Supplementary table 1. The contents of interventions employed in excluded studies

|  |  |
| --- | --- |
| First author, year |  |
| Chu, 2011 | Support groupThe support group focused on discussing key issues in caregiving including carers’ emotions and feelings about caregiving, common behaviour problems, the importance of self-care, financial issues, and available community resources. |
| Connell, 2009 | Technology based (guided) exercise programmeDuring the first two telephone calls, participants were directed to set a realistic long-term exercise goal that specified the type of exercise as well as duration and frequency. During all subsequent calls, participants set specific short-term goals for exercise, after evaluating success in reaching the previous short-term goal in collaboration with the counsellor. A problem-solving process was used to address any barriers to goal attainment. |
| Danucalov, 2013 | MedicationThe programme included the traditional Hatha Yoga exercises: a) Yoga body poses (asanas), b) exercises involving awareness and voluntary regulation of breath (pranayamas), and c) meditational practices and compassion meditation. |
| Gonzalez, 2014 | Resourcefulness trainingThe resourcefulness training aimed to enhance resourcefulness through five stages: focus, optimism, creativity, understanding, and solution. Participants were guided in finding the fact about identified problems (focus), assisted in developing a sense of optimism regarding their abilities to problem solve, assisted in brainstorming solutions (creativity), assisted in understanding the patient’s preference in considering which solutions to implement (understanding), and assisted in the implementation of the solution. |
| Hirano, 2011 | Self-help exercise programmeParticipants were prescribed regular exercise with moderate-intensity three times per week for 12 weeks. |
| Kurz, 2010 | Information provisionThe programme focused on providing the information about Alzheimer’s disease and was structured along the different stages of dementia severity. The information included the presentation of typical caring problems and examples of supportive carer behaviours at the different stages of dementia. |
| Leach, 2015 | MeditationThe programme comprised content on the health effects of stress, the theory of Transcendental Meditation (TM), training of the TM technique, and assessment and refining of the technique.  |
| Stirling, 2012 | Self-help decision aidsParticipants were mailed decisions aids and given instructions to work through the contents of the decision aids. The decision aids contained brief descriptive information about the common community services available, descriptive information about respite care, decision tools based on selecting a respite care option, vignettes describing carers’ experiences, brief targeted information about the trajectory of decline in dementia, and phone numbers and links to facilitate gaining further information. |
| Winter, 2006 | Technology based support groupThe primary goal was to enhance carers ability to manage daily stressors by providing emotional support and validation. The support group focused on discussing key issues in caregiving including intimate problems, personal conflicts, emotions about caregiving. Participants were encouraged to assist each other in problem solving by sharing their coping strategies and educational resources. |
| Xiao, 2016 | Case managementParticipants were assigned to a care coordinator who made regular contact with carers to assess the needs of care recipients and the carers. Care coordinators referred carers to new services and education programmes based on needs assessments. |

Supplementary table 2. The contents of psychoeducational-skill building interventions

|  |  |
| --- | --- |
| First author, year |  |
| ***Face-to-face psychoeducational-skill building interventions*** |
| Chen, 2015 | The programme included:* Information about dementia such as its symptoms and treatment plan
* Information regarding available support resources
* Discussion on how to improve techniques to manage behaviour problems
* Developing skills to self-care such as relaxation techniques, emotional support, or individual coaching
* Establishing self-support system to enable access to immediate assistance for problem solving
 |
| Chien, 2011 | An individualised education and support programme was formulated for each family based on their needs. Seven major themes of family supportive care programmes were used in the intervention which included:* Information about dementia such as prognosis and current treatment and care
* Developing social relationships with close relatives and friends
* Sharing and leaning to adapt the emotional impact of caregiving
* Learning about self-care and motivation
* Improving interpersonal relationships between family members and the person with dementia
* Establishing support from community groups and healthcare resources
* Improving home care and finance skills
 |
| Gaugler, 2015 | The programme included:* Psychoeducation on critical stressors
* Promoting communicating skills to establish positive relationships with other family members and staff
* Counselling session to help carers identify ways to manage problems effectively
* Learning skills and strategies to manage reactions to unpredictable behavior outbursts
* Learning to set concrete goals for optimal care for relatives in residential long-term care and methods to achieve such goals in collaboration with staff
* Information about the psychopharmacological, medical, and rehabilitative treatments used in residential long-term care
* Ad Hoc counselling to respond to immediate issues of need
 |
| Gavrilova, 2009 | The programme included:* Education on dementia including (a) general introduction to the illness; (b) what to expect in the future; (c) what causes and what does not cause dementia?; and (d) locally available care and treatment
* Learning skills and strategies to manage up to eight problem behaviours (personal hygiene, dressing, incontinence, repeated questioning, clinging, aggression, wandering, apathy) through counselling
 |
| Gitlin, 2010 | The programme included:* Education on common medical conditions that may exacerbate problem behaviours (e.g., pain, dehydration, constipation).
* Identification of behaviour problems and the assessment of home environment
* Learning to identify antecedents and consequences or potential modifiable triggers of the target problem behaviour
* Provision of a typed action plan stating targeted behaviour, treatment goal, potential triggers, and four types of modifying management strategies (physical environments, using assistive devices, simplifying communications and tasks, engaging patients in activities)
* Instructions on stress reduction and self-care techniques
 |
| Guerra, 2011 | The programme included:* Education on dementia including (a) general introduction to the illness; (b) what to expect in the future; (c) what causes and what does not cause dementia?; and (d) locally available care and treatment
* Learning skills and strategies to manage up to eight problem behaviours (personal hygiene, dressing, incontinence, repeated questioning, clinging, aggression, wandering, apathy) through counselling
 |
| Joling, 2012 | The programme included:* Psychoeducation
* Learning problem solving techniques
* Identifying caregiving issues (e.g., management of behaviour problems, coping with feelings of guilt) and assisting in motivating other family members to help the primary carer
* Ad hoc telephone counselling to carers and their families beyond the scheduled sessions
 |
| Pahlavanzadeh, 2010 | The programme included:* Information about dementia such as symptoms, risk factors, diagnostic methods, and treatment
* Lecture and group discussion on ways to improve communication with people with dementia and daily care such as urine and faecal incontinence, bathing, dressing, and personal hygiene
* Lecture and group discussion on methods to control unusual behaviours such as repetitive behaviour, restlessness, hiding things, being suspicious, wandering, and aggression
* Lecture and group discussion on safety measures at home, how to entertain patients at home, and methods of reducing carers’ burden
 |
| de Rotrou, 2011 | The programme included:* Information about dementia and available resource and practical advice
* Learning to stimulate the person with dementia in daily activities and social situations in an ecological and individual tailored way (e.g., helping the person with dementia only if necessary, letting them take time)
* Developing problem-solving techniques, emotion-centred coping strategies, skills in managing behaviour problems, and communication skills (Solutions raised from individual experiences had to emerge from the group rather than provided by the group coordinator)
 |
| Sepe-Monti, 2016 | The programme included:* Information about dementia and the importance of the family as a source of support
* Education on managing self-care and emotional situations by suggesting strategies aimed at managing behavioural problems and developing effective communication skills
* Learning strategies to improve people with dementia in activities and their residual abilities
* Education on a decision-making model
 |
| Wang, 2011 | The programme included:* Information about dementia such as prognosis and current treatment and care
* Developing social relationships with close relatives and friends
* Sharing and leaning to adapt the emotional impact of caregiving
* Learning about self-care and motivation
* Improving interpersonal relationships between family members and the person with dementia
* Establishing support from community groups and healthcare resources
* Improving home care skills
 |
| Wang, 2012 | The programme included:* Information about dementia
* Developing the group as a support system
* Learning the emotional impact of care-giving
* Learning about self-care
* Improving interpersonal relationships
* Establishing support outside the group
* Improving home care skills
 |
| ***Technology based psychoeducational-skill building interventions*** |
| Cristancho-Lacroix, 2015 | The web-based programme included:* Presentation of a definition of stress and its causes and consequences on carers, the mechanisms and effects of relaxation, and strategies for managing stress underlining the importance of looking for respite.
* Information about the Alzheimer’s disease diagnosis procedure, symptoms, and prognosis
* Presentation of strategies to involve people with dementia in the process of care in order to stimulate the preserved functions
* Presentation of common behavioural and psychological symptoms and intrinsic factors that might be associated with them
* Practical advice on how to cope with the behavioural and psychological symptoms
* Presentation of common language troubles and strategies to modulate and adapt communication
* Information about different interventions available for carers in France
* Information about different stakeholders and services that may help carers in their daily life
* Information about the role of disease progression and encouraging carers to look for further sources of information
* Emphasising the acceptance of support and help and the importance of obtaining more information
 |
| Liddle, 2012 | The DVD programme included:* Presentation of strategies to manage communication difficulties with people with dementia to reduce the negative impact of caregiving (e.g., use of eye contact, providing clear choices, allowing time, talking about family and life history)
* Presentation of strategies to reduce the impact of memory difficulties in daily life (use of prompts, having a permanent place for objects, keeping up familiar routines, redirecting attention, breaking tasks down into simple steps)
 |
| Martindale-Adams, 2013 | The telephone delivered programme included:* Information about dementia and financial and legal issues, safety, caregiver health and well-being, communication, and problem-solving
* Learning strategies to manage behaviour problems (e.g., bathing, repeated questions)
* Learning strategies to cope with caregiving issues (e.g., assertiveness, communication, grief)
 |
| Tremont, 2008 | * The telephone-delivered programme included:
* Information about dementia and common psychological, emotional, psychosocial and medical effects of caregiving
* Specific interventions applied at therapists’ discretion, including supportive approaches (i.e., empathy, giving permission, normalizing, provision of information, validation or venting) or more active strategies (i.e., bibliotherapy, interpretation, positive reframing, problem solving, reference to resource packet, referral and setting task directives)
 |

Supplementary table 3. Additional study characteristics of included studies

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| First author, year | Type of data analyses | Randomisation method | Manualised intervention | Assessment of treatment integrity | Supervision during the trial | Attrition rate from randomisation to post-intervention |
| ***Face-to-face psychoeducational-skill building interventions*** |
| Chen, 2015 | Completer | Computer generated randomisation by an independent researcher | – | – | – | – |
| Chien, 2011 | ITT | – | Y | – | – | 1% |
| Gaugler, 2015 | Completer | Computer generated randomisation | Y | – | – | 0% |
| Gavrilova, 2009 | ITT | Randomisation by an independent researcher | Y | – | – | 12% |
| Gitlin, 2010 | ITT | Randomisation by an independent researcher | – | Audio recordings of sessions for review by expert(s) | – | 12% |
| Guerra, 2011 | ITT | Randomisation by an independent researcher | Y | – | – | 3% |
| Joling, 2012 | ITT | Randomisation by an independent researcher | Y | Audio recordings of sessions for review by expert(s) | Y | 13% |
| Pahlavanzadeh, 2010 | Completer | – | – | – | Y | – |
| de Rotrou, 2011 | ITT | Computer generated randomisation by an independent researcher | – | – | – | 10% |
| Sepe-Monti, 2016 | ITT | Computer generated randomisation by an independent researcher | Y | – | – | 25% |
| Wang, 2011 | ITT | Computer generated randomisation | – | – | – | 3% |
| Wang, 2012 | ITT | – | Y | Audio recordings of sessions for review by expert(s) | Y | 8% |
| ***Technology based psychoeducational-skill building interventions*** |
| Cristancho-Lacroix, 2015 | ITT | Computer generated randomisation | NA | NA | NA | 18% |
| Tremont, 2008 | Completer | Urn randomisation (no further details provided) | Y | Audio recordings of sessions for review by expert(s) | Y | 45% |
| Liddle, 2012 | Completer | – | – | – | – | 19% |
| Martindale-Adams, 2013 | ITT | – | Y | – | – | 10% |
| ***Face-to-face interventions informed by standard CBT*** |
| Au, 2010 | Completer | – | Y | – | – | 27% |
| Belle, 2006  | ITT | Computer generated randomisation by an independent researcher | Y | Audio recordings of sessions for review by expert(s) | Y | 9% |
| Gallagher-Thompson, 2008 | ITT | Biased coin randomisation (no further details provided) | Y | – | Y | 15% |
| Livingston, 2013 | ITT | Computer generated randomisation by an independent researcher | Y | Audio recordings of sessions for review by expert(s) | Y | 9% |
| Losada, 2011 | Completer | Use of a table of random number (no further details provided) | Y | – | – | 29% |
| Losada, 2015 | Completer | Computer generated randomisation | Y | – | Y | 32% |
| Márquez-González, 2007 | ITT | Use of a table of random number (no further details provided) | Y | – | – | 24% |
| Martín-Carrasco, 2009 | Completer | Randomisation by an independent individual | – | – | – | 10% |
| Martín-Carrasco, 2014 | ITT | Computer generated randomisation by an independent researcher | Y | – | – | 26% |
| ***Face-to-face interventions informed by third wave CBT (ACT)*** |
| Losada, 2015 | Completer | Computer generated randomisation | Y | – | Y | 31% |
| ***Technology based CBT interventions*** |
| Blom, 2015 | ITT | Computer generated randomisation by an independent researcher | – | – | – | 30% |
| Finkel, 2007 | Completer | – | – | – | – | 22% |
| Gallagher-Thompson, 2010 | Completer | Randomisation by an independent researcher | NA | NA | NA | 8% |
| Glueckauf, 2007 | Completer | – | – | – | – | 43% |
| Kwok, 2013 | Completer | Computer generated randomisation | – | – | – | 10% |

*Note*. ITT = Intention-to-treat analysis, NA = Not applicable due to no therapist-participant interactions during the treatment, ACT = Acceptance and Commitment Therapy, CBT = Cognitive Behaviour Therapy