1 AND #5) 5. (#2 OR #3 OR #4) 4. (dementia[title] OR alzheimers[title] OR alzheimer's[title] OR alzheimer[title]) AND (interventions[title] OR intervention[title] OR program[title] OR programs[title] OR programme[title] OR programmes[title] OR programming[title] OR train[title] OR training[title] OR trainer[title] OR trainers[title] OR therapy[title] OR therapies[title] OR therapeutic[title] OR counselling[title] OR counseling[title] OR counsellor[title] OR counsellors[title] OR counselor[title] OR counselors[title] OR non-pharmacological[title] OR nonpharmacological[title] OR non-pharmacologic[title] OR nonpharmacologic[title] OR psychosocial[title] OR community[title] OR carer[title] OR carers[title] OR caregiver[title] OR caregivers[title]) 3. dementia[Majr] AND (health services for the aged[Majr] OR community health services[Majr] OR psychotherapy[Majr] OR rehabilitation[Majr] OR "caregivers/education"[Majr] OR self-help groups[Majr]) 2. "Dementia/nursing"[Majr] OR "Dementia/therapy"[Majr] OR "Dementia/rehabilitation"[Majr] OR "Dementia/diet therapy"[Majr] OR "Dementia/organization and administration"[Majr] OR "Dementia/prevention and control"[Majr] 1. meta analysis[Publication Type] OR meta analysis[Title/Abstract] OR meta analysis[MeSH Terms] OR review[Publication Type] OR search*[Title/Abstract] OR "systematic review"[Title] OR systematic [sb]
RCTs	
Limits	Abstract available; Publication date from 2014/03/01 to 2015/02/28; English
Therapy filter	((clinical[Title/Abstract] AND trial[Title/Abstract]) OR clinical trials[MeSH Terms] OR clinical trial[Publication Type] OR random*[Title/Abstract] OR random allocation[MeSH Terms] OR therapeutic use[MeSH Subheading])
Results	383 on March 12, 2015

CINAHL Search Strategy

Systematic Reviews	
Limits	Abstract Available; Published Date: 20100101-20150131; English Language; Exclude MEDLINE records; Clinical Queries: Review - Best Balance
Results	56 on January 29, 2015
Development	4. S1 OR S2 OR S3 3. (TI dementia OR TI alzheimers OR TI alzheimer's OR TI alzheimer) AND (TI interventions OR TI intervention OR TI program OR TI programs OR TI programme OR TI programmes OR TI programming OR TI train OR TI training OR TI trainer OR TI trainers OR TI therapy OR TI therapies OR TI therapeutic OR TI counselling OR TI counseling OR TI counsellor OR TI counsellors OR TI counselor OR TI counselors OR TI non-pharmacological OR TI nonpharmacological OR TI non-pharmacologic OR TI nonpharmacologic OR TI psychosocial OR TI community OR TI carer OR TI carers OR TI caregiver OR TI caregivers) 2. MM "Dementia+/DH/NU/PC/TH/RH/PF” 1. MM dementia+ AND (MM health services for the aged+ OR MM community health services+ OR MM psychotherapy+ OR MM rehabilitation+ OR MM support groups+ OR MM caregivers+)
RCTs	
Limits	Abstract Available; Published Date: 20140301-20150231; English Language; Exclude MEDLINE records; Clinical Queries: Therapy - High Sensitivity
Results	43 on March 12, 2015

EMBASE Search Strategy

Systematic Reviews	
Limits	[embase]/lim NOT [medline]/lim AND 'systematic review'/de AND (2010:py OR 2011:py OR 2012:py OR 2013:py OR 2014:py OR 2015:py) AND [english]/lim AND [abstracts]/lim
Results	92 on January 29, 2015
Development	4. #1 OR #2 OR #3 3. 'dementia':ti OR 'alzheimer':ti OR 'alzheimers':ti AND ('interventions':ti OR 'intervention':ti OR 'program':ti OR 'programs':ti OR 'programme':ti OR 'programmes':ti OR 'programming':ti OR 'train':ti OR 'training':ti OR 'trainer':ti OR 'trainers':ti OR 'therapy':ti OR 'therapies':ti OR 'therapeutic':ti OR 'counselling':ti OR 'counseling':ti OR 'counsellor':ti OR 'counsellors':ti OR 'counselor':ti OR 'counselors':ti OR 'non-pharmacological':ti OR 'nonpharmacological':ti OR 'non-pharmacologic':ti OR 'nonpharmacologic':ti OR 'psychosocial':ti OR 'community':ti OR 'carer':ti OR 'carers':ti OR 'caregiver':ti OR 'caregivers':ti) 2. 'dementia'/exp/mj AND ('psychological and psychiatric procedures'/exp/mj OR 'therapy'/exp/mj OR 'elderly care'/exp/mj OR 'community care'/exp/mj OR 'self help'/exp/mj OR 'caregiver'/exp/mj) 1. 'dementia'/exp/mj/dm_th,dm_rh
RCTs	
Limits	[embase]/lim NOT [medline]/lim AND 'randomized controlled trial'/de AND (2014:py OR 2015:py) AND [english]/lim AND [abstracts]/lim
Results	63 on March 12, 2015

A search of grey literature websites was also conducted in January 2015 in an attempt to identify any relevant articles:

I. Canada

CADTH (http://www.cadth.ca/en/products): search for “dementia” (30 results), “Alzheimer” (19 results) in “All Products,” none selected

Evidence-Informed Healthcare Renewal Portal (www.eihrportal.org): search for “dementia” (56 results), “Alzheimer” (3 results), none selected

healthevidence.org (http://www.healthevidence.org/search.aspx): search for “dementia” (86 results), “Alzheimer” (39 results), selected: Martin, 2013; Meyer, 2013

PATH (http://www.path-hta.ca/Publications-Presentations/Publications/AI.aspx): manual search, selected: none

CHEPA (http://www.chepa.org/research-papers/search-for-documents): search for “dementia” (5 results), “Alzheimer” (9 results), selected: none

INESSS (http://www.inesss.qc.ca/index.php?id=49): manual search, selected: none

TAU of the MUHC (http://www.mcgill.ca/tau/publications): manual search, selected: none

MCHP (http://mchp-appserv.cpe.umanitoba.ca/deliverablesList.html): manual search, selected**:** none

IHE (http://www.ihe.ca/publications/library/): manual search, selected: none

ARCHE (http://www.ualberta.ca/ARCHE/publications.htm): manual search, selected: none

CHSPR (http://chspr.ubc.ca/pubs/pub-search): manual search, selected: none

II. U.K.

National Health Service Evidence (http://www.evidence.nhs.uk/): search for (a) “dementia” limited to clinical/social care, last 3 years, systematic reviews/HTAs, 877 results, selected**:** Fleming, 2014

TRIP Database (http://www.tripdatabase.com/index.html): search for (title:dementia) from:2010 to:2015 in ‘Systematic Reviews’ (240 results), selected: none

III. U.S.

AHRQ (http://www.ahrq.gov/research/findings/index.html): manual search of EPC Evidence-based Reports, selected: 0; manual search of Full Research Reports, selected: 0; manual search of Technology Assessments, selected: 0

U.S. Department of Veterans Affairs Evidence-Based Synthesis Program (http://www.hsrd.research.va.gov/publications/esp/reports.cfm) – manual search, selected: none

California Technology Assessment Forum (http://www.ctaf.org/reports) – manual search, selected: none

IV. Australia/New Zealand

National Health and Medical Research Council (http://www.nhmrc.gov.au/guidelines-publications): manual search, selected: none

Medical Services Advisory Committee (Gov of Australia) (http://www.msac.gov.au/internet/msac/publishing.nsf/Content/completed-assessments): manual search of Completed Assessments and Reviews, selected: 0

D. Excluded Articles

Articles excluded on the basis of a full-text review are listed below.

(1) Afram B, Verbeek H, Bleijlevens MH, Hamers JP. Needs of informal caregivers during transition from home towards institutional care in dementia: a systematic review of qualitative studies. Int.Psychogeriatr. 2014 Oct 7:1-12.

(2) Alves J, Magalhaes R, Thomas RE, Goncalves OF, Petrosyan A, Sampaio A. Is there evidence for cognitive intervention in alzheimer disease? A systematic review of efficacy, feasibility, and cost-effectiveness. Alzheimer Dis.Assoc.Disord. 2013 /;27(3):195-203.

(3) Bahar-Fuchs A, Clare L, Woods B. Cognitive training and cognitive rehabilitation for mild to moderate Alzheimer's disease and vascular dementia. Cochrane Database Syst.Rev. 2013 Jun 5;6:CD003260.

(4) Ballard C, Khan Z, Clack H, Corbett A. Nonpharmacological treatment of Alzheimer disease. Can.J.Psychiatry 2011 Oct;56(10):589-595.

(5) Blankevoort CG, van Heuvelen MJ, Boersma F, Luning H, de Jong J, Scherder EJ. Review of effects of physical activity on strength, balance, mobility and ADL performance in elderly subjects with dementia. Dement.Geriatr.Cogn.Disord. 2010;30(5):392-402.

(6) Brodaty H, Arasaratnam C. Meta-analysis of nonpharmacological interventions for neuropsychiatric symptoms of dementia. Am.J.Psychiatry 2012 Sep;169(9):946-953.

(7) Brodaty H, Burns K. Nonpharmacological management of apathy in dementia: a systematic review. Am.J.Geriatr.Psychiatry 2012 Jul;20(7):549-564.

(8) Brodaty H, Burns K. Nonpharmacological management of apathy in dementia: a systematic review. Am.J.Geriatr.Psychiatry 2012 Jul;20(7):549-564.

(9) Chien LY, Chu H, Guo JL, Liao YM, Chang LI, Chen CH, et al. Caregiver support groups in patients with dementia: a meta-analysis. Int.J.Geriatr.Psychiatry 2011 Oct;26(10):1089-1098.

(10) Cooper C, Mukadam N, Katona C, Lyketsos CG, Ames D, Rabins P, et al. Systematic review of the effectiveness of non-pharmacological interventions to improve quality of life of people with dementia. Int.Psychogeriatr. 2012 Jun;24(6):856-870.

(11) Crellin NE, Orrell M, McDermott O, Charlesworth G. Self-efficacy and health-related quality of life in family carers of people with dementia: a systematic review. Aging Ment.Health. 2014;18(8):954-969.

(12) Egan M, Berube D, Racine G, Leonard C, Rochon E. Methods to enhance verbal communication between individuals with Alzheimer's disease and their formal and informal caregivers: A systematic review. Int.J.Alzheimer's Dis. 2010 2010/.

(13) Eggenberger E, Heimerl K, Bennett MI. Communication skills training in dementia care: a systematic review of effectiveness, training content, and didactic methods in different care settings. Int.Psychogeriatr. 2013 Mar;25(3):345-358.

(14) Elvish R, Lever S, Johnstone J, Cawley R, Keady J. Psychological interventions for carers of people with dementia: A systematic review of quantitative and qualitative evidence. CPR 2013 06;13(2):106-125.

(15) Fleming R, Sum S. Empirical studies on the effectiveness of assistive technology in the care of people with dementia: a systematic review. Jnl of Assistive Technologies 2014 03/12; 2015/02;8(1):14-34.

(16) Forbes D, Thiessen EJ, Blake CM, Forbes SS, Forbes S. Exercise programs for people with dementia. Sao Paulo Med.J. 2014;132(3):195-196.

(17) Hall L, Skelton D. Occupational therapy for caregivers of people with dementia: a review of the United Kingdom literature. 2012;75(6):281-288.

(18) Hopper T, Bourgeois M, Pimentel J, Qualls CD, Hickey E, Frymark T, et al. An Evidence-Based Systematic Review on Cognitive Interventions for Individuals With Dementia. AM J SPEECH LANG PATHOL 2013 02;22(1):126-145.

(19) Jensen LE, Padilla R. Effectiveness of interventions to prevent falls in people with Alzheimer's disease and related dementias. Am.J.Occup.Ther. 2011 Sep-Oct;65(5):532-540.

(20) Kim SY, Yoo EY, Jung MY, Park SH, Park JH. A systematic review of the effects of occupational therapy for persons with dementia: a meta-analysis of randomized controlled trials. NeuroRehabilitation 2012;31(2):107-115.

(21) Kurz AF, Leucht S, Lautenschlager NT. The clinical significance of cognition-focused interventions for cognitively impaired older adults: a systematic review of randomized controlled trials. Int.Psychogeriatr. 2011 Nov;23(9):1364-1375.

(22) Letts L, Edwards M, Berenyi J, Moros K, O'Neill C, O'Toole C, et al. Using occupations to improve quality of life, health and wellness, and client and caregiver satisfaction for people with Alzheimer's disease and related dementias. Am.J.Occup.Ther. 2011 Sep-Oct;65(5):497-504.

(23) Letts L, Minezes J, Edwards M, Berenyi J, Moros K, O'Neill C, et al. Effectiveness of interventions designed to modify and maintain perceptual abilities in people with Alzheimer's disease and related dementias. Am.J.Occup.Ther. 2011 Sep-Oct;65(5):505-513.

(24) Littbrand H, Stenvall M, Rosendahl E. Applicability and effects of physical exercise on physical and cognitive functions and activities of daily living among people with dementia: a systematic review. Am.J.Phys.Med.Rehabil. 2011 Jun;90(6):495-518.

(25) Livingston G, Kelly L, Lewis-Holmes E, Baio G, Morris S, Patel N, et al. A systematic review of the clinical effectiveness and cost-effectiveness of sensory, psychological and behavioural interventions for managing agitation in older adults with dementia. Health Technol.Assess. 2014 Jun;18(39):1-226, v-vi.

(26) Martin AJ, Marottoli R, O'Neill D. Driving assessment for maintaining mobility and safety in drivers with dementia. Cochrane Database Syst.Rev. 2013 May 31;5:CD006222.

(27) Moon H, Adams KB. The effectiveness of dyadic interventions for people with dementia and their caregivers. Dementia (London) 2013 Nov;12(6):821-839.

(28) O'Neil ME, Freeman M, Christensen V, Telerant R, Addleman A, Kansagara D. A systematic evidence review of non-pharmacological interventions for behavioral symptoms of dementia. 2011 Mar.

(29) Padilla R. Effectiveness of environment-based interventions for people with Alzheimer's disease and related dementias. Am.J.Occup.Ther. 2011 Sep-Oct;65(5):514-522.

(30) Padilla R. Effectiveness of interventions designed to modify the activity demands of the occupations of self-care and leisure for people with Alzheimer's disease and related dementias. Am.J.Occup.Ther. 2011 Sep-Oct;65(5):523-531.

(31) Potter R, Ellard D, Rees K, Thorogood M. A systematic review of the effects of physical activity on physical functioning, quality of life and depression in older people with dementia. Int.J.Geriatr.Psychiatry 2011 Oct;26(10):1000-1011.

(32) Rao AK, Chou A, Bursley B, Smulofsky J, Jezequel J. Systematic review of the effects of exercise on activities of daily living in people with Alzheimer's disease. Am.J.Occup.Ther. 2014 Jan-Feb;68(1):50-56.

(33) Ruthirakuhan M, Luedke AC, Tam A, Goel A, Kurji A, Garcia A. Use of physical and intellectual activities and socialization in the management of cognitive decline of aging and in dementia: a review. J.Aging Res. 2012;2012:384875.

(34) Shinagawa S, Nakajima S, Plitman E, Graff-Guerrero A, Mimura M, Nakayama K, et al. Non-pharmacological management for patients with frontotemporal dementia: a systematic review. J.Alzheimers Dis. 2015 Jan 1;45(1):283-293.

(35) Smits CH, de Lange J, Droes RM, Meiland F, Vernooij-Dassen M, Pot AM. Effects of combined intervention programmes for people with dementia living at home and their caregivers: a systematic review. Int.J.Geriatr.Psychiatry 2007 Dec;22(12):1181-1193.

(36) Thinnes A, Padilla R. Effect of educational and supportive strategies on the ability of caregivers of people with dementia to maintain participation in that role. Am.J.Occup.Ther. 2011 Sep-Oct;65(5):541-549.

(37) Ueda T, Suzukamo Y, Sato M, Izumi S. Effects of music therapy on behavioral and psychological symptoms of dementia: a systematic review and meta-analysis. Ageing Res.Rev. 2013 Mar;12(2):628-641.

(38) Van Mierlo LD, Meiland FJ, Van der Roest HG, Droes RM. Personalised caregiver support: effectiveness of psychosocial interventions in subgroups of caregivers of people with dementia. Int.J.Geriatr.Psychiatry 2012 Jan;27(1):1-14.

(39) Woods B, Aguirre E, Spector AE, Orrell M. Cognitive stimulation to improve cognitive functioning in people with dementia. Cochrane Database Syst.Rev. 2012 02(2).

E. Critical Appraisal

As stated in the main report, our critical appraisal methodology for systematic reviews employs AMSTAR[1], a validated measurement tool for evaluating the methodological quality of systematic reviews. Higher scores can be taken as an indicator that the various stages of the review – e.g., literature searching, pooling of data, critical appraisal, etc. – were conducted appropriately. Each included systematic review was scored independently by both Rob Kean and David Speed using the AMSTAR tool. Rob and David then met and compared their appraisals, review by review, and resolved any discrepancies in score via a consensus procedure. Included RCTs were appraised using the Cochrane Risk of Bias tool[2] and, just as with the systematic reviews, each RCT was judged independently by Rob and David who then compared their judgments, resolving any discrepancies via a consensus process. Below we provide a blank version of the AMSTAR scoring sheet, a table that illustrates how each review was scored, and the Risk of Bias assessments.

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[1] See: Shea, B.J., Bouter, L.M., Peterson, J., Boers, M., Andersson, N., et al. 2007. External Validation of a Measurement Tool to Assess Systematic Reviews (AMSTAR). *PLoS ONE* 2(12): e1350. doi:10.1371/journal.pone.0001350

[2] See: Higgins, J.P.T., Altman, D.G.; Sterne, J.A.C. 2011. “Chapter 8: Assessing risk of bias in included studies,” in Higgins, J.P.T. and Green, S., eds., *Cochrane Handbook for Systematic Reviews of Interventions* 5.1.0.

REFERENCE:

AMSTAR Item	**Answer**
1. Was an 'a priori' design provided? The research question and inclusion criteria should be established before the conduct of the review.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
2. Was there duplicate study selection and data extraction? There should be at least two independent data extractors and a consensus procedure for disagreements should be in place.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
3. Was a comprehensive literature search performed? At least two electronic sources should be searched. The report must include years and databases used (e.g. Central, EMBASE, and MEDLINE). Key words and/or MESH terms must be stated and where feasible the search strategy should be provided. All searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and by reviewing the references in the studies found.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
4. Was the status of publication (i.e. grey literature) used as an inclusion criterion? The authors should state that they searched for reports regardless of their publication type. The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language etc.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
5. Was a list of studies (included and excluded) provided? A list of included and excluded studies should be provided.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
6. Were the characteristics of the included studies provided? In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions and outcomes. The ranges of characteristics in all the studies analyzed e.g. age, race, sex, relevant socioeconomic data, disease status, duration, severity, or other diseases should be reported.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
7. Was the scientific quality of the included studies assessed and documented? 'A priori' methods of assessment should be provided (e.g., for effectiveness studies if the author(s) chose to include only randomized, double-blind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
8. Was the scientific quality of the included studies used appropriately in formulating conclusions? The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review, and explicitly stated in formulating recommendations.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
9. Were the methods used to combine the findings of studies appropriate? For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e. Chi-squared test for homogeneity, I2). If heterogeneity exists a random effects model should be used and/or the clinical appropriateness of combining should be taken into consideration (i.e. is it sensible to combine?)	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
10. Was the likelihood of publication bias assessed? An assessment of publication bias should include a combination of graphical aids (e.g., funnel plot, other available tests) and/or statistical tests (e.g., Egger regression test).	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable
11. Was the conflict of interest stated? Potential sources of support should be clearly acknowledged in both the systematic review and the included studies.	☐ Yes ☐ No ☐ Can't answer ☐ Not applicable

	AMSTAR Item											
Review	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	**Total**
Lins 2014	1	1	1	0	1	1	1	1	1	1	0	9/10 (90%)
Jensen 2014	0	1	1	1	0	1	1	1	1	n/a	1	8/10 (80%)
Maayan 2014	1	0	1	0	1	1	1	1	1	n/a	1	8/10 (80%)
Vernooij-Dassen 2011	1	0	1	0	1	1	1	1	1	0	0	7/11 (64%)
Orgeta 2014	0	1	0	0	1	1	1	1	1	n/a	0	6/10 (60%)
Carrion 2013	0	1	1	0	0	1	1	1	n/a	n/a	0	5/9 (56%)
Tam-Tham 2013	0	0	1	0	0	1	1	1	1	1	0	6/11 (55%)
Burton 2015	0	0	1	0	0	1	1	1	1	n/a	0	5/10 (50%)
Somme 2012	0	0	0	0	0	1	1	1	1	n/a	1	5/10 (50%)
Drennan 2012	0	0	1	0	0	1	1	1	n/a	n/a	0	4/9 (44%)
Boots 2014	0	0	1	0	0	1	1	1	n/a	0	0	4/10 (40%)
McKechnie 2014	0	0	1	0	0	1	1	1	n/a	0	0	4/10 (40%)
Meyer 2013	0	0	1	0	0	1	1	1	n/a	0	0	4/10 (40%)
Pitkala 2013a	0	0	1	0	0	1	1	1	n/a	0	0	4/10 (40%)
Van’t Leven 2013	0	0	1	0	0	1	1	1	n/a	0	0	4/10 (40%)
Zabalegui 2014	0	1	0	0	0	1	1	1	n/a	0	0	4/10 (40%)
Corbett 2012	0	0	1	0	0	1	1	1	0	0	0	4/11 (36%)
Olazarán 2010	0	0	1	0	1	1	0	0	1	0	0	4/11 (36%)
Hurley 2014	0	0	0	0	0	1	1	1	n/a	n/a	0	3/9 (33%)
Marim 2013	0	0	1	0	0	1	0	0	1	n/a	0	3/10 (30%)
McLaren 2013	0	0	0	0	0	1	1	1	n/a	0	0	3/10 (30%)
Schoenmakers 2010	0	0	1	0	0	1	0	0	1	0	0	3/11 (27%)
Godwin 2013	0	1	0	0	0	1	0	0	n/a	n/a	0	2/9 (22%)
Buettner 2010	0	0	0	0	0	0	1	1	n/a	0	0	2/10 (20%)
Goy 2010	0	0	1	0	0	1	0	0	n/a	0	0	2/10 (20%)
de Werd 2013	0	0	1	0	0	1	0	0	0	0	0	2/11 (18%)
Martin-Carrasco 2014	0	0	0	0	0	1	0	0	1	0	0	2/11 (18%)

Arango-Lasprilla 2014

Bias	Authors' judgment	Support for judgment
Random sequence generation (selection bias)	Low risk	"randomly assigned using the flip of a coin to either the experimental (caregiver intervention) or the control (educational program) condition" (p549).
Allocation concealment (selection bias)	Unclear risk	No info provided about steps taken to conceal allocation sequence
Blinding of outcome assessment (detection bias)	High risk	Study included subjective measures reported by the caregiver and blinding of caregivers was not possible
Incomplete outcome data (attrition bias)	Unclear risk	Insufficient reporting of attrition/exclusions
Selective reporting (reporting bias)	Unclear risk	Protocol unavailable
Other bias	Low risk	"baseline differences emerged in mental health that were controlled for in the statistical analysis. Although caregivers were similar in terms of sociodemographic characteristics such as age, education, gender, income, and care provision variables (eg, time providing care and hours of care provided per week), it is not known whether the control group commanded any additional resources in providing care to their loved one with dementia, such as in-home (paid) caregivers, outside mental health support, or other respite services that may impact the findings. However, this concern can be somewhat tempered because these baseline differences were controlled for in all analyses and therefore could not have contributed to the significant treatment effects found in the current study" (p553).

Brunelle-Hamann 2014 (Thivierge 2014 has a more comprehensive description of the methodology)

Bias	Authors' judgment	Support for judgment
Random sequence generation (selection bias)	Unclear risk	Insufficient information about sequence generation process
Allocation concealment (selection bias)	Unclear risk	Because we can't be sure the sequence was random, we also can't be sure it was concealed
Blinding of outcome assessment (detection bias)	Caregiver burden: High risk IADL: Low risk	"the examiners of the immediate post-training and follow-up evaluations were blind to the participants' status (trained or untrained)" (Thivierge 2014, p1190). Nevertheless, burden is a subjective measure reported by the caregiver and caregivers could not be blinded.
Incomplete outcome data (attrition bias)	Low risk	"Twenty patients were randomised to participate in the cognitive intervention study. Of these 20 patients, 17 completed the intervention and 3 left the trial [one in Group 1 because of anxiety, and two in Group 2 because of caregiver's high level of burden and dissatisfaction with randomization process, respectively]. Since we did not have sufficient results for these 3 participants, their data were not included, resulting in this study being a completer-only analysis. Two additional patients [from Group 1] did not have any caregiver involved in the study. As a result, BPSD data were finally available for 15 patients" (Brunelle-Hayman 2014, p9). Reasons for missing outcome data do not seem to be related to true outcome.

Selective reporting (reporting bias)	Unclear risk	Protocol unavailable
Other bias	Low risk	“At baseline, there was no significant difference between the groups on age, education, gender and MMSE score. T-test for independent samples also revealed that the two groups were comparable on the total NPI-12 (*t*=0.000, *df*=13, *p*=1.000) and ZBI-22 (*t*=0.563, *df*=13, *p*=.583) scores, suggesting that the BPSD general level and caregiver burden severity were similar in both groups before the intervention. Medications taken at baseline by all participants were similar in both groups” (p10).

Chen 2014

Bias	**Authors’ judgment**	**Support for judgment**
Random sequence generation (selection bias)	Low risk	“The allocation schedule was created by an independent researcher using a computerized random number generator and was unknown to the investigators of this study” (p2).
Allocation concealment (selection bias)	Low risk	See above
Blinding of outcome assessment (detection bias)	High risk	Study included subjective measures reported by the caregiver and blinding of caregivers was not possible
Incomplete outcome data (attrition bias)	Unclear risk	Insufficient reporting of attrition/exclusions
Selective reporting (reporting bias)	Unclear risk	Protocol unavailable
Other bias	Low risk	“The caregivers in both groups had similar demographic and relationship characteristics at baseline, as shown in Table 1. Comparison of patients’ symptom severity as measured by the Revised Memory and Behaviour Problems Checklist did not show any statistical difference between the two groups” (p3).

Chodosh 2015

Bias	**Authors’ judgment**	**Support for judgment**
Random sequence generation (selection bias)	Low risk	“After caregivers completed baseline surveys described below, they were randomized into in-person or telephone-only care management using computer-assisted stratified randomization in block size of 4, within groups defined by caregiver-preferred language of Spanish versus English, and 1 of 3 sources of participant recruitment (administrative data, Memory Disorders Clinic, or self-referral/outreach)” (p5).
Allocation concealment (selection bias)	Unclear risk	No info provided about steps taken to conceal allocation sequence
Blinding of outcome assessment (detection bias)	High risk	Study included subjective measures reported by the caregiver and blinding of caregivers was not possible
Incomplete outcome data (attrition bias)	Unclear risk	“Less than expected retention may have biased study results but we adjusted analyses using non-response weights” (p26).
Selective reporting (reporting bias)	Unclear risk	Protocol unavailable
Other bias	Low risk	“There were no baseline differences between study arms in terms of caregiver demographic characteristics, acculturation, spoken language, or relationship to the care recipient” (p15).

Dopp 2014		
Bias	**Authors' judgment**	**Support for judgment**
Random sequence generation (selection bias)	Unclear risk	"an independent statistician randomly assigned service units to either the usual postgraduate course or the new training package" (p3). How?
Allocation concealment (selection bias)	Unclear risk	Because we can't be sure the sequence was random, we also can't be sure it was concealed
Blinding of outcome assessment (detection bias)	High risk	Primary outcome was professionals' self-rated intended adherence to training – blinding of outcome assessment not possible
Incomplete outcome data (attrition bias)	Unclear risk	"Bias may have occurred as more occupational therapists in the experimental group filled out the vignettes" (p9).
Selective reporting (reporting bias)	Unclear risk	Clinical trial number: NCT01117285. Some of the primary outcome measures listed in the protocol (e.g., community OT use, costs) are not discussed in the article.
Other bias	Low risk	"At baseline, experimental and control units did not differ based on characteristics of occupational therapists (Table 2) or physicians…. Baseline characteristics of client–caregiver couples (see Table 3) indicated no major between-group differences" (pp 6-7).

Dowling 2014		
Bias	**Authors' judgment**	**Support for judgment**
Random sequence generation (selection bias)	Low risk	"Before the first session, subjects were randomized to the intervention or control conditions determined by a computer-generated random number sequence in blocks of 10" (pp 176-7).
Allocation concealment (selection bias)	Unclear risk	No info provided about steps taken to conceal allocation sequence
Blinding of outcome assessment (detection bias)	High risk	Study included subjective measures reported by the caregiver and blinding of caregivers was not possible
Incomplete outcome data (attrition bias)	Unclear risk	"Twenty-six subjects were enrolled between July 2011 and March 2012. Two subjects withdrew before starting sessions. Twenty-four participants (12 intervention and 12 attention control) participated…. Twenty subjects completed all sessions and follow-up assessments" (p178). Authors do not specify the reasons for the dropouts or the groups to which they were originally assigned, making it difficult to ascertain whether the missing outcome data were balanced in numbers across intervention groups, whether the reasons for missing data were similar across groups, and whether these reasons were related to true outcomes.
Selective reporting (reporting bias)	Unclear risk	Protocol unavailable
Other bias	Low risk	"there were no differences between the groups on any of the demographic or outcome measures at baseline with the exception of the PSS in which the skills group scored significantly higher" (p178)

Gallagher-Thompson 2015

Bias	Authors' judgment	Support for judgment
Random sequence generation (selection bias)	Unclear risk	"A total of 147 Latino CGs met entry criteria and were randomly assigned to either the FNC or UIC" (p3). How?
Allocation concealment (selection bias)	Unclear risk	No info provided about steps taken to conceal allocation sequence
Blinding of outcome assessment (detection bias)	High risk	Study included subjective measures reported by the caregiver and blinding of caregivers was not possible
Incomplete outcome data (attrition bias)	Unclear risk	"Thirteen were deleted subsequently [i.e., after assignment] because of data problem that could not be rectified, such as excessive data missing, conflicting responses on scales suggesting inadequate comprehension, or members in the same household being assigned to different conditions. Thirteen were deleted because they were not the primary CG. After baseline testing 11 (9%) dropped, citing time constraints or lack of interest. This left 110 CGs with 55 in each condition" (p3). This explanation is confusing, making it difficult to ascertain whether the missing outcome data were balanced in numbers across intervention groups, whether the reasons for missing data were similar across groups, and whether these reasons were related to true outcomes
Selective reporting (reporting bias)	Unclear risk	Protocol unavailable
Other bias	Low risk	No indication of significant baseline differences

Gonyea 2014

Bias	Authors' judgment	Support for judgment
Random sequence generation (selection bias)	Unclear risk	"A randomized controlled trial was used to evaluate the efficacy of Circulo de Cuidado; through block randomization, caregivers were assigned to one of two study arms: the CBT treatment experimental condition or the PED control condition" (p3). How?
Allocation concealment (selection bias)	Unclear risk	See above
Blinding of outcome assessment (detection bias)	High risk	Study measured caregiver distress, a subjective measure reported by the caregiver, and blinding of caregivers was not possible
Incomplete outcome data (attrition bias)	Low risk	Reasons for missing data (relative with dementia moved away or the progress of his/her disease worsened) were balanced across both groups and did not appear to be related to true outcomes
Selective reporting (reporting bias)	Unclear risk	Protocol unavailable
Other bias	Low risk	"No significant differences were found at baseline between the participants in the CBT and PED conditions in terms of the background characteristics or the five outcome measures" (p7).

Holthoff 2015

Bias	**Authors' judgment**	**Support for judgment**
Random sequence generation (selection bias)	Uncertain risk	"Thirty patients with AD were randomized to either the intervention (n = 15) or control group (n = 15)" (p5). How?
Allocation concealment (selection bias)	Uncertain risk	See above
Blinding of outcome assessment (detection bias)	Low risk	"All participants underwent testing by a blinded psychologist at baseline, 12 and 24 weeks (at 10 a.m.). Measures included activities of daily living (ADL, ADCS ADL total score) and behavioural symptoms of dementia (NPI total score) and caregiver burden (NPI total burden score). Cognitive evaluation included the MMSE and measures of executive function and language ability applying the semantic and phonemic word fluency as measured by the CERAD and the FAS-test" (p4).
Incomplete outcome data (attrition bias)	Low risk	"One patient in the control group and 2 patients in the intervention group were not available for long-term follow-up after 6 months (hospitalization and death of the caregiver)" (p5).
Selective reporting (reporting bias)	Uncertain risk	The link provided in the article doesn't connect to a protocol
Other bias	Low risk	"No considerable differences between both groups were noted in the baseline data for demographic and clinical measures. Patients trained at a relatively uniform level with respect to training frequency and time" (p5).

Muniz 2014

Bias	**Authors' judgment**	**Support for judgment**
Random sequence generation (selection bias)	Low risk	"After baseline assessment, subjects were randomized to either the experimental (EG) or the control (CG) group in a 1:1 proportion by means of a list of random numbers that was managed by an independent investigator" (p3).
Allocation concealment (selection bias)	Low risk	See above
Blinding of outcome assessment (detection bias)	Cognitive subscale of the ADAS: Low risk Caregiver-reported measures (e.g., Functional Activities Questionnaire, Index of ADL, Burden Interview): High risk	Variables measured by blinded raters (psychologist), but some measures were subjective and reported by the caregiver
Incomplete outcome data (attrition bias)	Unclear risk	"Whereas the observed benefits in ADL are relevant and consistent with a previous study [12], he cognitive results should be cautiously interpreted, in part because of the attrition that was observed at the end of the study, particularly in the CG, which had double the mortality rate of the EG (Fig. 1 and Table 4). Differences in mortality between the two study groups may have produced a false impression of improvement in the CG, due to relatively high performance of the survivors" (p8).
Selective reporting (reporting bias)	Uncertain risk	Protocol unavailable
Other bias	Low risk	"There were no differences between the EG and the CG participants at study inception in demographic or medical characteristics of subjects

		and study partners, or in subjects' disease stage and duration" (p4).

Samus 2014

Bias	Authors' judgment	Support for judgment
Random sequence generation (selection bias)	Low risk	"Participants were randomized by the principal investigator within 48 hours of the BL visit to intervention or augmented usual care group (1:2 allocation), using a custom Excel program that generated a random number from a uniform distribution" (p400).
Allocation concealment (selection bias)	High risk	Principal investigator handled allocation
Blinding of outcome assessment (detection bias)	Time to transfer out of home: low risk Caregiver burden: high risk	"Time to transfer out of the home was collected through study partner report by masked evaluators at 4.5 (telephone), 9 (inhome), 14.5 (telephone), and 18 months (in-home)" (p402).
Incomplete outcome data (attrition bias)	Uncertain risk	Explanation of flow of individuals through the study is confusing, making it difficult to ascertain whether the missing outcome data were balanced in numbers across intervention groups, whether the reasons for missing data were similar across groups, and whether these reasons were related to true outcomes
Selective reporting (reporting bias)	Uncertain risk	Protocol unavailable
Other bias	Low risk	"Intervention (N = 110) and augmented usual care (N = 193) groups were balanced on BL participant and CG characteristics, except that intervention participants were taking more medications compared with control participants" (p404).

Tremont 2014

Bias	Authors' judgment	Support for judgment
Random sequence generation (selection bias)	Low risk	"Participants were randomly assigned to receive FITT-C (n 5 133) or TS (n 5 117) using an urn randomization procedure, to balance the two conditions on non-treatment variables that might affect outcome (i.e., caregiver gender, dementia severity, relationship status, dementia type, live-in caregiver or not, and frequency of care recipient behavior problems)" (p3).
Allocation concealment (selection bias)	Uncertain risk	No info provided about steps taken to conceal allocation sequence
Blinding of outcome assessment (detection bias)	High risk	Study included subjective measures reported by the caregiver and blinding of caregivers was not possible
Incomplete outcome data (attrition bias)	Low risk	A fuller description of the recruitment flow through the study is provided in an article published in 2013 by the same authors. Reasons for missing data were balanced across both groups and did not appear to be related to true outcomes
Selective reporting (reporting bias)	Uncertain risk	Protocol unavailable
Other bias	Low risk	"There were no significant differences between the groups on any demographic characteristic or dementia variable, except for significantly greater years of education for FITT-C caregivers compared with those in the TS group" (p4).

	Sequence generation	Allocation concealment	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Other bias
Arango-Lasprilla 2014	🟢	🟡	🔴	🟡	🟡	🟢
Brunelle-Hamann 2014	🟡	🟡	Caregiver burden: 🔴 IADL: 🟢	🟢	🟡	🟢
Chen 2015	🟢	🟢	🔴	🟡	🟡	🟢
Chodosh 2015	🟢	🟡	🔴	🟡	🟡	🟢
Dopp 2014	🟡	🟡	🔴	🟡	🟡	🟢
Dowling 2014	🟢	🟡	🔴	🟡	🟡	🟢
Gallagher-Thompson 2015	🟡	🟡	🔴	🟡	🟡	🟢
Gonyea 2014	🟡	🟡	🔴	🟢	🟡	🟢
Holthoff 2015	🟡	🟡	🟢	🟢	🟡	🟢
Muniz 2014	🟢	🟢	Cognitive subscale of the ADAS: 🟢 Caregiver reported measures: 🔴	🟡	🟡	🟢
Samus 2014	🟢	🔴	Time to transfer out of home: 🟢 Caregiver burden: 🔴	🟡	🟡	🟢
Tremont 2014	🟢	🟡	🔴	🟢	🟡	🟢

F. Data Extraction – Systematic Reviews

The information contained in the "Review authors' assessment…" and "Main Findings" columns below consist mainly of direct quotations from the review articles included in our synthesis.

Citation, AMSTAR score	Intervention(s)	Findings	Review authors' assessment of included study quality
Boots 2014	Interventions used the **Internet as a mode of providing support for caregivers**: • website with information and support on various aspects of caregiving • website combined with telephone support • website with additional e-mail support • website with a combination of individual work and exchange with other caregivers online	***Burden –*** "Specifically, improvement... was observed in measures of... burden (Glueckauf et al., 2004; Coulehan, 2011). Then again, caregiver burden did not decrease significantly in all studies (Chiu et al., 2009; Lai et al., 2013). Chiu et al. (2009) did, however, observe significant differences in caregiver burden between nonusers and frequent users of the program...[Also], caregiver stress and strain decreased [Beauchamp, 2005]" (p340) "…multicomponent programs that combined information, tailored caregiving strategies, and contact with other caregivers resulted in positive effects on confidence, self-efficacy, stress, burden, and depression.... The results also demonstrate that guidance by a coach could be a noteworthy extension to an online intervention for informal dementia caregivers.... Moreover, Lai et al. (2013) mentioned that the support function of online interactions between caregivers should not be overlooked" (pp340 & 342).	"It should be noted that the methodological quality of the majority of the included studies was limited. Only five studies (...Coulehan, 2011; Lai et al., 2013) compared the results of the intervention with a control group, and most studies (n = 9) exhibited an LOE of 3 or lower, indicating a low quality of evidence.... In addition, our results demonstrate that none of the included studies described or concealed treatment allocation. This might be because it is nearly impossible to blind the participants in psychosocial intervention trials with respect to the intervention to which they have been assigned" (p342).
Buettner 2010	**Technology-based interventions**	10 studies met the criteria for inclusion in the review: Hoffman, 1996; Oriani, 2003; Quittre, 2005; Poon, 2005; Schreiber, 1999; Kinney, 2004; Topo, 2004; Hayes, 2009; Jimison, 2008; Smith, 2007. "Positive effects were noted for functional behaviors; recall of appointments, dates, or tasks… recall of routes in the environment; … and improved medication adherence" (p19).	"Of the 10 studies included in this review, the majority (90%) were graded at level C, representing less rigorous research methods" (p18).
Burton 2015	**Exercise**	***Fall reduction*** "Overall, the exercise interventions achieved a significant reduction in the mean number of falls for home-based exercise and a 32% reduction in the risk of being a faller in the intervention group [based on a meta-analysis of Pitkala, 2013 & Wesson, 2013].... [E]xercise programs that incorporate strength, balance and endurance, and progress in intensity over time have been shown to reduce falls in older people without cognitive impairment living in the community..... It appears that similar exercise interventions are likely to be beneficial in the reduction of falls and number of people falling, for older people living in the community with dementia. However, there may need to be some modifications, such as those utilized by Suttanon et al and Wesson et al including	"The three RCTs (Pitkala, 2013; Wesson, 2013; Suttanon, 2013) included in the review were of high quality, although some of the studies were underpowered and follow-up limited, which has also been reported as a problem in falls prevention studies for older people without cognitive impairment living in the community. Limited comparison or effect was found for the other outcome measures used across the four studies" (p431).

Citation, AMSTAR score	Intervention(s)	Findings	Review authors' assessment of included study quality
		engagement of carers, regular contact by physiotherapist, more detailed exercise history in order to tailor the exercises to participant preferences, and a greater choice of exercises…" (p431).	
Carrion 2013	"Several **skills training** programmes were tested... Different strategies are used to this end, such as training exercises to match and categorise objects, other exercises to perform basic daily activities or simple software that helps patients to perform memory or perception activities" (p372).	***Activities of daily living –*** "...although positive effects were shown in most [trials], only 2 trials achieved statistically significant improvement, with only 1 being of sufficient methodological quality. Patients showed modest improvement in tasks in which they were trained, but not in others. This improvement did not persist after the training intervention ended" [p372 – based on Galante, 2007; Loewenstein, 2004; Cahn-Wainer, 2003; and Davis, 2001 – none of these noted statistically significant effects on ADL].	"Psychological interventions such as reality orientation or skills training programmes have been widely used to treat dementia. Despite being first described some time ago, their effects remain open to question as none of the studies we analysed were rated as being of high methodological quality. In fact, 35% (6 out of 17 RCTs) were rated as being of poor methodological quality, that is, having a high risk of bias" (p372).
Corbett 2012	**"Dementia Adviser" services for caregivers** of PwD OR PwD themselves: "Included studies were those focussing on a service intervention with information provision as a key service component..." (p629). - Includes 6 trials also included in reviews of case mgmt (Tam-Tham & Van't Leven, below): Eloniemi-Sulkava 2001, Nobili 2004, Callahan 2006, Gaugler 2008, Brodaty 2009, & Dias 2008	***Institutionalization –*** "...scrutiny of individual studies showed that neither of the two studies that included institutionalisation as an outcome measure demonstrated any sustained impact (Nobili et al., 2004; Callahan et al., 2006)" (p632). ***Activities of Daily Living/Cognition –***"The effect on daily living and cognition could not be subjected to meta-analysis due to an insufficient number of studies using the same or similar outcome measures. However, the individual studies of these outcomes did not find any benefit (Gitlin et al., 2003; Senanarong et al., 2004; Callahan et al., 2006; Dias et al., 2008)" (p632). ***Carer burden/stress –*** "Seven of the nine studies focussing on standardised measures for carer burden reported significant benefits in the intervention groups compared with the controls. Unfortunately, very few trials analysed carer burden via the same or similar outcome measures. A meta-analysis of three trials employing the Zarit Carer Burden Score did not indicate a significant benefit (Zarit scale, points difference _0.87; confidence interval, _2.81 to 1.06) (Winter, 2007; Dias et al., 2008; [Gavrilova, 2009]). Two trials used alternative burden measures: one indicated a reduction in carer burden, whereas the other failed to identify any significant difference (Callahan et al., 2006; Winter, 2007)" (p632). "None of the interventions focussed purely on the provision of information, and like many psychosocial interventions, most had many	"There were insufficient studies of specific service models to allow the key elements of an effective service to be distilled, particularly in the context of the large variability in effect size" (p634). "The heterogeneity of outcome measures and timescales employed in this field makes meta-analysis of research findings challenging. In order to be consistent between studies, outcome at 6 months was used in the meta-analysis of the secondary and additional outcome measures. It should be noted that some studies involved longer-term follow-up, and that on occasions, these measurements indicated more benefit from the advisory treatment when applied over these longer time periods. However, a meta-analysis of these findings was not possible because of the small number of longitudinal studies" (p635).

Citation, AMSTAR score	Intervention(s)	Findings	Review authors' assessment of included study quality
		other components in addition to information. Studies with significant benefits usually included either skills training (most frequently pertaining to the management of behavioural symptoms), telephone support or direct help to people with dementia in navigating the medical and social care systems. The benefit conferred by these additional service components in comparison with information/advice alone cannot be determined from the available literature." (p633).	
deWerd 2013	**Errorless learning** – an instructional method involving "any combination of graded tasks where the task at hand is broken down into small steps, immediate error correction, encouraging participants not to guess, modeling the task steps, fading cues and prompts when steps are successfully performed (vanishing cues), or rehearsal of the retrieval of information that is taught with increasing time intervals (spaced retrieval)" (p1178).	***Activities of daily living –*** "Seventeen of the 25 [sic] studies demonstrated a statistically significant superior effect of EL immediately after training compared with EF or a no-treatment condition," including, "eight multiple-baseline studies, one study using an ABAB design, and three studies using an ABA design. To examine whether the EL effects were preserved over time, 20 of the 26 studies carried out follow-up evaluations, 17 of which showed maintenance of EL effects after one week up to 9 months. The time span between the post-intervention and the follow-up assessments varied considerably..." (p1186). "The results of our review of 26 studies applying principles of EL show that people with minimal to moderate dementias can (re)learn meaningful daily life skills or relevant knowledge using an error-reducing teaching approach. Five controlled group studies and 12 single-case studies obtained significantly superior effects using EL." (p1187)	"Our search of the relevant literature produced a notable number of single-case studies, most with experimental designs ensuring good internal validity. Nevertheless, to reliably establish the effects of EL, study designs affording higher internal validity need to be applied in larger population samples. The five group studies included in our review all employed a control condition and randomization, but the number of participants was still relatively small (n < 15). Clearly, randomized controlled trials with sufficiently large samples are required to replicate the current results." (p1188)
Drennan 2012	Multicomponent interventions for **reducing incontinence**	"This review identified only three reported studies investigating conservative interventions for urinary incontinence and none provided evidence to support or rule out the effectiveness of these interventions" (p9).	"Only three intervention studies were identified in the review, two were exploratory or pilot studies and all three had some methodological weakness resulting in bias. In all the findings are described as tentative and additional research is required." (p8).
Godwin 2013	**Technology-driven interventions**	"The 2 interventions that reported on strain [Beauchamp 2005; Bass 1998] did use the same Caregiver Strain Index but had conflicting findings. One study reported significant improvement in strain, while the other reported no improvement in overall strain but reductions in relationship strain for spouses and reductions in emotional strain for caregivers with increased informal support" (p220).	"Robust conclusions cannot be drawn about the effects of technology driven interventions for caregivers of PWD because of the small number of RCTs, the large variability in the content and delivery of the intervention, and the inconsistency in measurement and variability of outcomes.... However, to date, too few RCTs of such interventions have been conducted to fully evaluate their merit.

Citation, AMSTAR score	Intervention(s)	Findings	Review authors’ assessment of included study quality
			Additionally, of the studies that have been conducted, heterogeneity in outcome measures prevents comparison across the studies. Although large RCTs of promising technological interventions will provide the strongest evidence, they are not always feasible” (p221).
Goy 2010	**Psychosocial interventions** • Multicomponent psychosocial interventions (exercise, case manager, behavioural management) • Individual skills training • Behaviour management **Technology based interventions** • GPS	***Institutionalization*** – • “There is no consistent evidence that **multicomponent interventions** delayed CR institutionalization” (p11). • “There is insufficient evidence to support that **case management** interventions have an impact on rates of CR institutionalization” (p16). • “A combined individual/group [**counselling**] approach resulted in delayed institutionalization for the CR… but this was a very resource-intensive intervention and replicability should be evaluated” (p33). ***Caregiver burden*** – • There is insufficient evidence evaluating the impact of **exercise** for the CG on CG burden. (p16) • “Individually tailored intensive, **multicomponent interventions** show promise for reducing CG … sense of burden…” (p11) • “Most studies [of **individual skills training**] found no impact on CG’s sense of burden…” (p23). • “There is insufficient evidence from controlled empirical studies on the effectiveness of technology-based interventions. Uncontrolled studies suggest that **GPS** location systems for wandering behavior may... reduce CG … burden, and stress” (p39). ***CR functioning & safety***: “There is insufficient evidence from controlled empirical studies on the effectiveness of technology-based interventions. Uncontrolled studies suggest that **GPS** location systems for wandering behavior may improve patient function and safety...” (p39).	Multicomponent studies: “In the initial studies reviewed, group sizes were small, ranging from 30-33 across both studies, possibly limiting power to detect change.... [I]t is difficult to ascertain which aspect(s) of the multicomponent treatment were effective in these studies” (p12). Behavioural management training: “There was an overall lack of methodologic rigor… Heterogeneity in the interventions delivered makes it difficult to combine findings across studies” (p20). Individual skills training: “…unequal sample sizes, varying measures across studies, and differing recruitment strategies – some drawing from populations seeking help for dementia-related problems and others drawing from clinic populations – were common limitations” (p24). GPS: “…the interventions included in these reviews were generally limited in design by the lack of a control group. Heterogeneity in the types of interventions makes it difficult to combine the findings across studies.” (p41)
Hurley 2014	**Meditation**	***Burden*** – “Of the eight studies, five assessed participants’ levels of burden pre- and post-intervention. Three found a significant reduction pre- to post- intervention (Epstein-Lubow et al., 2011; Franco et al., 2010; Hoppes, Bryce, Hellman, & Finlay, 2012) and the data of a fourth	Three of the reviewed studies employed a randomized controlled trial (RCT) design and were scored for methodological quality using the PEDro scale (Maher et al., 2003).

Citation, AMSTAR score	Intervention(s)	Findings	Review authors' assessment of included study quality
		study showed a non-significant trend for reduced levels of burden among participants (Bormann et al., 2009). The final study revealed no significant pre–post changes (Waelde et al., 2004).... [T]he findings of three studies revealed that the levels of burden had continued to reduce since the post-intervention measures (Bormann et al., 2009; Epstein-Lubow et al., 2011; Franco et al., 2010), whilst the fourth study found that levels of burden had increased at the four-week follow-up when compared to post-intervention scores, but that they still remained lower than baseline (Hoppes et al., 2012)" (p284-5). "[I]t appears that meditation-based interventions offer a feasible and effective intervention for dementia caregivers experiencing burden or depression" (p286).	The three RCTs include, Franco et al. (2010), Lavretsky et al. (2013) and Oken et al. (2010), which scored, 5/11, 7/11 and 6/11, respectively (M = 6/11). The three RCTs scored highly on items including random allocation, baseline similarity between conditions and the statistical tests used. All three neglected to blind subjects and therapists or to conduct intention-to treat analysis. Two of the studies were able to gain marks for collecting data from over 85% of participants that were initially recruited; Franco et al. (2010) narrowly failed on this score as their study experienced an attrition rate of 18%.... The other five studies reviewed here adopted a case series design and were assessed using the 18-item checklist devised by Moga et al. (2012). These five studies, including Bormann et al. (2009), Epstein-Lubow et al. (2011), Hoppes et al. (2012), Innes et al. (2012) and Waelde et al. (2004), received scores of 11/18, 12/18, 11/ 18, 14/18 and 13/18, respectively (M = 12.2/18) " (p285)..
Jensen 2014	**"[E]ducational interventions** aimed at teaching skills relevant to dementia caring, for example, communication skills, coping and management strategies, facts about dementia and availability of support services" (p2).	***Burden*** – "The pooled analysis of the five trials (n= 395) [Hepburn et al., 2001; Gavrilova et al., 2009; Martin-Carrasco et al., 2009; de Rotrou et al., 2011; Guerra et al., 2011] with low to moderate risk of bias showed a moderate effect of education on carer burden (SMD= – 0.52; 95% confidence interval (CI) -0.79 to -0.26 [*p*<0.0001])..." (p4). ***Transition to LTC –*** One study (Kurz et al., 2010) reported on the number of transitions to long stay care (intervention group 34/156 and control group 23/136) and found no effect of the intervention at 15 months follow-up (RR 1.29; 95% CI 0.80-2.08)" (p8). "This systematic review suggests that educational programmes for carers of community dwelling patients with dementia have a protective effect on caregiver burden and a small effect on caregiver depression. However, it does not provide evidence for effect on QoL and number of transitions to long stay care" (p11).	"Of these, six reported random sequence generation and four concealed allocation. Two reported blinding of health care providers not involved in the study and four blinded outcome assessors. Because of the nature of the intervention, study participants and deliverers of the education programme could not be blinded. Three studies had follow-up of greater than 85% or imputation of incomplete outcome data. All of these reported comprehensively on reasons for attrition. Four studies were deemed to be at unclear risk of bias due to incomplete outcome data. There was no evidence of selective outcome reporting in the trials. Three studies reported

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			adherence to intention to treat analysis, and in the remainder, this was not mentioned. Overall, four studies (Gavrilova et al., 2009; Kurz et al., 2010; de Rotrou et al., 2011; Guerra et al., 2011) were deemed by the authors to be at low risk of bias, two studies (Hepburn et al., 2001; Martin-Carrasco et al., 2009) at unclear risk of bias and one study (Pahlavanzadeh et al., 2010) was classified as being at high risk of bias" (p4). "Overall, the evidence is relatively robust to determine the comparative effectiveness of education on caregiver burden" (p8).
Lins 2014	**Telephone counselling** – "Eliciting a person's concerns, listening, and providing support, information, or teaching in response to a persons' stated concerns, over the telephone" (p2).	***Burden*** – "The forest plot shows a non-significant pooled difference in caregiver burden between the telephone counselling group and the control group (SMD 0.45, 95% CI -0.01 to 0.90, P value 0.05) [Davis 2004, Finkel 2007, Tremont 2008, Winter 2007]" (p21). "The efficacy studies... provided some evidence that telephone counselling is effective for reducing depressive symptoms in carers of people with dementia (three studies), but no clear positive effects could be shown for any other outcome such as stress or anxiety" (p3).	"The methodological quality of the included quantitative studies was moderate for three reasons: the intervention could not be blinded, the outcomes were self-reported carer outcomes and overall there was insufficient reporting of study details to allow 'Risk of bias' assessment" (p31).
Maayan 2014	**Respite care**	"Four randomised studies met the inclusion criteria for this review [Lawton 1989; Wishart 2000; Grant 2003; Korn 2009]" (p8). "Analysis of the available data showed no significant effects on caregiver outcomes when respite care was compared with no respite care in three studies, and there was no evaluable data for people with dementia" (p17). "Current evidence does not demonstrate any benefits or adverse effects from the use of respite care for people with dementia or their caregivers. These results should be treated with caution, however, as they may reflect the lack of high quality research in this area rather than an actual lack of benefit" (p2).	"Overall the quality of the evidence, based on GRADE, was very low. One study did not report data that could be used in the analysis, the remaining three studies were very small and had short lengths of follow-up. Only Korn 2009 mentioned blinding of the outcome assessor. This means that preconceived ideas about the efficacy of respite care might have been allowed to influence the results." (p18)
Marim 2013	**Education and Support Programs for Caregivers**	"The selected studies were: Carrasco et al. 2009, Fortinsky et al. 2009, Gavrilova et al. 2009, Guerra et al. 2009, Hérbert et al.1994, Hérbert et al. 2003 and de Rotrou et al. 2011" (p271).	"All selected studies were considered to have low risk of bias according to the criteria in the Cochrane Handbook. The

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		Burden – "In order to reduce the heterogeneity caused by the previously cited articles, we conducted a sensitivity analysis excluding them; Hérbert et al. 1994, due to the difference in intervention content, and Fortinsky 2009 and Carrasco 2008, due to the differences in the population studied. Excluding these studies, the results became more robust and with accepfigure [sic] heterogeneity (31% with P-0, 22), supporting intervention based on educational and support programs (p <0.00001)" (p273). "The evidence obtained in this study suggests that interdisciplinary education and support programs for caregivers can help to reduce the burden of individuals who care for patients with dementia" (p274).	blinding of participants or evaluator was considered as low risk because all of these studies used blinded evaluation and it is impossible to blind participants in studies of non pharmacological intervention" (p271).
Martin-Carrasco 2014	• **Counseling** – "a professional support intervention for the caregiver and family aimed at helping them understand the process of the illness, i.e., the symptoms, consequences, and caregiver reactions, and offering possible solutions for the specific problems identified" (p302). • **Psychoeducational** – "[P]rograms focused on improving understanding of the illness, self care, and patient care. This category differs from the rest because it includes techniques specifically aimed at understanding and alleviating the mental distress of the caregiver (stress management, relaxation, thought	***Burden*** • For **counseling**, 3 of 7 studies showed statistically significant results • "Overall, the **psychoeducational interventions** showed better burden results" (p310 – 6 of 11 studies showed statistically significant results: Ostwald, 1999; Davis, 2004; Chien, 2008; Martin-Carrasco, 2009; Gitlin, 2010-ACT; Chien, 2011 vs. Hebert, 1994 & 2003; Gendron, 1996; Gonyea, 2006; de Rotrou, 2011) "Among the studies that assess the depression and burden variables, psychoeducational interventions were the most effective, followed by counseling interventions" (p311).	"Despite the many studies that deal with the distress of informal caregivers and propose potential interventions, few satisfy methodological criteria for quality" (p311).

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	control, self-control techniques, etc)" (p302).		
McKechnie 2014	**Computer-mediated psycho-educational support interventions for caregivers**	***Burden*** – "Nine studies measured carer stress or burden.... Five studies of medium and high quality found [statistically significant] positive effects of the intervention on carer burden (Glueckauf et al., 2004; Beauchamp et al., 2005; Gallagher-Thompson et al., 2010; van der Roest et al., 2010; Marziali and Garcia, 2011).Three studies of medium and high quality found some effects of the intervention on carer burden (Mahoney *et al.*, 2003; Marziali and Donahue, 2006; Chiu *et al.*, 2009). .... One study found no effect on carer burden as a result of the intervention (Torp *et al.*, 2008). In a high quality study, Gallagher-Thompson *et al.* (2010) found that mean upset or bother in relation to problems decreased in a skills learning DVD group, but not in an educational DVD group, perhaps indicating that information needs to be combined with other forms of support to reduce carer burden" (1632-3). "[T]he most commonly measured variables were carer burden/stress and depression. In general, higher quality studies found that interventions did have an effect on these variables...." (p1634).	"The studies reviewed had a number of limitations: they often had poorly defined aims, many did not have control groups, a number were underpowered and follow-up periods were often short. Future research would benefit from addressing these issues. It is also important that outcome measures be closely linked to the aims of interventions in order that the intervention's effectiveness can be properly evaluated." (p1634)
McLaren 2013	• **Occupational therapies** • **Exercise interventions –** "These interventions included a variety of training methods, such as aerobic exercise (usually walking), resistance training or weightlifting, and balance and flexibility training" (p662).	***Physical function*** • "Seven randomized controlled trials were identified that examined an **occupational therapy** intervention to maintain physical function in dementia patients.... All interventions were performed for five weeks or fewer, and all reported positive, significant increases in abilities [Gitlin, 2001, 2005, & 2010-COPE; Graff, 2006; Nobili, 2004] or quality of life [Gitlin, 2008], except for one in a study by Gitlin in 2003 (Gitlin et al., 2003)" (p657). • "Six randomized controlled trials [Hauer, 2012; Kwak, 2008; Netz, 2007; Schwenk, 2010; Steinberg, 2009; Teri, 2003] were identified that examined an **exercise intervention** in community-dwelling dementia patients.... All exercise interventions reported positive significant results in at least one primary outcome for functional performance" (p662). "Studies from both the exercise and occupational therapy literature reported statistically significant differences between study groups and thus, at minimum, the literature supports a 'proof of concept' that the functional decline associated with dementia can be delayed. The clinical significance of the reported differences in functional impairment or	"Two high quality RCTs (grade A) [of occupational therapies] were identified... Five trials were given Grade B, four with a medium risk for bias and one with a low risk" (p657). "Of the six RCTs [of exercise interventions] identified, four gave grade A evidence. The other two articles were grade B studies with medium risk of bias" (p662). "Although many of the reviewed studies did demonstrate statistical significance between groups on self-reported or performance based measures of physical functioning, the clinical significance of these outcomes is less certain.... [E]ven among the more proximate outcome measures such as activities of daily living, researchers relied on self-reports or proxy-reports of function rather than direct

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		disability between treatment groups remains uncertain” (pp663-4).	measurement. Because these interventions cannot be double-blind, the potential for bias exists in the self-report measures. In addition, some interventions focus on specific muscle groups or domain-specific tasks believed to be important determinants of disability rather than focusing on actual function at the level of the individual. Third, although some studies report statistical significance, the standardized effect sizes are often small to modest.... The effect sizes vary widely among the reviewed studies but in general effect sizes are higher for those outcomes that would be considered domain specific and weaker for those studies reporting disability outcomes such as activities of daily living” (p663).
Meyer 2013	• **Educational interventions** • **Behavioral change support interventions** • **Communication skills training**	***Fall reduction*** “A consistent nonsignificant trend toward a reduction in falls rates in intervention groups, with limited evidence to suggest an effect on health and well-being measures was shown” (p14).	“The four RCTs [Mahoney, 2007; Shaw, 2003; Suttanon, 2012; Teri, 2003] , two pre–post design studies and five qualitative studies included in the review, were of mixed quality” (p14).
Olazarán 2010	• Multicomponent for caregiver – included individual assessment, information, counseling, and support. • Multicomponent for persons with dementia – included cognitive stimulation and some of the following: reminiscence, physical exercise, ADL training, support	***Institutionalization delay*** – “The pooling of 3 high quality RCTs [Lawton, 1989; Mittelman, 1993; Belle, 2006] testing multicomponent interventions for the caregiver demonstrated a delay in the institutionalization of mild to moderately severe Alzheimer disease persons when compared to usual care. The essential components of these interventions were individual assessment, information, counseling and support. Sessions lasted from 30 to 90 min and were conducted with a frequency of every 2 months to twice monthly by social workers [Lawton, 1989] , nurses [Mittelman, 1993] or trained personnel [Belle, 2006] . Skill training [Mittelman, 1993; Belle, 2006], respite services [Lawton, 1989] , support groups [Mittelman, 1993; Belle, 2006] and continuous availability of a therapist [Lawton, 1989; Mittelman, 1993] were particularly stressed. After 6 or 12 months of intervention, the overall institutionalization rate was 10.6% in the intervention groups	“Despite the high number of RCTs included, the proportion of high-quality studies was low. Limitations such as often small and poorly defined samples may in part reflect the restricted financial support available for research of this kind. Other problems such as poorly specified interventions, absence of a theoretical model and lack of blind outcome measurements illustrate methodological difficulties commonly encountered in this research field.... In addition, most RCTs utilized usual care or minimal attention conditions as the control group. When experimental and control

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		versus 14.9% in the control groups (risk reduction 0.67, 95% confidence interval 0.49–0.92).... The odds ratio of 0.67 indicates 33% less institutionalization after 6–12 months of multicomponent intervention compared to the minimal support or usual-care control group" (pp166-7). ***Activities of daily living*** – "...meta-analysis of [multicomponent interventions for persons with dementia] indicated positive results [0.369 (0.062–0.676), based on Chapman, 2004; Olazarán, 2004; Tadaka, 2004 – test of significance not provided]" (pp 167-8). "Multicomponent interventions based on caregiver education and support delayed the institutionalization of Alzheimer's disease and related disorder persons with only modest amounts of resources used. This important outcome in relation to both QoL and cost was not found with any other treatment approach on the basis of high-quality evidence. For other outcomes (cognition, ADLs, behavior, mood), the magnitude of the effect seemed to be similar to the effect obtained by drugs" (p171).	groups were exposed to similar social attention, positive results were less frequent, and intervention specificity became blurred. In addition, many studies did not have a clear theoretical model with a defined active agent intended to lead to a specific outcome. Instead, research has often been oriented towards the development and evaluation of multicomponent interventions for the PWD, CG or both and almost half of the findings and recommendations came from multicomponent categories, each category improving several domains. This means it is hard to know what element worked, how it worked and for whom" (p171).
Orgeta 2014	**Physical exercise:** "any intervention that aimed towards promoting physical activity in carers" (p773)	***Burden –*** "Physical activity was favored in reducing subjective caregiver burden (measured by two different scales) but this was not a significant difference, SMD -0.22; 95% CI –0.48 to 0.05 (222 participants) [Castro, 2002; Connell, 2009]... [P]hysical activity reduced subjective caregiver burden as measured by the Screen for Caregiver Burden scale. The meta-analysis included 108 participants, SMD –0.43; 95% CI –0.81 to –0.04 [*p*=0.03 – Castro, 2002; King, 1997]… [T]here was no effect of physical activity on objective caregiver burden (108 participants), SMD –0.22; 95% CI –0.60 to 0.16 [Castro, 2002; King 1997]…. We found that physical activity may be of some benefit in terms of reducing caregiver burden for carers of people with dementia; however, further high-quality evidence is needed to reach a definitive conclusion" (p778).	"Based on the GRADE system, we have classified the quality of the evidence as moderate; because of the limited number of RCTs, and methodological limitations of the identified studies" (p778 & p780).
Pitkala 2013	**Physical exercise**	***Physical function –*** "We found 10 randomised studies (total n=803 participants) that investigated the efficacy of exercise on community-dwelling older people with dementia.... Two of the ten studies were of high quality. They had a large number of participants, and used valid measurements and analyses (Schwenk et al., 2010; Teri et al., 2003). Both of these studies found that intervention had positive effects on functional limitations. Five studies were of moderately high quality (Miu et al., 2008; Pomeroy et al., 1999; Shaw et al., 2003; Steinberg et al., 2009; Toulotte et al., 2003): four of these showed improvements in	"Determining the real effect sizes and performing a meta-analysis was… impossible. The studies share a high degree of heterogeneity in intensity, duration and type of exercise performed. In addition, the outcome measures vary considerably and are not comparable with each other. The target groups also differ from one study to another: patients in mild stages of

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		functional limitations in favour of the intervention group (Miu et al., 2008; Shaw et al., 2003; Steinberg et al., 2009, Toulotte et al., 2003) but one found no differences between the study groups (Pomeroy et al., 1999).... Other physical exercise intervention studies of home-dwelling older people with dementia were of poor quality (Burgener et al., 2008; Kwak et al., 2008; Netz et al., 2007).... Two of the studies reporting positive effects used a multicomponent intervention (Shaw et al., 2003; Teri et al., 2003), which makes it difficult to determine the specific effect of the physical exercise.... In other studies, [two] used strength and balance training (Schwenk et al., 2010; Toulotte et al., 2003), [one] dual-tasking (Schwenk et al., 2010), and one an aerobic cycle-ergometer (Miu et al., 2008). In fact, most of the effective, high quality studies used multimodal interventions by combining various types of exercises (Schwenk et al., 2010; Shaw et al., 2003; Steinberg et al., 2009; Toulotte et al., 2003), using dual tasking in exercises (Schwenk et al., 2010) or combining exercises to other interventional components (Shaw et al., 2003; Teri et al., 2003). In studies with a positive outcome, the frequency of intervention was at least twice per week and usually with a progressive increase in intensity (Schwenk et al., 2010). The duration of the intervention varied from 12 weeks (Schwenk et al., 2010) to 16 weeks (Toulotte et al., 2003)... Effective interventions relied on both individual- (Shaw et al., 2003; Teri et al., 2003) and group-based exercises (Schwenk et al., 2010; Toulotte et al., 2003).... In summary, we can conclude there is moderate grade of evidence that intense exercise (at least twice per week) for at least three months entailing several types of exercises may improve at least some dimensions of mobility or functional limitations among patients with dementia" (p88 & 91-2).	dementia differ substantially from those in more severe stages and may not benefit from same types of exercises" (p91).
Schoenmakers 2010	**Home care interventions** • Psychosocial interventions, including cognitive behavioral family or group training • Respite care	***Burden*** • "In the **psychosocial intervention** group [Zarit, 1987; Ostwald, 1999; Hepburn, 2001; Hebert, 2003; Gitlin, 2005; Kahan, 1985]... [b]urden appeared to decrease in the intervention arm in a non-significant way (effect size 2.94 95% CI 6.28 to 0.40)" (p46). • "**Respite care** support remarkably increased feelings of burden (effect size 0.30, 95% CI 0.12–0.48)[p46 – Lawton, 1989; Logiudice, 1999].... Caregivers of patients, who were temporarily admitted to or scheduled for a day or night care center, reported an increase in burden. In both included studies, additional to respite care professional support and a comprehensive care plan was included in the intervention (1988; Lawton et al., 1989; Logiudice et al., 1999).	"Sensitivity analysis by means of standardized mean differences and standard deviations if available did not change the result in a materially way. Excluding studies with small sample sizes, weak study designs or diverging results did not affect the effect sizes. The robustness of the results was finally proved by changing the fixed effects model into a random effects model" (p46).

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		Handing over a relative with dementia is not well accepted by family caregivers. Besides the concerns about the nursing quality, caregivers feel rather uncomfortable about the suddenly generated time off" (p53). "Based upon the findings above, interventions to support family caregivers of community-dwelling elderly patients with dementia are not overwhelmingly successful" (p54).	
Somme 2012	**Case Management** – "case identification, standardized multidimensional assessment, individualized plan, implementation of this plan, and monitoring and reassessment of the plan" (p427).	***Institutionalization*** – "The studies analyzed [Callahan, 2006; Miller, 1999/Newcomer, 1999; Eloniemi-Sulkava, 2001] reported a[n].... impact on resource utilization (e.g., prevention of hospitalization or institutionalization) [that] was usually not statistically significant or only very slight" (p432). "Many countries reorganizing their public policy for individuals with cognitive disorders are hoping that case management will improve care. The scientific literature.... is less clear about an effect on hospitalization or the institutionalization rates" (p435).	"As expected, recent RCTs fulfilled more CONSORT criteria than did earlier ones; therefore, part of this systematic review is based on RCTs that did not satisfy a high standard of reporting quality" (p432). "It should be stressed that the evidence is still weak, considering the small number of RCTs published and the moderate methodological quality of most of these studies" (p435).
Tam-Tham 2012	**Case Management** – "Dementia case management (CM) is a collaborative intervention that involves assessment, planning, and advocacy for people with dementia and their caregivers. Further, it aims to empower caregivers and facilitate timely access to essential care services to help support their caregiver needs" (p890).	"Sixteen trials reported on the outcome of LTC placement (**Mohide** 1990; **Vernooij-Dassen** 1993; **Brodaty 1997&2009**; **Miller** 1999; **Chu** 2000; **Eloniemi-Sulkava 2001&2009**; **Wright** 2001; **Teri 2003**; **Nobili** 2004; **Callahan** 2006; **Gaugler** 2008; **Duru** 2009; **Fortinsky** 2009; **Wray** 2010)... Sufficient data for time to LTC placement were available from five studies (Mohide 1990; **Mittelman 1996**; Brodaty 1997&2009; Wright 2001)" (p892). ***Institutionalization*** – "Compared with usual care, dementia CM was not associated with a statistically significant reduction in the risk of LTC placement. However, there appeared to be a short-term effect in that dementia CM was associated with a significant reduction in LTC placement within the first 18 months following the intervention.... The lack of effect of dementia CM on the risk of LTC placement in studies with follow-up durations of 18 months or greater should be interpreted in light of several clinical and methodological issues. The literature suggests that dementia CM may have a positive effect on the caregiver but does not improve the care receiver's symptoms over the long term (Pinquart and Sörensen, 2006). It is possible that the positive effect of dementia CM on the risk of LTC placement decreases after 18 months because of the natural progression of the disease (Oh et al., 2011).	"Of the 17 trials, there was blinding of the outcome assessor in six, allocation concealment in four, and intention-to-treat analysis in eight. Only three trials provided a description of loss to follow-up, and six provided an adequate description of randomization. All the studies reviewed received Jadad scores ranging from 1 to 3 (on a 5-point scale), suggesting that the quality of the RCTs of dementia CM was low to moderate" (p896).

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		Another explanation of decreasing effectiveness of dementia CM may be that non-sustained interventions lose their effect over longer periods, similar to other community interventions that target older adults (Choi and Hector, 2012; Gustafsson et al., 2012). This observation calls for repeated dementia CM interventions that address the progression of symptoms in care receivers and the fading effect of a single time intervention. Further research is needed to determine whether repeated CM interventions would sustain the short-term benefits on resource utilization " (pp900-1). "In our meta-analysis, there was no overall significant effect of dementia CM on time to LTC placement" (p901). "[I]t is unclear which specific components of CM interventions are effective for which particular groups of people with dementia. The components most frequently used were education about dementia, psychological support, and referrals to community services. The first two components improve caregivers' coping skills (Mittelman et al., 1993), which might delay institutionalization and facilitate aging in place. The latter component might reduce the fragmentation of dementia-related health services available in the community and help caregivers to navigate the system more easily (Mittelman et al., 1993; Wright et al., 2001; Case Management Society of America, 2010). To obtain a comprehensive benefit, a standardized CM intervention would ideally include all three components" (p901).	
Van't Leven 2013	**Dyadic psychosocial interventions** for PwD and their caregivers – i.e., interventions which involve face-to-face contact between a care professional and the person with dementia, and which target psychosocial outcomes, improving mental health or well-being. • Short-period, intensive programs (Chien 2011, McCurry 2011, Lodgson 2010, Gitlin 2010-ACT,	***Institutionalization*** – "We studied 'institutionalization' or 'time to Admission' for seven studies. The body of evidence for this outcome is moderate to strong. One short-period program [Chien, 2011], one long lasting program [Eloniemi-Sulkava, 2009], and two programs with hospitalization [Eloniemi-Sulkava, 2001; Brodaty, 1989/1997] significantly reduced institutionalization or the time to institutionalization. Another program, the long lasting Early Home Care program [Chu, 2000], also had significant effects, although for a subgroup with a Mini-Mental State Examination (MMSE) of less than 23 only [the other two studies were Teri, 2003 & Miller, 1999/Newcomer, 1999]" (p1595). ***Activities of daily living*** – "Ten of the 23 studies, involving eight programs, measured independence and engagement in ADL. The strength of the body of evidence for this outcome is moderate. Five of	"Following the GRADE approach, four limitations influence the strength of the body of evidence. Two of them, lack of blinding of participants and therapists as well as indirectness of evidence (the control condition is usual care), are realistic for studies in the current field. The other two limitations are apparent in the studies: a short follow-up period or heterogeneity of results (e.g. significant outcomes at different follow-up moments)" (p1586).

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	2010-COPE, 2008, & 2003/1, Graff 2006/7, Voigt-Radloff 2011, Hepburn 2005, Teri 2003, Ostwald 1999) • “Long-lasting programs, that is, case management” [p1584 – Jansen 2011, Dias 2008, Callahan 2006, Onder 2005, Chu 200, Miller 1999/Newcomer 1999] • Other programs with temporary hospitalization [Bakker 2011, Eloniemi-Sulkava 2001, Brodaty 1989/1997]	the ten studies showed statistically significant positive effects [Gitlin, 2010-COPE; Gitlin, 2008; Gitlin, 2001; Graff, 2006/2007; Bakker, 2011]. Four of these concern short-period programs in which the professional actively involves both the person with dementia and the caregiver in skill training. The intervention components in these programs are daily activity training, choosing meaningful (pleasant or purposeful) activities, and environmental adaptations for the person with dementia; and psycho-education and skills training for the caregiver [the other five studies were Voigt-Radloff, 2011; Gitlin, 2003; Dias, 2008; Callahan, 2006; Onder, 2005]” (p1594). ***Caregiver burden*** – “The strength of the body of evidence for this outcome is moderate. [11 of 15] studies, [including six] short-period programs [Chien, 2011; Lodgson, 2010; Gitlin, 2010-ACT; Gitlin, 2003; Hepburn, 2005; Ostwald, 1999], four long-lasting programs [Dias, 2008; Callahan, 2006; Chu, 2000; Miller, 1999/Newcomer, 1999], and one program with hospitalization [Bakker, 2011] showed significant positive effects for burden... although not at all moments of follow-up. The programs with statistically significant effects included varying intervention components. The remaining four studies without significant effects involve both short-period programs and long-lasting programs [Gitlin, 2008; Gitlin 2001; Jansen, 2011; Onder, 2005]” (pp1596-7).	
Vernooij-Dassen 2011	**Cognitive reframing**, defined as reduction of caregiver problems 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; or • family carers’ interpretations of the behaviors of the people	***Caregiver 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, *p*=0.12)” (p9), and yet... • “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, *p*=0.006)” (p10). “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” (pp10-1).	“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

Citation, AMSTAR score	Intervention(s)	Findings	Review authors' assessment of included study quality
	with dementia.		non-spousal carers" (p11).
Zabalegui 2014	Various: **Specialized care plans for PwD**: • guidelines based on standardized twice-yearly consultation for patients and their caregivers (Nourhashemi, 2010) • 10 half-hour sessions of physiotherapy following a functional assessment identifying patients' capacities and limitations (Pomeroy, 1999) **Psychoeducational interventions** ("aim to provide information, education materials or feedback/advice about dementia and its complications" (p181)**:** • environmental skill-building program (Gitlin, 2003) • standardized caregiver interventions like Savvy Caregiver (Hepburn, 2007) or Advanced Caregiver Training (Gitlin, 2010-ACT) **Supportive interventions** ("...clarifying doubts or providing emotional support" (p181). • Nurse case management [Eloniemi-Sulkava, 2001 & 2009; ; see def on p181]	***Institutionalization*** – "We identified two case management clinical trials developed by the same authors applying the same intervention. This approach reduced institutionalization and the use of other community services, such as nursing home visits, according to the results of one study which were corroborated in later study [Eloniemi-Sulkava, 2001 & 2009].... [I]ncreasing service availability for PwD and their caregivers increased the number of PwD admitted to a nursing home, particularly those who lived alone [O'Connor, 1991]" (pp181-2). ***Functional decline*** – "Only one clinical trial of a specific physical rehabilitation intervention to enhance physical activity was tested [Pomeroy, 1999] and although participants in the intervention group improved their mobility, these positive results were not statistically significant. Nor was efficacy demonstrated in a comprehensive cognitive rehabilitation intervention in a memory clinic for people with dementia living at home [Nourhashemi, 2010]" (p181). ***Caregiver burden***: • Psychoeducational – "Good results were also identified in... occupational therapist programs [Gitlin, 2010-ACT], even in long-term follow-up.... To improve caregiver well-being, an environmental skill-building program for informal caregivers, which consisted of 5 home visits and one telephone contact over 6 months followed by 6-month reinforcement, was tested [Gitlin, 2003] and overall perceived well-being improved significantly in the experimental group. Positive results were found in [Hepburn, 2007]... where the effectiveness of a psycho educational intervention in reducing caregiver distress and burden was demonstrated" (p181).	Only RCTs included... "[V]ery few reports attempted to blind the assessment of outcomes, as we have seen through the Cochrane risk of bias assessment; a recurrent problem in this area of research. In addition, in many articles the interventions were not well described and there was variation in the instruments used to measure the same variable. Moreover, most interventions were limited to very short periods of application or follow-up (weeks or a few months). However, to obtain significant results, larger intervention doses are needed since dementia's chronic nature with altered cognition could hamper the application of the programmed interventions and their effectiveness in the long run" (p183).

Citation, AMSTAR score	Intervention(s)	Findings	Review authors' assessment of included study quality
	• Multicomponent, including financial benefits, physical aid, home help, respite admissions, practical advice and psychiatric assessment over 2 years [O'Connor, 1991]		

Data Extraction – Primary Research

The information contained in the "Main Findings" column below consists mainly of direct quotations from the RCTs included in our synthesis.

Citation, sample size	Intervention	Main Findings
Arango-Lasprilla, 2014 N=69 (XP=39; CG=30)	Coping with Frustration, a **cognitive–behavioral intervention** program developed by Gallagher-Thompson based on a cognitive–behavioral model for the management of frustration and anger. The goal of this 8-week intervention is to introduce family caregivers to a variety of cognitive–behavioral strategies that they can use to manage negative feelings (eg, anger and frustration) that arise within the context of caregiving.	"…. the intervention group had [significantly] lower burden than the control group through the 3-month follow-up" (p551). "Compared to controls, caregivers in the treatment group showed improved satisfaction with life, burden, and depression, and these effects persisted over the 3-month follow-up" (p553).
Brunelle-Hayman, 2014 N=15 (XP=7; CG=8)	Application of **errorless learning and spaced retrieval memory** techniques to re-learn IADL (e.g., origami, utilisation of computer, TV remote control, etc.)	"Paired-sample t-test revealed no significant difference on the… ZBI-22 [burden] scores between baseline (T1) and endpoint (T7) assessments" (p18). "A statistical [sic] significant difference was found between the trained and untrained groups on the DMT immediately following the intervention. Improvements were maintained for a 3-month period" [from Thivierge 2014, a separately published article by the same researchers].
Chen, 2014 N=46 (XP=24; CG=22)	**Pyschoeducational support** intervention focusing on caregiver coping strategies. The intervention was composed of six sessions, completed over 3 months.	Reduction in burden for the intervention group F(1, 44)=6.155, p=.017 "The present clinical trial indicated that, in comparison with caregivers who received the usual care, caregivers who participated in the intervention reported decreased burden" (p4).
Chodosh, 2015 N=151 dyads (Telephone=73; In person=71)	**Case management** – included comprehensive in-home assessment of 408 patient–caregiver dyads, collaborative goal setting between care managers and caregivers, and close follow-up and coordination between dyads, health system	"We compared a more intensive, in-person approach to care management with a telephone-only approach to assess whether the more intensive approach would yield better outcomes—albeit at higher cost—due to cultural, language, and educational barriers in a

Citation, sample size	Intervention	Main Findings
	clinicians, and community agencies that provided services for ACCESS participants. Compared two modes of delivery: home visits supplemented with telephone calls vs. telephone calls and mailings.	low-income immigrant community. In this study in one setting and region, we did not identify any additional benefit from a dementia care management approach that included in-person interactions compared with a telephone-only approach" (p25).
Dopp, 2014 N=45 service units	Training package associated with **community-based occupational therapy** program	"No significant between-group differences between baseline and 12 months were found for adherence (1.58, 95% CI −0.10 to 3.25), nor for any client or caregiver outcome" (abstract).
Dowling, 2014 N=24 (XP=12, CG=12)	**Psychoeducational support** teaching caregivers a series of behavioral and cognitive skills for increasing positive affect	"At the end of the intervention, scores on positive affect, negative affect, burden, and stress all improved in the intervention compared with the control group. These scores continued to show improvement at the assessment done 1 month after intervention" (abstract).
Gallagher-Thompson, 2015 N=110 (XP=55; CG=55)	**Psychoeducational support** – 20-page "picture book" designed to illustrate key skills for managing difficult behaviors, using adaptive coping strategies, asking for help from other family members, and managing stress.	No group differences on the measure for burden (p5 & p6)
Gonyea, 2014 N=67 caregivers (XP=29; CG=28)	**Cognitive behavioral therapy** group intervention vs. psychoeducational control condition	"CBT participants reported lower... caregiver distress about neuropsychiatric symptoms" (abstract).
Holthoff, 2015 N=30 (XP=15; CG=15)	Home-based **12-week physical activity** intervention	"Analysis of activities of daily living in the patients (ADCS ADL total score) revealed a significant group × time interaction effect (95% CI of the difference between both groups at T2: 5.01–10.51). The control group experienced decreases in ADL performance at week 12 and 24 whereas patients in the intervention group remained stable. Analyses of executive function and language ability revealed considerable effects for semantic word fluency with a group × time interaction (95% CI of the difference between both groups at T2: 0.18–4.02). Patients in the intervention group improved during the intervention and returned to initial performance at week 12 whereas the controls revealed continuous worsening. Analyses of reaction time, hand-eye quickness and attention revealed improvement only in the intervention group. Caregiver burden remained stable in the intervention group but worsened in the control group... This study suggests that PA in a home-based setting might be an effective and intrinsically attractive way to promote PA training in AD and modulate caregiver burden. The results demonstrate transfer benefits to ADL, cognitive and physical skill in patients with AD" (abstract).
Muniz, 2014 N=84 (XP=44; CG=40)	**Cognitive-motor stimulation program** – "Sessions were divided into: welcome (10min), orientation (50min), individual cognitive	"Significant benefits were observed in basic ADL at the 2- and 3-year assessments, whereas instrumental ADL showed benefits only up to

Citation, sample size	Intervention	Main Findings
	exercises (10min), group cognitive exercises (20min), ADL training (which was related to the day specific cognitive function) (30min), coffee break (30min), psychomotor therapy or workshops (50min), and conclusion (10min)" (p3).	the second year of intervention ($p < 0.05$)" (abstract). No differences between morality rates or LTC placement
Samus, 2014 N=188 (XP=74; CG=114)	**Case management** – "18-month care coordination intervention to systematically identify and address dementia-related care needs through individualized care planning; referral and linkage to services; provision of dementia education and skill-building strategies; and care monitoring by an interdisciplinary team"(abstract).	"Intervention participants had a significant delay in time to all-cause transition from home and the adjusted hazard of leaving the home was decreased by 37%... A home-based dementia care coordination intervention delivered by non-clinical community workers trained and overseen by geriatric clinicians led to delays in transition from home" (abstract). "The intervention did not substantially improve or worsen subjective caregiver burden despite delaying CR transition from home" (p16 of Tanner 2014).
Tremont, 2014 N=250	Telephone-delivered **psychosocial support for caregivers**	"…no group differences for caregiver burden" (p5).