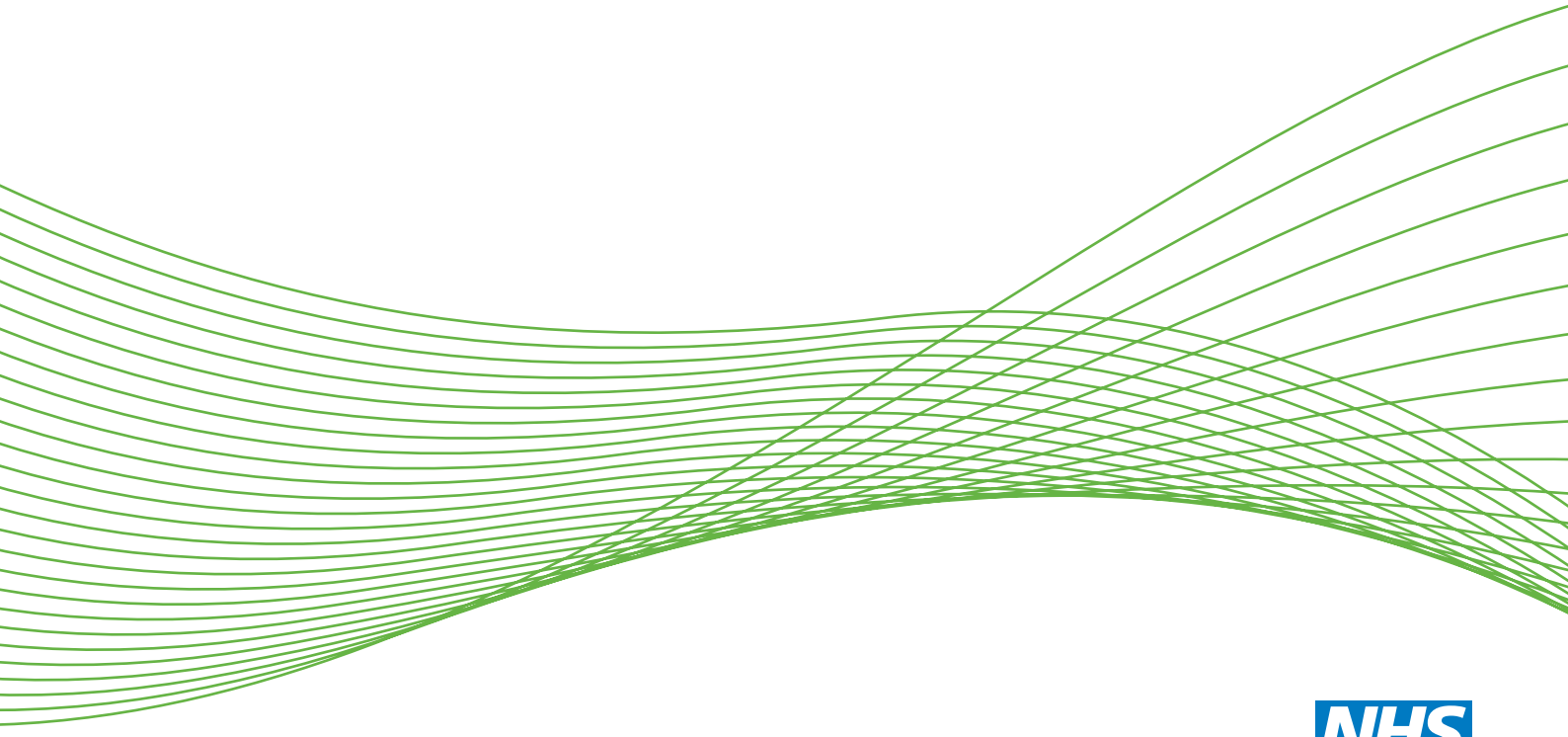
HEALTH TECHNOLOGY ASSESSMENT

VOLUME 18 ISSUE 39 JUNE 2014
ISSN 1366-5278

A systematic review of the clinical effectiveness and cost-effectiveness of sensory, psychological and behavioural interventions for managing agitation in older adults with dementia

Gill Livingston, Lynsey Kelly, Elanor Lewis-Holmes, Gianluca Baio, Stephen Morris, Nishma Patel, Rumana Z Omar, Cornelius Katona and Claudia Cooper



NHS
National Institute for Health Research

DOI 10.3310/hta18390

A systematic review of the clinical effectiveness and cost-effectiveness of sensory, psychological and behavioural interventions for managing agitation in older adults with dementia

Gill Livingston,[1]* Lynsey Kelly,[1] Elanor Lewis-Holmes,[1] Gianluca Baio,[2] Stephen Morris,[3] Nishma Patel,[3] Rumana Z Omar,[2] Cornelius Katona[1] and Claudia Cooper[1]

[1]Unit of Mental Health Sciences, University College London, London, UK
[2]Department of Statistical Science and PRIMENT Clinical Trials Unit, University College London, London, UK
[3]Department of Applied Health Research, University College London, London, UK

*Corresponding author

Declared competing interests of authors: All authors declare that they have no financial or personal relationships with other people or organisations that could inappropriately influence (bias) their work.

Published June 2014
DOI: 10.3310/hta18390

This report should be referenced as follows:

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;**18**(39).

Health Technology Assessment is indexed and abstracted in *Index Medicus*/MEDLINE, *Excerpta Medica*/EMBASE, *Science Citation Index Expanded* (SciSearch®) and *Current Contents®*/ Clinical Medicine.

Health Technology Assessment

HTA/HTA TAR

ISSN 1366-5278 (Print)

ISSN 2046-4924 (Online)

Five-year impact factor: 5.804

Health Technology Assessment is indexed in MEDLINE, CINAHL, EMBASE, The Cochrane Library and the ISI Science Citation Index and is assessed for inclusion in the Database of Abstracts of Reviews of Effects.

This journal is a member of and subscribes to the principles of the Committee on Publication Ethics (COPE) (www.publicationethics.org/).

Editorial contact: nihredit@southampton.ac.uk

The full HTA archive is freely available to view online at www.journalslibrary.nihr.ac.uk/hta. Print-on-demand copies can be purchased from the report pages of the NIHR Journals Library website: www.journalslibrary.nihr.ac.uk

Criteria for inclusion in the *Health Technology Assessment* journal

Reports are published in *Health Technology Assessment* (HTA) if (1) they have resulted from work for the HTA programme, and (2) they are of a sufficiently high scientific quality as assessed by the reviewers and editors.

Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

HTA programme

The HTA programme, part of the National Institute for Health Research (NIHR), was set up in 1993. It produces high-quality research information on the effectiveness, costs and broader impact of health technologies for those who use, manage and provide care in the NHS. 'Health technologies' are broadly defined as all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care.

The journal is indexed in NHS Evidence via its abstracts included in MEDLINE and its Technology Assessment Reports inform National Institute for Health and Care Excellence (NICE) guidance. HTA research is also an important source of evidence for National Screening Committee (NSC) policy decisions.

For more information about the HTA programme please visit the website: www.hta.ac.uk/

This report

The research reported in this issue of the journal was funded by the HTA programme as project number 10/43/01. The contractual start date was in August 2011. The draft report began editorial review in March 2013 and was accepted for publication in October 2013. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' report and would like to thank the reviewers for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

This report presents independent research funded by the National Institute for Health Research (NIHR). The views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, NETSCC, the HTA programme or the Department of Health. If there are verbatim quotations included in this publication the views and opinions expressed by the interviewees are those of the interviewees and do not necessarily reflect those of the authors, those of the NHS, the NIHR, NETSCC, the HTA programme or the Department of Health.

Published by the NIHR Journals Library (www.journalslibrary.nihr.ac.uk), produced by Prepress Projects Ltd, Perth, Scotland (www.prepress-projects.co.uk).

Abstract

A systematic review of the clinical effectiveness and cost-effectiveness of sensory, psychological and behavioural interventions for managing agitation in older adults with dementia

Gill Livingston,[1]* Lynsey Kelly,[1] Elanor Lewis-Holmes,[1] Gianluca Baio,[2] Stephen Morris,[3] Nishma Patel,[3] Rumana Z Omar,[2] Cornelius Katona[1] and Claudia Cooper[1]

[1]Unit of Mental Health Sciences, University College London, London, UK
[2]Department of Statistical Science and PRIMENT Clinical Trials Unit, University College London, London, UK
[3]Department of Applied Health Research, University College London, London, UK

*Corresponding author

Background: Agitation is common, persistent and distressing in dementia and is linked with care breakdown. Psychotropic medication is often ineffective or harmful, but the evidence regarding non-pharmacological interventions is unclear.

Objectives: We systematically reviewed and synthesised the evidence for clinical effectiveness and cost-effectiveness of non-pharmacological interventions for reducing agitation in dementia, considering dementia severity, the setting, the person with whom the intervention is implemented, whether the effects are immediate or longer term, and cost-effectiveness.

Data sources: We searched twice using relevant search terms (9 August 2011 and 12 June 2012) in Web of Knowledge (incorporating MEDLINE); EMBASE; British Nursing Index; the Health Technology Assessment programme database; PsycINFO; NHS Evidence; System for Information on Grey Literature; The Stationery Office Official Documents website; The Stationery National Technical Information Service; Cumulative Index to Nursing and Allied Health Literature; and The Cochrane Library. We also searched Cochrane reviews of interventions for behaviour in dementia, included papers' references, and contacted authors about 'missed' studies. We included quantitative studies, evaluating non-pharmacological interventions for agitation in dementia, in all settings.

Review method: We rated quality, prioritising higher-quality studies. We separated results by intervention type and agitation level. As we were unable to meta-analyse results except for light therapy, we present a qualitative evidence synthesis. In addition, we calculated standardised effect sizes (SESs) with available data, to compare heterogeneous interventions. In the health economic analysis, we reviewed economic studies, calculated the cost of effective interventions from the effectiveness review, calculated the incremental cost per unit improvement in agitation, used data from a cohort study to evaluate the relationship between health and social care costs and health-related quality of life (DEMQOL-Proxy-U scores) and developed a new cost-effectiveness model.

Results: We included 160 out of 1916 papers screened. *Supervised* person-centred care, communication skills (SES = –1.8 to –0.3) or modified dementia care mapping (DCM) with implementing plans (SES = –1.4 to –0.6) were all efficacious at reducing clinically significant agitation in care home residents, both immediately and up to 6 months afterwards. In care home residents, during interventions but not at follow-up, activities (SES = –0.8 to –0.6) and music therapy (SES = –0.8 to –0.5) by protocol reduced mean levels of agitation; sensory intervention (SES = –1.3 to –0.6) reduced mean and clinically significant symptoms. Advantages were not demonstrated with 'therapeutic touch' or individualised activity. Aromatherapy and light therapy did not show clinical effectiveness. Training family carers in behavioural or cognitive interventions did not decrease severe agitation. The few studies reporting activities of daily living or quality-of-life outcomes found no improvement, even when agitation had improved. We identified two health economic studies. Costs of interventions which significantly impacted on agitation were activities, £80–696; music therapy, £13–27; sensory interventions, £3–527; and training paid caregivers in person-centred care or communication skills with or without behavioural management training and DCM, £31–339. Among the 11 interventions that were evaluated using the Cohen-Mansfield Agitation Inventory (CMAI), the incremental cost per unit reduction in CMAI score ranged from £162 to £3480 for activities, £4 for music therapy, £24 to £143 for sensory interventions, and £6 to £62 for training paid caregivers in person-centred care or communication skills with or without behavioural management training and DCM. Health and social care costs ranged from around £7000 over 3 months in people without clinically significant agitation symptoms to around £15,000 at the most severe agitation levels. There is some evidence that DEMQOL-Proxy-U scores decline with Neuropsychiatric Inventory agitation scores. A multicomponent intervention in participants with mild to moderate dementia had a positive monetary net benefit and a 82.2% probability of being cost-effective at a maximum willingness to pay for a quality-adjusted life-year of £20,000 and a 83.18% probability at a value of £30,000.

Limitations: Although there were some high-quality studies, there were only 33 reasonably sized (> 45 participants) randomised controlled trials, and lack of evidence means that we cannot comment on many interventions' effectiveness. There were no hospital studies and few studies in people's homes. More health economic data are needed.

Conclusions: Person-centred care, communication skills and DCM (all with supervision), sensory therapy activities, and structured music therapies reduce agitation in care-home dementia residents. Future interventions should change care home culture through staff training and permanently implement evidence-based treatments and evaluate health economics. There is a need for further work on interventions for agitation in people with dementia living in their own homes.

Protocol registration: The study was registered as PROSPERO no. CRD42011001370.

Funding: The National Institute for Health Research Health Technology Assessment programme.

Contents

List of tables

List of figures

List of abbreviations

BPSD	behavioural and psychological symptoms of dementia
CBT	cognitive–behavioural therapy
CEBM	Centre for Evidence-based Medicine
CHEERS	Consolidated Health Economic Evaluation Reporting Standards
CI	confidence interval
CMAI	Cohen-Mansfield Agitation Inventory
DARE	Database of Abstracts of Reviews of Effects
DCM	dementia care mapping
DEM	dementia quality of life
FAST	Functional Assessment Staging
GP	general practitioner
HTA	Health Technology Assessment
LASER-AD	London and the South-East Region – Alzheimer's Disease
MMSE	Mini-Mental State Examination
MNB	monetary net benefit
NICE	National Institute for Health and Care Excellence
NPI	Neuropsychiatric Inventory
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PSA	probabilistic sensitivity analysis
PSS	Personal Social Services
QALY	quality-adjusted life-year
RCT	randomised controlled trial
SD	standard deviation
SES	standardised effect size

Plain English summary

Background

Agitation is common in dementia, and is usually understood as purposeless behaviour such as shouting, moving about or even violence without an obvious cause. It is distressing, can cause care to break down and can increase costs. Drug treatments can have serious side effects and are often ineffective, but the evidence regarding non-pharmacological interventions is unclear.

Aims

This study aimed to discover which non-drug approaches to agitation in dementia worked, for whom and in what setting, whether or not they work immediately and in the longer term, and whether or not they represent good value for money.

Methods

We searched electronic databases and consulted the references and the authors of existing papers to find quantitative studies of non-drug treatments of agitation. We scored each study, giving more importance to those which were more rigorous, such as randomised controlled trials. Our results were organised according to the approach used. Owing to the differences between studies and lack of rigour, we could not meta-analyse (combine) results other than light therapy, and so we present a qualitative synthesis of the evidence, calculating the scale of the changes in different studies so that they could be compared. We evaluated the relationship between agitation and health and social care costs, and health-related quality of life, and developed an economic model to calculate whether or not interventions are good value for money.

Results

One hundred and sixty out of 1916 papers identified were included. Agitation was reduced, both in the short and in the long term, by training care staff and giving them supervision to assist implementation in either person-centred care, communication skills or dementia care mapping. Agitation decreased when care home residents carried out pleasant activities, or sensory intervention or structured music therapy. Neither aromatherapy nor light therapy decreased agitation, and training family carers to use psychological techniques did not decrease severe agitation either. There was little evidence about intervention costs and whether or not interventions are good value for money. We calculated that health and social care costs increase considerably in people who are severely agitated.

Conclusions

There is consistent evidence that teaching staff in care homes to communicate and consider the person with dementia's needs rather than focus on completing tasks with them was helpful for severe agitation, as were touch therapies. Activities and structured music therapy helped to decrease the level of agitation in care homes but was not specifically tested in severe agitation. We suggest using a manual with managers and staff of care homes to ensure the permanent and consistent implementation of effective interventions. Future studies should consider cost-effectiveness, and treatments for people in their own homes.

Scientific summary

Introduction

The number of people with dementia is rising dramatically with increased longevity. While the core dementia symptom is cognitive deterioration, agitation (inappropriate verbal, vocal or motor activity) is common, persistent and distressing. Its impact can be devastating for people with dementia, their families, and paid carers, and is associated with distress, deteriorating relationships and nursing home admission. Drug treatments, for example antipsychotics or benzodiazepines, have undesirable effects and modest benefits in agitation, and agitation is often difficult to manage. The 2006 National Institute for Health and Care Excellence (NICE) dementia guidelines recommend non-pharmacological interventions, including aromatherapy, music therapy and dance therapy, but the evidence is unclear. Since then, there have been no large systematic reviews of the evidence for non-pharmacological treatment of agitation.

There is, therefore, a need for an up-to-date systematic evidence synthesis of non-pharmacological management of specific neuropsychiatric symptoms, particularly agitation. Effective management may improve quality of life, reduce inappropriate medication use, delay institutionalisation and be cost-effective.

Review question

Which non-pharmacological interventions are effective for reducing agitation in adults with dementia immediately and in the longer term, considering agitation severity, setting, and whether the intervention is with the person with dementia, their carer, or both?

Methods

Protocol

The protocol registration is at www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42011001370.

Study identification

We searched twice using relevant search terms (9 August 2011 and 12 June 2012) in Web of Knowledge (incorporating MEDLINE); EMBASE; British Nursing Index; Health Technology Assessment programme database; PsycINFO; NHS Evidence; System for Information on Grey Literature; the Stationery Office Official Documents website; the Stationery National Technical Information Service; Cumulative Index to Nursing and Allied Health Literature; and The Cochrane Library. We also searched Cochrane reviews of interventions for behaviour in dementia. We hand-searched reference lists of included papers and relevant reviews, and contacted included papers' authors to ask about relevant studies.

Study selection

Inclusion and exclusion criteria

We defined agitation as having a behavioural component. We included papers in any language. Our inclusion criteria were:

- studies evaluating a psychological, behavioural, sensory or environmental intervention to manage agitation
- studies with a comparator group: separate groups or before/after comparisons
- studies with quantitative agitation results
- studies in which all participants had dementia.

We excluded interventions if every individual was given psychotropic drugs or some participants only had medication but no other intervention.

Data extraction

We extracted methodological characteristics; intervention descriptors; who the intervention was with; statistical methods; relevant outcome measures (including if agitation was reported, quality of life or effect on activities of daily living function); length of follow-up; intervention setting; diagnostic details; and summary outcome data (immediate and longer term).

Quality assessment

Each study was given one quality point for dementia diagnosis reliable; agitation measures valid; agitation measures reliable; participant blinded to intervention group; rater blinded to intervention group; randomised controlled trial (RCT) (analysed as randomised); description and adequacy of randomisation; or, if non-randomised, control group comparability; adequate follow-up rate at primary outcome; all participants accounted for; power calculation; full power calculation details; sufficiently powered ($\geq$ 80% and achieved within 5% of power calculation); intention-to-treat analysis; appropriate statistical analysis (we reanalysed some of the studies, e.g. studies including intervention and control groups but not directly comparing them, or where one-tailed statistical significance tests were used. For these reasons, in some cases we have obtained a result differing from that reported in the original paper), then gave full points, and correct statistical tests. The researchers then assigned a Centre for Evidence-based Medicine level of evidence:

- level 1b: high-quality RCTs: scoring $\geq$ 10, had blinded raters and validated outcome
- level 2b: lower-quality RCTs and higher-quality non-randomised studies (scoring $\leq$ 11)
- level 2c: moderate-quality non-randomised studies (scoring 6–9)
- level 4: scored $<$ 6 and were not RCTs.

We used quality scores and level of evidence to prioritise higher-quality studies.

The intervention categories were psychological, behavioural, sensory or environmental, and were further subdivided into:

- activities
- music therapy (protocol driven and general)
- sensory interventions (all involved touch; some included other stimulation)
- training paid caregivers in person-centred care or communication skills or dementia care mapping (DCM) with supervision [all focused on training paid caregivers to see people with dementia as individuals, finding out about their wants (as opposed to being task focused) and improving communication]
- light therapy (30–60 minutes of daily bright-light exposure)
- home-like care (the homes resembled a domestic environment and had eight or fewer residents, with meals prepared by a small fixed staff team and residents or family carers)
- aromatherapy
- training family carers in behavioural management
- training family carers in cognitive–behavioural therapy (CBT)
- exercise
- changing the environment
- dementia-specific therapies
- pet therapy.

We integrated the results in each category to consider if the evidence was conclusive, preliminary (pointing in a particular direction but the weight of evidence is inconclusive) or absent.

Level of agitation

We considered interventions treating clinically significant agitation, and those decreasing mean agitation symptoms.

Analysis

Light therapy was the only intervention fulfilling a priori meta-analysis criteria: three or more studies with homogenous interventions and outcome measures, and a quality score ≥ 6.

Standard effect sizes

As we were generally unable to meta-analyse, we estimated standardised effect sizes (SESs) with 95% confidence intervals (CIs) where possible to compare heterogeneous interventions and outcomes using a common effect measure.

Health economic analysis

The aims of the health economic analysis were:

1. to analyses cost and cost-effectiveness studies of non-pharmacological interventions
2. to analyse the cost of non-pharmacological interventions
3. to undertake a cost-effectiveness analysis of non-pharmacological interventions, measured in terms of the incremental cost per unit improvement in agitation
4. to construct a cost-effectiveness model of a non-pharmacological intervention for reducing agitation in adults with dementia.

To achieve the third aim we:

1. undertook an analysis of health and social care costs associated with agitation
2. undertook an analysis of the change in health-related quality of life associated with agitation.

These analyses used data from our 54-month longitudinal cohort study of patients with Alzheimer's disease from London and the south-east region of the UK [London and the South-East Region – Alzheimer's Disease (LASER-AD)].

Results

Included and excluded studies

One hundred and sixty out of 1916 records fitted our inclusion criteria. We discuss the 97 (61%) higher-quality studies (levels 1b, 2b and 2c) in more detail.

Interventions with evidence to support their efficacy: working with the person with dementia

Activities

Ten studies implemented a group activity, of which three studies individualised the activities.

- Activities in care homes reduce agitation levels and decrease symptomatic agitation in care homes while in place: SES = –0.8 to –0.6.
- There is no evidence for those who are severely agitated or who are not in care homes.
- Individualising activities does not make significant additional reductions in agitation.

Music therapy using a specific protocol

Ten studies of group music therapy followed a specific protocol; they were led by a trained therapist and included specific content such as a warm-up of a well-known song, and a period of listening to, followed by joining in with, music.

- In care homes, music therapy by protocol is effective for decreasing agitation levels immediately, but has no long-term effect: SES = –0.8 to –0.5.
- There is no evidence for people with severe agitation. There is minimal evidence outside care homes.

Sensory interventions

Sensory interventions included massage, multisensory stimulation and 'therapeutic touch' (healing-based touch focusing on the whole person).

- Sensory interventions significantly improved all levels of agitation during the intervention: SES = –1.3 to –0.6.
    - This did not affect activities of daily living in the two higher-quality studies, although one lower-quality study found a positive effect.
- Therapeutic touch has no added advantages.
- There is insufficient evidence about long-term effects or in settings outside care homes.

Interventions with evidence to support their efficacy: working through paid caregivers in care homes

Training paid caregivers in person-centred care or communication skills or dementia care mapping, with supervision

We grouped together person-centred care, communication skills training and DCM with supervision (ongoing advice in implementation).

Communication or person-centred care skills

- There is convincing evidence from high-quality studies that training *and supervising* paid caregivers in communication or person-centred care skills is effective for symptomatic and severe agitation, immediately and up to 6 months after: SES = –1.8 to –0.3.
- There is preliminary evidence of overall agitation levels reduction in care homes and supported living residences, but no evidence in other settings.

Dementia care mapping

- Dementia care mapping is effective immediately and over 4 months for severe agitation in care homes, but there is no evidence about emergent agitation or in other settings: SES = –1.4 to –0.6.
- There was no effect on the quality of life of people with dementia.

Interventions with the person with dementia without evidence of efficacy

Light therapy

A meta-analysis of the three light therapy studies using the Cohen-Mansfield Agitation Inventory (CMAI) found no overall effect: SES 0.045 (95% credible interval –1.228 to 1.468), consistent with individual studies.

- Bright-light therapy does not improve symptomatic or severe agitation in care homes.

Home-like care

Four large studies evaluated small-group living for people with dementia.

- Moving people with dementia into home-like care does not reduce, and may increase, agitation. This worsens over time.

Aromatherapy

All six aromatherapy studies were in care homes.

- There is good evidence from high-quality studies that aromatherapy does not improve agitation.
- It did not improve quality of life.

Interventions with too little evidence to make definitive recommendations

Training family caregivers in behavioural management for people with dementia living at home

- There is evidence that teaching behavioural management techniques to family caregivers does not improve severe agitation, either immediately or in the longer term.
- There is insufficient evidence to evaluate it for reducing overall agitation levels.

Education in cognitive–behavioural therapy for family caregivers

There were three studies of training family caregivers in CBT, two of which were with people with severe agitation. None found significant improvements.

- There is lack of evidence of efficacy for teaching family caregivers CBT to treat agitation.

Music therapy without a specific protocol

The 11 studies on music therapy without a specific protocol were all in care homes and typically of lower quality.

- It is unclear whether or not music therapy without a protocol is therapeutic for agitation.
- There is no evidence for longer-term or for severe agitation.

Exercise

All four exercise intervention studies were in care homes and of low quality.

- There is no convincing evidence that exercise is a therapeutic intervention for agitation, but the studies' low standard precludes confident conclusions.

Training programmes for caregivers without supervision

Training in communication skills and person-centred care was not effective without supervision.

- Training staff without supervision seems to be less effective than with supervision.

Changing the environment

Four small studies tested environmental interventions (8–24 participants).

- Studies of environmental interventions are too small and disparate to draw conclusions.

Dementia-specific therapies

Two studies of cognitive stimulation therapy and one of validation therapy found no significant decrease in agitation.

- There is too little evidence to make recommendations on dementia-specific therapies; they are not designed primarily to improve agitation.

Pet therapy

Three small studies considered pet therapy, using both real and simulated animals, with mixed results.

- There is too little evidence to make recommendations about pet therapy for agitation.

Mixed interventions

- There is not enough evidence to make recommendations on simulated presence therapy, wayfinding or mixed activities.

Secondary outcomes

Four included studies also reported on functioning, and seven on quality of life; the findings were mixed but, overall, few interventions showed either improvement in either.

Health economic analysis

We identified two previous cost and cost-effectiveness studies of non-pharmacological interventions for reducing agitation in adults with dementia, of low to middle quality, providing little information on the cost-effectiveness of interventions in a UK context. The review revealed little pre-existing evidence to inform our cost-effectiveness model.

We calculated the costs of 30 interventions that had a significant impact on agitation. Costs ranged from £80 to £696 (activities), from £13 to £27 (music therapy), from £3 to £527 (sensory interventions) and from £31 to £339 (training and supervising paid caregivers in person-centred care or communication skills, with or without behavioural management training, and DCM). Among the 11 interventions that were evaluated using the CMAI, the incremental cost per unit reduction in CMAI score ranged from £162 to £3480 for activities, £4 for music therapy, from £24 to £143 for sensory interventions and from £6 to £62 for training and supervising paid caregivers in person-centred care or communication skills, behavioural management training or DCM.

Using LASER-AD study data, we found that, after adjusting for sex, age, cognitive impairment, follow-up and individual clustering, NHS and Personal Social Services (PSS) costs increase with Neuropsychiatric Inventory (NPI) agitation scores, from around £7000 over 3 months with non-clinically significant agitation symptoms up to around £15,000 at the most severe levels of agitation. The 95% CIs are wider at higher NPI agitation scores, possibly due to the smaller number of observations. We also found that, after adjusting for sex, age, cognitive impairment and individual clustering, there is some evidence that Dementia Quality of Life-Proxy-U (DEMQL-Proxy-U) scores decline with increasing NPI agitation scores, from around 0.75 with clinically non-significant agitation symptoms to around 0.65 with the most severe agitation. The 95% CIs overlap, however, and there is not a clear trend between the lowest and highest NPI agitation scores, possibly due to the relatively small number of observations.

We constructed a new cost-effectiveness model to evaluate interventions for reducing agitation in dementia. It can evaluate interventions that impact on NPI agitation scores. In an illustrative example, we found that a multicomponent intervention in participants with mild to moderate dementia had a positive

monetary net benefit: an 82.20% probability of being cost-effective at a willingness to pay for a quality-adjusted life-year of £20,000 and a 83.18% probability at a value of £30,000.

Discussion

Training paid caregivers in person-centred care, communication skills and dementia mapping *with supervision* during implementation is efficacious for significant agitation at implementation and for some months after. All three interventions seek to communicate with people with dementia, and to understand and fulfil their wishes and needs. The SESs were clinically significant, suggesting similar efficacy.

Activities, sensory intervention and music therapy by protocol all prevented worsening agitation during the intervention but longer-term effects are unknown; sensory interventions are also useful for clinically significant agitation. Theory-based activities (neurodevelopmental and Montessori education) were more expensive (£590–696) than general pleasant activities (£173–274).

Aromatherapy, light therapy and home-like care do not appear to be clinically effective. There were few level 1 studies; lack of evidence is not evidence of lack of efficacy.

Some interventions may be helpful in preventing agitation from developing or worsening but impractical in clinically significant agitation. This is the first review to consider this.

We recommend the development and evaluation of a manual-based training for staff in care homes for long-term implementation of interventions with evidence for efficacy. Effective interventions to reduce agitation in people with dementia living in their own homes are needed. Health economic evidence is sparse and further research is required.

Study registration

This study is registered as PROSPERO no. CRD42011001370.

Funding

The National Institute for Health Research Health Technology Assessment programme.

Chapter 1 Introduction

The frequency of dementia will rise dramatically over the next 20 years as a result of increased longevity. In the UK, 820,000 people are currently living with dementia (> 1% of the entire UK population) and dementia care is currently estimated to cost £23B per year.[1] The number of people with dementia is projected to reach over 1 million by 2020 and double again in the subsequent 20 years. Costs are expected to treble in the next 30 years as the number of older people increases.[2,3] For comparison, the entire NHS budget was £110B in 2009.[4] Dementia affects not only the person with the illness, but also his or her family and society. The Alzheimer's Society Dementia UK report found that current levels of services and support for people with dementia and families are inadequate.[2] This impacts on patients and families as well as the UK economy, as it can result in breakdown of care at home and, therefore, in institutionalisation.[5,6] The National Audit Office recently emphasised the need to 'spend to save' on dementia care, reducing crises and resultant institutionalisation. The National Dementia Strategy outlines 10-year plans to increase the detection of dementia (currently only 30% of people living with dementia are ever diagnosed) and improve the quality of care for people with dementia and their carers.[3] In the NHS Operating Framework (published 21 June 2010), the Secretary of State for Health named dementia as one of two priority areas for the NHS, with the implementation of the National Dementia Strategy central to these plans.[7] In March 2012, David Cameron launched the Prime Minister's challenge on dementia. This sets out renewed ambition to build on progress made through the National Dementia Strategy. He cited dementia as his personal priority.

While the core symptom of dementia is cognitive deterioration, agitation is a common, persistent and distressing neuropsychiatric symptom in people with dementia. Agitation may be defined as inappropriate verbal, vocal or motor activity which is not judged by an outside observer to be an outcome of need.[8] The term encompasses physical and verbal aggression.[9] Common symptoms are restlessness, pacing, verbal insults, shouting and physical aggression.

Agitation is one of the most common neuropsychiatric symptoms in dementia, with nearly half of the participants in a representative prevalence study having some symptoms of agitation in the previous month.[9,10] About 80% of those with clinically significant symptoms remained symptomatic 6 months later, and this was more likely where the agitation was initially more severe.[10] In one large study, 41% of people with severe dementia were classified as agitated.[11] A recent review reported that 10–52% of people living in 24-hour care and 19–51% of people with dementia in the community exhibited verbal agitation, one of the most common types of agitation.[12]

Three subtypes of agitation have been identified: (1) physically non-aggressive behaviour, such as wandering or trespassing in inappropriate places; (2) physically aggressive behaviour, such as hitting and kicking; and (3) verbally or vocally agitated behaviour, such as repeating words or questions, demanding constant attention, shouting, or verbal aggression.[13] The term 'agitation' may also include wandering.[14]

The impact of agitation can be devastating for people with dementia, as well as for their family and for paid carers. The socioeconomic impact is also huge. For the person with dementia, it has been associated with poor quality of life.[13,15] This may result directly from the agitated feelings and resultant behaviour, which often occurs several times per hour, occupying a considerable proportion of their day.[16] Agitation also affects relationships within the family and is often associated with feelings of helplessness, anxiety and anger among carers and others.[17] In addition, agitation and associated symptoms predict nursing home admission[5] and can also result in greater use of restraint and psychotropic drugs.[18]

Reduction in quality of life for the person with dementia may be due not only to the agitation itself, but also to strategies implemented with the intention of managing the agitation. Carers tend to isolate and overmedicate people with agitation in long-term care facilities; the distress caused to the nursing staff can influence the quality of their care to people with agitation and other residents.[16]

The currently accepted approach to good management of agitation in dementia begins by considering its underlying cause(s) and treating these (e.g. pain or delirium or constipation) where possible.[19] Psychological and social treatments should be considered before resorting to drug treatments.

Agitation is, however, often difficult to manage and, while the use of psychotropic medication is discouraged, professionals often struggle to implement effective alternative treatment plans. The 2006 National Institute for Health and Care Excellence (NICE) dementia guidelines recommended a range of non-pharmacological interventions, including aromatherapy, music therapy, dance therapy, animal-assisted therapy and multisensory stimulation, but the evidence for many of these is currently unclear.[20] A previous Health Technology Assessment (HTA)-commissioned systematic review found no conclusive evidence to justify recommending any non-pharmacological interventions for reducing wandering behaviour (which, as previously stated, may be regarded as a form of agitation).[14]

The potential importance of non-pharmacological approaches has increased because of growing concern regarding the undesirable effects of drug treatments for agitation such as the atypical antipsychotics. In 2004, the Committee on the Safety of Medicines recommended that risperidone (Risperdal®, Janssen-Cilag) and olanzapine (Zyprexa®, Eli Lilly) should not be used for treatment of non-psychotic symptoms in dementia because of increased risk of cerebrovascular adverse events and death.[21] Recent meta-analyses found modest benefits in the treatment of aggression (best evidence for risperidone, followed by aripiprazole) but increased risk of cerebrovascular events and death.[22–24] The 2006 NICE dementia guidelines recommend limiting the use of antipsychotic medication, for treating agitation in people with dementia, to those whose behaviour was causing significant distress.[25] The use of both antipsychotics[26] and benzodiazepines[27]in dementia has been associated with increased cognitive decline. Both classes of drug are currently commonly prescribed to manage agitation. Cholinesterase inhibitors seem to be ineffective; there was no significant difference between groups when 272 patients with Alzheimer's disease and agitation unresponsive to psychological treatment were randomised to either donepezil 5–10 mg (Aricept®, Pfizer) or placebo.[28] A 2009 UK government-commissioned review found that only 20% of the 180,000 UK dementia patients prescribed antipsychotics benefited from them, and antipsychotic overprescribing has been linked to 1800 excess deaths per year.[29] The review concluded that it should be an NHS priority to reduce antipsychotic use in people with dementia by two-thirds over the next 3 years.

Our search of core databases of systematic reviews, namely the Database of Abstracts of Reviews of Effects (DARE), HTA and the Cochrane Database of Systematic Reviews (CDSR), identified four reviews focusing on non-pharmacological treatment of agitation in dementia over the past 10 years. These were a recent systematic review of non-pharmacological interventions for agitation in dementia, a review of behavioural interventions and two reviews of music therapy.[30–33] The first of these is a well-conducted review but it included evidence only up to 2004 and limited the review to randomised controlled trials (RCTs) and those written in English or Korean.[31] It therefore did not include recent large RCTs of psychological interventions. It also did not consider cost-effectiveness. It concluded that the trials were small but only sensory interventions showed evidence of benefit. The other three papers did not state predefined inclusion criteria in terms of study design and also did not specify either outcome or validity measures.

Our previous systematic review, considering psychological approaches to all neuropsychiatric symptoms in dementia, included all other such symptoms, as well as agitation.[20] We found that overall psychoeducation for carers and behavioural management techniques for managing neuropsychiatric symptoms were effective treatments whose benefits lasted for months. Music therapy (and possibly other sensory stimulation approaches) were useful during the treatment session but had no longer-term effects; and interventions that changed the visual environment looked promising. A more recent, very broad review of interventions for agitation selected 47 trials of pharmacological and non-pharmacological treatment for consideration and concluded that the best evidence for effective non-drug treatment was for aromatherapy, although all trials were small and of short duration (< 4 weeks).[34]

There is an urgent need for an up-to-date systematic synthesis of evidence from studies exploring non-pharmacological management of the broader range of related, and often comorbid, behaviours encompassed by the term 'agitation'. Consistent evidence-based management of agitation could improve the quality of life of people with dementia and their carers and also be cost-effective. It might relieve the person's distress, decreasing unnecessary sedation associated with the inappropriate use of medication, and enabling people with dementia to engage in more positive relationships and activities. It could also delay institutionalisation. The National Dementia Strategy anticipated at least a 6% decrease in institutionalisation as a result of early detection and diagnosis of dementia when assessing the cost of implementation.[3] Prompt and effective management of agitation may increase this benefit.

Chapter 2 Review question

Which non-pharmacological interventions are clinically effective for reducing agitation in adults with dementia, considering the following: dementia severity; setting; whether the intervention is with the person with dementia, their carer, or both; and whether any beneficial effects are immediate or longer term?

Chapter 3 Methods

Protocol

We developed a protocol for the review based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria.[35] Our protocol is registered with PROSPERO (no. CRD42011001370) and can be accessed at www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42011001370.

Identification of studies

Search dates

Searches were carried out between 9 August 2011 and 12 June 2012.

Search terms

The search terms were agreed in consultation with carer representatives and professionals from a range of older adults disciplines. We searched Web of Knowledge (encompassing MEDLINE); beginning on 9 August 2011; second search: 12 June 2012 using search terms: (agitation OR restless* OR irrita* OR aggression OR "aberrant motor behav*" OR "psychomotor activity" OR "challenging behav*" OR pacing OR sundowning OR wander* OR "walking about" OR "safe walking") AND (dement* OR alzheimer OR "vascular dement*" OR "pick's disease" OR huntington OR creutzfeldt OR cjd OR binswanger OR lewy) AND ("randomised control* trial*" OR RCT OR cohort OR observational OR intervention OR "single blind" OR "double blind" OR evaluation OR comparative OR pretest OR "post test"). We then searched Web of Knowledge (incorporating MEDLINE); EMBASE; British Nursing Index; the HTA programme database; PsycINFO; NHS Evidence (16 January 2012); System for Information on Grey Literature (6 December 2011); The Stationery Office Official Documents website; The Stationery National Technical Information Service (27 February 2012); Cumulative Index to Nursing and Allied Health Literature (CINAHL) (17 January 2012); and The Cochrane Library (13 April 2012). Reference lists of included papers and relevant reviews were searched by hand, and all authors of included papers were contacted, where possible, to ask if they knew of other relevant studies.

Study selection

Inclusion and exclusion criteria

We defined agitation as having a behavioural component. Anger, for example, was included only when expressed behaviourally, as opposed to exclusively by report that someone was thought to be feeling angry. We included papers in any language and commissioned translations into English as necessary.

Our inclusion criteria were:

- studies evaluating a psychological, behavioural, environmental or sensory intervention that aimed to manage agitation
- studies with a comparator group reported, either a separate group or a before/after comparison (within subjects)
- studies with agitation results reported as a quantitative outcome, or one could be generated from the data provided
- studies in which all participants had dementia, or those with dementia were analysed separately
- studies in which no people with dementia in the sample were aged < 50 years.

We excluded interventions in which every individual was given psychotropic drugs to control agitation or some participants only had medication but not any other type of intervention, unless they were separated out in the analysis.

Data extraction

We assessed reliability of the exclusion procedure by GL and LK independently screening the first 20 papers in our search to decide whether or not they should be included and then comparing their decisions. No paper was excluded incorrectly, thereby confirming satisfactory reliability of our exclusion process. LK and ELH screened all abstracts and extracted the data from the papers. Data extracted included methodological characteristics of the study, descriptors of the intervention, whether the intervention was with the person with dementia, with family carers or with staff, statistical methods used, details of relevant outcome measures, length and time of follow-up, place of intervention, dementia severity and diagnostic details, and summary outcome data (immediate and longer term).

Quality assessment

We assessed validity by operationalising the Centre for Evidence-based Medicine (CEBM) (www.cebm.net/index.aspx?o=1025, accessed on 13 July 2012) RCT evaluation criteria. We have used this method before.[20,36–38] The papers were independently rated for quality by two raters and difficulties in rating were discussed with the senior author or statistician. Each study was given an arithmetic score out of 14 and we have explained how this was done in detail below. Scoring criteria were as follows:

1. Power calculation (yes, 1 point; if yes but not related to agitation, 0.5 points).
2. Were all the full details of the power calculation given (including estimates used, e.g. size of the clinically important effect to be detected, drop-out/non-compliance rates)?; relevant justification (i.e. appropriate references or clinical arguments) – justification should be provided for the effect size considered; chosen levels of significance and power; methods/formula/software used with reference (1 point for all or all excluding last, 0.5 for intermediate information provided, 0 for none).
3. Power of the study to detect a significant effect on agitation (1 point).
4. Blinding of participants (1 point).
5. Blinding of raters (1 point).
6. Intention to treat (1 point) or completer analysis (0 points).
7. Randomised controlled trial (1 point) or non-randomised study (0 points).
8. Description and adequacy of randomisation (if researchers have any control over randomisation) (1 point) OR, if non-randomised, whether the intervention and control group are comparable (possible confounders considered were severity of dementia, whether living at home or in a care home, and severity of agitation) (1 point); follow-up rate at primary outcome time (80% + 1 point; 60 < 80% 0.5 points); whether or not all participants are accounted for (1 point).
9. Validity of outcome measures (0.5 for validated for any population, 1 for validated for this population).
10. Reliability of outcome measures (1 point).
11. Reliability of the dementia diagnosis [*Diagnostic and Statistical Manual for Mental Disorders* (DSM), *International Classification of Diseases*, clinical semistructured instrument – do not require scan (1 point)].
12. Were appropriate methods used for statistical analysis? (1 point).
13. Were all participants accounted for? (1 point).
14. Were > 80% of participants retained in the study at 1-month follow-up? (1 point).

Power

We took the conventional measure of 80% power to be adequate. Where papers used a 90% power rating but only achieved between 80% and 90% power, we considered this sufficient power to get a point. If a study achieved sufficient power at baseline and not at the primary follow-up time, but used an intention-to-treat analysis, we awarded the sufficient power point. If participant numbers were within 5% of their power calculation, then we still awarded the sufficient power point.

Reliability and validity of outcome measures

We awarded the reliability point on the basis of inter-rater reliability, and did not mark down if test–retest reliability was not reported. We took an inter-rater reliability of 0.6 to be sufficient, as this is considered substantial by Landis and Koch.[39] We took a liberal view of studies where validated scales had been modified, and reported how they actually used the measure. If, for example, they changed the time period that the scale was used for in order to measure the immediate effect of an intervention, for example changing the Cohen-Mansfield Agitation Inventory (CMAI) to reflect the previous hour rather than the previous 2 weeks in order to assess the effect of a bathing intervention, we regarded this as valid. However, if the instrument was modified so that it could no longer detect change, but only whether or not a symptom was present, for example changing CMAI to yes/no rather than seven-point Likert scale, then we did not consider this as validated. When more than one scale had been used to measure agitation as the primary outcome, and one or more of these were validated and/or reliable, a score of 0.5 was awarded for either or both categories, respectively. Where a study used a validated measure of agitation as their primary outcome, but also reported non-validated measures, then we disregarded the secondary outcome to award the full point for validity.

Randomised controlled trials

We analysed the data in accordance with the design that was actually used rather than the one stated. For example, where a randomised design was used but the intervention was not compared with the control group, we considered this a within-subjects design.

Randomised controlled trials which fulfilled the following criteria were judged to be 'high-quality RCTs':

1. randomised
2. at least single blind
3. follow-up rates of 80%
4. intention-to-treat analysis
5. sufficiently powered
6. validity of outcome measures
7. findings reported with relatively narrow confidence intervals (CIs).

Blinding

Where assessor blinding was not possible but the study controlled for systematic bias in other ways (e.g. establishing inter-rater reliability between a subset of blinded and unblinded assessments), then we gave them the point. As blinding is often compromised within psychological studies, we awarded the point as long as blinding had been attempted, and had not completely failed. Where two raters were used and only half were blinded (e.g. a non-blinded rater assessing the immediate effects of an intervention by being present while it was administered, and a blinded rater assessing any follow-up effects), we awarded half a point. We awarded a point for blinding in studies of aromatherapy only where some effort had been made to disguise the smell, for example where raters had to wear nose clips.

Appropriate statistical methods

Where one-tailed statistical tests were used but not justified, and a non-significant result was found, we gave only half a point for appropriate use of statistics. Where results were significant and we had sufficient data, we reanalysed using a two-tailed test, and used the resulting *p*-value rather than the one in the original paper. As we had reanalysed the data, in this case we gave the full point for appropriate statistics.

Where wholly inappropriate statistics were used, for example using nine *t*-tests without correction with a sample of 12, or an inappropriate statistical test was selected as the primary form of analysis, we did not award a point. If cluster adjustments should have been made but had not been, but otherwise the statistics were appropriate, we awarded half a point for appropriate use of statistics.

Follow-up rates

For the purpose of scoring follow-up rates, we considered patients to be in the study from the time of randomisation for RCTs, or first assessment from non-randomised trials.

The researchers then assigned a level of evidence from the CEBM as follows:

- Level 1b: high-quality RCTs. These all scored ≥ 10, were single or double blind, with validated outcome measures.
- Level 2b: lower-quality RCTs and higher-quality non-randomised studies (scoring ≤ 11).
- Level 2c: moderate-quality non-randomised studies (scoring 6–9).
- Level 4: these scored < 6. They were not RCTs.

Other levels of evidence were not relevant to our study as they referred to excluded research: 1a, 2a and 3a refer to systematic reviews, 1c and 3b refer to case studies, and level 5 refers to expert opinion.

Risk of bias

Individual study level

The CEBM tool for assessing validity of RCTs, described in detail above in the quality assessment section, allowed us to assess the relative likelihood of a range of biases, including but not limited to selection, attrition and detection bias, in any study; a higher score indicated fewer sources of possible bias than those with lower scores.

Across the studies

We intended to assess publication bias using a funnel plot; however, owing to the heterogeneity of the studies in terms of intervention, outcomes measured and quality, this was not possible. Instead, a comparison between the findings of the higher-quality (levels 2c and above) and the lower-quality (level 4) studies was made.

We attempted to avoid selection bias by:

- searching both major and minor databases and the grey literature, and doing this twice so as not to miss the most recently published works
- writing to all authors to enquire about extra papers and unpublished works
- eliciting expert opinion about extra papers and unpublished works
- searching references of relevant reviews
- translating papers into English from other languages.

We attempted to avoid reviewer bias by:

- working in accordance with our published protocol's predefined criteria for inclusion of studies
- assessing inter-rater reliability with regard to inclusion of papers as described above in *Data extraction*
- having two independent researchers rate each paper for quality separately.

Categorisation of the intervention

LK, ELH and GL reviewed the details of the interventions, in order to categorise them. If we judged that the interventions were similar but with different labels given, we categorised them together, for example training in person-centred care or communication skills with people with dementia. The categories we used were:

- activities
- music therapy (protocol driven and general)
- sensory interventions (all involved touch, and some included additional sensory stimulation, e.g. light)
- training paid caregivers in person-centred care or communication skills with supervision (both of which focused on improving communication with the person with dementia and finding out what they wanted)
- dementia care mapping (DCM): watching an individual with dementia and feeding back what they responded well to and what they did not, and then supervising an implementation of the plan
- light therapy
- home-like care
- aromatherapy
- training family carers in behavioural management
- training family carers in cognitive–behavioural therapy (CBT)
- exercise
- changing the environment
- dementia-specific therapies
- pet therapy.

Table 1 shows how these categories are organised by type of intervention. In many cases, the mode of action of the intervention is not certain, meaning that they could possibly work more than one way and fit into more than one of the 'types'. For example, training family caregivers in CBT encompasses both psychological and behavioural aspects. However, we have organised these into only one type per category for ease of understanding.

TABLE 1 Categories organised by type of intervention

Type of intervention	Categories
Psychological: pertaining to mental processes	Training paid caregivers in person-centred care or communication skills with supervision
	Dementia-specific therapies
	Training family caregivers in CBT
Behavioural: pertaining to the person's actions	Activities
	DCM
	Training family carers in behavioural management
	Pet therapy
	Exercise
Sensory: pertaining to the person's senses	Aromatherapy
	Light therapy
	Sensory
Environmental: pertaining to the person's environment	Home-like care
	Changing the environment

Level of agitation

In order to differentiate between interventions treating current agitation and those preventing emergent agitation (new onset, recurrent or increasing agitation), we separated studies according to the level of agitation of recruited participants specified in the inclusion criteria. These levels were as follows.

1. Any level of agitation, including no symptoms.
2. Some symptoms of agitation.
3. A significant level of agitation. Most papers trying to recruit participants with a significant level of agitation used a score of ≥ 39 on the CMAI[40] as demonstrating significant agitation, and so we used this as a cut-point. Where another measure of agitation was used, we considered it significant if it would equate to a score of 39 or more on the CMAI, e.g. a score of > 4 on the Neuropsychiatric Inventory (NPI).
4. Those including participants with behavioural disturbance but not specifically agitation were labelled as 'not specified'.

Data synthesis

The intervention effects, comparing either baseline with post-intervention outcome measurements or the outcome between the control and intervention groups, were estimated for studies with available data. We recalculated some results, for example studies including intervention and control groups but not directly comparing them, or where one-tailed statistical significance tests were used. We were unable to meta-analyse most studies.

Meta-analysis

We decided a priori to meta-analyse where there were at least three studies investigating homogeneous interventions using the same outcome measure which were not of very low quality (score ≥ 6). Light therapy (where three studies met these requirements) was the only intervention which fulfilled these criteria. Because outcome assessment periods differed across these three studies, it was not possible to pool the results using a standard random effects summary statistic method. Thus, we used a Bayesian random effects model with random effects for the intervention and accounting for the time of measurement of the outcome. Independent vague normal prior distributions for the fixed effects and vague uniform prior distributions for the standard deviations (SDs) of the random effects were used; these are relatively standard choices.[41] The sensitivity of the results to the assumptions of the prior distributions was evaluated by using alternative formulations (e.g. gamma and half-Cauchy priors for the SD of the random effects) and the results were not much affected.

Standard effect sizes

As we were unable to meta-analyse studies in the light of our a priori criteria for carrying out such meta-analyses, we estimated the interventions' standardised effect sizes (SESs) with 95% CI, if data were available,[42] to allow comparison across different interventions and outcomes using a common effect measure. In some studies, the outcome was measured at several time points during an intervention. In these papers, the original analyses either used multiple significance tests comparing the outcome at each time point separately, or repeated outcome measurements. As individual patient data were not available to estimate the SES incorporating the repeated measures, we used the outcome data measured at the last time point allowing time for the intervention to work. This also made the SESs estimated from these

studies comparable with those where the outcome was only measured at a single time point following intervention. We calculated the SESs and 95% CIs, comparing the outcomes between the control and intervention groups in this paper or baseline with post-intervention outcome measurements in the supplement. We reanalysed some of the studies, for example studies including intervention and control groups but not directly comparing them, or where one-tailed statistical significance tests were used. For these reasons, in some cases we have obtained a result differing from that reported in the original paper.

Chapter 4 Results

Details of included and excluded studies

Figure 1 shows the PRISMA diagram and describes the results of our search.

We found 1916 potentially relevant records; we excluded 1632 abstracts, then another 124 full papers and included 160 papers. Of these, eight papers were translated into English: three from Korean, three from German, one from Dutch and one from French. Papers were mostly from English-speaking nations, mainly the USA ($n = 77$), Australia ($n = 13$), the UK ($n = 13$) and Canada ($n = 10$). Papers were also from the following countries: Italy ($n = 7$), Taiwan, Province of China ($n = 7$), the Netherlands ($n = 6$), Republic of Korea ($n = 6$), Japan ($n = 4$), Sweden ($n = 4$), China/Hong Kong ($n = 3$), Germany ($n = 3$), France ($n = 2$), Islamic Republic of Iran ($n = 2$), Iceland ($n = 1$), Israel ($n = 1$) Norway ($n = 1$) and Spain ($n = 1$).

One hundred and four (88 first and 16 second) authors were contacted, who suggested 73 papers, of which 25 were included and 48 were excluded.

The methodological characteristics (whether comparison is between a separate control group or the same people before and after; participants' agitation level), quality ratings, design, interventions, SESs (95% CIs) for outcomes if calculable or specified as not calculable, and outcomes of the 97 out of 160 (61%) included studies rated as high quality are described in the tables of this chapter. Lower-quality papers are described in *Table 13*. Studies demonstrating significantly effective interventions are highlighted in bold and those of interventions that significantly worsened agitation are in green. The results for each category are summarised in the text. Details of each study's quality score for those rated 2c and above are shown in *Appendix 1*. Details of excluded studies and reasons for exclusion are reported in in *Appendix 2*.

Seventy-one of the included studies did not record the type of dementia, 54 specified a mix of dementia but did not analyse each type separately, and 35 specified Alzheimer's disease only. Fifteen studies rated 2c and above had outcome measures that were either invalid ($n = 8$), unreliable ($n = 2$) or both ($n = 5$). The effect of removing these from the analysis is reported in *Appendix 3*.

Findings of the review

An overview of the findings of the review is given in *Table 2*.

Interventions with evidence to support their efficacy

Working with the person with dementia

Activities

Details of activity, quality of study and outcome can be seen in *Table 3*.

Ten level 1 and 2 studies implemented a group activity, of which three studies tested the additional effect of individualising the activities. All participants were in care homes, except for one study where some participants were recruited from a day centre and others from a care home.[52] No study required participants to have symptoms of agitation to be included.

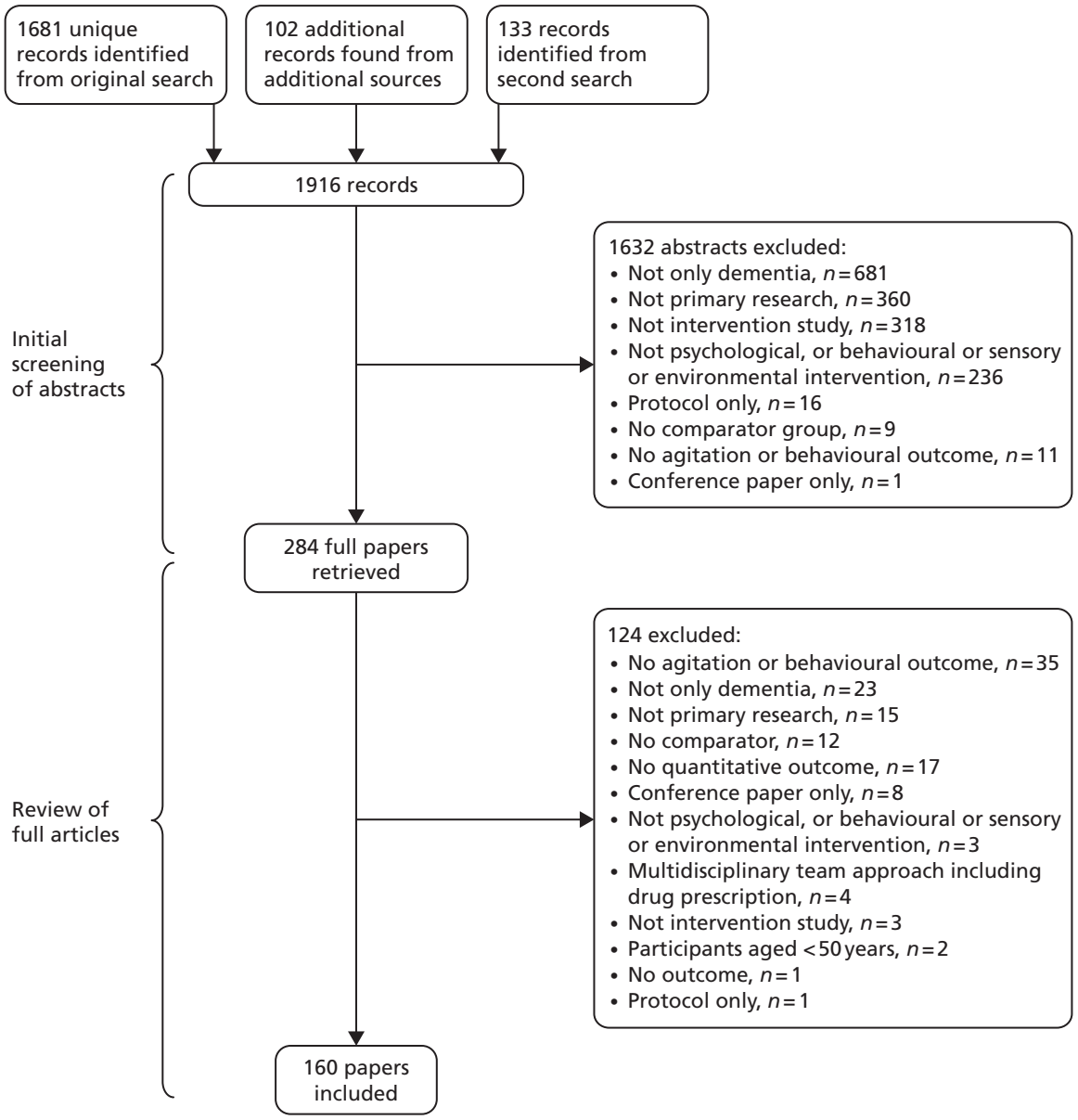


FIGURE 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses diagram.

Some interventions consisted of only one activity, for example cooking groups, while others encompassed a variety of activities. Individualised activities meant that the investigators chose from a list of potential activities and matched them to an individual's interests and cognitive level, and these could take place either in a group or individually. Two high-quality papers did not find any additional effects of individualising activities,[50,51] although one lower-quality paper did.[52] Standard activities reduced emergent (new-onset) symptoms of agitation, and decreased agitation in care homes during the time they were in place.[43–49] The SES was calculable in two studies and was significant in both, with a reduction in symptoms ranging from –0.6 to –0.8. Only two studies measured agitation after the intervention period, at 1-week and 4-week follow-up, and neither showed a difference.[48,50]

- Overall, activities in care homes reduce emergent agitation and decrease symptomatic agitation in care homes during the time they are in place.
- Individualising activities does not appear to make significant additional reductions in agitation.
- There is no evidence for those who are severely agitated or who are not in care homes.

TABLE 2 Overview of findings of the review

Findings	SES range
Interventions with evidence of efficacy	
Working with the person with dementia	
Activities	–0.8 to –0.6
Music therapy using a specific protocol	–0.8 to –0.5
Sensory interventions	–1.3 to –0.6
Working through paid caregivers in care homes and assisted living settings, with supervision	
Person-centred care and communication skills	–1.8 to –0.3
Dementia care mapping	–1.4 to –0.6
Behavioural management and communication skills	Not calculated
Interventions with no evidence of efficacy	
Working with the person with dementia	
Light therapy	Not applicable
Home-like care	
Aromatherapy	
Interventions with too little evidence to make definitive recommendations	
Working with family caregivers in the home of the person with dementia	
Training family caregivers in behavioural management	Not applicable
Training family caregivers in CBT	
Working with the person with dementia in a care home	
Music therapy not following a specific protocol	Not applicable
Exercise	
Dementia-specific therapies	
Pet therapy	
Working through paid caregivers in care homes, without supervision	Not applicable
Changing the environment	Not applicable
Mixed interventions	Not applicable

TABLE 3 Activities: effect on immediate and longer-term agitation

Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)	Mean cost per person with agitation (2011 £)
Kovach *et al.*, 2003[43]	USA	RCT	Some	2b	7.5	78	Varied activities matched to arousal level (e.g. music, exercise, storytelling)	Usual care	Significant improvement in visual analogue scale of agitation	NC	None	NC	378
Lin *et al.*, 2009[44]	Taiwan, Province of China	RCT	Some	2b	6	133	28 sessions of Montessori activities	Presence (having researcher present)	Significant improvement	NC	None	NC	372
Lee and Kim, 2008[45]	Republic of Korea	Within subjects	Some	2c	7	23	56 indoor gardening sessions	No	Significantly improvement	–0.8 (–1.4 to –0.2)	None	NC	274
Buettner and Ferrario, 1997[46]	USA	RCT	None	2b	7	66	30 weeks of neurodevelopmental sequenced activities (e.g. cooking group), frequency unclear	Usual care including activities	Significantly improved at two time points but not third	NC	None	NC	696
Fitzsimmons and Buettner, 2002[47]	USA	RCT	None	2b	7	29	Six to 10 sessions of a range of individualised activities (e.g. cooking)	Crossover: usual care	Significant improvement	–0.6 (–1.0 to –0.2)	None	NC	173
Buettner *et al.*, 1996[48]	USA	RCT	None	2b	7	36	12 sessions of neurodevelopmental sequenced activities (e.g. cooking group)	Crossover: similar non-sequenced activities	Significantly improved during session, but not on overall weekly measures	NC	NS (4 weeks)	NC	590

Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)	Mean cost per person with agitation (2011 £)
Fitzsimmons and Buettner, 2003[49]	USA	RCT	None	2c	7	12	10 sessions of a cooking group	Usual care group not analysed	Significant improvement vs. baseline	NC	None	NC	203
Kolanowski *et al.*, 2011[50]	USA	RCT	Some	1b	13·5	128	15 sessions activities adjusted or opposite to both skill level (FL) and interest (PSI): FL (+ opposite PSI) PSI (+ opposite FL) FL + PSI	Opposite FL + PSI	NS	FL: 0.2 (–0.3 to 0.7) to PSI: 1.5 (0.9 to 2) PSI + FL: 1.0 (0.4 to 1.5)	No differences (1 week)	NC	NC
Kolanowski *et al.*, 2005[51]	USA	Within subjects	None	2b	10.5	30	36 sessions of activities matched to both skill level/ interest	Activities matched only to skill level or interest	NS	PSI: –0.2 (–0·7 to 0·4) PSI + FL: –0·1 (–0·6 to 0.4)	None	NC	NC
Cohen-Mansfield *et al.*, 2006[52]	USA	RCT	None	2b	6	105	Five sessions of activity matched to self-identity roles	Standard activities	Significant improvement	NC	None	NC	80

FL, (matched to) functional level; NC, not calculated; NS, not significant; PSI, (matched to) interest only; PSI + FL, (matched to both) interest and FL.

Music therapy using a specific protocol

Details of therapy, quality of study and outcome are given in *Table 4*.

There were 10 studies of group music therapy following a specific protocol; these were led by a trained therapist and, for example, included a warm-up of a well-known song, and a period of listening to, followed by joining in with, music.[53–62] All took place in care homes, except one which was in a day centre.[61] A reasonable-quality study of music therapy for people with some symptoms of agitation found a significant improvement in the intervention group during the time of the intervention, while two others did not. The largest study included participants irrespective of whether or not they were agitated, and found that music therapy, twice per week for 6 weeks, improved the mean level of agitation symptoms.[44] Three studies considered the longer-term outcome in periods ranging from 3 to 8 weeks, and none found that it continued to be effective.[53,56,60] As the SES was calculated using only the first and last time periods for papers with multiple time points, some of our results differ from the original papers. They ranged from –0.5 to –0.8.

- In care homes, music therapy by protocol is effective for emergent agitation and decreasing symptomatic agitation, but has no long-term usefulness in agitation.
- There is no evidence for people with severe agitation. There is minimal evidence outside care homes.

Sensory interventions

Details of sensory interventions are given in *Table 5.*

Sensory interventions target perceived understimulation of the person with dementia, and ranged from those focused purely on touch, such as massage, to multisensory interventions involving tactile, light and auditory stimulation, such as 'snoezelen'. All 13 studies took place in care homes. Some used 'therapeutic touch,' which was defined as a healing-based touch intervention designed to focus on the person as a whole. Trials of therapeutic touch found no significant improvements relative to other touch interventions.[65,67,68] There was one large trial that did not specify presence of agitation as an entry criterion, which showed significant improvement.[74] The studies with participants with symptomatic and clinically significant agitation also showed an improvement compared with usual care.[44,63,66,69–73] The SES ranged from –0.6 to –1.3. There were three studies which looked at outcomes between 1 and 3 weeks later: two found no improvement and one found a significant reduction.

Secondary measures

One study assessed the effect of sensory interventions on functioning using the Katz Index of Activities of Daily Living scale, and did not find significant effects.[69]

- Sensory interventions significantly improved emergent agitation, symptomatic agitation, and severe agitation during the time the intervention took place.
- Therapeutic touch has no added advantages.
- There is insufficient evidence about long-term effects or in settings outside care homes.

Working through paid caregivers in care homes and assisted living settings

Details of training paid caregivers in person-centred care or communication skills with or without behavioural management training, or DCM with supervision, are given in *Table 6*.

As person-centred care, communication skills training and DCM all seek to change the caregiver's perspective, communication with and thoughts about people with dementia, and to encourage them to see and treat them as individuals rather than being task focused, we grouped them together. They all included supervision during initial training and implementation. Supervision encompasses ongoing practical and theoretical advice in implementation, rather than initial training only.

TABLE 4 Music therapy using a specific protocol: effect on immediate and longer-term agitation

Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)	Mean cost per person with agitation (2011 £)
Cooke *et al.*, 2010[53]	**Australia**	**RCT**	**Some**	**1b**	**11.5**	**47**	**Music therapy three times per week for 8 weeks**	**Reading group**	**NS (total agitation)**	**–0.9 (–1.2 to –0.6)**	**NC**	**NC**	**NC**
Sung *et al.*, 2011[54]	**Taiwan, Province of China**	**RCT**	**Some**	**2b**	**10.5**	**55**	**Music therapy twice per week for 6 weeks**	**Usual care**	**NS**	**–0.5 (–1.0 to 0.0)**	**None**	**NC**	**NC**
Sung *et al.*, 2006[55]	**Taiwan, Province of China**	**RCT**	**Some**	**2b**	**7**	**40**	**Group music with movement, twice per week for 4 weeks**	**Usual care**	**Significant improvement**	**–0.8 (–1.5 to –0.1)**	**None**	**NC**	**13**
Tuet and Lam, 2006[56]	Hong Kong	Non-randomised – crossover	Some	2c	6	16	Music therapy three times per week for 3 weeks	Usual care (crossover)	Significant worsening	NC	NS (3 weeks)	NC	NC
Lin *et al.*, 2011[57]	Taiwan, Province of China	RCT	None	2b	9.5	104	Music therapy twice per week for 6 weeks	Usual care	Significant improvement	–0.6 (–0.9 to –0.4)	Significant improvement (1 month)	–0.6 (–0.9 to –0.3)	27

continued

TABLE 4 Music therapy using a specific protocol: effect on immediate and longer-term agitation (*continued*)

Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)	Mean cost per person with agitation (2011 £)
Groene, 1993[58]	USA	RCT	None	2b	6[a]	30	Five sessions of 15 minutes of music therapy, two sessions of being read to	Five sessions of 15 minutes of being read to, two sessions of music therapy	NS	NC	None	NC	NC
Raglio *et al.*, 2008[59]	**Italy**	**RCT**	**Not specific**	**2c**	**9**	**59**	**30 sessions of music therapy over 16 weeks**	**No**	**Significant improvement**	**NC**	**NC**	**NC**	**NC**
Svansdottir and Snaedal 2006[60]	Iceland	Within subjects	None	2c	7.5	20	Music therapy three times per week for 6 weeks	No	NS (aggressiveness)	NC	NS (4 weeks)	NC	NC
Jennings and Vance, 2002[61]	**USA**	**Within subjects**	**None**	**2c**	**7**	**16**	**Music therapy once per week for 4 weeks**	**No**	**Significant improvement**	**NC**	**None**	**NC**	**24**
Suzuki, 2007[62]	Japan	Non-randomised – case-matched controls	None	2c	7	16	Music therapy including short reality orientation, twice per week for 13 weeks	Unclear but presumably usual care	NS	NC	NS	NC	NC

NC, not calculated; NS, not significant.
a Outcome measure neither reliable nor validated.
Note: studies demonstrating significantly effective interventions are highlighted in bold and those of interventions that significantly worsened agitation are in green.

TABLE 5 Sensory interventions effect on immediate and longer-term agitation

Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)	Mean cost per person with agitation (2011 £)
Moyle *et al.*, 2011[63]	Australia	Within subjects	Significant	2c	6	27	14 sessions of daily foot massage	No	Significant improvement	–0.6 (–1.2 to 0.0)	Significant reduction (2 weeks)	NC	128
Yang *et al.*, 2007[64]	**Taiwan, Province of China**	**Within subjects**	**Significant**	**2c**	**6**	**31**	**40 sessions of acupressure over 4 weeks; social contact**	**No**	**Significant improvement**	**–1.2 (–0.7 to –1.7)**	**None**	**NC**	**527**
Woods *et al.*, 2005[65]	USA	RCT	Some	2b	11	60	Therapeutic touch twice per day for 3 days	Placebo therapeutic touch; usual care	NS	NC	None	NC	NC
Remington, 2002[66]	**USA**	**RCT**	**Some**	**2b**	**11**	**51**	**Hand massage, hand massage and calming music; given once**	**Usual care**	**Significant improvement**	**Hand massage: –0.6 (–1.1 to –0.1) plus music: –1.3 (–1.9 to –0.8)**	**None**	**NC**	**3, 10**
Woods *et al.*, 2009[67]	USA	RCT	Some	2b	10	64	Therapeutic touch twice per day for 3 days	Placebo therapeutic touch; usual care	NS (vs. placebo)	NC	None	NC	NC

continued

TABLE 5 Sensory interventions effect on immediate and longer-term agitation (*continued*)

Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)	Mean cost per person with agitation (2011 £)
Hawranik *et al.*, 2008[68]	USA	RCT	Some	2b	7	51	Five sessions of therapeutic touch on consecutive days	Placebo therapeutic touch; usual care	NS (total agitation)	NC	NS (1 week, 2 weeks)	NC	NC
Staal *et al.*, 2007[69]	**USA**	**RCT**	**Some**	**2b**	**7**	**24**	**Snoezelen, duration unclear**	**One-to-one structured activity**	**Significant improvement**	**–0.3 (–0.9 to –0.3) (Pittsburgh Agitation Scale)**	**None**	**NC**	**273**
Hicks-Moore and Robinson, 2008[70]	Canada	Within subjects	Some	2b	6	32	One session each of hand massage and hand massage plus music, while agitated	No	NS	Music PA: 0.2 (–0.3 to 0.7); PN: –1.8 (–2.4 to –1.2); VA: –1.0 (–1.6 to –0.5) No music PA: –0.4 (–0.9 to 0.1); PN: –1.4 (–1.9 to –0.8); VA: –0.7 (–1.3 to –0.2)	None	NC	NC
Lin *et al.*, 2009[44]	**Taiwan, Province of China**	**RCT**	**Some**	**2b**	**6**	**133**	**28 sessions of acupressure over 4 weeks**	**Presence (researcher present)**	**Significant improvement**	**NC**	**None**	**NC**	**300**

Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)	Mean cost per person with agitation (2011 £)
Woods and Dimond, 2002[71]	**USA**	**Within subjects**	**Some**	**2c**	**8**	**10**	**Therapeutic touch twice a day for 3 days**	**No**	**Significant improvement in subscales**	**NC**	**No tests**	**NC**	**32**
Gerdner *et al.*, 2008[72]	**USA**	**Within subjects**	**Some**	**2c**	**7**	**9**	**42 sessions of craniosacral massage over 6 weeks**	**No**	**Significant improvement**	**NC**	**NS total agitation (3 weeks)**	**NC**	
Whall *et al.*, 1997[73]	**USA**	**Quasi-experimental (non-randomised, control groups)**	**Some**	**2c**	**7**	**31**	**Natural sounds/food while bathing**	**No**	**Significant improvement while bathing**	**NC**	**None**		**30**
van Weert *et al.*, 2005[74]	**Netherlands**	**RCT**	**None**	**2b**	**10**	**125**	**Snoezelen over 18 months**	**No**	**Significant improvement in aggression. PN and VA NS**	**PN –0.1 (–0.3 to –0.1) PA: –1.4 (–1.7 to –1.0) VA: –3.9 (–4.4 to –3.4)**	**None**		**109**

NC, not calculated; NS, not significant; PA, physical aggression; PN, physical non-aggression; VA, verbal aggression.

Note: studies demonstrating significantly effective interventions are highlighted in bold.

TABLE 6 Training paid caregivers in person-centred care or communication skills with or without behavioural management training, with supervision, or in DCM with supervision: effect on immediate and longer-term agitation

Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)	Mean cost per person with agitation (2011 £)
Chenoweth *et al.*, 2009[75]	**Australia**	**RCT**	**Significant**	**1b**	**11.5**	**180**	**Training plus two site visits and telephone-based supervision**	**Usual care**	**Significant improvement; restraint use. Prescriptions p.r.n. and CR quality of life NS**	**–1.4 (–1.5 to –1.3)**	**Significant improvement (8 weeks)**	**–1.4 (–1.5 to –1.3)**	**99**
McCallion *et al.*, 1999[76]	**USA**	**RCT**	**Some**	**1b**	**10**	**66**	**Nursing assistants delivered seven communication-focused sessions to family caregiver, with supervision**	**Usual care**	**Verbal agitation, physical non-aggression and irritability improved; aggression did not**	**PN: –0.6 (–1.0 to 0.3) VA: –0.7 (–1.0 to –0.3) PA: 0.1 (–0.3 to 0.4)**	**Only verbal aggression and irritability remained significant (3 months)**		**87**
McCallion *et al.*, 1999[77]	USA	RCT	Some	2b	6	105	Communication skills training with ongoing support	Partial crossover – usual care	Significant improvement in all agitation	–0.4 (–0.7 to –0.2)	Significant improvement; physical restraints improved, PRNs worsened (6 months)	–0.2 (–0.5 to 0.1)	72

Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)	Mean cost per person with agitation (2011 £)
Teri *et al.*, 2005[78]	**USA**	**RCT**	**Not specified**	**2b**	**8**	**31**	**Communication and behaviour management skills training, plus training managers to provide supervision**	**Usual care**	**Significant improvement in overall agitation 8 weeks**	**NC**	**NR**	**NC**	**339**
Hoeffer *et al.*, 1997[79]	USA	Within subjects	Some	2c	6	11	Trained in person-focused bathing with support implementing	No	None		Significant improvement in physical and verbal aggression and being upset (combined 1 and 6 months)		158
Sloane *et al.*, 2004[80]	**USA**	**RCT**	**None**	**2b**	**6**	**73**	**Trained in person-centred bathing/towel bath with support implementing**	**Crossover – usual care**	**Significant improvement for both showering and towel bath conditions**		**None**		**64, 75**

continued

TABLE 6 Training paid caregivers in person-centred care or communication skills with or without behavioural management training, with supervision, or in DCM with supervision: effect on immediate and longer-term agitation (*continued*)

Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)	Mean cost per person with agitation (2011 £)
Deudon *et al.*, 2009[81]	France	RCT	Not specified	2b	7.5	306	Training including issuing 'staff instruction cards' on BPSD, ongoing support	Usual care	Significant improvement	–0.32 (–0.48 to –0.16)	Significant improvement (20 weeks)	–0.3 (–0.5 to 1.3)	31
Chenoweth *et al.*, 2009[75]	Australia	RCT	Significant	1b	11·5	191	12 hours' DCM plus support implementing	Usual care	Significant improvement. Prescription of neuroleptic drugs/chemical restraints p.r.n., quality of life and restraint NS		Significant improvement. PRNs and restraint NS (4 months)		108
Chenoweth and Jeon, 2007[82]	Australia	Within subjects	Significant	2c	6	35	4 days' DCM plus 2 months of implementing	No	NR		Significant improvement. CG quality of life NS (4 months)		127

BPSD, behavioural and psychological symptoms of dementia; CG, caregiver; CR, care recipient; NC, not calculated; NS, not significant; PA, physical aggression; PN, physical non-aggression; p.r.n., as needed.

Person-centred care and communication skills

One large, very high-quality study of training in person-centred care found significant improvements in severe agitation both during the intervention period and 8 weeks later.[75] Three studies of improving communication skills or person-centred care, two for participants with symptomatic agitation and one without this as an entry criterion, found significant improvements in immediate agitation[76,77,80] and longer term outcome up to 6 months.[76,77,79] Similarly, in a large study where the inclusion criterion was significant neuropsychiatric problems although not necessarily agitation, there was a significant improvement during the 8 weeks of person-centred care training, and this continued at 20 weeks.[81] The SES ranged from –0.4 to –1.8.

- There is convincing evidence that training paid caregivers in communication or person-centred care skills is effective for symptomatic and severe agitation, both immediately and up to 6 months, in the care home setting.
- There is preliminary evidence that it helps to prevent emergent agitation.
- Evidence for settings other than care homes is limited.

Dementia care mapping

Two studies evaluated DCM in care homes. This is a specific intervention involving individual observation and assessment of each resident's behaviour, factors improving perceived well-being, and potential environmental triggers. The results are fed back to caregivers, who incorporate them into plan and are supported in implementing any proposed changes. It aims to change the way the unit perceives residents, so that they see them more as individuals. One large, very high-quality study built on a pilot and decreased severe agitation during the intervention period, and the effects continued for 4 months.[75,82] The SES ranged from –0.3 to –1.4.

Secondary measures

Both the pilot[82] and the main study[75] investigated our secondary measure of quality of life using the QoLAD scale, but found no significant improvement. The pilot study[82] assessed our secondary measure of function using the Functional Assessment Staging (FAST) scale but found no significant change.

- There is some evidence that DCM is effective immediately and over 4 months for severe agitation in care homes.
- There is little evidence for emergent agitation or symptomatic agitation, or in other settings.

Behavioural management and communication skills

One reasonable-quality RCT addressed behavioural problems rather than specifically agitation as their inclusion criteria, and the intervention was a combined programme of improving communication skills and behavioural management in an assisted living setting. They found significant improvements in agitation immediately after 8 weeks of training.[78]

- There is preliminary evidence that training paid caregivers in behavioural management and communication skills is effective in reducing agitation symptoms in assisted living settings in the short term.
- There is no evidence in this setting for the longer-term effects.

Interventions with evidence of no efficacy

Working with the person with dementia

Light therapy

Details of light therapy are given in *Table 7*.

Light therapy's proposed mechanism for reducing agitation involves manipulating the disrupted circadian rhythms associated with dementia, typically by 30–60 minutes of daily exposure to bright light. All 11 studies took place in care homes.[83–92] None of the high-quality studies (RCTs) found a significant improvement. Among participants with both significant and emergent agitation, the three studies with the largest samples found that agitation was made worse by light therapy.[85,89,90] Most other studies did not report a significant result. A meta-analysis of the three studies using the CMAI found no overall effect of light therapy on the CMAI [0.045 (95% credible interval –1.228 to 1.468)], which is consistent with the findings reported by the individual studies. The between-study variance for the intervention effect was estimated to be 0.83, suggesting a moderate degree of heterogeneity between the studies.

- Light therapy does not show efficacy for emergent agitation, symptomatic agitation, or severe agitation in care homes.
- There is preliminary evidence that light therapy worsens agitation.
- There is no evidence for light therapy in settings other than care homes.

Home-like care

Details of home-like care are given in *Table 8*.

Four large studies evaluated small group living for people with dementia, aiming to create a home-like environment. The homes had a maximum of eight residents, and all meals were prepared with staff and residents or family carers. The staff were a small fixed team, and the facilities resembled a domestic environment. None were able to randomise due to ethical and practical considerations, but three used comparisons of traditional nursing homes. None directly recruited participants with agitation. All studies showed increasing agitation in the intervention group over time, with three becoming significantly worse than the comparator over 12 months,[93,94,96] and the fourth showing a trend towards more agitated behaviours than control after 6 months ($p = 0.087$).[95]

Secondary measures

Two studies investigated quality of life: one used the QUALIDEM and found no significant change[93] and the other measured pleasant activities and found that participation in pleasant activities decreased less in the intervention group than in the control group.[95] This study found a significantly slower decline in functionality as measured by the FAST scale in the intervention group.

- There is good evidence that moving people with dementia into a home-like care environment does not reduce, and may significantly increase, their risk of developing agitation.
- There is good evidence that agitation increases in the longer term with home-like care, and this cannot solely be accounted for by the move itself.

Aromatherapy

All six aromatherapy studies took place in care homes. One excellent, large, blinded study found no immediate or long-term improvement for participants with severe agitation.[97] This result is similar to a small, less rigorous blinded study.[102] The results of the non-blinded studies were mixed.[98–101]

Secondary measures

Quality of life measured by the Blau Quality of Life (Blau QOL) scale was reported by the large, excellent, blinded study and found no difference between the aromatherapy condition and the control condition.[103]

In another study, functionality was measured as the percentage of time spent either constructively, or withdrawn, and the intervention group improved significantly.[99]

- There is good evidence that aromatherapy is not an effective intervention for treating agitation.
- There is no evidence for settings outside care homes.

Interventions with too little evidence to make definitive recommendations

Working with family caregivers in the home of the person with dementia

Training family caregivers in behavioural management

One very high-quality, large study found no immediate or longer-term effect (3, 6 or 12 months) of 11 sessions of training family caregivers in behavioural management of severe agitation in people with dementia living at home.[104] Of the two smaller studies of symptomatic agitation, the larger found a borderline significant improvement in agitation at 2 weeks, and the other found no effect.[105,106]

- There is preliminary evidence that teaching behavioural management techniques to family caregivers is not an effective intervention for severe agitation, both in the immediate and the longer term.
- There is not enough evidence to conclude whether it may be helpful in symptomatic or emergent agitation.

Training family caregivers in cognitive–behavioural therapy

Details of training family caregivers in CBT are given in *Table 9*.

There were three studies, of reasonable or lower quality, of training family caregivers in CBT in the home: two with people with severe agitation, and one to prevent emergent agitation. None of these found significant improvements.[107–109]

- There is no evidence that teaching family caregivers CBT is effective for treating agitation.

Working with the person with dementia in a care home

Music therapy not following a specific protocol

Details of music therapy not following a specific protocol are given in *Table 10*.

Overall, the 11 studies on music therapy without a specific protocol, which were all in care homes, had small participant numbers, and were typically of a lower quality. Three studies found no improvement in agitation, including the only two blinded studies,[66,110,116] and one found an increase in agitation.[117] In general, studies found a significant improvement during the time of the therapy.[67,70,111–115,118] There were no studies of people with severe agitation, and no long-term outcomes were reported.

- Overall, it is unclear whether or not playing music without a specific protocol is therapeutic for agitation in the short term in care homes.
- There is no evidence for the long-term usefulness of music therapy without a protocol on agitation, or for treating participants with severe agitation, or for settings outside care homes.

Exercise

Details of exercise, dementia-specific therapies and pet therapy are given in *Table 11*.

Of the four studies on exercise interventions, all were in care homes. One large, reasonable-quality study of walking (112 participants) and a smaller study of exercise to music found no effect on participants with

TABLE 7 Effect of light therapy on immediate and longer-term agitation

Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants
Burns *et al.*, 2009[83]	UK	RCT	Some	1b	12.5	48
Lyketsos *et al.*, 1999[84]	USA	RCT	Some	2b	7.5	15
Dowling *et al.*, 2007[85]	USA	RCT	Some	2b	6	70
Thorpe *et al.*, 2000[86]	Canada	Non-randomised – within subjects ABA[a]	Some	2c	8	16
Lovell *et al.*, 1995[87]	**USA**	**Within subjects**	**Some**	**2c**	**7**	**6**
Satlin *et al.*, 1992[88]	USA	**Within subjects**	Some	2c	6[b]	10
Barrick *et al.*, 2010[89]	USA	Non-randomised weighted control group	None	2c	7	66
Ancoli-Israel *et al.*, 2003[90]	USA	RCT	Significant	2b	6	92
Skjerve *et al.*, 2004[91]	Norway	**Within subjects**	Significant	2c	7	11
Haffmans *et al.*, 2001[92]	**Netherlands**	**Within subjects**	**Significant**	**2c**	**6.5**	**10**

CG, caregiver; NC, not calculated; NS, not significant; p.r.n., as needed.
a Participants have baseline condition (A), i.e. no treatment. Next, participants receive the experimental treatment (B), the baseline (A).
b Outcome measure neither reliable or validated.
Note: studies demonstrating significantly effective interventions are highlighted in bold and those of interventions that significantly worsened agitation are in green.

Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)
2 hours' daily light therapy for 2 weeks	Standard light	NS	–0.2 (–0.6 to 0.2)	NS (4 weeks)	–0.3 (–0.7 to 0.2)
1 hour of daily light therapy for 4 weeks	Standard light	NS	–0.3 (–0.8 to 0.2) (BEHAVE-AD)	None	NC
Activities in brightly lit area (outside/lightbox), 1 hour per day/10 weeks	Similar activities in a non-brightly lit area	Significantly worsened	p.m. light: 4.0 (3.1 to 4.9) a.m. light 7.0 (5.8 to 8.3)	None	NC
5 days of light therapy at 30 minutes per day	No	NS	–0.2 (–0.9 to 0.5)	None	
2 hours' daily light therapy for 10 days, repeated after 8-day gap	**No**	**Significant improvements vs. non-intervention days**	**–0.8 (–2.0 to 0.4) (Agitated Behaviour Rating)**	**None**	
2 hours' daily light therapy for 7 days while restrained	No	NS (agitation, prescription of drugs p.r.n., restraints)	NC	None	
3 weeks of a.m. bright light, p.m. bright light, all-day bright light, throughout whole unit	Standard light	Significant worsening in mild/moderate dementia	NC	None	
2 hours per day of light therapy for 10 days, either a.m. or p.m.	Placebo red light during AM	Verbal agitation worsened	–2.0 (–2.4 to –1.6)	None	–0.3 (–0.6 to 0.1)
4 weeks of daily a.m. light for 45 minutes	No	Unclear: no direct comparisons made	–0.5 (–1.4 to 0.4)	Unclear	–1.0 (–2.0 to –0.1)
30 minutes' daily light therapy for 2 weeks	**No**	**Significant improvement (restlessness)**	**NC**	**None**	**NC**

TABLE 8 Home-like care and aromatherapy: effect on agitation in immediate and longer term

Category of intervention	Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants
Home-like care	Verbeek *et al.*, 2010[93]	USA	Matched controls	Any	2b	10.5	259
Home-like care	Elmstahl *et al.*, 1997[94]	Sweden	Within subjects	Any	2c	7	103
Home-like care	Reimer *et al.*, 2004[95]	Canada	Non-randomised-matched groups	Any	2c	7	185
Home-like care	Annerstedt *et al.*, 1993[96]	Sweden	Non-randomised-matched controls	Any	2c	6[a]	56
Aromatherapy	Burns *et al.*, 2011[97]	UK	RCT	Significant	1b	13.5	94
Aromatherapy	Lin *et al.*, 2007[98]	Hong Kong	RCT	Significant	2b	10	35
Aromatherapy	**Ballard *et al.*, 2002[99]**	**UK**	**RCT**	**Significant**	**2b**	**6**	**72**
Aromatherapy	**Holmes *et al.*, 2002[100]**	**UK**	**Within subjects**	**Some**	**2c**	**9**	**15**
Aromatherapy	Akhondzadeh *et al.*, 2003[101]	Islamic Republic of Iran	RCT	None	2b	7.5	42
Aromatherapy	Cameron, 2012[102]	UK	RCT	Not specific	2b	7	18

NC, not calculated; NS, not significant; p.r.n., as needed.
a Outcome measure neither reliable nor validated.
Note: studies demonstrating significantly effective interventions are highlighted in bold and those of interventions that significantly worsened agitation are in green.

Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)
Small group living in home-like environment	Traditional nursing home	Significant worsening over time (up to 12 months); quality of life NS	–0.1 (–0.2 to 0.1)	None	NC
Corridor-like, 'L'-shaped or 'H'-shaped living environment	No	Significantly worsened over 12 months (aggressiveness)	NC	None	NC
Small group living in home-like environment	Traditional nursing home group; plus group recently moved between two traditional nursing homes	NS agitation, quality of life (3, 6, 9 and 12 months)	NC	None	NC
Small group living in home-like environment	Traditional nursing home	Significantly worsened over 12 months (aggressiveness); prescriptions p.r.n. use improved	NC	None	NC
168 sessions aromatherapy massage (plus placebo donepezil)	Placebo aromatherapy massage (plus placebo donepezil)	NS	NC	None	NC
21 sessions lavender aromatherapy	Crossover: odourless sunflower oil	NS	0.0 (–0.3 to 0.4)	None	NC
56 sessions of Melissa oil massage	**Odourless sunflower oil**	**Significant improvement**	**NC**	**None**	**NC**
Aromatherapy oil sprayed on ward for 5 days; also water steam control condition	**No**	**Significant improvement**	**NC**	**None**	**NC**
Melissa oil aromatherapy, frequency unclear	Placebo aromatherapy oil (details not stated)	'Side effect' of agitation more frequent in placebo group	NC	None	NC
42 sessions of lemon balm oil massage	Crossover: inert lemon balm oil	NS	NC	None	NC

TABLE 9 Training family caregivers in behavioural management and CBT: effect on agitation in short and longer term

Category of intervention	Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants
Training family caregivers in behavioural management	Teri *et al.*, 2000[104]	USA	RCT	Significant	1b	11	148
Training family caregivers in behavioural management	Gormley *et al.*, 2001[105]	UK	RCT	Some	1b	11·5	65
Training family caregivers in behavioural management	Bourgeois *et al.*, 1997[106]	USA	RCT	Some	2b	7	7
Training family caregivers in CBT	Huang *et al.*, 2003[107]	Taiwan, Province of China	RCT	Significant	2b	8	59
Training family caregivers in CBT	Wright *et al.*, 2001[108]	USA	RCT	Significant	2b	7	93
Training family caregivers in CBT	Haupt *et al.*, 2000[109]	Germany	Within subjects	None	2c	9	14

CG, caregiver; NC, not calculated; NS, not significant; RAGE, Rating Scale for Aggressive Behaviour.

Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)
11 sessions	Placebo medication (plus two drug arms)	NS (agitation, CG burden)	NC	NS (3, 6 and 12 months)	NC
Four sessions	Given non-behavioural advice and signposting	NR	None	NS agitation and CG burden (2 weeks)	–0.6 (–1.0 to –0.2) (RAGE)
One workshop and 11 consultations	Home-based support (detail unclear)	NS (vs. control)	NC	Unclear-aggregated with immediate outcome	NC
Two home and 13 telephone consultations	Written educational materials and social telephone calls	Unclear as baseline/ change scores not analysed; significantly different at time 2	–0.3 (–0.6 to –0.0)	Unclear (3 months)	–0.2 (–0.5 to 1.1)
Three home and two telephone consultations	Usual care	NS	NC	NS agitation, CG well-being (9 months)	NC
12 groups	No	CG rated agitation NS. Clinician rated agitation improved but not aggression	NC	None	NC

TABLE 10 Music therapy not following a specific protocol: effect on agitation in short term

Author	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)
Remington, 2002[66]	**USA**	**RCT**	**Some**	**2b**	**11**	**34**	**Calming music, given once**	**Usual care**	**Significant improvement in all groups**	**–0.9 (–1.4 to –0.4)**
Garland *et al.*, 2007[110]	Australia	RCT	Some	2b	8	30	Three sessions of preferred music tape	Crossover – usual care	NS	NC
Clark *et al.*, 1998[111]	USA	RCT	Some	2b	6.5	18	Preferred music played while bathing	Usual care	Significant improvement during baths	NC
Gerdner, 2000[112]	USA	RCT	Some	2b	6	45	Individualised music on a cassette, twice per week for 6 weeks	Non-preferred classical music	Significant improvement vs. classical/no music, both during and 15 minutes after treatment	NC
Hicks-Moore and Robinson, 2008[70]	Canada	Within subjects	Some	2b	6	32	10 minutes of preferred music played while agitated	None	Physical non-aggression and verbal agitation improved. Aggression NS	PA: –0.4 (–0.9 to 0) PN: –2.2 (–2.8 to –1.6) VA: –1.0 (–1.5 to –0.4)
Park and Specht, 2009[113]	USA	Within subjects	Some	2c	8.5	15	Family CG played preferred music prior to peak agitation time, twice per week for 2 weeks	No	NS difference between music/no music weeks; however, significant improvements during and immediately after music	NC

Author	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)
Gerdner, 2005[114]	USA	Within subjects	Some	2c	7	8	Music played on CD player every day for 2 months, plus when patient agitated	No	Significant improvement in daytime agitation; mixed result for evening	NC
Tabloski, 1995[115]	**USA**	**Within subjects**	**Some**	**2c**	**7**	**20**	**Calming background music for 15 minutes while agitated, repeated once**	**No**	**Significant improvement**	**NC**
Ragneskog *et al.*, 1996[116]	Italy	RCT	None	2c	8	24	Soothing music vs. 1920s pop vs. 1980s rock and pop, played at lunchtime	No	NS (restlessness)	NC
Chang *et al.*, 2010[117]	Taiwan, Province of China	Within subjects	None	2c	6	47	Nature sounds played during lunchtime, 7 days per week, repeated four times	No	Significant worsening (total, verbal and physical aggression)	NC
Gerdner, 1997[118]	**USA**	**Within subjects**	**None**	**2c**	**6**	**5**	**Individualised music played on a tape, every day for 1 week**	**No**	**Significant improvement**	**NC**

CG, caregiver; NC, not calculated; NS, not significant.
Note: studies demonstrating significantly effective interventions are highlighted in bold and those of interventions that significantly worsened agitation are in green.

TABLE 11 Exercise, dementia-specific therapies, pet therapy: effect on agitation in immediate and longer term

Category of intervention	Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants
Exercise	Aman and Thomas, 2009[119]	USA	Within subjects	Significant	2c	8	50
Exercise	Holmberg, 1997[120]	USA	Within subjects	Some	2c	6[a]	11
Exercise	Eggermont *et al.*, 2010[121]	UK	RCT	None	2b	6.5[a]	112
Exercise	Buettner and Fitzsimmons, 2004[122]	USA	Within subjects	None	2c	6.5	20
Cognitive stimulation therapy	Robichaud *et al.*, 1994[123]	Canada	RCT	Some	1b	11.5	40
Cognitive stimulation therapy	Hong, 2011[124]	Republic of Korea	RCT	None	2b	7	55
Validation therapy	Toseland[125]	USA	RCT	Some	2b	6.5	33
Pet therapy	Kanamori *et al.*, 2001[126]	Japan	Within subjects	None	2c	7	7
Pet therapy	Mossello *et al.*, 2011[127]	Italy	Within subjects	None	2c	7	10
Pet therapy	Libin and Cohen-Mansfield, 2004[128]	USA	Within subjects	None	2c	6	9

NC, not calculated; NS, not significant.
a Outcome measure neither reliable nor validated.

Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)
Nine exercise sessions	No	NS (CMAI)	0.0 (–0.4 to 0.4)	None	NC
Approximately 156 sessions of a walking group	No	Significantly fewer incidents of aggression on days group met	NC	None	NC
30 sessions of walking	Social visit, outside	NS (restlessness)	NC	NS (7 weeks)	NC
28 sessions of either morning or afternoon exercise to music	No	NS	a.m.: –0.1 (–1.0 to 0.8) p.m.: 0.2 (–0.7 to 1)	None	NC
20 session group including sensory and social stimulation over 10 weeks	Usual leisure activities	NS	0.9 (0.3 to 1.5) (Revised Memory and Behaviour Checklist)	None	NC
Culturally familiar environment from youth with sensory activities	Same familiar environment but no activities	NS (total agitation, depression, functional capacity)	–0.3 (–0.7 to 0.1)	None	NC
Approximately 208 sessions of validation group therapy	Social contact (placebo), usual care (control)	NS (total agitation)	NC	None	NC
Six sessions of animal-assisted therapy	No	Mixed: significant improvement in aggressiveness; activity disturbance NS	Aggressiveness: –0.6 (–1.7 to 0.5) Activity: 0.0 (–1.0 to 1.0) (BEHAVE-AD)	None	NC
Nine sessions of pet therapy with either dog or plush toy	No	NS	NC	None	NC
One session each of robotic cat and plush toy cat	No	Plush cat significantly improved, robotic cat NS	NC	None	NC

emergent agitation.[121,122] One study of walking sessions three times per week (11 participants with symptomatic agitation) found that there was less aggression on the days when the group met[120] and a study on exercise sessions for people with severe agitation found no effect.[119] Only one of these studies looked at longer-term outcomes, and this was not significant.[121]

- There is no convincing evidence that exercise as an intervention is therapeutic for agitation in care homes.
- The evidence is of generally low standard, precluding confident conclusions.
- There is no evidence for other settings, and only minimal evidence (of no effect) in the longer term.

Dementia-specific therapies

Two studies of cognitive stimulation therapy, including one very high-quality study and one study of validation therapy, did not find a significant decrease in agitation.[123–125]

Secondary measures

One study investigated functionality using the Activities of Daily Living scale but found no significant change.[124]

- Overall, there is too little evidence to make recommendations on dementia-specific therapies, but they are not designed primarily to improve agitation and do not seem to improve it.

Pet therapy

Three very small, lower-quality studies looked at pet therapy in care homes and a day care centre, including both real and simulated animals (e.g. toys or robots), and found mixed results.[126–128]

- Overall, there is too little evidence, of too low a standard, to make recommendations about the use of pet therapy for agitation.

Training programmes for paid caregivers in care homes

Details of training programmes for paid caregivers in care homes are given in *Table 12*.

The effectiveness of training programmes for paid caregivers depends on what they are trained to do, and the level of supervision provided. Training in both communication skills and person-centred care was not effective when offered without supervision.[129,132] An extensive trial of emotion-oriented care, which aimed to elicit residents' feelings towards their dementia diagnosis and help them cope with it, alongside promoting staff empathy, failed to find any significant results.[130] However, motivating people with dementia to improve their independence in carrying out activities of daily living (e.g. washing), with supervision, significantly improved agitation in one level 2c study.[131]

- Overall, training staff without supervision seems to be less effective than training with supervision, in both the short and the longer term.
- The evidence is generally of a low standard, precluding confident conclusions.

Changing the environment

Four small studies tested environmental interventions, with numbers ranging from 8 to 24 participants (see *Table 12*).[133–136] None had a control group. One found significant improvements in agitation by providing a wander garden for care home residents;[133] a second found no significant improvements after implementing a more home-like environment at mealtimes.[134] Two small studies tested masking exits to reduce absconding from unlocked doors, and found some improvements.[135,136]

- Overall, the evidence for environmental interventions is limited. Studies lack quality and are too small and disparate to draw conclusions.

Mixed interventions

In one very small study (with 16 participants), special care units compared with standard nursing care improved severe agitation over 6 months (see *Table 12*).[139] In simulated presence therapy, a tape mimicking a telephone conversation with a family member is played at a time when the participant is agitated, and the one study testing this found no significant results.[138] A wayfinding intervention tested whether or not training residents to find their way to their bedroom from the living area of their care home would improve agitation, and found no significant effects initially but, by 3 months, those in the intervention group were significantly more agitated.[139] Finally, one study testing a mix of psychosocial interventions such as massage, and an intervention focusing on improving residents' independence at activities of daily living, did not find any significant improvements in agitation.[140]

- There is not enough evidence to make recommendations on simulated presence therapy, wayfinding or mixed activities.

Level 4 studies

Details of level 4 studies are given in *Table 13*.

Most level 4 studies which fitted our criteria had findings which were inconclusive or in line with the higher-quality studies. They are listed in *Table 13*. Many of these tested activities, including pet therapy, in care home settings.[40,141–148] Only four had more than 30 participants and, as with the higher-quality studies, they found for most activities a significant improvement in some aspects of agitation or a reduction in the prescription of psychotropic medication.[40,145,163,164] Low-quality studies of sensory therapies had mixed results.[181–186] As expected, masking exits meant that people tried to exit less often, although putting tape in front of the exit to make a 'two-dimensional barrier' did not change the behaviour.[160–162]

Two studies of aromatherapy[158,159] found no significant effect on agitation. Light therapy remained ineffective in lower-quality studies.[149,150] Unlike the better-quality studies, a lower-quality study of DCM did not find a significant effect.[151] In contrast, one low-quality, low number study of exercise,[152] two of simulated presence[187,188] and one of home-like care[153] were effective, unlike the higher-quality studies. Special care units had mixed results, with the larger studies not showing an effect.[189–191]

In high-quality studies, training paid caregivers with supervision was effective, but this was not so in low-quality studies.[192,200] The small, low-quality studies of training paid caregivers with supervision had mixed results but most were negative.[193–199,201] Those of music therapy were small and not blinded to raters, sometimes incorporated other interventions, and had mixed results.[165–177,179]

Low-quality studies of individualised interventions were ineffective,[155–157] as was individualised activity[154] and dementia-specific therapies, which were sometimes used in combination with other therapies.[177,178,180]

TABLE 12 Working through paid caregivers, without supervision; changing the environment; simulated presence therapy; wayfinding; mixed interventions: effect on agitation in immediate and longer term

Category of intervention	Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants
Paid unsupervised caregivers	Magai *et al.*, 2002[129]	USA	RCT	None	2b	6.5	91
Paid unsupervised caregivers	Finnema *et al.*, 2005[130]	Netherlands	RCT	None	2b	8	146
Paid unsupervised caregivers	**Galik *et al.*, 2008[131]**	**USA**	**Within subjects**	**None**	**2c**	**6**	**46**
Paid unsupervised caregivers	Matthews *et al.*, 1996[132]	Australia	Within subjects	None	2c	6	40
Changing environment	**Detweiler *et al.*, 2008[133]**	USA	**Within subjects**	**None**	**2c**	**6**	**34**
Changing environment	Perivolaris *et al.*, 2006[134]	Canada	Within subjects	None	2c	6	13
Masking exits	Darby, 1990[135]	UK	**Within subjects**	Some	2c	6	9
Masking exits	**Hussian and Brown, 1987[136]**	**USA**	**Within subjects**	**None**	**2c**	**6**	**8**
Wayfinding intervention	McGilton *et al.*, 2003[137]	Canada	RCT	None	**2b**	**7.5**	32

Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)
Non-verbal communication skills training; no supervision	Educational training (placebo), usual care (control)	NS	NC	NS (9, 12, 15 weeks)	NC
Whole staff ethos training, selected staff intensive training, groups and supervision on emotion-oriented care	Usual care	NS	NC	None	NC
Trained in restoring/ promoting functional independence, plus supervision	**No**	**Significant improvement over time (unclear at which time point)**	**–0.2 (–0.6 to –0.3)**	**Unclear**	**NC**
1-day workshop on person-centred care	No	NS	NC	NS (4, 8 weeks)	NC
Wander-garden available over 1 year	**No**	**Significant improvement. Prescription of neuroleptic drugs/chemical restrains p.r.n. NS**	**NC**	**None**	**NC**
12 days of home-like environment for meals with quiet background music	No	NS	NC	None	NC
Full-length and reversed mirror placed over exit door	No	Significantly improved ward exits	NC	None	NC
Masking tape in front of door	**No**	**Significant improvement; but improvement also found for control condition**	**NC**	**None**	**NC**
12 sessions of wayfinding intervention	Yes – details not reported	Significant worsening	–0.521 (–1.040 to –0.010)	NS	0.217 (–0.290 to 0.730)

continued

TABLE 12 Working through paid caregivers, without supervision; changing the environment; simulated presence therapy; wayfinding; mixed interventions: effect on agitation in immediate and longer term (*continued*)

Category of intervention	Author and year	Country of origin	Study design	Degree of participant agitation	Level of evidence	Quality score	Total participants
Simulated presence therapy	Camberg *et al.*, 1999[138]	**USA**	**RCT**	Not specified	**2b**	**8**	54
Special care unit putting in place a variety of interventions	**Bianchetti *et al.*, 1997[139]**	**Italy**	**Within subjects**	**Significant**	**2c**	**6.5**	**16**
Mix of activities of daily living, communication skills and psychosocial activities	Beck *et al.*, 2002[140]	USA	RCT	Some	2b	7	96

NC, not calculated; NS, not significant; p.r.n., as needed.

Note: studies demonstrating significantly effective interventions are highlighted in bold and those of interventions that significantly worsened agitation are in green.

Therapeutic regime	Separate control group	Immediate outcome	Immediate SES (CI)	Long-term outcome	Long-term SES (CI)
Simulated presence tape at least twice per a day while CR agitated	Crossover – neutral tape (placebo), usual care (control)	NS (total agitation)	**NC**	None	**NC**
6 months in special care unit with multidisciplinary support	**Standard nursing care**	**Significant improvement in agitation, prescription of neuroleptic drugs/ chemical restrains p.r.n. and restraint use**	**–0.8 (–1.6 to –0.1) Restraint –0.4 (–1.1 to 0.3) Psychotropic –0.3 (–1 to 0.4)**	**None**	**NC**
60 sessions promoting either functional independence, psychosocial intervention or both	Social contact (placebo), usual care (control)	NS	NC	NS (1, 2 months)	NC

TABLE 13 Level 4 studies (i.e. with quality rating < 6/14)

Category of Intervention	Author	Degree of agitation for participation in study	Quality score	24-hour care	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Long-term outcome
Activities	Cohen-Mansfield *et al.*, 2010[40]	Significant	5	Yes	143	Short presentation of eight stimuli: live social, stimulated social, task, reading, self-identity, music, work, manipulative	No	Significant improvement in agitation for all stimuli except manipulation	None
Activities	Putman and Wang, 2007[141]	Significant	5	Yes	16	2 years of a psychosocial group, 5 days per week	No	Significant improvement	None
Activities	Vespa *et al.*, 2002[142]	None	5	Yes	18	Daily psychosocial activities for at least 1 year	No	Significant improvement	None
Activities	Schalek *et al.*, 2004[143]	Some	4.5	Yes	20	10 sessions of recreational air-mat therapy	Usual care group not analysed	Significant improvement vs. baseline (wandering)	None
Activities	Buettner, 1999[144]	None	3	Yes	Unclear	Recreational items made available over 6 months	Crossover – usual care	Mixed: one group found significant improvement, one did not	None
Activities	Volicer *et al.*, 2006[145]	None	0	Yes	90	Club providing continuous meaningful activity; frequency unclear	No	Agitation measurement unclear. Prescription of neuroleptic drugs/ chemical restraints p.r.n. less prescribed	None
Activities	Luk *et al.*, 2011[146]	Some	5	Yes	14	12 sessions of outdoor horticultural activities	Sensory and social activities	NS	None
Activities – pet therapy	Churchill *et al.*, 1999[147]	Some	4	Yes	28	One session with therapy dog	No	NS	
Activities plus validation therapy	Kim *et al.*, 2002[148]	None	5	No	22	Day care with validation therapy principles (50 days)	No	Significantly worsened	None

Category of Intervention	Author	Degree of agitation for participation in study	Quality score	24-hour care	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Long-term outcome
Aromatherapy	Lee, 2005[48]	None	5	Yes	63	12 sessions each of hand massage with lavender oil and jojoba oil	Crossover – usual care	NS	None
Aromatherapy	Smallwood *et al.*, 2001[150]	None	5	Yes	21	Aromatherapy massage group; conversation and aromatherapy group (frequency unclear)	Massage only	NS (vs. control)	None
DCM plus behavioural intervention	Kuiper *et al.*, 2009[151]	None	5	Mixed	67	Two cycles of 2 weeks' DCM	No	NS (total agitation, cognition)	NS (6 months)
Exercise	Numazu *et al.*, 1995[152]	None	4	Yes	11	28 exercise sessions to promote sleeping	Control group not analysed	Significant improvement	None
Home-like care	Wilkes *et al.*, 2005[153]	None	5.5	Yes	23	Small group living in home-like environment	Traditional nursing home	Significant improvement at 3 but not 6 months	None
Individualised activity	Gori *et al.*, 2001[154]	None	4.5	Yes	25	Approximately 49 activities matched to preference	No	NS (total agitation)	None
Individualised intervention – aimed at cause of the problem	Cohen-Mansfield *et al.*, 2007[155]	Significant	5.5	Yes	167	10 sessions aimed at cause of agitation (e.g. thirst)	Education session for staff	Significant improvement	None
Individualised intervention – aimed at cause of the problem	Bedard *et al.*, 2011[156]	Some	5	Yes	33	Six sessions targeted at comfort, attention and stimulation whilst agitated	No	NS (total agitation)	Frequency but not duration of agitation improved (2, 4 weeks)
Individualised intervention delivered through paid caregiver	Ballard *et al.*, 2009[157]	Significant	5	No	387	Researcher trained paid CG to deliver four sessions of social, music or behavioural intervention	No	Significant improvement	None

continued

TABLE 13 Level 4 studies (i.e. with quality rating < 6/14) (*continued*)

Category of Intervention	Author	Degree of agitation for participation in study	Quality score	24-hour care	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Long-term outcome
Light therapy	Calkins *et al.*, 2007[158]	Some	4	Yes	18	Daily outdoor activities in summer for 2 weeks; control: summer no activity, winter indoor activity, winter no activity	No	Individual subscale items showed both significant improvements and significant worsening	None
Light therapy	van Hoof *et al.*, 2009[159]	None	3.5	Yes	26	10 hours' daily overhead blue or yellow lighting for 3 weeks	Usual care	NS	NS (8 weeks)
Masking exits	Dickinson, 1995[160]	None	5	Yes	7	Blind, cloth barrier, and both were used to mask exit door	No	Significant improvement in exiting	None
Masking exits	Kincaid and Peacock, 2003[161]	None	5	Yes	12	Wall mural painted over exit door	No	Significant improvement in door testing	None
Masking exits	Chafetz, 1990[162]	None	2	Yes	30	Masking tape in front of door	No	NS effect on door opening	None
Multidisciplinary care plus activities	Davison *et al.*, 2007[163]	Significant	5.5	Yes	34	Median 90 days of inpatient multidisciplinary care; activities provided	No	Significant improvement	None
Multidisciplinary care plus activities	Chapman and Toseland, 2007[164]	None	5	Yes	118	8 weeks' inpatient multidisciplinary care, activities provided	Traditional nursing home care	NS (total agitation)	None
Music therapy	Ledger and Baker, 2007[165]	None	5.5	Yes	60	Music therapy over 12 months, up to 42 sessions	Usual care	Significant effect on verbal aggression but unclear if improvement/ worsening	None

Category of Intervention	Author	Degree of agitation for participation in study	Quality score	24-hour care	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Long-term outcome
Music therapy	Choi *et al.*, 2009[166]	None	5	No	10	Music therapy three times per week for 5 weeks	Usual care, structured therapeutic sessions disallowed, weekly telephone call to maintain engagement	NC	NC
Music therapy	Lesta and Petocz, 2006[167]	Some	5	Yes	4	Singing group at peak agitation time, over 4 consecutive days	No	NS (wandering)	None
Music therapy	Sherratt *et al.*, 2004[168]	Not specific	5	Mixed	29	One session each of live music, vs. taped music by a musician, vs. taped commercial music	No	NS (challenging behaviour, wandering)	None
Music therapy	Ziv *et al.*, 2007[169]	None	5	Yes	28	Taped popular music played to participants, once per week for 3 weeks	No	Significant improvement (negative behaviours)	None
Music therapy	Brotons and PickettCooper, 1996[170]	Some	4	Yes	27	Five sessions of music therapy, time period unclear	No	Significant improvement	None
Music therapy	Cox *et al.*, 2011[171]	Some	4	Yes	7	Three individual violin recitals over 4 weeks	No	NS	None
Music therapy	Brotons and Marti, 2003[172]	None	3.5	No	14	Music therapy plus interdisciplinary care in rural house over 12 days	No	Significant improvement (agitation, CG anxiety); CG burden and depression NS	Improved but unclear if significantly (2 months)

continued

TABLE 13 Level 4 studies (i.e. with quality rating < 6/14) (*continued*)

Category of Intervention	Author	Degree of agitation for participation in study	Quality score	24-hour care	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Long-term outcome
Music therapy	Zare, 2010[173]	None	3.5	Yes	16	Individual preferred music, vs. group listening preferred music, vs. group listening of non-preferred music, and group singing of preferred music	Usual care	Significant effect but unclear if improvement/ worsening	None
Music therapy	Suzuki *et al.*, 2004[174]	None	3	Yes	23	Music therapy twice per week for 8 weeks	Therapeutic physical activities (e.g. games)	NS (irritability vs. control)	None
Music therapy	Thomas *et al.*, 1997[175]	Some	2.5	Yes	14	Music played once while bathing	No	NS (total agitation)	None
Music therapy	Clair and Bernstein, 1994[176]	Some	2	Yes	28	Stimulative music vs. sedative music in background, every day for 8 weeks	No	NS	NC
Music therapy or dementia specific therapy, plus support for the family	Berger *et al.*, 2004[177]	None	4	No	36	1 year of carers' support group plus either music therapy or cognitive stimulation therapy	Seen regularly at memory clinic	NS (agitation, CG burden and depression)	None
Other – activities, dementia specific therapy, and support for family	Droes *et al.*, 2000[178]	None	3.5	No	66	Approximately 91 day-care centre visits, supporting both CR and CG with dementia diagnosis	Usual care at daycentres	Significant improvement in non-social behaviour but not aggression	None

Category of Intervention	Author	Degree of agitation for participation in study	Quality score	24-hour care	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Long-term outcome
Other – TEACCH	Fischer-Terworth and Probst, 2011[179]	None	3	Yes	49	6 months of combination music therapy, cognitive stimulation, staff training and CBT principles	Non-specific, occupational interventions	Significant improvement	None
Reminiscence	Hall and Hare, 2011[180]	None	5	Yes	36	Interactive reminiscence video	No	NS	None
Sensory	Burgio *et al.*, 1996[181]	Significant	5	Yes	16	Eight sessions of white noise over 10 days	No	Significant improvement in verbal agitation for nine selected 'high responders'	None
Sensory	Suzuki *et al.*, 2010[182]	None	5	Yes	40	25 sessions of hand massage over 6 weeks	Usual care group not analysed	Significant improvement (aggression vs. baseline); activity disturbance NS	None
Sensory	Wang and Hermann, 2006[183]	None	5	Yes	6	28 sessions of healing touch over 4 weeks	No	Inappropriate analysis	None
Sensory	Milev *et al.*, 2008[184]	None	4	Yes	18	Snoezelen: either once or three times per week for 12 weeks	Usual care	Significant improvement in agitation/sleep	Significant improvement (12 weeks)
Sensory	Snyder *et al.*, 1995[185]	None	4	Yes	18	10 daily sessions of hand massage; 10 sessions therapeutic touch	Crossover – usual care	NS	None
Sensory	Sutherland *et al.*, 1999[186]	Some	3	Yes	10	10 daily sessions of foot acupressure and massage	Details unreported	NS (wandering)	NS wandering (3 days)
Simulated presence therapy	Woods and Ashley, 1995[187]	Some	4	Yes	9	Simulated presence therapy while CR agitated (frequency NR)	No	Significant improvement	None

continued

TABLE 13 Level 4 studies (i.e. with quality rating < 6/14) (*continued*)

Category of Intervention	Author	Degree of agitation for participation in study	Quality score	24-hour care	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Long-term outcome
Simulated presence therapy	Miller *et al.*, 2001[188]	Some	3	Yes	13	One session simulated presence tape	No	Significant improvement	None
Special care unit putting in place a variety of interventions	Frisoni *et al.*, 1998[189]	Not specific	4.5	Yes	66	3 months in special care unit with multidisciplinary support	Standard nursing care	NS (total agitation)	None
Special care unit putting in place a variety of interventions	Lawton *et al.*, 1998[190]	None	4.5	Yes	182	Special care unit with focus on appropriate levels of stimulation	Physically identical unit	NS	None
Special care unit putting in place a variety of interventions	Bellelli *et al.*, 1998[191]	Not specific	4	Yes	55	6 months in special care unit with multidisciplinary support	No	Significant improvement in agitation, prescription of neuroleptic drugs/ chemical restrains p.r.n. and restraint use; functional capacity NS	None
Training paid caregivers in care skills, with support and supervision	Davison *et al.*, 2007[192]	None	5.5	Yes	113	One group trained in care skills only; one group additionally given peer support	Usual care	NS	NS (6 months)
Training paid caregivers in challenging behaviour, without supervision	Asthill *et al.*, 2004[193]	Some	2.5	Yes	Unclear	Four training sessions on challenging behaviour, for two non-random groups	Usual care	Mixed – one group improved, one NS	Mixed – one group improved, one NS (4 weeks)
Training paid caregivers in CBT, without supervision	Ousset *et al.*, 2003[194]	None	3	Yes	26	Trained in CBT-based approach to behavioural symptoms	No	NR	Significant improvement (1 month)

Category of Intervention	Author	Degree of agitation for participation in study	Quality score	24-hour care	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Long-term outcome
Training paid caregivers in person-centred care, with supervision	Edberg and Hallberg, 2001[195]	None	4	Yes	22	Trained to use individual care planning, 26 sessions of biweekly supervision	Usual care	Significant improvement; less sad and secluded in rooms than control	None
Training paid caregivers in person-centred care, without supervision	Sidani *et al.*, 2012[196]	None	5.5	Yes	102	Staff nurses given 2-hour training on person-centred care, cascaded to nursing assistants	No	NS	None
Training paid caregivers in person-centred care, without supervision	Cohen-Mansfield and Jensen, 2006[197]	None	4	Yes	20	Changed care plan to be more similar to premorbid self-care routine	Crossover (usual care) – but only analysed within subjects	NS	None
Training paid caregivers to motivate PWD to improve their activities of daily living	Wells *et al.*, 2000[198]	None	4.5	Yes	60	Trained in restoring/ promoting functional independence, plus reinforcement sessions	Usual care	Unclear	Mixed: one measure improved, one worsened (6 months)
Training paid caregivers to motivate PWD to improve their activities of daily living	Rogers *et al.*, 1999[199]	None	2	Yes	84	Trained in restoring/ promoting functional independence, plus habit training follow-up	No	Disruptive behaviour improved	Unclear but disruptive behaviour did increase again (10 days)

continued

TABLE 13 Level 4 studies (i.e. with quality rating < 6/14) (*continued*)

Category of Intervention	Author	Degree of agitation for participation in study	Quality score	24-hour care	Total participants	Therapeutic regime	Separate control group	Immediate outcome	Long-term outcome
Training paid givers in behavioural management, with supervision	Visser *et al.*, 2008[200]	Some	4	Yes	76	Trained in behavioural management, one group additionally given peer support	Usual care	NS (agitation, quality of life)	NS (3 and 6 months)
Training to allow and make wandering safe, without supervision	Cohen-Mansfield *et al.*, 1997[201]	None	3	Yes	Unclear	One session on safe management of wandering	No	Agitation NS; physical restraints worsened	Agitation NS; physical restraints worsened (4 weeks)

CG, caregiver; NS, not significant; p.r.n., as needed; PWD, people with dementia.

Chapter 5 Health economic analysis

Introduction

In the study protocol we planned to include the following in the health economic analyses:

1. A systematic review of cost and cost-effectiveness studies of non-pharmacological interventions for reducing agitation in adults with dementia.
2. A detailed costing exercise to evaluate the NHS costs incurred by the provision of each of the interventions considered in the effectiveness review.
3. Construction of a de novo cost-effectiveness model to assess the cost-effectiveness of non-pharmacological interventions to reduce agitation in dementia. To do this we would:
   - Design an appropriate model to characterise the health states of agitated patients. The proposed design was a Markov model allowing transition between agitation states.
   - Populate the model using data from published studies and routine sources.
   - Relate intermediate agitation outcomes to final outcomes, ideally expressed in terms of quality-adjusted life-years (QALYs).
   - Identify which parameters are uncertain and which are important drivers of cost-effectiveness.

As explained below, we identified few economic studies in the systematic review for number 1.

As described in the effectiveness review, we identified a large number of interventions that had been evaluated and many of them were found to have no impact on agitation. In the costing exercise we undertook for number 2, we included only interventions that were shown to have a significant impact on agitation in our effectiveness review. This was because it is unlikely that additional data on the cost of ineffective interventions would affect whether or not these interventions would be implemented.

During the completion of number 3, we encountered a number of problems that limited our ability to meet the original aims described above.

First, as evidenced from our literature review, we found no studies that evaluated the impact of interventions in terms of QALYs. As a consequence we undertook two analyses. The first was a cost-effectiveness analysis measuring cost-effectiveness using intermediate outcome measures, that is to say measures of agitation reported in the effectiveness studies included in the systematic review (e.g. incremental cost per unit improvement in CMAI score). This allows us to examine which interventions for managing agitation represent the *best* value for money among all such interventions, but it does not allow us to say whether or not any of these interventions are *good* value for money for the NHS because cost-effectiveness thresholds for these outcomes do not exist. The second analysis we undertook was a cost–utility analysis, seeking to measure the impact of interventions on QALYs. We did this using a two-stage process. At the first stage, we evaluated the impact of the interventions on measures of agitation (e.g. NPI agitation scores), as in our effectiveness review. At the second stage, we used supplementary data to model the impact of changes in agitation on QALYs. We identified a single data source we could use for this analysis – the LASER-AD (London and the South-East Region – Alzheimer's Disease) study.[10] This was a cohort study of patients with Alzheimer's disease from London and the south-east region of the UK, who were followed for 54 months. At the last follow-up point in the study, data were collected on NPI agitation scores and a measure of health-related quality of life for people with dementia – the dementia quality of life (DEMQOL) system. We used recently published methods to convert DEMQOL-Proxy values submitted by carers into utilities suitable for estimating QALYs. This approach provided a method for estimating the impact of interventions on QALYs, but it limited the studies we could include in the cost-effectiveness

analysis because we could use only studies that evaluated intermediate outcomes using the agitation measure recorded in the LASER-AD study, that is to say NPI agitation scores.

Second, we found no studies that evaluated the impact of non-pharmacological interventions on the full range of health and social care costs associated with agitation that would be relevant in a UK context. As above, we undertook two analyses. In the cost-effectiveness analysis, which we undertook for all effective interventions, we only included intervention costs, assuming that the impact of the interventions on the costs of managing agitation would be zero. For the cost–utility analyses, we adopted the same two-stage process we used to estimate QALYs, first evaluating the impact of interventions on agitation, and then using the LASER-AD study to model the impact of changes in agitation on health and social care costs (which are covered comprehensively in that study). This allowed us to account for the impact of interventions on a comprehensive range of health and social care costs but, as above, it limited the interventions we could evaluate.

Third, with regards the time horizon of our model, as evidenced in the effectiveness review, we found very little evidence supporting the long-term effectiveness of interventions. In the effectiveness review, four types of intervention had a significant effect on agitation. In the case of activities, only two studies measured agitation after the intervention period, at 1 week[50] and 4 weeks[48] afterwards, and neither continued to be effective at those times. For music therapy, three studies measured longer-term outcomes, at 3 to 8 weeks beyond the end of the intervention,[56,60,62] and none continued to be effective. For sensory interventions, three studies evaluated outcomes beyond the end of the intervention period, between 1 and 3 weeks later;[63,64,68] there was some evidence that the interventions continued to be effective at that time. In terms of person-centred care and communication skills and DCM, six studies found the improvements in agitation that persisted up to 6 months beyond the end of the intervention.[75–77,79,81,82] In the cost-effectiveness analysis, we limited the time horizon to the time period used to measure outcomes in each study included in the review; where short- and long-term outcomes were reported, we focused on the long-term outcomes. In the cost–utility analysis, given that we found no evidence of effect of interventions beyond 1 year, we limited our time horizon to a 1-year period. In this period we accounted for the time it takes from the start of when the intervention is delivered until the benefits are achieved, and for the time it takes beyond the end of the delivery of the intervention for the effects to diminish.

Fourth, we were unable to find any data on the movement between agitation states over time. This meant that it was not possible to measure value for money in the cost–utility analysis using a Markov model, as originally planned. In the LASER-AD study, NPI agitation scores were measured at repeated points in time, but the time period between measurements was 12–18 months, and what happened between those times was unknown. In our cost–utility analysis, we used a different modelling approach that accounted for the impact of interventions on agitation levels over a 12-month period, and consequent improvements in utility and decreases in health and social care costs achieved before agitation levels were assumed to return to the original levels.

The upshot is that we completed number 3, but we did it using a different approach than originally anticipated in the study protocol. For the interventions identified as being effective in the systematic review, we undertook a cost-effectiveness analysis measuring the incremental cost per unit improvement in agitation. We also undertook a cost–utility analysis measuring the incremental cost per QALY gained, but we were limited in the interventions we could evaluate using this approach.

Aims

Accounting for the above, the aims of the health economic analysis were to:

1. review cost and cost-effectiveness studies of non-pharmacological interventions for reducing agitation in adults with dementia
2. undertake analyses of the cost of non-pharmacological interventions for reducing agitation in adults with dementia
3. undertake a cost-effectiveness analysis of non-pharmacological interventions for reducing agitation in adults with dementia, measuring the incremental cost per unit improvement in agitation
4. construct a cost-effectiveness model to undertake a cost–utility analysis of non-pharmacological intervention for reducing agitation in adults with dementia, measuring the incremental cost per QALY gained.

To achieve the fourth aim we were required to:

5. undertake an analysis of health and social care costs associated with agitation
6. undertake an analysis of the change in health-related quality of life associated with agitation.

The methods and results for each of these components are described separately below.

Systematic review of cost and cost-effectiveness studies

Methods

We undertook a systematic review of cost and cost-effectiveness studies of non-pharmacological interventions for reducing agitation in adults with dementia. Studies with analyses of costs and cost-effectiveness identified using the strategy described for the effectiveness review were included. In addition, we searched (on 13 March 2012) the NHS Economic Evaluation Database, the HTA programme database and the DARE using the search terms agitat* and dement*. Reference lists of included papers were searched by hand. Our inclusion and exclusion criteria were as described for the effectiveness review above, plus we only included studies that examined the cost and/or cost-effectiveness of interventions. In particular, we rejected studies that were not attempting to reduce agitation, that were not undertaken in people with dementia, that were not non-pharmacological, and that had no health economics component.

NP and SM devised the search strategy. NP conducted the searches and screened the abstract and full text of identified papers. Where inclusion was unclear, this was discussed with SM. NP extracted the data from the included papers.

The quality of the included studies was assessed by applying them to the Consolidated Health Economic Evaluation Reporting Standards (CHEERS) checklist.[202]

Data were extracted from the included papers on:

- type of analysis (e.g. cost analysis, cost-effectiveness analysis)
- descriptors of the intervention and comparator
- categorisation of the intervention, using the same taxonomy that was used in the effectiveness review
- country in which the analysis was undertaken, the currency and the study year
- cost components included in the analysis
- time horizon
- summary economic measure

- results, and
- how uncertainty was analysed.

To inform our subsequent analysis, we were particularly interested in studies that had measured outcomes in terms of QALYs, that measured health and social care costs comprehensively from a UK perspective, and that measured cost-effectiveness over a long time period.

Results

Cost-effectiveness data from pre-existing studies were limited. We found 688 potentially relevant records, excluded 679 abstracts and seven full papers, and included two papers in the final review (*Figure 2*).[203,204]

These studies were, first, a US blended inpatient and outpatient programme to reduce hospitalisation,[203] and second, an Australian comparison of DCM and person-centred care programmes (*Table 14*).[204] The first study is a standalone study. The second study is linked with a clinical trial included in the effectiveness review.

Comparing each study with the CHEERS checklist (see *Appendix 4*, *Tables 29* and *30*), the first study was deemed to be low quality due to the extent of missing details about the analysis, and its limited scope. The second study was deemed to be of medium quality; the study was well described but limited in scope.

The range of cost components included in both studies was narrow; the first study included only hospital costs, and found that for $1000 of expenditure, the blended inpatient and outpatient programme produced a change of 0.89 in the CMAI scale, compared with 0.27 for the inpatient programme. The second study included intervention costs and pharmaceutical use and a univariate sensitivity analysis. This measured the cost per CMAI point averted, compared with usual care immediately and at follow-up. Person-centred care costs were A$8.01 immediately, and A$6.43 at follow-up, and DCM costs were A$48.95 and A$46.78, respectively. In both cases, it was difficult to identify if the intervention was cost-effective because the cost-effectiveness threshold for the summary economic measure is unknown.

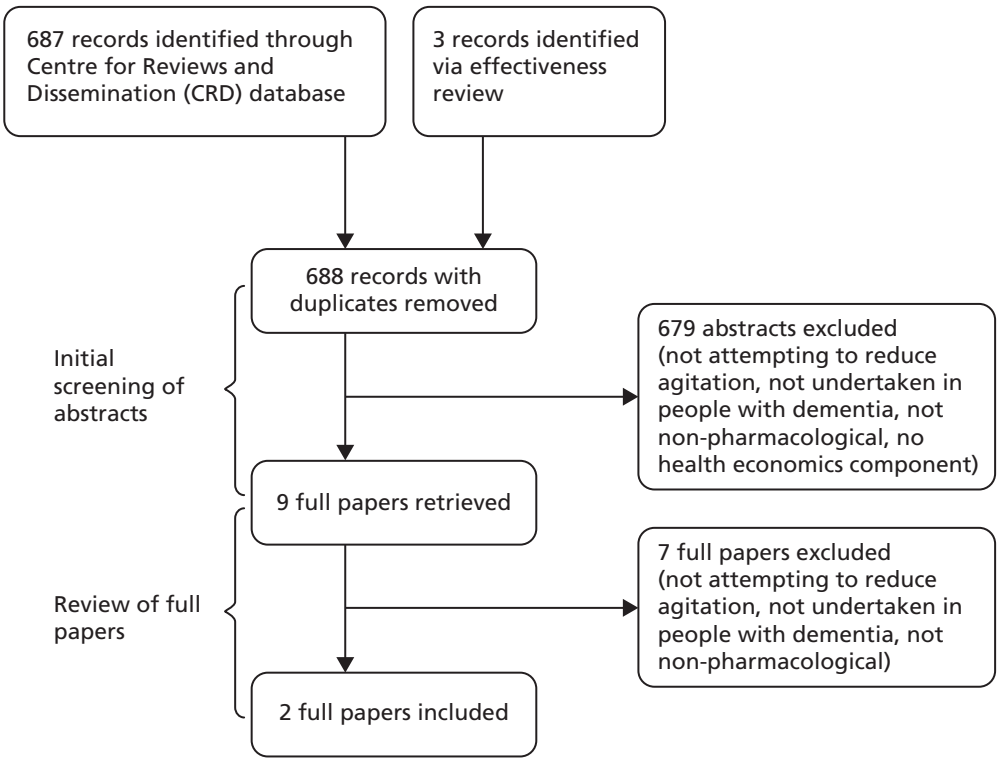


FIGURE 2 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram for review of cost and cost-effectiveness studies.

TABLE 14 Studies assessing cost and/or cost-effectiveness of interventions of non-pharmacological interventions for reducing agitation in adults with dementia

Authors	Type of analysis	Intervention	Category	Country (currency; year)	Cost components	Time horizon	Summary economic measure	Results	Analysis of uncertainty
Mintzer *et al.*, 1997[203]	CEA	Continuum-of-care programme vs. inpatient programme	Changing the environment; DCM	USA (USD; NR)	Inpatient and partial hospitalisation	21 days	Change in total CMAI for $1000 expenditure	Continuum-of-care programme 0.89; inpatient programme 0.27	None
Norman *et al.*, 2008[204]	CEA	Training paid caregivers in person-centred care or dementia-care mapping vs. usual care	Training paid caregivers in person-centred care; DCM	Australia (AUD; NR)	Trainer time to educate and support staff, time staff spent on activities specific to intervention, replacement costs of backfilling positions while staff received training, pharmaceutical use	8 months	Cost per CMAI score change	The cost per CMAI point averted for person-centred care relative to usual care was A$8.01 immediately after intervention and A$6.43 at follow-up; for DCM these values were A$48.95 and A$46.89 respectively	Univariate sensitivity analysis

CEA, cost-effectiveness analysis; NR, not reported.
UK£1 ≈ A$1.52.

In terms of informing our de novo cost-effectiveness model, neither study measured cost-effectiveness in terms of QALYs, neither considered a comprehensive range of health and social care costs, and neither was UK based. In both studies, the time horizon was <1 year.

Analysis of the cost of non-pharmacological interventions

Methods

We calculated the NHS and Personal Social Services (PSS) costs in 2011 GBP incurred in the provision of every intervention identified in the effectiveness review that had a significant impact on agitation, where there was evidence that the intervention type had a positive impact on agitation (30 interventions in total). We did not calculate costs for ineffective interventions, as it is unlikely that they would be implemented and so further analysis would be redundant.

Resource use was determined by the intervention descriptors in the included studies. The cost components included in the analysis were limited to the components of the intervention described in each study. The main cost components were staff costs, usually nursing staff. For UK studies, it was usually possible to identify the type of staff involved. For non-UK studies, we made assumptions about the type of staff who would typically be involved if the intervention were provided in the UK context. Durable items were generally inexpensive (e.g. a CD player), and we assumed that these items did not last beyond the end of the intervention described in the study. For group interventions, we calculated the total cost of the intervention and then divided this by the group size as reported in the study. Unit costs were taken from market prices and routine sources. Where cost components were not adequately described, or unit costs were not directly available, we selected the unit cost based on the closest similar service or item from available published unit cost estimates.

Results

We calculated the costs of 30 interventions from 26 studies that had a significant impact on agitation (see *Appendix 5*, *Tables 31–34* and *Box 1* for further details).[43–49,52,54,57,61,63,64,66,69,71–82] Costs ranged from £80 to £696 for activities, from £13 to £27 for music therapy, from £3 to £527 for sensory interventions and from £31 to £339 for training and supervising paid caregivers in person-centred care or communication skills, with or without behavioural management training, and DCM. Costs for individual studies are reported alongside the results of the effectiveness review in *Tables 1–5*.

Cost-effectiveness analysis of non-pharmacological interventions for managing agitation

Methods

We calculated the cost-effectiveness of non-pharmacological interventions for managing agitation using the results of the cost analysis described in the previous section. These costs were combined with the outcomes obtained from the effectiveness review to measure the incremental cost per unit improvement in agitation. Effectiveness was measured using difference-in-differences, that is to say the before-and-after change in outcomes in the intervention group minus the before-and-after change in outcomes in the control group. We limited the time horizon to the time period used to measure outcomes in each study included in the review; where short- and long-term outcomes were reported, we focused on the long-term outcomes. As in the effectiveness review, we recalculated some study outcomes, for example for studies including intervention and control groups but not directly comparing them. Cost-effectiveness was computed by dividing the unit cost of each intervention by the change in agitation outcome. While providing a measure of cost-effectiveness, the analysis is limited in its usefulness for the following reasons:

- Incremental costs are measured in terms of the costs of the intervention only; costs incurred from managing agitation are not included. As discussed above, this is because data were not available on

the health and social care costs associated with managing agitation. We provide new estimates for these costs (see *Results*, below), but their application is limited because they can be applied only to interventions that are evaluated intermediate outcomes using the agitation measure recorded in the LASER-AD study, that is to say NPI agitation scores. If, as is shown below, health and social care costs decline when agitation is reduced, then measuring the incremental costs of an intervention in terms of the direct costs of the intervention only is likely to overestimate the incremental costs of that intervention.

- Incremental effectiveness is measured in terms of the unit improvement in agitation. As discussed above, this is because data were not available on the QALYs associated with managing agitation. As with the health and social care costs, we provide new estimates of the utility associated with different levels of agitation (see below), but the application of these is also limited because they can be applied only to interventions that are evaluated intermediate outcomes using NPI agitation scores. Focusing on improvements in agitation means that comparisons with other interventions are limited: first, it is not possible to compare non-pharmacological interventions for managing agitation with interventions for other health problems because the outcomes are not commensurate; second, several agitation measures are used in the studies included in the effectiveness review, and it is not possible to make judgements about the relative effectiveness of interventions that are evaluated using different agitation measures because the measures are not commensurate.
- Third, incremental cost-effectiveness is measured in terms of the incremental cost per unit improvement in agitation. This allows us to make limited judgements about which interventions for managing agitation represent the best value for money among the interventions included in the effectiveness review – the interventions with the lowest incremental cost per unit improvement in agitation, where agitation is measured using the same outcome measure – but it does not allow us to say whether or not any of these interventions are good value for money to the NHS because cost-effectiveness thresholds for these outcomes do not exist.

As explained, in the following sections we present a framework for undertaking cost–utility analyses of interventions for managing agitation that includes the full range of health and social care costs and measures outcomes in terms of QALYs.

Results

The results of the cost-effectiveness analyses are reported in *Table 15*. Of the 30 effective interventions for which we calculated costs in the previous section, relevant outcomes were quantitatively reported in the published studies for 23 interventions.[43–49,52,54,57,61,63,64,66,69,71–82] Outcomes were measured in terms of the CMAI (11 interventions), the modified CMAI (five interventions), CMAI subscales (two interventions) and the CMAI-Short form,[40] Pittsburgh Agitation Scale,[205] Agitated Behaviour Rating Scale,[206] Agitated Behaviour in Dementia[207] and the Ryden Aggression Scale (all one study each).[208] *Table 14* reports the change (difference-in-difference) in these outcome measures, computed for each intervention.

Cost-effectiveness is reported as the incremental cost per unit improvement in outcome. It is not appropriate to compare interventions that are evaluated using different outcome measures because the outcomes are not commensurate. As noted, the most common outcome measure was the CMAI. Among the 11 interventions that were evaluated using this measure, the incremental cost per unit reduction in CMAI score ranged from £162 to £3480 for activities, £4 for music therapy, from £24 to £143 for sensory interventions and from £6 to £62 for training paid caregivers in person-centred care or communication skills with or without behavioural management training, with supervision, and for DCM.

These findings suggest that, among the different types of interventions included in the effectiveness review that measured outcomes in terms of the CMAI, music therapy and training paid caregivers in person-centred care or communication skills with or without behavioural management training, with supervision, and for DCM appear to be the most cost-effective options. However, as we have pointed out above, it is not possible to say whether or not they represent good value for money to the NHS, because

TABLE 15 Unit costs and changes in outcomes

Author	Unit cost (2011 £)	Outcome measure(s)	Change in outcome	Incremental cost per unit improvement in outcome
Activities				
Lin *et al.*[44]	**372**	**CMAI**	**–2.3**	**162**
Lee and Kim[45]	274	Modified CMAI	–1.9	144
Buettner and Ferrario[46]	**696**	**CMAI**	**–0.2**	**3480**
Fitzsimmons and Buettner[47]	**173**	**CMAI**	**–0.3**	**577**
Music therapy using a specific protocol				
Sung *et al.*[55]	13	Modified CMAI	–1.0	13
Lin *et al.*[57]	**27**	**CMAI**	**–7.7**	**4**
Sensory interventions				
Moyle *et al.*[63]	128	CMAI-Short Form	–4.6	28
Yang *et al.*[64]	**527**	**CMAI**	**–21.6**	**24**
Remington[66]				
Hand massage	3	Modified CMAI	–6.24	1
Hand massage + calming music	10	Modified CMAI	–13.5	1
Staal *et al.*[69]	273	Pittsburgh Agitation Scale	–0.8	341
Lin *et al.*[44]	**300**	**CMAI**	**–2.1**	**143**
Woods and Dimond[71]	32	Agitated Behaviour Rating Scale	–0.03	1067
Whall *et al.*[73]	30	Modified CMAI	–6.7	4
van Weert *et al.*[74]	109	CMAI subscales (aggressive behaviour; physically non-aggressive behaviour; verbally agitated)	Aggressive behaviour = –3.0; physically non-aggressive behaviour = –0.03; verbally agitated = –0.8	Aggressive behaviour = 36; physically non-aggressive behaviour = 3633; verbally agitated = 136

Author	Unit cost (2011 £)	Outcome measure(s)	Change in outcome	Incremental cost per unit improvement in outcome
Training paid caregivers in person-centred care or communication skills, with supervision, or in DCM with supervision				
Chenoweth *et al.*[75]	**99**	**CMAI**	**–17.7**	**6**
McCallion *et al.*[76]	87	CMAI subscales (physically aggressive behaviour; physically non-aggressive behaviour)	Physically aggressive behaviour = +0.5; physically non-aggressive behaviour = –5.2	Physically aggressive behaviour = DOM;[a] physically non-aggressive behaviour = 17
McCallion *et al.*[77]	**72**	**CMAI**	**–1.7**	**42**
Teri *et al.*[78]	339	Agitated Behaviour In Dementia	–3.4	100
Hoeffer *et al.*[79]	158	Ryden Aggression Scale physical aggression; Ryden Aggression Scale verbal aggression	Ryden Aggression Scale physical aggression = –1.4; Ryden Aggression Scale verbal aggression = –0.3	Ryden Aggression Scale physical aggression = 113; Ryden Aggression Scale verbal aggression = 527
Deudon *et al.*[81]	**31**	**CMAI**	**–0.5**	**62**
Chenoweth *et al.*[75]	**108**	**CMAI**	**–9.8**	**11**
Chenoweth and Jeon[82]	**127**	**CMAI**	**–11.9**	**11**

a DOM indicates that the intervention is dominated by the alternative (it is more costly and less effective in terms of the outcome measure). Rows highlighted in bold where the outcome measure was the CMAI.

we do not know what the NHS is willing to pay is for a one-unit reduction in CMAI score (i.e. we do not know what the cost-effectiveness threshold is). We explore this issue in more detail the following sections.

Analysis of health and social care costs associated with agitation

Methods

We calculated the NHS and PSS costs associated with different levels of agitation measured by the NPI[209] agitation scale using data from a cohort study of patients with Alzheimer's disease.[210] The LASER-AD study recruited 224 people with Alzheimer's disease between July 2002 and January 2003 from London and the south-east region, UK, and followed them for 54 months. Data on NPI agitation scores and health and social care resource use were collected at baseline (recruitment) and 18, 30, 42 and 54 months. One hundred and eleven participants had died by 54 months; our data set had 695 data points (person follow-ups).

Resource use was measured using the Client Service Receipt Inventory, amended for use with older people,[211] for the previous 3 months from participant responses and caregiver reports on where the person was living (at home; in residential respite care; in day respite care; in a residential home; in a nursing home; in sheltered housing; in supported (extra care sheltered) housing; or in hospital awaiting placement), and their contacts with health and social care services [general practitioner (GP), practice nurse, district nurse, dietitian, community psychiatric nurse, home help, meals on wheels, physiotherapist, chiropodist, optician, dentist, audiologist, psychologist, psychiatrist, day centre, hospital outpatient visits and inpatient stays].

We applied unit costs from routine sources[212] in 2011 GBP and calculated 3-month costs for each participant at each follow-up point. We then pooled these data and analysed the 3-month costs by agitation level, controlling for a range of covariates including the follow-up point, and adjusting for individual-level clustering.

Agitation was measured according to the NPI agitation score at each follow-up point, which could take one of nine values (0, 1, 2, 3, 4, 6, 8, 9, 12), with higher values indicating more severe levels of agitation.

To account for the skewness of the cost data, we regressed the 3-month total cost variable against the agitation measures using a generalised linear model with gamma family and log link,[213] controlling for sex, age at baseline (50–59 years, 60–60 years, 70–79 years, 80–89 years, 90–99 years), cognitive impairment [measured according to Mini-Mental State Examination (MMSE);[214] severe ≤ 9 points, moderate 10–20 points, mild 21–30 points], and follow-up point (baseline, 18 months, 30 months, 42 months, 54 months). We adjusted for clustering by participant. We calculated predictive margins for NPI agitation scores; these are the predicted 3-month health and social care costs by NPI agitation score, controlling for the covariates.

Results

The unit costs we applied to the resource use data in the LASER-AD study are in *Table 16*. Unadjusted mean SD and median (interquartile range) 3-month costs across all 695 observations were £7749 (£10,273) and £6814 (£1073 to £9757), respectively (*Table 17*). Unadjusted costs increased with agitation. The 3-month cost data were highly skewed (*Figure 3*).

Descriptive statistics for the variables used in regression analysis are given in *Table 18*. The mode and median NPI agitation score are 0 and 17, respectively. The majority of the sample was female, and aged ≥ 70 years. In 21% of observations, the patient had mild cognitive impairment, compared with 35% for moderate cognitive impairment and 44% for severe cognitive impairment.

TABLE 16 Unit costs used in analysis of data from LASER-AD study

Cost component	Unit cost (£)	Unit	Source
GP	36.00	Per surgery consultation	Curtis[212]
Practice nurse/district nurse	60.00	Per hour	Curtis[212]
Dietitian	35.00	Per hour	Curtis[212]
Community psychiatric nurse	50.00	Per hour	Curtis[212]
Occupational therapist	82.00	Per hour	Curtis[212]
Home help	27.00	Per hour	Curtis[212]
Meals on wheels	6.14	Per meal	Curtis[212]
Physiotherapist	34.00	Per hour	Curtis[212]
Chiropodist	31.00	Per hour	Curtis[212]
Optician	57.00	Per contact	NHS Reference Costs[215]
Dentist	92.00	Per contact	NHS Reference Costs[215]
Audiologist	67.00	Per contact	NHS Reference Costs[215]
Psychiatrist	418.00	Per contact	Curtis[212]
Psychologist	135.00	Per hour	Curtis[212]
Day centre	34.00	Per visit	Curtis[212]
Hospital outpatient visit	100.00	Per visit	Curtis[212]
Hospital inpatient stay	321.00	Per day	Curtis[212]
Residential respite care	104.71	Per overnight stay	Curtis[212]
Day respite care	95.71	Per day	Curtis[212]
Part III residential home	519.00	Per week	Curtis[212]
Nursing home	741.00	Per week	Curtis[212]
Part II sheltered housing	155.00	Per week	Curtis[212]
Supported living part II and a half	418.00	Per week	Curtis[212]
Hospital awaiting placement	321.00	Per day	Curtis[212]

TABLE 17 Summary statistics for total 3-month cost per person

	Total 3-month cost per person (2011 £)					
NPI agitation score	Mean	SD	Median	25th percentile	75th percentile	Observations
0	7054	10,833	3490	762	9111	314
1	5649	6066	5588	667	8037	68
2	7386	8607	6832	2137	9772	60
3	7413	5770	7054	2272	9769	51
4	6977	5838	6892	1699	9682	60
6	8831	10,222	6912	2430	9757	57
8	10,572	12,174	7769	5904	10,633	45
9	11,647	10,325	9847	4504	16,182	12
12	15,266	19,018	9198	6781	11,117	28
All	7749	10,273	6814	1073	9757	695

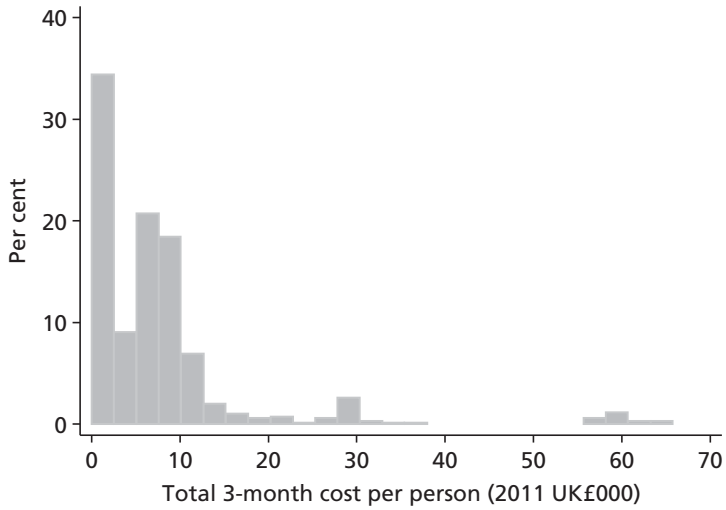


FIGURE 3 Distribution of total 3-month costs per person in LASER-AD (695 observations).

TABLE 18 Descriptive statistics of variables used in regression analysis (695 observations)

Variables	Frequency	Per cent
NPI agitation scores		
0	314	45
1	68	9
2	60	8
3	51	7
4	60	8
6	57	8
8	45	6
9	12	1
12	28	4
Sex		
Male	195	28
Female	500	72
Age category (years)		
50–59	10	1
60–69	52	7
70–79	258	37
80–89	307	44
90–99	68	9
Cognitive impairment		
Mild (MMSE 21–30)	148	21
Moderate (MMSE 10–20)	243	35
Severe (MMSE ≤ 9)	304	44
Follow-up		
Baseline	203	29
18 months	165	23
30 months	132	19
42 months	110	16
54 months	85	12

Based on the regression results, after adjusting for sex, age, cognitive impairment, follow-up and individual clustering, NHS and PSS costs increase with NPI agitation scores, from around £7000 over a 3-month period with clinically non-significant agitation symptoms (NPI agitation score = 0) up to around £15,000 at the most severe levels of agitation (NPI agitation score = 12; *Table 19*). The CIs are wider at higher NPI agitation scores, possibly due to the smaller number of observations with these values. Costs are also higher for females than males, are highest in the youngest age category (50–59 years), increase with cognitive impairment, and do not vary by follow-up point.

TABLE 19 Predictive margins: adjusted mean 3-month health and social care costs per person (695 observations)

Clinical variables	Mean (95% CI)	Standard error
NPI agitation scores		
0	7266 (6012 to 8521)	640
1	7006 (5186 to 8827)	929
2	8761 (6220 to 11,301)	1296
3	7298 (5507 to 9089)	914
4	8557 (6021 to 11,093)	1294
6	6762 (4871 to 8653)	965
8	7802 (5956 to 9647)	942
9	12,806 (5618 to 19,994)	3667
12	15,148 (4592 to 25,705)	5386
Sex		
Male	6215 (4803 to 7627)	720
Female	8587 (7250 to 9924)	682
Age category (years)		
50–59	17,832 (–2947 to 38,611)	10,602
60–69	5373 (2902 to 7843)	1261
70–79	6997 (5512 to 8482)	758
80–89	8617 (6938 to 10,297)	857
90–99	8958 (5839 to 12,077)	1592
Cognitive impairment		
Mild (MMSE 21–30)	2442 (1633 to 3250)	413
Moderate (MMSE 10–20)	5720 (4585 to 6854)	579
Severe (MMSE ≤ 9)	12,124 (10,152 to 14,096)	1006
Follow-up		
Baseline	8558 (6782 to 10,335)	906
18 months	8107 (6493 to 9721)	823
30 months	7926 (6452 to 9399)	752
42 months	7958 (6220 to 9696)	887
54 months	6906 (5683 to 8129)	624

Analysis of health-related quality of life associated with agitation

Methods

We calculated health-related quality of life associated with different levels of agitation measured by the NPI also using the LASER-AD study. We wished to use a preference-based single index measure suitable for calculating QALYs. In the last follow-up in the LASER-AD study (at 54 months), data were collected for the DEMQOL system. This system was developed to generate a measure of health-related quality of life for people with dementia by using patient self-report and carer proxy report. It consists of two interviewer-administered instruments: DEMQOL, which is self-reported by the patient, and DEMQOL-Proxy, which is reported by a carer.[216,217] The system was developed to be used across all types of dementia, care arrangements and levels of severity, and it has been shown to be reliable and valid. DEMQOL data were available for only 28 study participants in the 54-month follow-up in LASER-AD; DEMQOL-Proxy data were available for 84 study participants, and so we focused on the latter. The DEMQOL-Proxy contains 31 items, scored from 1 to 4.

We converted the DEMQOL-Proxy data into a preference-based single index measure suitable for calculating QALYs using a recently published method. This has two stages. At the first stage, the DEMQOL-Proxy was converted into a carer-reported health state classification system using Rasch analysis. A four-dimension classification system was developed using four items of the DEMQOL-Proxy, classifying positive emotion, cognition, appearance and negative emotion. At the second stage, a valuation study of the classification system was undertaken, using 287 members of the general population and the time-trade-off technique.[216] Regression analysis was used to derive preference weights for the carer-reported health state classification system based on the DEMQOL-Proxy, called the DEMQOL-Proxy-U.[216,217]

We used the classification system developed by Mulhern *et al.*,[218] and calculated DEMQOL-Proxy-U values using the preferred regression model (7) reported by Rowen *et al.*[216]

Results

Once we had computed the DEMQOL-Proxy-U scores, we regressed this variable against the agitation measures using a Tobit regression model, controlling for sex, age at baseline and cognitive impairment. We used Tobit regression to account for the censoring of DEMQOL-Proxy-U scores; the feasible range of values using the preferred regression model in Rowen *et al.*[216] is 0.357 to 0.918; hence, these values were set as the lower and upper limits for censoring in the Tobit model, respectively. We adjusted for clustering by participant. We calculated predictive margins for NPI agitation scores; this is the predicted DEMQOL-Proxy-U score by NPI agitation score, controlling for the covariates.

Unadjusted mean (SD) and median (interquartile range) DEMQOL-Proxy-U scores across the 84 observations were 0.743 (0.118) and 0.730 (0.646 to 0.845), respectively (*Table 20*). Unadjusted DEMQOL-Proxy-U scores were lower at the highest levels of agitation. The range of values was 0.468 to 0.937 (*Figure 4*).

Descriptive statistics for the variables used in regression analysis are in *Table 21*. In these data, the mode and median NPI agitation scores are 0 and 2, respectively. As before, the majority of the sample were female and aged 70 years or over. In 42% of observations, the patient had mild cognitive impairment, compared with 36% for moderate cognitive impairment and 23% for severe cognitive impairment.

Based on the regression results, after adjusting for sex, age, cognitive impairment, and individual clustering, there is some evidence that DEMQOL-Proxy-U decline with NPI agitation scores, from a score of around 0.75 with clinically non-significant agitation symptoms (NPI agitation score = 0) to around 0.65 at the most severe levels of agitation (NPI agitation score = 12; *Table 22* and *Figure 5*) but the 95% CIs overlap, and there is not a clear trend between the lowest and highest NPI agitation scores, possibly due to the relatively small number of observations.

TABLE 20 Summary statistics for DEMQOL-Proxy-U

	DEMQOL-Proxy-U score					
NPI agitation score	Mean	SD	Median	25th percentile	75th percentile	Observations
0	0.748	0.132	0.808	0.646	0.845	26
1	0.720	0.111	0.679	0.655	0.845	11
2	0.798	0.081	0.819	0.730	0.860	12
3	0.747	0.085	0.754	0.672	0.819	10
4	0.844	0.079	0.844	0.788	0.900	2
6	0.696	0.116	0.679	0.599	0.800	12
8	0.777	0.166	0.874	0.646	0.900	5
9	0.696	0.107	0.646	0.624	0.819	3
12	0.672	0.162	0.646	0.525	0.845	3
All	0.743	0.118	0.730	0.646	0.845	84

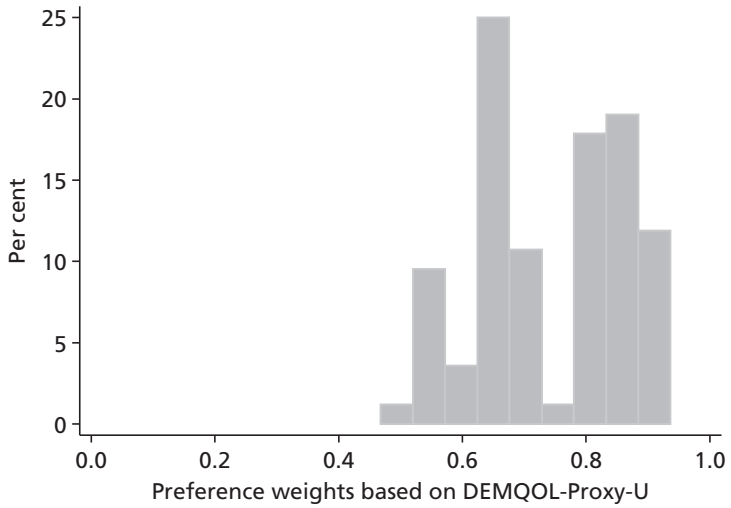


FIGURE 4 Distribution of DEMQOL-Proxy-U scores (84 observations). The feasible range of values is 0.357 to 0.918.

TABLE 21 Descriptive statistics of variables used in regression analysis (84 observations)

Clinical variables	Frequency	Per cent
NPI agitation scores		
0	26	31
1	11	13
2	12	14
3	10	12
4	2	2
6	12	14
8	5	6
9	3	4
12	3	4
Sex		
Male	24	29
Female	60	71
Age category (years)		
50–59	2	2
60–69	8	10
70–79	32	38
80–89	36	43
90–99	6	7
Cognitive impairment		
Mild (MMSE 21–30)	35	42
Moderate (MMSE 10–20)	30	36
Severe (MMSE ≤ 9)	19	23

TABLE 22 Predictive margins: adjusted DEMQOL-Proxy-U (84 observations)

Clinical variables	Mean (95% CI)	Standard error
NPI agitation scores		
0	0.757 (0.711 to 0.803)	0.023
1	0.729 (0.658 to 0.800)	0.036
2	0.805 (0.755 to 0.854)	0.025
3	0.733 (0.682 to 0.784)	0.026
4	0.869 (0.774 to 0.964)	0.048
6	0.677 (0.619 to 0.735)	0.030
8	0.780 (0.674 to 0.886)	0.054
9	0.679 (0.589 to 0.769)	0.046
12	0.654 (0.501 to 0.808)	0.078
Sex		
Male	0.733 (0.689 to 0.777)	0.022
Female	0.748 (0.721 to 0.775)	0.014
Age category (years)		
50–59	0.581 (0.498 to 0.664)	0.042
60–69	0.786 (0.732 to 0.840)	0.028
70–79	0.757 (0.719 to 0.795)	0.019
80–89	0.724 (0.686 to 0.761)	0.019
90–99	0.788 (0.732 to 0.844)	0.028
Cognitive impairment		
Mild (MMSE 21–30)	0.717 (0.679 to 0.755)	0.019
Moderate (MMSE 10–20)	0.774 (0.734 to 0.814)	0.020
Severe (MMSE ≤ 9)	0.744 (0.698 to 0.791)	0.024

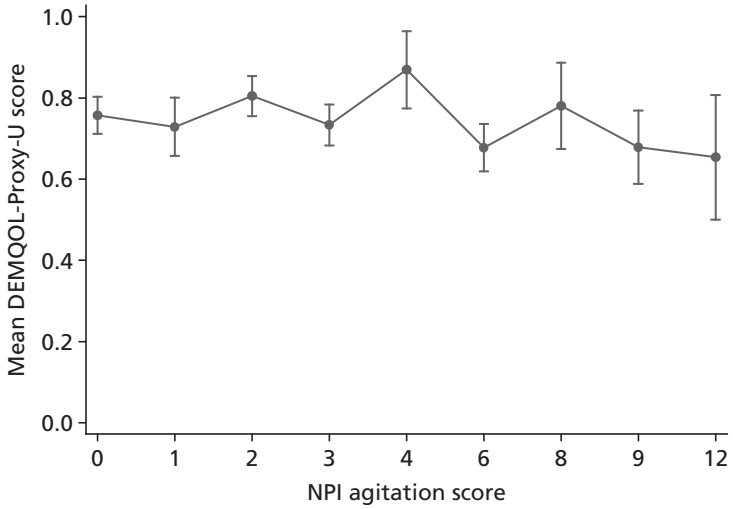


FIGURE 5 Adjusted mean DEMQOL-Proxy-U score by NPI agitation score.

Cost–utility analysis of non-pharmacological interventions for managing agitation

Introduction

In this section, we describe how we constructed an economic model to undertake a cost–utility analysis of a non-pharmacological intervention for reducing agitation in adults with dementia. As discussed, our initial plans as described in the study protocol were not feasible due to lack of data about the impact of non-pharmacological interventions for reducing agitation on QALYs; the impact of non-pharmacological interventions on the full range of health and social care costs associated with agitation that would be relevant in a UK context; time horizon beyond 12 months; and transition probabilities necessary to construct a Markov model. This analysis addresses the limitations of the cost-effectiveness analysis reported above because it includes the full range of costs (intervention costs plus health and social care costs associated with managing agitation), measuring outcomes in terms of QALYs permits comparisons with other interventions, and it is possible to identify whether or not an intervention represents good for money to the NHS, that is to say if the incremental cost per QALY gained is below the NHS's maximum willingness to pay for a QALY.

We used a different approach to measuring cost-effectiveness, primarily based on data from the LASER-AD study described above, and using only a 12-month time horizon.

Methods

The aim was to use model-based cost–utility analysis to estimate the incremental cost per QALY gained of non-pharmacological interventions for reducing agitation in adults with dementia. The analysis was undertaken from the perspective of the UK NHS and PSS. Costs were calculated in 2011 GBP. As explained, we used a time horizon of 1 year for costs and outcomes. This effectively assumes that after 1 year there were no differences in the costs and QALYs associated between receiving the interventions and not receiving them.

Model structure

The structure of the economic model is in *Figure 6*. Using the data and methods described previously, we evaluated the relationship between agitation and health and social care costs associated (see *Figure 6a*) and relationship between agitation and utility (see *Figure 6b*). Using the data generated by the effectiveness review, we then evaluated the impact of an intervention on agitation over time (see *Figure 6c*). The intervention is delivered at the start of the 12-month time horizon and reduces agitation during the period t_1 to t_2. Combining this with data on the relationship between agitation and health and social care costs and utility, we calculated the impact of the intervention on health and social care costs (see *Figure 6d*) and utility (see *Figure 6e*), assuming that the time period during which the intervention affects agitation is the period during which health and social care costs and utility are also affected. We combined the health and social care costs associated with managing agitation with the costs of the intervention to calculate the incremental costs of the intervention. We then combined the incremental costs with the change in utility to estimate cost-effectiveness.

Intervention

The model requires information on the relationship between the intervention and agitation. It is necessary that agitation is measured in the same units, that is to say using the same instrument, that are used to quantify the relationship between agitation and health and social care costs and agitation and utility. We used the LASER-AD study to quantify these relationships, as this was the only source of data available. In the LASER-AD study, as discussed, agitation was measured in terms of NPI agitation scores. In order to be able to use these data, we required an intervention that was evaluated in terms of its impact on NPI agitation scores. We are not aware of any mapping studies that relate NPI agitation scores to other measures of agitation, such as the CMAI, which was the most commonly used outcome measure in the studies included in our effectiveness review. Further research linking different agitation measures would be beneficial.

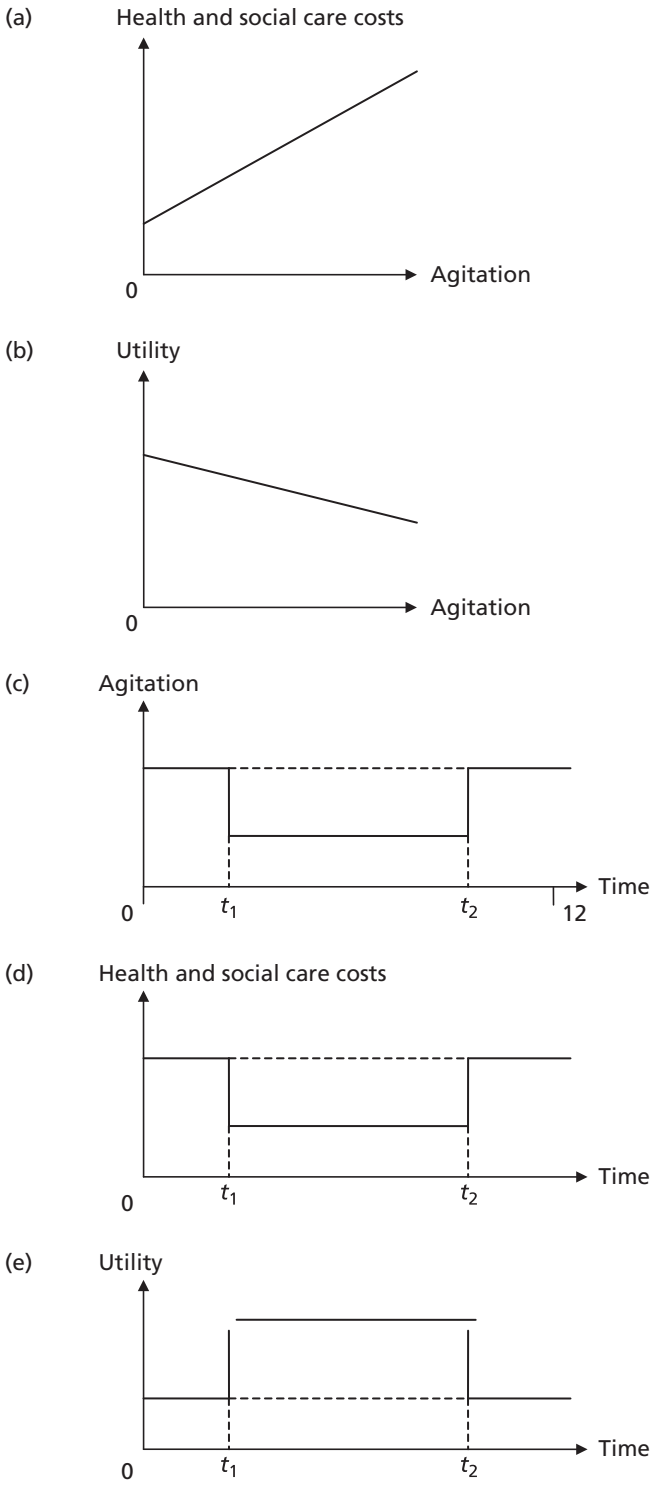


FIGURE 6 Model structure. (a) Association between agitation and health and social care costs; (b) association between agitation and utility; (c) impact of intervention on agitation over time; (d) impact of intervention on health and social care costs; (e) impact of intervention on utility.

Two studies in our effectiveness review had a significant favourable effect on agitation, measured using NPI agitation scores.[179] The study by Ousset *et al.*[194] provided insufficient information on the details of the intervention, and so we were not able to compute the costs of it. Hence, we evaluated the intervention tested in the study by Fischer-Terworth and Probst.[179]

The authors evaluated a multicomponent intervention involving a combination of music therapy, structured teaching, psychoeducational staff training and intensive family member–staff communication in participants with mild to moderate dementia. The intervention was compared with non-specific occupational therapy. Twenty-six participants received the intervention and 22 received the control. The study used a non-randomised design. The intervention was provided for 6 months. NPI agitation scores were measured at baseline and at the 6-month point. The change in NPI agitation scores over time was measured in both groups (on a linear scale), and between-group differences in the change were evaluated. In the effectiveness review, the study was judged to be a level 4 study (i.e. with quality rating < 6) due to the non-randomised design and the poor description of the statistical methods used.

Impact of intervention on agitation

We measured the impact of the intervention in terms of the difference-in-difference in NPI agitation scores using the NPI agitation scores reported at baseline and 6 months in the intervention and control groups. The standard error of the difference-in-difference was computed using the SDs and sample sizes reported at baseline and 6 months in both groups.

Association between agitation and health and social care costs and between agitation and utility

The associations between agitation and health and social care costs and agitation and utility were quantified using the data and methods described above, that is to say using regression analysis of data on health and social care costs, utility, NPI agitation scores, age, sex, cognitive impairment and follow-up from the LASER-AD study. The only difference is that we included NPI agitation scores in the regression models as a linear term rather than categorical indicators for each value to match the effectiveness measure reported by Fischer-Terworth and Probst[179] (change in NPI agitation score). We did not evaluate the impact of the change in NPI agitation scores on the change in health and social care costs and the change in utility over time directly in the LASER-AD data due to the relatively small numbers of transitions and the length of time between follow-ups; in addition, the DEMQOL system was measured at only one point in time (the 54-month follow-up). Ideally, we would have had data on the proportion of participants at each level of agitation before and after the intervention, in which case we could have applied the results of the previous analysis of the LASER-AD study directly, but this information was not reported in the study.

Duration of effect of intervention

To measure the incremental costs and QALYs gained due to the intervention, we combined data on the change in health and social care costs and utility associated with the intervention and the time period over which the change occurs. In the Fischer-Terworth and Probst study,[179] the intervention was delivered over a 6-month period and the outcomes were assessed only at that point. We assumed the following.

First, the impact of the intervention on agitation was maximised at the 6-month assessment. Second, the transition between agitation levels at baseline and 6 months occurred during the 6-month period, and agitation levels returned to their baseline levels during the period from 6 to 12 months. Third, in the absence of evidence to the contrary, the transitions between agitation levels (baseline values to 6-month values, 6-month values back to baseline values) were instantaneous. Fourth, in the base case, the transitions occur exactly halfway through each 6-month period, that is to say at 3 and 9 months. The sensitivity of the results to the duration of effect of the intervention was assessed in the univariate sensitivity analysis and probabilistic sensitivity analysis (PSA).

Cost of intervention

Based on the information provided in the study, the intervention comprised the following:

- music-based group therapy once per week for 26 weeks for 45 minutes with a mean group size of seven participants
- structured teaching with a therapist once per week for 26 weeks for 45 minutes with a mean group size of seven participants
- psychoeducational staff training by a psychologist through a programme of 12 lessons
- intensive family member–staff communication comprising provision of basic information about dementia to family members, everyday availability of professional caregivers to answer family members' questions, and a 1-hour session of psychoeducational counselling by a psychologist to a close family member of each participant.

To compute the unit cost of the intervention per participant, we assumed the following. First, music-based group therapy was provided by a NHS community occupational therapist and, for each 26-week programme, costs were incurred for a CD player (£30) and music (£30). Second, structured teaching was provided by a NHS community occupational therapist. Third, psychoeducational staff training was provided by a psychologist to three members of staff at a time and each of these staff members was responsible for the care of seven participants. Fourth, the provision of basic information about dementia to family members and the everyday availability of professional caregivers to answer family members' questions incurred zero cost on the basis that these activities provided no increase in workload. Psychoeducation counselling was provided by a clinical psychologist on a one-to-one basis to a close family member of each patient. Fifth, no additional costs were incurred for venue hire. Sixth, given the unspecified but seemingly low-intensity nature of the control intervention (non-specific occupational therapy), we assumed that this was provided at zero additional cost over usual care received by all participants.

Unit costs for staff were taken from published sources.[212] Non-staff unit costs were valued as described.

The sensitivity of the results to the costs of the intervention was assessed in the univariate sensitivity analysis and PSA.

Measuring cost-effectiveness

Cost-effectiveness was measured using monetary net benefits (MNBs). The MNB is calculated as the mean QALYs gained per patient accruing to the intervention multiplied by decision-makers' maximum willingness to pay for a QALY (also referred to as the cost-effectiveness threshold, which in the UK is approximately £20,000 to £30,000 per QALY gained[217,219]), minus the mean incremental cost per patient for the intervention. This approach converts the gain in outcomes associated with the intervention into monetary terms and then subtracts the incremental costs of the intervention from the monetised benefits, calculating the net benefit in monetary terms. The incremental costs included the costs of the intervention plus the change on health and social care costs associated with the intervention (positive or negative). MNBs were calculated using the base-case parameter values; these are referred to as the deterministic results as they do not depend on chance. If the MNB for the intervention is > 0, it represents good value for money and is preferred to the comparator on cost-effectiveness grounds.

Sensitivity analysis

One-way sensitivity analysis was undertaken, varying the key parameters one at a time within a prespecified range. The aim was to identify the threshold value for each parameter, where one exists, where the MNB became negative, so the intervention was no longer cost-effective.

We also undertook a PSA as recommended by NICE. Distributions were assigned to parameters to reflect the uncertainty with each parameter value. A random value from the corresponding distribution for each parameter was selected. This generated an estimate of the mean incremental cost and mean QALYs gained and the MNB associated with the intervention. This was repeated 5000 times and the results for each simulation were noted. The mean value for each model parameter and the mean costs and QALYs associated with each treatment option were calculated from the 5000 simulations and these were used to calculate the MNBs for each treatment; these are referred to as the probabilistic results because they depend on chance. The MNB was also calculated for each of the 5000 simulations, and the proportion of times the intervention had a positive MNB was calculated for a range of values for the maximum willingness to pay for a QALY. These were summarised graphically using a cost-effectiveness acceptability curve.

In the PSA, we used gamma distributions to model uncertainty in the cost of the intervention, the impact of the intervention on agitation, the impact of changes in agitation on health and social care costs, and the impact of changes in agitation on utility.[220] To model the duration of effect of the intervention, we used uniform distributions as there are no data to inform the time point at which the transition occurs and so each time was judged to be equally likely. In cases where standard errors were required for the PSA, these were computed from the figures reported in the study (in the case of the impact of the intervention on agitation) or from the statistical analysis of the LASER-AD data (the impact of changes in agitation on health and social care costs, and the impact of changes in agitation on utility). Where standard errors were not obtainable (cost of the intervention), it was assumed that these were equal to the mean.[220]

Results

In the base-case analysis, the cost per participant was £406 (*Table 23*). In the study by Fischer-Terworth and Probst,[195] the intervention was calculated to reduce NPI agitation scores by 1.8. Based on the analysis of data from the LASER-AD study, a one-unit increase in NPI agitation scores was associated with a statistically significant increase in health and social care costs over a 3-month period of £306 per patient (95% CI £7 to £606; *Table 24*). Note that we controlled for cognitive impairment in the regression model. If we limit the sample to those with mild or moderate dementia in order to reflect the study population, a one-unit increase in NPI agitation scores is associated with an increase in costs of £394 (95% CI £79 to £708).

TABLE 23 Model parameters, range of values used in univariate sensitivity analysis, and threshold values

Clinical variables	Base case value (SE)	Distribution	Range	Value at which MNB becomes negative
Cost of intervention per participant	406 (406)	Gamma	100 to 1000	–
Impact of intervention on *reduction* on NPI agitation scores	1.8 (0.813)	Gamma	0.5 to 4.0	< 0.6
Impact of a one-unit *increase* in NPI agitation scores on 3-month health and social care costs	306 (153)	Gamma	7 to 606	< 79
Impact of a one-unit *decrease* in NPI agitation scores on utility	0.00661 (0.00413)	Gamma	–0.001485 to 0.0147	–
Proportion of time during 12-month time horizon until intervention takes effect	0.25	Uniform	0.0–0.5	–
Proportion of time during 12-month time horizon after which intervention is no longer effective	0.75	Uniform	0.5–1.0	–

SE, standard error.

TABLE 24 Association between NPI (as a linear term) and 3-month health and social care costs per person and DEMQOL-Proxy-U score

Dependent variable	Regression model	Marginal effect (95% CI)	SE	Observations
Three-month health and social care costs per person[a]	Generalised linear model	306[b] (7 to 606)	153	695
DEMQOL-Proxy-U score[c]	Tobit	0.00661[d] (–0.001485 to 0.0147)	0.00413	84

SE, standard error.
a 2011 GBP. Including controls for sex, age, cognitive impairment, and follow-up.
b The marginal effect shows the change in 3-month health and social care costs per person for a one-unit *increase* in NPI agitation score. If, alternatively, we limit the sample to those with mild or moderate dementia, the results are marginal effect = 394; 95% CI = 79 to 708; SE = 161; observations = 391.
c Including controls for sex, age and cognitive impairment.
d The marginal effect shows the change in DEMQOL-Proxy-U score for a one-unit *decrease* in NPI agitation score. If we limit the sample to those with mild or moderate dementia, the results are marginal effect = 0.010247; SE = 0.0044308; 95% CI = 0.00156 to 0.01893; observations = 65.

A one-unit decrease in NPI agitation scores was associated with a non-significant increase in DEMQOL-Proxy-U scores of 0.00661 (95% CI –0.001485 to 0.0147). If we limit the sample to those with mild or moderate dementia, the marginal effect is 0.010247 (95% CI 0.00156 to 0.01893).

Using base-case values, the intervention was associated with a cost saving of £711 per patient compared with the comparator (deterministic results, *Table 25*). The savings were due to the reduction in the costs of managing agitation, which more than offset the intervention costs. The QALY gain associated with the intervention was 0.005949. The intervention was less costly and more effective than the comparator, and the MNB is positive at a maximum willingness to pay for a QALY of £20,000 and £30,000, indicating that this option was preferred to the comparator on cost-effectiveness grounds. As expected, the probabilistic results were broadly the same, and the values of the mean costs and mean QALYs per patient were similar.

In the one-way sensitivity analysis, the key parameters were varied one at a time within the ranges listed in *Table 22*. The results were not sensitive to change, that is to say the MNB did not become negative within the ranges used for the cost of the intervention per participant, the associated between NPI agitation scores and utility, and the duration of effect. If the intervention reduced NPI agitation scores by less than 0.6 units, and if an increase in NPI agitation scores reduced 3-month health and social care costs by less than £79, then the MNB became negative and the intervention no longer represented good value for money.

TABLE 25 Base-case results

			MNB	
Clinical variables	QALYs gained	Incremental cost (£)	£20,000	£30,000
Deterministic results	0.005949	–711	830	889
Probabilistic results	0.005829	–716	832	891

Costs are in 2011–12 GBP. The MNB is calculated at a maximum willingness to pay for a QALY of £20,000 and £30,000. The deterministic results are calculated using base-case values of the model parameters. The probabilistic results are mean values from 5000 simulations in the PSA.

The cost-effectiveness acceptability curve shows that the intervention had an 82.2% probability of being cost-effective at a maximum willingness to pay for a QALY of £20,000 and an 83.18% probability at a value of £30,000 (*Figure 7*).

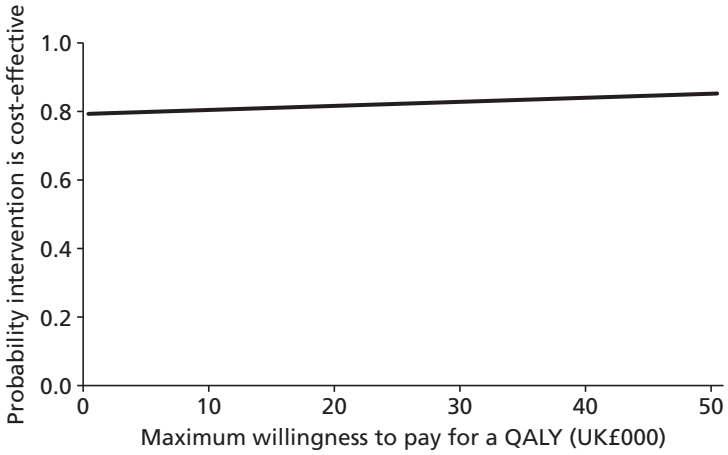


FIGURE 7 Cost-effectiveness acceptability curves showing the probability that each option is cost-effective at different values of the maximum willingness to pay for a QALY.

Chapter 6 Discussion

The main findings in this report are clinical, economic and conceptual. We are able to recommend the use of some interventions in specific groups of people with dementia to manage agitation and to recommend that others are not useful. We detail these overall conclusions and their implications below.

Effective interventions

There is convincing evidence that training paid caregivers in communication or person-centred care skills or DCM (all with supervision during implementation) is effective, for symptomatic and severe agitation, during the intervention and for 6 months afterwards, and preliminary evidence that it helps prevent emergent agitation. This form of DCM is somewhat different to that used in everyday practice and so could be regarded as modified. All of these interventions seek to communicate with people with dementia, to understand and fulfil their wishes and needs. The SESs suggest they are similarly efficacious, although DCM is more expensive. A 30% decrease in agitation is clinically significant and these changes are in this range.[99] Another way of considering clinical significance is through effect size; a SES of 0.2 is usually regarded as clinically small, of 0.5 as medium and of 0.8 as large.[221] This suggests that they are clinically significant interventions but there remains substantial variability in the interventions' statistical significance.

We also found replicated evidence from good-quality studies that sensory interventions, activities and music therapy by protocol reduce emergent agitation and decrease symptomatic agitation in care homes while they are in place. The theory-based activities (neurodevelopmental and Montessori) were more expensive (£590–696) than those promoting pleasant activities (£173–274). There is no evidence for those who are severely agitated.

More evidence is required for the implementation of group activities in care homes over longer time periods to prevent agitation. We were surprised that individualised activities were no more effective than prescribed activities but they may still be important in increasing the number of people accessing the intervention. There is no evidence of the effect of activity provision for people with dementia in their own homes. This is an important area of future research as decreasing emergent agitation could prolong staying at home.

Sensory interventions significantly improved emergent agitation, symptomatic agitation and severe agitation, while they were in place. 'Therapeutic touch' had no added advantages. There is no evidence about long-term effects or in settings outside care homes.

Ineffective interventions

Light therapy and aromatherapy do not work for agitation and should not be used. Earlier non-blinded interventions with aromatherapy seemed to be effective, but this was probably the effect of rater bias. Home-like care sounds appealing but was ineffective, possibly because people tend to move to care homes when they have not been able to stay safe in a home-like environment or perhaps the environment was not similar enough to the home they knew.

Interventions with insufficient evidence to draw definitive conclusions

Training family carers in behavioural or CBT interventions for the person with dementia was ineffective in severe agitation and there was a lack of evidence of efficacy at other levels of agitation; perhaps these are difficult to combine with a family relationship. Changing the environment is promising but the evidence is not definitive and we presume that different changes would have different effects. Hiding the exit door

could be construed as restraint. Results for music therapy without protocol are equivocal and we would recommend using it with a protocol. Pet therapy results are also varied and it may appeal to some people and not others. Exercise, dementia-specific therapies and wayfinding do not appear to show promise but the studies are unclear because they are of low quality.

Quality of life

Studies in which agitation was an outcome also considered quality of life. Although DCM with supervision improved agitation, it did not improve quality of life in the two studies in which it was measured. Other studies of staff education without supervision, aromatherapy, unstructured music therapy and changing the environment that found no improvement in agitation also found no improvement in quality of life. As there are only two studies which improve agitation and measure quality of life, the evidence is relatively sparse, but we have certainly not demonstrated a clear link between improvement in agitation and quality of life. This may partially be because global measures, by definition, encompass many domains, some of which would not be improved by improving agitation, for example finances, activities of daily living and cognition. Further work and larger studies are needed to consider the link between agitation and quality of life.

Health economic analysis

Our systematic review identified two previous cost and cost-effectiveness studies of non-pharmacological interventions for reducing agitation in adults with dementia. There were judged to be of low to middle quality and provided little information on the cost-effectiveness of interventions in a UK context. The review revealed little pre-existing evidence that could inform our cost-effectiveness model.

We calculated the costs of 30 interventions that had a significant impact on agitation. Costs ranged from £80 to £696 for activities, £13 to £27 for music therapy, £3 to £527 for sensory interventions, £31 to £339 for training paid caregivers in person-centred care or communication skills with or without behavioural management training, with supervision, and for DCM.

Among 11 interventions that were evaluated using the CMAI, the incremental cost per unit reduction in CMAI score ranged from £162 to £3480 for activities, £4 for music therapy, £24 to £143 for sensory interventions, and £6 to £62 for training paid caregivers in person-centred care or communication skills with or without behavioural management training, with supervision, and for DCM.

Based on data from the LASER-AD study, we found that after adjusting for sex, age, cognitive impairment, follow-up and individual clustering, NHS and PSS costs increase with NPI agitation scores from around £7000 over a 3-month period with clinically non-significant agitation symptoms up to around £15,000 at the most severe levels of agitation. The 95% CIs are wider at higher NPI agitation scores, possibly due to the smaller number of observations taking these values.

Again based on data from the LASER-AD study, we found that after adjusting for sex, age, cognitive impairment and individual clustering, there is some evidence that DEMQOL-Proxy-U scores decline with NPI agitation scores, from a score of around 0.75 with clinically non-significant agitation symptoms to around 0.65 at the most severe levels of agitation. However, the 95% CIs overlap, and there is not a clear trend between the lowest and highest NPI agitation scores, possibly due to the relatively small number of observations.

We constructed a new cost-effectiveness model to evaluate the impact of interventions for non-pharmacological interventions for reducing agitation in adults with dementia. The model can evaluate interventions that have been shown to impact on agitation measured using NPI agitation scores. In an

illustrative example, we found that a multicomponent intervention in participants with mild to moderate dementia had a positive MNB and had a 82.2% probability of being cost-effective at a maximum willingness to pay for a QALY of £20,000 and a 83.18% probability at a value of £30,000.

Emergent and clinically significant interventions

Some interventions may be helpful in preventing clinically significant agitation or decreasing mean agitation levels but not practical for someone who already has clinically significant agitation and who may be unco-operative and unable to concentrate. Previous reviews have not considered potential differences between preventative interventions and those for clinically significant symptoms. We think this is conceptually important and have specified which interventions are helpful in each category.

Implementation

Implementation of the findings will require considerably more work. Implementing them into everyday practice will involve observing and interviewing a wide range of people with dementia and those who care for them at home, in care homes and in hospitals (including at the end of life), in order to better understand how agitation is currently managed, barriers to good practice and ways in which care could be improved.

In care homes, a manual for training staff in interventions known to be effective would then be developed, tested and implemented, with 'champions' within each home charged with ensuring change in care-home culture and continuous implementation. This would require testing in terms of practicality, effectiveness and cost-effectiveness. Our model suggests that the intervention may well be affordable in terms of improvement in agitation, but its impact on QALYs is unclear.

Strengths and limitations

This is an exhaustive systematic review; two independent raters evaluated studies to ensure reliability in study inclusion and quality ratings. We searched all databases in health and social sciences, as well as the grey literature, translated non-English publications and asked authors about any other known studies, and then repeated our searches. We searched not only the Cochrane reviews about agitation and dementia but also the Cochrane reviews about behavioural problems in dementia, to try to ensure that we did not miss papers in which agitation was one of a number of outcome measures. The quality ratings enabled us to systematically consider sources of bias in carrying out and measuring the outcomes of individual studies. We reduced bias by prioritising higher-quality studies. We reduced publication bias by searching the grey literature and asking experts about other studies. Our quality rating tool was derived by assessing validity by operationalising the CEBM RCT evaluation criteria.[222] This meant that cohort studies, for example, would not be able to score as highly as very well-conducted RCTs. While RCTs are conventionally regarded as the highest level of evidence because they reduce bias by minimising systematic differences between groups, this approach is not agreed on by all commentators. In addition, giving one point for every criterion suggests that all are equally important. If the outcome measure is not validated and reliable, the whole study results, however well conducted in other ways, may be questionable. We have reanalysed our results (detailed in *Appendix 3*) and excluding these studies would not change our conclusions, with the possible exception of the evidence for activities which we would have to couch more cautiously. Our team, with clinical, statistical, health economic and carer expertise, have assessed them. As we have separated studies according to the setting, the severity of the participants' agitation symptoms and the immediate versus long-term results, we are able to consider both the evidence for each of these and the gaps in the evidence.

In terms of the health economic analysis, the main strength is that this is the first study to comprehensively assess the cost-effectiveness of non-pharmacological interventions for reducing agitation in adults with dementia. The main weakness is the paucity of health economic data. Focusing specifically on the model used in the cost–utility analysis, the main strength is that we have developed a model, using new data, that is capable of evaluating the cost-effectiveness of non-pharmacological interventions for reducing agitation in adults with dementia, using a framework that can determine whether or not an intervention is cost-effective using current guidelines. The weakness of the cost–utility analysis is that it is, at present, limited in the interventions that it can evaluate.

'Active ingredients'

Individual studies had multicomponent interventions and we could not find out which of the components were the 'active' ingredients. Nonetheless, we have tried to contrast studies; noting, for example, that differences in results with and without supervision suggest that supervision may be a necessary 'active ingredient' in changing care-home culture. Similarly, we have contrasted sensory interventions based on different models and found that there is no significant advantage offered by therapeutic touch over other sensory activities. Activities are an interesting category. It seems likely that, as is the case with people who do not have dementia, some activities are liked by some residents some of the time and, thus, it would be interesting to consider a menu of activities, say for example animal-assisted therapy, dance or cooking, rather than consider any one of them the answer, and understand that this may vary not just with cognition level but with mood, physical illness and other factors. We did not find that individualised activity was better than just offering an activity, but that may be because those who did not like the activity on offer did not enter the study and, thus, activities were effectively individualised.

Subtypes of dementia

Most studies recruited people with a variety of types of dementia and none of these analysed the participants according to their type of dementia. The only type of dementia which has any data considering it separately is Alzheimer's disease. The epidemiology of dementia suggests, as do the papers which describe the numbers in each group, that the vast majority of people in each intervention had Alzheimer's disease and, thus, we have not analysed those separately, reducing our already limited data, as the positive results are all likely to be applicable to people with Alzheimer's disease. It is a limitation that we are unable to comment on, as we do not know whether or not individuals with different types of dementias responded differently.

Chapter 7 Intervention setting

Care homes and hospitals

As people with agitation are disproportionately more likely to move to care homes, it is perhaps unsurprising that most interventions have been tried only in care homes, and we do not know their effect or practicality in people's own homes, or in hospitals. All sensory intervention, aromatherapy, exercise and light-therapy studies were in care homes and, similarly, for both music therapies and activities intervention, all except one study took place in a care home. The exceptions in both cases were studies situated in day centres. All staff interventions (DCM, communication skills and person-centred care) were also in care homes, except one which was in an assisted-living facility. Although there is a lack of good evidence, it is plausible and reasonable at present to build on the evidence available and, in hospital settings, to try interventions that work in care homes, such as staff training with supervision in communication skills as well as music and massage.

Community and domestic interventions

The few interventions in domestic environment comprised teaching family carers behavioural management for severe agitation, or cognitive–behavioural management. The former was unsuccessful in one large RCT of severe agitation and inconclusive in a group with less severe symptoms. The latter was unsuccessful in two large RCT studies of severe agitation and in one small study. The reasons for this are unclear, but it may be the case that family carers do not have the capacity to learn and implement these strategies while looking after someone who is agitated. While we do not know why there is so little evidence in the community, it may be due to difficulties regarding recruitment; people who are agitated and have dementia are often admitted to a care home, and those who do remain at home may be unco-operative and their families may be reluctant to take part in research, particularly as they may not receive the intervention. It is usually easier to recruit in a care home, and researchers may feel that this is a better setting to begin studies.

Country of origin and ethnicity of participants

Nearly all of the research papers come from English-speaking countries or other countries in the developed world; none was sufficiently powered to consider or report the results according ethnicity of the participants. Thus, we are unable to comment about the effect of ethnicity and culture.

Acceptability

Studies often involve only a relatively small number of participants and we speculate that this may be because many of the residents were unwilling or unable to access the interventions.

Lack of evidence

Many of the studies were underpowered and low quality. There were only eight level 1 studies and, while lack of evidence is not evidence of lack of efficacy, there were a number of interventions with insufficient evidence to draw conclusions. There were no studies which targeted agitation at the end of life in dementia, although one-third of people aged > 65 years die with dementia in the UK.

Comparison with other studies

A previous systematic review, focusing on non-pharmacological treatment of agitation in dementia at a time when there was less evidence, concluded that the trials were small but only sensory interventions showed evidence of benefit.[31] This positive review is in line with our findings and contrasts with the earlier Cochrane review, which found only two studies to be of sufficient quality to include and judged that there were not enough data to draw conclusions about massage and touch interventions.[223] These differences may be explained by the several more recent studies. After these, a broader review of interventions for agitation selected 47 trials of pharmacological and non-pharmacological treatment for consideration and concluded that the best evidence for effective non-drug treatment was for aromatherapy, although all trials were small and of short duration (< 4 weeks). Since then, further blinded work has not found aromatherapy to be of benefit.[34] A Cochrane review of light therapy for behavioural symptoms including agitation did not find evidence of benefit.[224] Another Cochrane review focused on special care units for agitation and noted the lack of RCTs and the lack of convincing evidence of benefit for behaviour in general.[225] A recent study, including overall neuropsychiatric symptoms, in contrast to our review about agitation specifically, found that working with family caregivers is effective; it would be useful to examine which symptoms contributed to this effect.[226]

Early studies did not have the opportunity to use valid instruments to measure agitation. These now exist but, while several instruments for measuring agitation perform similarly in detecting agitation, they vary in their sensitivity of detecting change. Differences in effect sizes between study results may, therefore, sometimes be due to the difference between the instruments used. Thus, while our study's strength is the integration of the literature, it underlines how much more work is needed in this field. There are a number of RCTs currently in progress which should add to the evidence base. While agitation in dementia has been regarded as due to organic brain damage, our findings that it is improved by, for example, communication, sensory experiences and activities suggest that the behaviour also arises from unmet needs in someone whose dementia makes them unable to explain or understand this. This is in line with Algase's Need-Driven Dementia-Compromised Behaviour (NDB)[227] theory and Kitwood's hypothesis that behaviours are in response to need and more likely to occur when care is task driven rather than person centred (although the latter applied to all neuropsychiatric symptoms and we are commenting only on agitation).[228]

In the health economic analysis, as identified in the systematic review, there is very little economic evidence.

Chapter 8 Conclusions

Implications for health care

At present, agitation is often managed pharmacologically with antipsychotics, about which there is growing concern, as their use is linked with an increased risk of cerebrovascular adverse events and death while they provide only limited benefit. A range of behavioural techniques are also recommended by NICE but with a limited evidence base. These include aromatherapy, music therapy and dance therapy. Restraint is also used in some countries. People are admitted to care homes (often specialist facilities), as they cannot be looked after at home.

This review has found several interventions which are effective for severe agitation in care homes. Person-centred care, communication, and feedback of DCM with a plan implemented all seem similar and, with supervision, efficacious for more severe agitation, and the effects last over a few months. In addition, activities, sensory intervention and music therapy using a protocol were all effective during the intervention, and activities and music therapy helped to prevent agitation symptoms during the intervention when compared with usual care. Sensory interventions also were helpful for clinically significant agitation. All of these improvements were clinically as well as statistically significant. These are very different from the current model of health care, which, in response to referrals for people with dementia and agitation, assesses individuals and then recommends treatment strategies, often working with the home staff individually. The interventions assessed here work at the level of the whole home instead, and suggest a need for a change of culture rather than individual treatment. There are no studies demonstrating the long-term implementation effect of these interventions, as the longest follow-up periods have been about 6 months. There is currently very little cost-effectiveness evidence. The model that we have generated suggests that there is high chance of benefit at low cost, though data limitations preclude a definitive analysis. If treatments are to be funded then this evidence is necessary. Despite NICE's recommendation, we found that the better-quality studies did not demonstrate that aromatherapy was effective and that only specific types of music therapy were useful. There is a need for more evidence about dance therapy but it could be subsumed under the rubric of activities. Aromatherapy, light therapy and home-like care do not show evidence of being effective. The results of interventions in people's own homes working through their family are very disappointing, as there is no high-quality evidence of effectiveness and much more work needs to be done.

Recommendations for research

We recommend a research programme evaluating the implementation of interventions that we have found to be effective. There is most evidence for effective interventions during the time they are being actively implemented. It is logical that effects may not carry over long after implementation has stopped, in an environment where many residents have memory problems and staff turnover is high. Thus, future programmes should focus on changing care-home culture to permanently implement change, and on evaluating the effect on all residents (unless they are unwilling to be evaluated) whether or not they are able or willing to co-operate with the intervention. This real-life implementation will indicate which interventions are likely to be useful in everyday practice for decreasing agitation. We suggest the use of a manual and training of 'champions' in each home, as well as the provision of continuing supervision, to evaluate the effect of interventions longer term. This would be manual based so that it can be consistently implemented in wider areas. There are very few studies which demonstrate the effect on quality of life and the work presented here shows that it is unclear whether or not the link exists in intervention studies. The questions to be addressed would regard effectiveness and cost-effectiveness.

In addition, it is clear that much more work is required to consider what interventions are most effective for people with dementia living in their own homes. The lack of evidence and lack of success of interventions which have been tried (despite an enormous need, with 70% or more of people with dementia living at home) suggests that further research in home settings should start with qualitative interviews considering how agitation is experienced by people with moderate and severe dementia living at home, how their families manage, and what interventions would be acceptable and practical. It may be that family carers who are finding it difficult to manage someone with dementia and agitation say that they are not able to learn a new and cognitively complex strategy during this period. This, together with the evidence above from other settings, can help to answer the questions about what are the important components of an intervention to reduce agitation.

As there are no studies at the end of life, we recommend an initial ethnographic approach involving people with dementia, family and paid carers to explore their interactions in end-of-life care and the barriers to and facilitators of compassion and quality of life. This will provide new knowledge about agitation management during the often-distressing terminal phases of dementia. We already know that dying people often do not have their physical and emotional needs attended to as they cannot express them,[229] that their families find it difficult to make decisions[230] and that the paid carers are often new to the individuals with dementia and do not understand them. This evidence could be used to develop and pilot acceptable and appropriate interventions.

Within individual categories of interventions, it was sometimes difficult to draw conclusions, given the wide variety of interventions and outcome measures. There are several interventions which require more research to indicate if they are effective. There are, for example, no good studies of exercise for agitation in dementia, although a recent study of moderate exercise for depressive symptoms in care-home residents was ineffective and, while not a panacea, it would be good to have an answer.[231]

In terms of the health economic analysis, further research is recommended in the following (in decreasing order of priority):

1. Inclusion of health economic analyses in clinical trials of non-pharmacological interventions for reducing agitation in adults with dementia. Such analyses should evaluate the impact of interventions using final outcomes such as QALYs, for example using new approaches based on the DEMQOL system. Such analyses should also include comprehensive cost analyses, including health and social care costs associated with managing agitation.
2. Evaluation of the long-term effects of interventions.
3. Mapping studies to evaluate the relationship between different measures of agitation, for example CMAI scores and NPI agitation scores.

Acknowledgements

This article presents independent research commissioned by the National Institute for Health Research (NIHR) HTA programme: HTA 10/43/01. The views expressed in this publication are those of the authors and not necessarily those of the NHS, the NIHR, or the Department of Health. The review was designed, conducted, analysed and interpreted by the authors entirely independently of the funding sources.

Patient/public involvement

We consulted Shirley Nurock, dementia carer, regarding the design, conduct and interpretation of the study.

Contributions of authors

Gill Livingston and **Claudia Cooper** initiated the review and helped to design the methodology.

Gill Livingston, **Lynsey Kelly** and **Elanor Lewis-Holmes** located references, extracted data, assisted with analyses and results interpretation, and drafted the report.

Nishma Patel ran the database searches and quality assessments for the review of economic studies.

Stephen Morris and **Nishma Patel** undertook the economic analyses.

Gianluca Baio and **Rumana Z Omar** undertook the statistical analyses. All authors helped to interpret findings and write the final report.

Gill Livingston is guarantor.

Cornelius Katona participated in interpretation of data and revising the paper critically for important intellectual content.

References

1. Luengo-Fernandez R, Leal J, Gray A. *Dementia 2010. The Economic Burden of Dementia and Associated Research Funding in the United Kingdom*. University of Oxford: Alzheimer's Research Trust 35; 2010.
2. Knapp M, Prince M, Albanese E, Banerjee S, Dhanasiri S, Fernández JL, *et al. Dementia UK*. London: Alzheimer's Society; 2007.
3. Department of Health. *Living Well with Dementia: A National Dementia Strategy*. London: Department of Health; 2009.
4. Chantrill C. *Public Expenditure Statistical Analysis*. 2009. URL: www.ukpublicspending.co.uk/uk_health_care_budget_2009_1.html (last accessed 4 April 2014).
5. Morris LW, Morris RG, Britton PG. The relationship between marital intimacy, perceived strain and depression in spouse caregivers of dementia sufferers. *Br J Med Psychol* 1988;**61**:231–6. http://dx.doi.org/10.1111/j.2044-8341.1988.tb02784.x
6. Cohen-Mansfield J. Agitated behavior in persons with dementia: the relationship between type of behavior, its frequency, and its disruptiveness. *J Psychiatr Res* 2008;**43**:64–9. http://dx.doi.org/10.1016/j.jpsychires.2008.02.003
7. ADH/NHS Finance P&O. *Revision to the Operating Framework for the NHS in England 2010/11*. Department of Health; 2010. URL: http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/@ps/documents/digitalasset/dh_116860.pdf (last accessed 4 April 2014).
8. Cohen-Mansfield J, Billig N. Agitated behaviors in the elderly. I. A conceptual review. *J Am Geriatr Soc* 1986;**34**:711–21.
9. Sommer OH, Kirkevold O, Cvancarova M, Engedal K. Factor analysis of the Brief Agitation Rating Scale in a large sample of Norwegian nursing home patients. *Dementia Geriatr Cogn Disord* 2010;**29**:55–60. http://dx.doi.org/10.1159/000265542
10. Ryu SH, Katona C, Rive B, Livingston G. Persistence of and changes in neuropsychiatric symptoms in Alzheimer disease over 6 months – the LASER-AD study. *Am J Geriatr Psychiatry* 2005;**13**:976–83. http://dx.doi.org/10.1176/appi.ajgp.13.11.976
11. Okura T, Plassman BL, Steffens DC, Llewellyn DJ, Potter GG, Langa KM. Prevalence of neuropsychiatric symptoms and their association with functional limitations in older adults in the United States: the aging, demographics, and memory study. *J Am Geriatr Soc* 2010;**58**:330–7. http://dx.doi.org/10.1111/j.1532-5415.2009.02680.x
12. Lemay M, Landreville P. Verbal agitation in dementia: the role of discomfort. *Am J Alzheimers Dis Other Demen* 2010;**25**:193–201. http://dx.doi.org/10.1177/1533317509356687
13. Cohen-Mansfield J, Marx MS, Rosenthal AS. A description of agitation in a nursing home. *J Gerontol* 1989;**44**:M77–84. http://dx.doi.org/10.1093/geronj/44.3.M77
14. Robinson L, Hutchings D, Corner L, Dickinson HO, Finch T, Hughes J, *et al.* A systematic literature review of the effectiveness of non-pharmacological interventions to prevent wandering in dementia and evaluation of the ethical implications and acceptability of their use. *Health Technol Assess* 2006;**10**(26).
15. Wetzels RB, Zuidema SU, de Jonghe JFM, Verhey FRJ, Koopmans RTCM. Determinants of quality of life in nursing home residents with dementia. *Dementia Geriatr Cogn Disord* 2010;**29**:189–97. http://dx.doi.org/10.1159/000280437

16. Burgio LD, Scilley K, Hardin JM, Janosky J, Bonino P, Slater SC, *et al.* Studying disruptive vocalization and contextual factors in the nursing home using computer-assisted real-time observation. *J Gerontol* 1994;**49**:230–9. http://dx.doi.org/10.1093/geronj/49.5.P230

17. Draper B, Snowdon J, Meares S, Turner J, Gonski P, McMinn B, *et al.* Case–controlled study of nursing home residents referred for treatment of vocally disruptive behavior. *Int Psychogeriatr* 2000;**12**:333–44. http://dx.doi.org/10.1017/S1041610200006438

18. Testad I, Ballard C, Bronnick K, Aarsland D. The effect of staff training on agitation and use of restraint in nursing home residents with dementia: a single-blind, randomized controlled trial. *J Clin Psychiatry* 2010;**71**:80–6. http://dx.doi.org/10.4088/JCP.09m05486oli

19. Livingston G, Cooper C. Psychological, behavioural and psychosocial interventions for neuropsychiatric symptoms in dementia. What works, what does not and what needs more evidence? In Ames D, Burns A, O'Brien J, editors. *Dementia*. 4th edn. London: Hodder Arnold; 2010.

20. Livingston G, Johnston K, Katona C, Paton J, Lyketsos CG. Systematic review of psychological approaches to the management of neuropsychiatric symptoms of dementia. *Am J Psychiatry* 2005;**162**:1996–2021. http://dx.doi.org/10.1176/appi.ajp.162.11.1996

21. Committee for the Safety of Medicines. *Atypical Antipsychotics and Stroke*. Medicines and Healthcare Regulatory Agencies; 2004. URL: www.mhra.gov.uk/Safetyinformation/Safetywarningsalertsandrecalls/Safetywarningsandmessagesformedicines/CON1004298 (last accessed 4 April 2014).

22. Ballard C, Howard R. Neuroleptic drugs in dementia: benefits and harm. *Nat Rev Neurosci* 2006;**7**:492–500. http://dx.doi.org/10.1038/nrn1926

23. Schneider LS, Dagerman K, Insel PS. Efficacy and adverse effects of atypical antipsychotics for dementia: meta-analysis of randomized, placebo-controlled trials. *Am J Geriatr Psychiatry* 2006;**14**:191–210. http://dx.doi.org/10.1097/01.JGP.0000200589.01396.6d

24. Schneider LS, Dagerman KS, Insel P. Risk of death with atypical antipsychotic drug treatment for dementia: meta-analysis of randomized placebo-controlled trials. *JAMA* 2005;**294**:1934–43. http://dx.doi.org/10.1001/jama.294.15.1934

25. National Institute for Health and Care Excellence. *SCIE: Dementia – Supporting People with Dementia and their Carers in Health and Social Care*. NICE clinical guide 42. URL: www.scie.org.uk/publications/misc/dementia/ (last accessed 4 April 2014).

26. Ballard C, Margallo-Lana M, Juszczak E, Douglas S, Swann A, Thomas A, *et al.* Quetiapine and rivastigmine and cognitive decline in Alzheimer's disease: randomised double blind placebo controlled trial. *BMJ* 2005;**330**:874. http://dx.doi.org/10.1136/bmj.38369.459988.8F

27. Bierman EJ, Comijs HC, Gundy CM, Sonnenberg C, Jonker C, Beekman AT. The effect of chronic benzodiazepine use on cognitive functioning in older persons: good, bad or indifferent? *Int J Geriatr Psychiatry* 2007;**22**:1194–200. http://dx.doi.org/10.1002/gps.1811

28. Howard RJ, Juszczak E, Ballard CG, Bentham P, Brown RG, Bullock R, *et al.* Donepezil for the treatment of agitation in Alzheimer's disease. *N Engl J Med* 2007;**357**:1382–92. http://dx.doi.org/10.1056/NEJMoa066583

29. Banerjee S. *The Use of Antipsychotic Medication for People with Dementia: Time for Action A Report*. Department of Health; 2010. URL: http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_108302.pdf (last accessed 4 April 2014).

30. Cohen-Mansfield J, Werner P, Marx MS. Screaming in nursing home residents. *J Am Geriatr Soc* 1990;**38**:785–92.

31. Kong EH, Evans LK, Guevara JP. Nonpharmacological intervention for agitation in dementia: a systematic review and meta-analysis. *Aging Ment Health* 2009;**13**:512–20. http://dx.doi.org/10.1080/13607860902774394

32. Spira AP, Edelstein BA. Behavioral interventions for agitation in older adults with dementia: an evaluative review. *Int Psychogeriatr* 2006;**18**:195–225. http://dx.doi.org/10.1017/S1041610205002747

33. Sung HC, Chang AM. Use of preferred music to decrease agitated behaviours in older people with dementia: a review of the literature. *J Clin Nurs* 2005;**14**:1133–40. http://dx.doi.org/10.1111/j.1365-2702.2005.01218.x

34. Ballard CG, Gauthier S, Cummings JL, Brodaty H, Grossberg GT, Robert P, *et al.* Management of agitation and aggression associated with Alzheimer disease. *Nat Rev Neurol* 2009;**5**:245–55. http://dx.doi.org/10.1038/nrneurol.2009.39

35. David M, Alessandro L, Jennifer T, Douglas GA. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *BMJ* 2009;**339**:b2535.

36. Paradise M, Cooper C, Livingston G. Systematic review of the effect of education on survival in Alzheimer's disease. *Int Psychogeriatr* 2009;**21**:25–32. http://dx.doi.org/10.1017/S1041610208008053

37. Pitfield C, Shahriyarmolki K, Livingston G. A systematic review of stress in staff caring for people with dementia living in 24-hour care settings. *Int Psychogeriatr* 2010;**23**:1–6.

38. Cooper C, Balamurali TBS, Selwood A, Livingston G. A systematic review of intervention studies about anxiety in caregivers of people with dementia. *Int J Geriatr Psychiatry* 2007;**22**:181–88. http://dx.doi.org/10.1002/gps.1656

39. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics* 1977;**33**:159–74. http://dx.doi.org/10.2307/2529310

40. Cohen-Mansfield J, Marx MS, Dakheel-Ali M, Regier NG, Thein K, Freedman L. Can agitated behavior of nursing home residents with dementia be prevented with the use of standardized stimuli? *J Am Geriatr Soc* 2010;**58**:1459–64. http://dx.doi.org/10.1111/j.1532-5415.2010.02951.x

41. Welton N, Sutton A, Cooper N, Abrams K, Ades A. *Evidence Synthesis for Decision Making in Healthcare (Statistics in Practice)*. Hoboken, NJ: Wiley-Blackwell; 2012.

42. Hedges L. Distribution theory for Glass's Estimator of effect size and related estimators. *J Educ Behav Stat* 1981;**6**:107–28. http://dx.doi.org/10.3102/10769986006002107

43. Kovach C, Cashin S, Taneli Y, Dohearty P, Schlidt A, Silva-Smith A. Effects of the BACE intervention on agitation of demented residents in longterm care. *Gerontologist* 2003;**43**:233.

44. Lin LC, Yang MH, Kao CC, Wu SC, Tang SH, Lin JG. Using acupressure and Montessori-based activities to decrease agitation for residents with dementia: a cross-over trial. *J Am Geriatr Soc* 2009;**57**:1022–9. http://dx.doi.org/10.1111/j.1532-5415.2009.02271.x

45. Lee Y, Kim S. Effects of indoor gardening on sleep, agitation, and cognition in dementia patients–a pilot study. *Int J Geriatr Psychiatry* 2008;**23**:485–9. http://dx.doi.org/10.1002/gps.1920

46. Buettner LL, Ferrario J. Therapeutic recreation-nursing team: a therapeutic intervention for nursing home residents with dementia. *Annu Ther Recreation* 1997;**7**:21–8.

47. Fitzsimmons S, Buettner LL. Therapeutic recreation interventions for need-driven dementia-compromised behaviors in community-dwelling elders. *Am J Alzheimers Dis Other Demen* 2002;**17**:367–81. http://dx.doi.org/10.1177/153331750201700603

48. Buettner LL, Lundegren H, Lago D, Farrell P, Smith R. Therapeutic recreation as an intervention for persons with dementia and agitation: an efficacy study. *Am J Alzheimers Dis* 1996;**11**:4–12. http://dx.doi.org/10.1177/153331759601100503

49. Fitzsimmons S, Buettner LL. A therapeutic cooking program for older adults with dementia: effects on agitation and apathy. *Am J Recreation Ther* 2003;**2**:23–33.

50. Kolanowski A, Litaker M, Buettner L, Moeller J, Costa PT. A randomized clinical trial of theory-based activities for the behavioral symptoms of dementia in nursing home residents. *J Am Geriatr Soc* 2011;**59**:1032–41. http://dx.doi.org/10.1111/j.1532-5415.2011.03449.x

51. Kolanowski AM, Litaker M, Buettner L. Efficacy of theory-based activities for behavioural symptoms of dementia. *Nurs Res* 2005;**54**:219–28. http://dx.doi.org/10.1097/00006199-200507000-00003

52. Cohen-Mansfield J, Parpura-Gill A, Golander H. Utilization of self-identity roles for designing interventions for persons with dementia. *J Gerontol Series B* 2006;**61B**:202–12. http://dx.doi.org/10.1093/geronb/61.4.P202

53. Cooke ML, Moyle W, Shum DH, Harrison SD, Murfield JE. A randomized controlled trial exploring the effect of music on agitated behaviours and anxiety in older people with dementia. *Aging Ment Health* 2010;**14**:905–16. http://dx.doi.org/10.1080/13607861003713190

54. Sung HC, Lee WL, Li TL, Watson R. A group music intervention using percussion instruments with familiar music to reduce anxiety and agitation of institutionalized older adults with dementia. *Int J Geriatr Psychiatry* 2012;**27**:621–7. http://dx.doi.org/10.1002/gps.2761

55. Sung HC, Chang SM, Lee WL, Lee MS. The effects of group music with movement intervention on agitated behaviours of institutionalized elders with dementia in Taiwan. *Complement Ther Med* 2006;**14**:113–19. http://dx.doi.org/10.1016/j.ctim.2006.03.002

56. Tuet RWK, Lam LCW. A preliminary study of the effects of music therapy on agitation in Chinese patients with dementia. *Hong Kong J Psychiatry* 2006;**16**:87–91.

57. Lin Y, Chu H, Yang CY, Chen CH, Chen SG, Chang HJ, *et al.* Effectiveness of group music intervention against agitated behavior in elderly persons with dementia. *Int J Geriatr Psychiatry* 2011;**26**:670–8. http://dx.doi.org/10.1002/gps.2580

58. Groene RW. Effectiveness of music-therapy 1/1 intervention with individuals having senile dementia of the Alzheimers type. *J Music Ther* 1993;**30**:138–57. http://dx.doi.org/10.1093/jmt/30.3.138

59. Raglio A, Bellelli G, Traficante D, Gianotti M, Ubezio MC, Villani D, *et al.* Efficacy of music therapy in the treatment of behavioral and psychiatric symptoms of dementia. *Alzheimer Dis Assoc Disord* 2008;**22**:158–62. http://dx.doi.org/10.1097/WAD.0b013e3181630b6f

60. Svansdottir HB, Snaedal J. Music therapy in moderate and severe dementia of Alzheimer's type: a case–control study. *Int Psychogeriatr* 2006;**18**:613–21. http://dx.doi.org/10.1017/S1041610206003206

61. Jennings B, Vance B. The short-term effects of music therapy on different types of agitation in adults with Alzheimer's. *Activities Adap Aging* 2002;**6**:27–33. http://dx.doi.org/10.1300/J016v26n04_03

62. Suzuki M, Kanamori M, Nagasawa S, Tokiko I, Takayuki S. Music therapy induced changes in behavioral evaluations, and saliva chromogranin A and immunoglobulin A concentrations in elderly patients with senile dementia. *Geriatr Gerontol Int* 2007;**7**:61–71. http://dx.doi.org/10.1111/j.1447-0594.2007.00374.x

63. Moyle W, Burne, O'Dwyer S. Exploring the effect of foot massage on agitated behaviours in older people with dementia: a pilot study. *Aust J Ageing* 2011;**30**:159–61. http://dx.doi.org/10.1111/j.1741-6612.2010.00504.x

64. Yang MH, Wu SC, Lin JG, Lin LC. The efficacy of acupressure for decreasing agitated behaviour in dementia: a pilot study. *J Clin Nurs* 2007;**16**:308–15. http://dx.doi.org/10.1111/j.1365-2702.2006.01428.x

65. Woods DL, Craven RF, Whitney J. The effect of therapeutic touch on behavioral symptoms of persons with dementia. *Alt Ther Health Med* 2005;**11**:66–74.

66. Remington R. Calming music and hand massage with agitated elderly. *Nurs Res* 2002;**51**:317–23. http://dx.doi.org/10.1097/00006199-200209000-00008

67. Woods DL, Beck C, Sinha K. The effect of therapeutic touch on behavioral symptoms and cortisol in persons with dementia. *Forschende Komplementarmedizin* 2009;**16**:181–9. http://dx.doi.org/10.1159/000220479

68. Hawranik P, Johnston P, Deatrich J. Therapeutic touch and agitation in individuals with Alzheimer's disease. *West J Nurs Res* 2008;**30**:417–34. http://dx.doi.org/10.1177/0193945907305126

69. Staal JA, Sacks A, Matheis R, Collier L, Calia T, Hanif H, *et al.* The effects of snoezelen (multi-sensory behavior therapy) and psychiatric care on agitation, apathy, and activities of daily living in dementia patients on a short term geriatric psychiatric inpatient unit. *Int J Psychiatry Med* 2007;**37**:357–70. http://dx.doi.org/10.2190/PM.37.4.a

70. Hicks-Moore SL, Robinson BA. Favorite music and hand massage. *Dementia* 2008;**7**:95–108. http://dx.doi.org/10.1177/1471301207085369

71. Woods DL, Dimond M. The effect of therapeutic touch on agitated behavior and cortisol in persons with Alzheimer's disease. *Biol Res Nurs* 2002;**4**:104–14. http://dx.doi.org/10.1177/1099800402238331

72. Gerdner LA, Hart LK, Zimmerman M. Craniosacral still point technique – exploring its effects in individuals with dementia. *J Gerontol Nurs* 2008;**34**:36–45. http://dx.doi.org/10.3928/00989134-20080301-04

73. Whall AL, Black ME, Groh CJ, Kupferschmid BJ, Foster NL. The effect of natural environments upon agitation and aggression in late stage dementia patients. *Am J Alzheimers Dis Other Demen* 1997;**12**:216–20. http://dx.doi.org/10.1177/153331759701200506

74. van Weert JCM, van Dulmen AM, Spreeuwenberg PMM, Ribbe MW, Bensing JM. Behavioral and mood effects of Snoezelen integrated into 24-hour dementia care. *J Am Geriatr Soc* 2005;**53**:24–33. http://dx.doi.org/10.1111/j.1532-5415.2005.53006.x

75. Chenoweth L, King MT, Jeon YH, Brodaty H, Stein-Parbury J, Norman R, *et al.* Caring for Aged Dementia Care Resident Study (CADRES) of person-centred care, dementia-care mapping, and usual care in dementia: a cluster-randomised trial. *Lancet Neurol* 2009;**8**:317–25. http://dx.doi.org/10.1016/S1474-4422(09)70045-6

76. McCallion P, Toseland RW, Lacey D, Banks S. Educating nursing assistants to communicate more effectively with nursing home residents with dementia. *Gerontologist* 1999;**39**:546–58. http://dx.doi.org/10.1093/geront/39.5.546

77. McCallion P, Toseland RW, Freeman K. An evaluation of a family visit education program. *J Am Geriatr Soc* 1999;**47**:203–14.

78. Teri L, Huda P, Gibbons L, Young H, van Leynseele J. STAR: a dementia-specific training program for staff in assisted living residences. *Gerontologist* 2005;**45**:686–93. http://dx.doi.org/10.1093/geront/45.5.686

79. Hoeffer B, Rader J, McKenzie D, Lavelle M, Stewart B. Reducing aggressive behavior during bathing cognitively impaired nursing home residents. *J Gerontol Nurs* 1997;**23**:16–23.

80. Sloane PD, Hoeffer B, Mitchell CM, McKenzie DA, Barrick AL, Rader J, *et al.* Effect of person-centered showering and the towel bath on bathing-associated aggression, agitation, and discomfort in nursing home residents with dementia: a randomized, controlled trial. *J Am Geriatr Soc* 2004;**52**:1795–804. http://dx.doi.org/10.1111/j.1532-5415.2004.52501.x

81. Deudon A, Maubourguet N, Gervais X, Leone E, Brocker P, Carcaillon L, *et al.* Non-pharmacological management of behavioural symptoms in nursing homes. *Int J Geriatr Psychiatry* 2009;**24**:1386–95. http://dx.doi.org/10.1002/gps.2275

82. Chenoweth L, Jeon YH. Determining the efficacy of dementia care mapping as an outcome measure and a process for change: a pilot study. *Aging Ment Health* 2007;**11**:237–45. http://dx.doi.org/10.1080/13607860600844226

83. Burns A, Allen H, Tomenson B, Duignan D, Byrne J. Bright light therapy for agitation in dementia: a randomized controlled trial. *Int Psychogeriatr* 2009;**21**:711–21. http://dx.doi.org/10.1017/S1041610209008886

84. Lyketsos CG, Lindell VL, Baker A, Steele C. A randomized, controlled trial of bright light therapy for agitated behaviors in dementia patients residing in long-term care. *Int J Geriatr Psychiatry* 1999;**14**:520–5. http://dx.doi.org/10.1002/(SICI)1099-1166(199907)14:7%3C520::AID-GPS983%3E3.3.CO;2-D

85. Dowling GA, Graf CL, Hubbard EM, Luxenberg JS. Light treatment for neuropsychiatric behaviors in Alzheimer's disease. *West J Nurs Res* 2007;**29**:961–75. http://dx.doi.org/10.1177/0193945907303083

86. Thorpe L, Middleton J, Russell G, Stewart N. Bright light therapy for demented nursing home patients with behavioral disturbance. *Am J Alzheimers Dis Other Demen* 2000;**15**:18–26. http://dx.doi.org/10.1177/153331750001500109

87. Lovell BB, Ancoliisrael S, Gevirtz R. Effect of bright light treatment on agitated behavior in institutionalized elderly subjects. *Psychiatry Res* 1995;**57**:7–12. http://dx.doi.org/10.1016/0165-1781(95)02550-G

88. Satlin A, Volicer L, Ross V, Herz L, Campbell S. Bright light treatment of behavioral and sleep disturbances in patients with Alzheimer's disease. *Am J Psychiatry* 1992;**149**:1028–32.

89. Barrick AL, Sloane PD, Williams CS, Mitchell C, Connell BR, Wood W, *et al.* Impact of ambient bright light on agitation in dementia. *Int J Geriatr Psychiatry* 2010;**25**:1013–21. http://dx.doi.org/10.1002/gps.2453

90. Ancoli-Israel S, Martin JL, Gehrman P, Shochat T, Corey-Bloom J, Marler M, *et al.* Effect of light on agitation in institutionalized patients with severe Alzheimer disease. *Am J Geriatr Psychiatry* 2003;**11**:194–203. http://dx.doi.org/10.1176/appi.ajgp.11.2.194

91. Skjerve A, Holsten F, Aarsland D, Bjorvatn B, Nygaard HA, Johansen IM. Improvement in behavioral symptoms and advance of activity acrophase after short-term bright light treatment in severe dementia. *Psychiatry Clin Neurosci* 2004;**58**:343–7. http://dx.doi.org/10.1111/j.1440-1819.2004.01265.x

92. Haffmans PMJ, Sival RC, Lucius SAP, Cats Q, Van Gelder L. Bright light therapy and melatonin in motor restless behaviour in dementia: a placebo-controlled study. *Int J Geriatr Psychiatry* 2001; **16**:106–10. http://dx.doi.org/10.1002/1099-1166(200101)16:1<106::AID-GPS288>3.0.CO;2-9

93. Verbeek H, Zwakhalen SM, van Rossum E, Ambergen T, Kempen GI, Hamers JP. Dementia care redesigned: effects of small-scale living facilities on residents, their family caregivers, and staff. *J Am Med Direct Assoc* 2010;**11**:662–70. http://dx.doi.org/10.1016/j.jamda.2010.08.001

94. Elmstahl S, Annerstedt L, Ahlund O. How should a group living unit for demented elderly be designed to decrease psychiatric symptoms? *Alzheimer Dis Assoc Disorders* 1997;**11**:47–52. http://dx.doi.org/10.1097/00002093-199703000-00008

95. Reimer MA, Slaughter S, Donaldson C, Currie G, Eliasziw M. Special care facility compared with traditional environments for dementia care: a longitudinal study of quality of life. *J Am Geriatr Soc* 2004;**52**:1085–92. http://dx.doi.org/10.1111/j.1532-5415.2004.52304.x

96. Annerstedt L, Gustafson L, Nilsson K. Medical outcome of psychosocial intervention in demented patients – one-year clinical follow-up after relocation into group living units. *Int J Geriatr Psychiatry* 1993;**8**:833–41. http://dx.doi.org/10.1002/gps.930081006

97. Burns A, Perry E, Holmes C, Francis P, Morris J, Howes MJ, *et al.* A double-blind placebo-controlled randomized trial of Melissa officinalis oil and donepezil for the treatment of agitation in Alzheimer's disease. *Dementia Geriatr Cogn Disorders* 2011;**31**:158–64. http://dx.doi.org/10.1159/000324438

98. Lin PW, Chan WC, Ng BF, Lam LC-W. Efficacy of aromatherapy (Lavandula angustifolia) as an intervention for agitated behaviours in Chinese older persons with dementia: a cross-over randomized trial. *Int J Geriatr Psychiatry* 2007;**22**:405–10. http://dx.doi.org/10.1002/gps.1688

99. Ballard CG, O'Brien JT, Reichelt K, Perry EK. Aromatherapy as a safe and effective treatment for the management of agitation in severe dementia: the results of a double-blind, placebo-controlled trial with Melissa. *J Clin Psychiatry* 2002;**63**:553–8. http://dx.doi.org/10.4088/JCP.v63n0703

100. Holmes C, Hopkins V, Hensford C, MacLaughlin V, Wilkinson D, Rosenvinge H. Lavender oil as a treatment for agitated behaviour in severe dementia: a placebo controlled study. *Int J Geriatr Psychiatry* 2002;**17**:305–8. http://dx.doi.org/10.1002/gps.593

101. Akhondzadeh S, Noroozian M, Mohammadi M, Ohadinia S, Jamshidi AH, Khani M. Melissa officinalis extract in the treatment of patients with mild to moderate Alzheimer's disease: a double blind, randomised, placebo controlled trial. *J Neurol Neurosurg Psychiatry* 2003;**74**:863–6. http://dx.doi.org/10.1136/jnnp.74.7.863

102. Cameron H. Using lemon balm oil to reduce aggression and agitation in dementia: results of a pilot study. *J Dementia Care* 2012;**19**:36–9.

103. Blau TH. Quality of life, social indicators, and predictors of change. *Prof Psychol* 1977;**8**:464–73.

104. Teri L, Logsdon RG, Peskind E, Raskind M, Weiner MF, Tractenberg RE, *et al.* Treatment of agitation in AD – a randomized, placebo-controlled clinical trial. *Neurology* 2000;**55**:1271–8. http://dx.doi.org/10.1212/WNL.55.9.1271

105. Gormley N, Lyons D, Howard R. Behavioural management of aggression in dementia: a randomized controlled trial. *Age Ageing* 2001;**30**:141–5. http://dx.doi.org/10.1093/ageing/30.2.141

106. Bourgeois MS, Burgio LD, Schulz R, Beach S, Palmer B. Modifying repetitive verbalizations of community-dwelling patients with AD. *Gerontologist* 1997;**37**:30–9. http://dx.doi.org/10.1093/geront/37.1.30

107. Huang HL, Shyu YIL, Chen MC, Chen ST, Lin LC. A pilot study on a home-based caregiver training program for improving caregiver self-efficacy and decreasing the behavioral problems of elders with dementia in Taiwan. *Int J Geriatr Psychiatry* 2003;**18**:337–45. http://dx.doi.org/10.1002/gps.835

108. Wright LK, Litaker M, Laraia MT, DeAndrade S. Continuum of care for Alzheimer's disease: a nurse education and counseling program. *Issues Mental Health Nurs* 2001;**22**:231–52. http://dx.doi.org/10.1080/01612840152053084

109. Haupt M, Karger A, Janner M. Improvement of agitation and anxiety in demented patients after psychoeducative group intervention with their caregivers. *Int J Geriatr Psychiatry* 2000;**15**: 1125–9. http://dx.doi.org/10.1002/1099-1166(200012)15:12<1125::AID-GPS257>3.0.CO;2-F

110. Garland K, Beer E, Eppingstall B, O'Connor DW. A comparison of two treatments of agitated behavior in nursing home residents with dementia: simulated family presence and preferred music. *Am J Geriatr Psychiatry* 2007;**15**:514–21. http://dx.doi.org/10.1097/01.JGP.0000249388.37080.b4

111. Clark ME, Lipe AW, Bilbrey M. Use of music to decrease aggressive behaviors in people with dementia. *J Gerontol Nurs* 1998;**24**:10–17.

112. Gerdner LA. Effects of individualized versus classical "relaxation" music on the frequency of agitation in elderly persons with Alzheimer's disease and related disorders. *Int Psychogeriatr* 2000;**12**:49–65. http://dx.doi.org/10.1017/S1041610200006190

113. Park H, Specht JK. Effect of individualized music on agitation in individuals with dementia who live at home. *J Gerontol Nurs* 2009;**35**:47–55. http://dx.doi.org/10.3928/00989134-20090706-01

114. Gerdner LA. Use of individualized music by trained staff and family: translating research into practice. *J Gerontol Nurs* 2005;**31**:22–30.

115. Tabloski PA. Effects of calming music on the level of agitation in cognitively impaired nursing home residents. *Am J Alzheimers Dis Other Demen* 1995;**10**:10–15. http://dx.doi.org/10.1177/153331759501000105

116. Ragneskog H, Brane G, Karlsson I, Kihlgren M. Influence of dinner music on food intake and symptoms common in dementia. *Scand J Caring Sci* 1996;**10**:11–17. http://dx.doi.org/10.1111/j.1471-6712.1996.tb00304.x

117. Chang F, Huang H, Lin K, Lin L. The effect of a music programme during lunchtime on the problem behaviour of the older residents with dementia at an institution in Taiwan. *J Clin Nurs* 2010;**19**:939–48. http://dx.doi.org/10.1111/j.1365-2702.2009.02801.x

118. Gerdner L. An individualized music intervention for agitation. *J Am Psychiatric Nurs Assoc* 1997;**3**:177–84. http://dx.doi.org/10.1016/S1078-3903(97)90043-4

119. Aman E, Thomas DR. Supervised exercise to reduce agitation in severely cognitively impaired persons. *J Am Med Direct Assoc* 2009;**10**:271–6. http://dx.doi.org/10.1016/j.jamda.2008.12.053

120. Holmberg SK. Evaluation of a clinical intervention for wanderers on a geriatric nursing unit. *Arch Psychiatr Nurs* 1997;**11**:21–8. http://dx.doi.org/10.1016/S0883-9417(97)80046-5

121. Eggermont LH, Blankevoort CG, Scherder EJ. Walking and night-time restlessness in mild-to-moderate dementia: a randomized controlled trial. *Age Ageing* 2010;**39**:746–9. http://dx.doi.org/10.1093/ageing/afq115

122. Buettner LL, Fitzsimmons S. Recreational therapy exercise on the special care unit: impact on behaviors. *Am J Recreation Ther* 2004;**3**:8–24.

123. Robichaud L, Hebert R, Desrosiers J. Efficacy of a sensory integration program on behaviors of inpatients with dementia. *Am J Occup Ther* 1994;**48**:355–60. http://dx.doi.org/10.5014/ajot.48.4.355

124. Hong GR. Effects of multisensory stimulation using familiarity: persons with dementia in long-term care facility in Korea. *J Korean Acad Nurs* 2011;**41**:528–38. http://dx.doi.org/10.4040/jkan.2011.41.4.528

125. Toseland RW, Diehul M, Freeman K, Manzanares T, Naleppa M, McCallion P. The impact of validation group therapy on nursing home residents with dementia. *South Gerontol Soc* 1997;**16**:31–50.

126. Kanamori M, Suzuki M, Yamamoto K, Kanda M, Matsui Y, Kojima E, *et al.* A day care program and evaluation of animal-assisted therapy (AAT) for the elderly with senile dementia. *Am J Alzheimers Dis Other Demen* 2001;**16**:234–9. http://dx.doi.org/10.1177/153331750101600409

127. Mossello E, Ridolfi A, Mello AM, Lorenzini G, Mugnai F, Piccini C, *et al.* Animal-assisted activity and emotional status of patients with Alzheimer's disease in day care. *Int Psychogeriatr* 2011;**23**:899–905. http://dx.doi.org/10.1017/S1041610211000226

128. Libin A, Cohen-Mansfield J. Therapeutic robocat for nursing home residents with dementia: preliminary inquiry. *Am J Alzheimers Dis Other Demen* 2004;**19**:111–16. http://dx.doi.org/10.1177/153331750401900209

129. Magai C, Cohen CI, Gomberg D. Impact of training dementia caregivers in sensitivity to nonverbal emotion signals. *Int Psychogeriatr* 2002;**14**:25–38. http://dx.doi.org/10.1017/S1041610202008256

130. Finnema E, Dres RM, Ettema T, Ooms M, Adr H, Ribbe M, *et al.* The effect of integrated emotion-oriented care versus usual care on elderly persons with dementia in the nursing home and on nursing assistants: a randomized clinical trial. *Int J Geriatr Psychiatry* 2005;**20**:330–43. http://dx.doi.org/10.1002/gps.1286

131. Galik EM, Resnick B, Gruber-Baldini A, Nahm ES, Pearson K, Pretzer-Aboff I. Pilot testing of the restorative care intervention for the cognitively impaired. *J Am Med Direct Assoc* 2008;**9**:516–22. http://dx.doi.org/10.1016/j.jamda.2008.04.013

132. Matthews EA, Farrell GA, Blackmore AM. Effects of an environmental manipulation emphasizing client-centred care on agitation and sleep in dementia sufferers in a nursing home. *J Adv Nurs* 1996;**24**:439–47. http://dx.doi.org/10.1046/j.1365-2648.1996.02102.x

133. Detweiler MB, Murphy PF, Myers LC, Kim KY. Does a wander garden influence inappropriate behaviors in dementia residents. *Am J Alzheimers Dis Other Demen* 2008;**23**:31–45. http://dx.doi.org/10.1177/1533317507309799

134. Perivolaris A, LeClerc CM, Wilkinson K, Buchanan S. An enhanced dining program for persons with dementia. *Alzheimers Care Q* 2006;**7**:258–67.

135. Darby SJ. Does a Mirror Deter Wandering in Demented Older People? *Int J Geriatr Psychiatry* 1990;**6**:607–9.

136. Hussian RA, Brown DC. Use of two-dimensional grid patterns to limit hazardous ambulation in demented patients. *J Gerontol* 1987;**42**:558–60. http://dx.doi.org/10.1093/geronj/42.5.558

137. McGilton KS, Rivera TM, Dawson P. Can we help persons with dementia find their way in a new environment? *Aging Ment Health* 2003;**7**:363–71. http://dx.doi.org/10.1080/1360786031000150676

138. Camberg L, Woods P, Ooi WL, Hurley A, Volicer L, Ashley J, *et al.* Evaluation of simulated presence: a personalized approach to enhance well-being in persons with Alzheimer's disease. *J Am Geriatr Soc* 1999;**47**:446–52.

139. Bianchetti A, Benvenuti P, Ghisla KM, Frisoni GB, Trabucchi M. An Italian model of dementia special care unit: results of a pilot study. *Alzheimer Dis Assoc Disord* 1997;**11**:53–6. http://dx.doi.org/10.1097/00002093-199703000-00009

140. Beck CK, Vogelpohl TS, Rasin JH, Uriri JT, O'Sullivan P, Walls R, *et al.* Effects of behavioral interventions on disruptive behavior and affect in demented nursing home residents. *Nurs Res* 2002;**51**:219–28. http://dx.doi.org/10.1097/00006199-200207000-00002

141. Putman L, Wang JT. The Closing Group: Therapeutic recreation for nursing home residents with dementia and accompanying agitation and/or anxiety. *Am J Alzheimers Dis Other Demen* 2007;**22**:167–75. http://dx.doi.org/10.1177/1533317507300514

142. Vespa A, Gori G, Spazzafumo L. Evaluation of non-pharmacological intervention on antisocial behavior in patients suffering from Alzheimer's disease in a day care center. *Arch Gerontol Geriatr* 2002;**34**:1–8. http://dx.doi.org/10.1016/S0167-4943(01)00106-6

143. Schalek M, Richeson NE, Buettner LL. Air mat therapy for treatment of agitated wandering: an evidence-based recrational therapy intervention. *Am J Recreation Ther* 2004;**3**:18–26.

144. Buettner LL. Simple pleasures: a multilevel sensorimotor intervention for nursing home residents with dementia. *Am J Alzheimers Dis* 1999;**14**:41–52. http://dx.doi.org/10.1177/153331759901400103

145. Volicer L, Simard J, Pupa JH, Medrek R, Riordan ME. Effects of continuous activity programming on behavioral symptoms of dementia. *J Am Med Direct Assoc* 2006;**7**:426–31. http://dx.doi.org/10.1016/j.jamda.2006.02.003

146. Luk KY, Lai KY, Li CC, Cheung WH, Lam SM, Li HY, *et al.* The effect of horticultural activities on agitation in nursing home residents with dementia. *Int J Geriatr Psychiatry* 2011;**26**:435–6. http://dx.doi.org/10.1002/gps.2493

147. Churchill M, Safaoui J, Mccabe BW, Baun MM. Using a therapy dog to alleviate the agitation and desocialization of people with Alzheimer's disease. *J Psychosoc Nurs Mental Health Serv* 1999;**37**:16–22.

148. Kim NC, Kim HS, Yoo YS, Hahn SW, Yeom HA. Outcomes of day care: a pilot study on changes in cognitive function and agitated behaviors of demented elderly in Korea. *Nurs Health Sci* 2002;**4**:3–7. http://dx.doi.org/10.1046/j.1442-2018.2002.00094.x

149. Calkins M, Szmerekovsky JG, Biddle S. Effect of increased time spent outdoors on individuals with dementia residing in nursing homes. *J Housing Elderly* 2007;**21**:211–28. http://dx.doi.org/10.1300/J081v21n03_11

150. van Hoof J, Aarts M, Rense C, Schoutens A. Ambient bright light in dementia: effects on behaviour and circadian rhythmicity. *Build Environ* 2009;**44**:146–55. http://dx.doi.org/10.1016/j.buildenv.2008.02.005

151. Kuiper D, Dijkstra GJ, Tuinstra J, Groothoff JW. [The influence of Dementia Care Mapping (DCM) on behavioural problems of persons with dementia and the job satisfaction of caregivers: a pilot study.] *Tijdschrift Gerontol Geriatr* 2009;**40**:102–12. http://dx.doi.org/10.1007/BF03079572

152. Namazi KH, Zadorozny CA, Gwinnup PB. The influences of physical-activity on patterns of sleep behavior of patients with Alzheimers-disease. *Int J Ageing Hum Develop* 1995;**40**:145–53. http://dx.doi.org/10.2190/Q1PQ-8MKY-XWHN-JH8M

153. Wilkes L, Fleming A, Wilkes BL, Cioffi JM, Le Miere J. Environmental approach to reducing agitation in older persons with dementia in a nursing home. *Aus J Ageing* 2005;**24**:141–5. http://dx.doi.org/10.1111/j.1741-6612.2005.00105.x

154. Gori G, Pientini S, Vespa A. The selection of meaningful activities as a treatment for day-care in dementia. *Arch Gerontol Geriatr Suppl* 2001;**7**:207–12. http://dx.doi.org/10.1016/S0167-4943(01)00141-8

155. Cohen-Mansfield J, Libin A, Marx MS. Nonpharmacological treatment of agitation: a controlled trial of systematic individualized intervention. *J Gerontol Series A* 2007;**62**:908–16. http://dx.doi.org/10.1093/gerona/62.8.908

156. Bedard A, Landreville P, Voyer P, Verreault R, Vezina J. Reducing verbal agitation in people with dementia: evaluation of an intervention based on the satisfaction of basic needs. *Ageing Mental Health* 2011;**15**:855–65. http://dx.doi.org/10.1080/13607863.2011.569480

157. Ballard C, Brown R, Fossey J, Douglas S, Bradley P, Hancock J, *et al.* Brief psychosocial therapy for the treatment of agitation in Alzheimer disease (the CALM-AD trial). *Am J Geriatr Psychiatry* 2009;**17**:726–33. http://dx.doi.org/10.1097/JGP.0b013e3181b0f8c0

158. Lee SY. [The effect of lavender aromatherapy on cognitive function, emotion, and aggressive behavior of elderly with dementia.] *Taehan Kanho Hakhoe Chi* 2005;**35**:303–12.

159. Smallwood J, Brown R, Coulter F, Irvine E, Copland C. Aromatherapy and behaviour disturbances in dementia: a randomized controlled trial. *Int J Geriatr Psychiatry* 2001;**16**:1010–13. http://dx.doi.org/10.1002/gps.473

160. Dickinson JI, McLain-Kark J, Marshall-Baker A. The effects of visual barriers on exiting behavior in a dementia care unit. *Gerontologist* 1995;**35**:127–30. http://dx.doi.org/10.1093/geront/35.1.127

161. Kincaid C, Peacock JR. The effect of a wall mural on decreasing four types of door-testing behaviours. *J Appl Gerontol* 2003;**22**:76–88. http://dx.doi.org/10.1177/0733464802250046

162. Chafetz PK. Two-dimensional grid is ineffective against demented patients' exiting through glass doors. *Psychol Aging* 1990;**5**:146–7. http://dx.doi.org/10.1037/0882-7974.5.1.146

163. Davison TE, Hudgson C, McCabe MP, George K, Buchanan G. An individualized psychosocial approach for "treatment resistant" behavioral symptoms of dementia among aged care residents. *Int Psychogeriatr* 2007;**19**:859–73. http://dx.doi.org/10.1017/S1041610206004224

164. Chapman DG, Toseland RW. Effectiveness of advanced illness care teams for nursing home residents with dementia. *Soc Work* 2007;**52**:321–9. http://dx.doi.org/10.1093/sw/52.4.321

165. Ledger AJ, Baker FA. An investigation of long-term effects of group music therapy on agitation levels of people with Alzheimer's disease. *Aging Ment Health* 2007;**11**:330–8. http://dx.doi.org/10.1080/13607860600963406

166. Choi AN, Lee MS, Cheong KJ, Lee JS. Effects of group music intervention on behavioral and psychological symptoms in patients with dementia: a pilot-controlled trial. *Int J Neurosci* 2009;**119**:471–81. http://dx.doi.org/10.1080/00207450802328136

167. Lesta B, Petocz P. Familiar group singing: addressing mood and social behaviour of residents with dementia displaying sundowning. *Aus J Music Ther* 2006;**17**:2–17.

168. Sherratt K, Thornton A, Hatton C. Emotional and behavioural responses to music in people with dementia: an observational study. *Aging Ment Health* 2004;**8**:233–41. http://dx.doi.org/10.1080/13607860410001669769

169. Ziv N, Granot A, Hai S, Dassa A, Haimov I. The effect of background stimulative music on behavior in Alzheimer's patients. *J Music Ther* 2007;**44**:329–43. http://dx.doi.org/10.1093/jmt/44.4.329

170. Brotons M, Pickett-Cooper PK. The effects of music therapy intervention on agitation behaviors of Alzheimer's disease patients. *J Music Ther* 1996;**33**:2–18. http://dx.doi.org/10.1093/jmt/33.1.2

171. Cox E, Nowak M, Buettner P. Managing agitated behaviour in people with Alzheimer's disease: the role of live music. *Br J Occup Ther* 2011;**74**:517–24. http://dx.doi.org/10.4276/030802211X13204135680866

172. Brotons M, Marti P. Music therapy with Alzheimer's patients and their family caregivers: a pilot project. *J Music Ther* 2003;**40**:138–50. http://dx.doi.org/10.1093/jmt/40.2.138

173. Zare M, Ebrahimi AA, Birashk B. The effects of music therapy on reducing agitation in patients with Alzheimer's disease, a pre–post study. *Int J Geriatr Psychiatry* 2010;**25**.

174. Suzuki M, Kanamori M, Watanabe M, Nagasawa S, Kojima E, Ooshiro H, *et al.* Behavioral and endocrinological evaluation of music therapy for elderly patients with dementia. *Nurs Health Sci* 2004;**6**:11–18. http://dx.doi.org/10.1111/j.1442-2018.2003.00168.x

175. Thomas DW, Heitman RJ, Alexander T. The effects of music on bathing cooperation for residents with dementia. *J Music Ther* **4**:246–59.

176. Clair AA, Bernstein B. The effect on no music, stimulative background music and sedative background music on agitated behaviours in persons with severe dementia. *Activities Adapt Ageing* 1994;**19**:61–70. http://dx.doi.org/10.1300/J016v19n01_05

177. Berger G, Bernhardt T, Schramm U, Muller R, Landsiedel-Anders S, Peters J, *et al.* No effects of a combination of caregivers support group and memory training/music therapy in dementia patients from a memory clinic population. *Int J Geriatr Psychiatry* 2004;**19**:223–31. http://dx.doi.org/10.1002/gps.1055

178. Droes RM, Breebaart E, Ettema TP, van Tilburg W, Mellenbergh GJ. Effect of integrated family support versus day care only on behavior and mood of patients with dementia. *Int Psychogeriatr* 2000;**12**:99–115. http://dx.doi.org/10.1017/S1041610200006232

179. Fischer-Terworth C, Probst P. Evaluation of a TEACCH- and music therapy-based psychological intervention in mild to moderate dementia: a controlled trial. *J Gerontopsychol Geriatr Psychiatry* 2011;**24**.

180. Hall L, Hare J. Video respite for cognitively impaired persons in nursing homes. *Am J Alzheimers Dis* 2011;**12**:117–21. http://dx.doi.org/10.1177/153331759701200304

181. Burgio L, Scilley K, Hardin JM, Hsu C, Yancey J. Environmental "white noise". An intervention for verbally agitated nursing home residents. *J Gerontol Series B* 1996;**51**:364–73. http://dx.doi.org/10.1093/geronb/51B.6.P364

182. Suzuki M, Tatsumi A, Otsuka T, Kikuchi K, Mizuta A, Makino K, *et al.* Physical and psychological effects of 6-week tactile massage on elderly patients with severe dementia. *Am J Alzheimers Dis Other Demen* 2010;**25**:680–6. http://dx.doi.org/10.1177/1533317510386215

183. Wang KL, Hermann C. Pilot study to test the effectiveness of healing touch on agitation in people with dementia. *Geriatr Nurs* 2006;**27**:34–40. http://dx.doi.org/10.1016/j.gerinurse.2005.09.014

184. Milev RV, Kellar T, McLean M, Mileva V, Luthra V, Thompson S, *et al.* Multisensory stimulation for elderly with dementia: a 24-week single-blind randomized controlled pilot study. *Am J Alzheimers Dis Other Demen* 2008;**23**:372–6. http://dx.doi.org/10.1177/1533317508316681

185. Snyder M, Egan EC, Burns KR. Interventions for decreasing agitation behaviors in persons with dementia. *J Gerontol Nurs* 1995;**21**:34–40.

186. Sutherland JA, Reakes J, Bridges C. Foot acupressure and massage for patients with Alzheimer's disease and related dementias. *J Nurs Scholar* 1999;**31**:347–8. http://dx.doi.org/10.1111/j.1547-5069.1999.tb00516.x

187. Woods P, Ashley J. Simulated presence therapy: using selected memories to manage problem behaviors in Alzheimer's disease patients. *Geriatr Nurs* 1995;**16**:9–14. http://dx.doi.org/10.1016/S0197-4572(05)80072-2

188. Miller S, Vermeersch PEH, Bohan K, Renbarger K, Kruep A, Sacre S. Audio presence intervention for decreasing agitation in people with dementia. *Geriatr Nurs* 2001;**22**:66–70. http://dx.doi.org/10.1067/mgn.2001.115200

189. Frisoni GB, Gozzetti A, Bignamini V, Vellas BJ, Berger A-K, Bianchetti A *et al.* Special care units for dementia in nursing homes: a controlled study of effectiveness. *Arch Gerontol Geriatr* 1998;**6**:215–24. http://dx.doi.org/10.1016/S0167-4943(98)80031-9

190. Lawton MP, Van Haitsma K, Klapper J, Kleban MH, Katz IR, Maize J. A stimulation-retreat special care unit for elders with dementing illness. *Int Psychogeriatr* 1998;**10**:379–95. http://dx.doi.org/10.1017/S104161029800547X

191. Bellelli G, Frisoni GB, Bianchetti A, Boffelli S, Guerrini GB, Scotuzzi A, *et al.* Special care units for demented patients: a multicenter study. *Gerontologist* 1998;**38**:456–62. http://dx.doi.org/10.1093/geront/38.4.456

192. Davison TE, McCabe MP, Visser S, Hudgson C, Buchanan G, George K. Controlled trial of dementia training with a peer support group for aged care staff. *Int J Geriatr Psychiatry* 2007;**22**:868–73. http://dx.doi.org/10.1002/gps.1754

193. Asthill LF. Staff training and challenging behaviour in a day hospital. *Dementia* 2004;**3**:384–92.

194. Ousset PJ, Sorel H, Cazard JC, Vellas B. [Behavioral disorders in dementia: intervention study in a long-term care unit.] *Psychol Neuropsychiatr Vieil* 2003;**1**:207–12.

195. Edberg AK, Hallberg IR. Actions seen as demanding in patients with severe dementia during one year of intervention. Comparison with controls. *Int J Nursing Studies* 2001;**38**:271–85. http://dx.doi.org/10.1016/S0020-7489(00)00076-6

196. Sidani S, Streiner D, Leclerc C. Evaluating the effectiveness of the abilities-focused approach to morning care of people with dementia. *Int J Older People Nurs* 2012;**7**:37–45. http://dx.doi.org/10.1111/j.1748-3743.2011.00273.x

197. Cohen-Mansfield J, Jensen B. Do interventions bringing current self-care practices into greater correspondence with those performed premorbidly benefit the person with dementia? A pilot study. *Am J Alzheimers Dis Other Demen* 2006;**21**:312–17. http://dx.doi.org/10.1177/1533317506291135

198. Wells DL, Dawson P, Sidani S, Craig D, Pringle D. Effects of an abilities-focused program of morning care on residents who have dementia and on caregivers. *J Am Geriatr Soc* 2000;**48**:442–9.

199. Rogers JC, Holm MB, Burgio LD, Granieri E, Hsu C, Hardin JM, *et al.* Improving morning care routines of nursing home residents with dementia. *J Am Geriatr Soc* 1999;**47**:1049–57.

200. Visser S, Mccabe M, Hudgson C, Buchanan G, Davison T, George K. Managing behavioural symptoms of dementia: effectiveness of staff education and peer support. *Aging Ment Health* 2008;**12**:47–55. http://dx.doi.org/10.1080/13607860701366012

201. Cohen-Mansfield J, Werner P, Culpepper WJ, Barkley D. Evaluation of an inservice training program on dementia and wandering. *J Gerontol Nurs* 1997;**23**:40–7.

202. Husereau D, Drummond M, Petrou S, Carswell C, Moher D, Greenberg D, *et al.* Consolidated Health Economic Evaluation Reporting Standards (CHEERS) statement. *BMJ* 2013;**346**:f1049. http://dx.doi.org/10.1136/bmj.f1049

203. Mintzer JE, Colenda C, Waid LR, Lewis L, Meeks A, Stuckey M, *et al.* Effectiveness of a continuum of care using brief and partial hospitalization for agitated dementia patients. *Psychiatric Services* 1997;**48**:1435–9.

204. Norman R, Haas M, Chenoweth L, Jeon Y-H, King M, Brodaty H, *et al. Dementia Care Mapping and Patient-centred Care in Australian Residential Homes: an Economic Evaluation of the Care Study*. Centre for Health Economics Research and Evaluation working paper 2008/4. Sydney, NSW: Centre for Health Economics Research and Evaluation, University of Technology, Sydney; 2008.

205. Rosen J, Burgio L, Kollar M, Cain M, Allison M, Fogleman M, *et al.* A user-friendly instrument for rating agitation in dementia patients. *Am J Geriatr Psychiatry* 1994;**2**:52–9. http://dx.doi.org/10.1097/00019442-199400210-00008

206. Bogner J, Corrigan JD, Stange M, Rabold D. Reliability of the Agitated Behavior Scale. *J Head Trauma Rehabil* 1999;**14**:91–6. http://dx.doi.org/10.1097/00001199-199902000-00012

207. Logsdon RG, Teri L, Weiner MF, Gibbons LE, Raskind M, Peskind E, *et al.* Assessment of agitation in Alzheimer's disease: the agitated behavor in dementia scale. Alzheimer's Diseases Cooperative Study. *J Am Geriatr Soc* 1999;**47**:1354–8.

208. Ryden MB, Bossenmaier M, McLachlan C. Aggressive behavior in cognitively impaired nursing home residents. *Res Nurs Health* 1991;**14**:87–95. http://dx.doi.org/10.1002/nur.4770140203

209. Cummings JL, Mega M, Gray K, Rosenberg-Thompson S, Carusi DA, Gornbein J. The Neuropsychiatric Inventory: comprehensive assessment of psychopathology in dementia. *Neurology* 1994;**44**:2308–14. http://dx.doi.org/10.1212/WNL.44.12.2308

210. Livingston G, Katona C, Roch B, Guilhaume C, Rive B. A dependency model for patients with Alzheimer's disease: its validation and relationship to the costs of care – the LASER-AD Study. *Curr Med Res Opin* 2004;**20**:1007–16. http://dx.doi.org/10.1185/030079904125003980

211. Beecham JKM. Costing psychiatric interventions. In Thornicroft G, editor. *Measuring Mental Health Needs Costing Psychiatric Interventions*. 2nd edn. London: Gaskell; 2001. pp. 200–24.

212. Curtis L. *Unit Costs of Health and Social Care 2011*. 2012. Canterbury: Personal Social Services Research Unit, University of Kent; 2012.

213. Barber J, Thompson S. Multiple regression of cost data: use of generalised linear models. *J Health Serv Res Policy* 2004;**9**:197–204. http://dx.doi.org/10.1258/1355819042250249

214. Folstein SE, McHugh PR. 'Mini-mental state'. A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* 1975;**12**:189–98. http://dx.doi.org/10.1016/0022-3956(75)90026-6

215. Department of Health. *2010–2011 NHS Reference Costs*. London: Department of Health; 2011. URL: www.dh.gov.uk/health/2011/11/reference-costs/ (last accessed 22 October 2012).

216. Rowen D, Mulhern B, Banerjee S, Hout B, Young TA, Knapp M *et al.* Estimating preference-based single index measures for dementia using DEMQOL and DEMQOL-Proxy. *Value Health* 2012;**15**:346–56. http://dx.doi.org/10.1016/j.jval.2011.10.016

217. Smith SC, Lamping DL, Banerjee S, Harwood RH, Foley B, Smith P, *et al.* Development of a new measure of health-related quality of life for people with dementia: DEMQOL. *Psychol Med* 2007;**37**:737–46. http://dx.doi.org/10.1017/S0033291706009469

218. Mulhern B, Smith SC, Rowen D, Brazier JE, Knapp M, Lamping DL, *et al.* Improving the measurement of QALYs in dementia: developing patient- and carer-reported health state classification systems using Rasch analysis. *Value Health* 2012;**15**:323–33. http://dx.doi.org/10.1016/j.jval.2011.09.006

219. National Institute for Health and Care Excellence (NICE). *Guide to the Methods of Technology Appraisal 2013*. London: NICE; 2013.

220. Briggs A, Schulpher M, Claxton K. *Decision Modelling for Health Economic Evaluation*. Oxford: Oxford University Press; 2006.

221. Long PW. *When Is A Difference Between Two Groups Significant?* Internet Mental Health; 2005–11. URL: www.mentalhealth.com/dis-rs/rs-effect_size.html (accessed 16 March 2013).

222. Oxford Centre for Evidence-based Medicine. *Levels of Evidence*. 2009. URL: www.cebm.net/index.aspx?o=1025 (last accessed 13 July 2012).

223. Hansen N, Jorgensen T, Ortenblad L. Massage and touch for dementia. *Cochrane Database Syst Rev* 2006;**4**:CD004989.

224. Forbes D, Morgan DG, Bangma J, Peacock S, Pelletier N, Adamson J. Light therapy for managing sleep, behaviour, and mood disturbances in dementia. *Cochrane Database Syst Rev* 2004;**2**:CD003946.

224. Lai CK, Yeung JH, Mok V, Chi I. Special care units for dementia individuals with behavioural problems. *Cochrane Database Syst Rev* 2009;**4**:CD006470.

225. Brodaty H, Arasaratnam C. Meta-analysis of nonpharmacological interventions for neuropsychiatric symptoms of dementia. *Am J Psychiatry* 2012;**169**:946–53. http://dx.doi.org/10.1176/appi.ajp.2012.11101529

227. Algase DL, Beck C, Kolanowski A, Whall A, Berent S, Richards K, *et al.* Need-driven dementia-compromised behavior: an alternative view of disruptive behavior. *Am J Alzheimers Disease Other Demen* 1996;**11**:10–19. http://dx.doi.org/10.1177/153331759601100603

228. Kitwood TBK. Towards a theory of dementia care: personhood and well-being. *Ageing Soc* 1992;**12**:269–87. http://dx.doi.org/10.1017/S0144686X0000502X

229. Sampson EL, Ritchie CW, Lai R, Raven PW, Blanchard MR. A systematic review of the scientific evidence for the efficacy of a palliative care approach in advanced dementia. *Int Psychogeriatr* 2005;**17**:31–40. http://dx.doi.org/10.1017/S1041610205001018

230. Livingston G, Leavey G, Manela M, Livingston D, Rait G, Sampson E, *et al.* Making decisions for people with dementia who lack capacity: qualitative study of family carers in UK. *BMJ* 2010;**341**:c4184. http://dx.doi.org/10.1136/bmj.c4184

231. Underwood M, Lamb SE, Eldridge S, Sheehan B, Slowther AM, Spencer A, *et al.* Exercise for depression in elderly residents of care homes: a cluster-randomised controlled trial. *Lancet* 2013;**382**:41–9. http://dx.doi.org/10.1016/S0140-6736(13)60649-2

232. Weiner MF, Tractenberg RE, Sano M, Logsdon R, Teri L, Galasko D, *et al.* No long-term effect of behavioral treatment on psychotropic drug use for agitation in Alzheimer's diease patients. *J Geriatr Psychiatry Neurol* 2002;**15**:95–8. http://dx.doi.org/10.1177/089198870201500208

Appendix 1 Scoring of studies for quality of evidence

Studies were given a score of 0, 0.5 or 1 for each of the following criteria, with a maximum score of 14.

1. whether or not the study was a RCT
2. whether or not it had rater blinding
3. whether or not it had participant blinding
4. whether or not the outcome measure was valid
5. whether or not the outcome measure was reliable
6. whether or not a power analysis had been carried out
7. whether or not enough details had been given of the power analysis
8. whether or not sufficient power had been achieved
9. whether or not all participants were accounted for
10. whether or not > 80% of participants remained in the study at 1 month
11. whether or not intention-to-treat analyses had been used
12. whether or not the randomisation procedure, or in non-randomised studies, the control of the participants, was adequate to prevent bias
13. whether or not the statistical methods used were appropriate
14. whether or not a reliable diagnosis of dementia had been given.

Studies were assessed as being 'high-quality RCTs' if they had the following attributes:

1. RCT
2. rater or participant blinding or both
3. valid outcome measure
4. sufficient power
5. intention to treat
6. follow-up rates of > 80%
7. findings with reasonably small CIs.

Studies were then rated according to the CEBM levels of evidence as follows:

- Level 1b: high-quality RCTs. These all scored ≥ 10, were single or double blind, with validated outcome measures.
- Level 2b: lower-quality RCTs and higher-quality non-randomised studies (scoring ≤ 11).
- Level 2c: moderate-quality non-randomised studies (scoring 6–9)
- Level 4: these scored < 6. They were not RCTs.

Table 26 below shows details of the scoring for each study that was rated as 2c or above.

TABLE 26 Details of scoring and levels of evidence for all level 1b, 2b and 2c studies ($n = 97$)

Study	Overall category	1. RCT	2. Participant blinding	3. Rater blinding	4. 80% follow-up rate at 1 month	5. Intention-to-treat analysis	6. Sufficiently powered to measure agitation	7. Valid outcome measure	8. Power calculation carried out	9. Power calculation – full details given
Akhondzadeh *et al.*, 2003[101]	Aromatherapy	1	0	0	1	0	1	0	1	0.5
Aman and Thomas, 2009[119]	Exercise	0	0	0	1	1	0	1	0	0
Ancoli-Israel *et al.*, 2003[90]	Light therapy	1	0	1	0	0	0	1	0	0
Annerstedt *et al.*, 1993[96]	Changing environment	0	0	0	0	0	0	1	0	0
Ballard *et al.*, 2002[99]	Aromatherapy	1	0	0	1	0	0	1	0	0
Barrick *et al.*, 2010[89]	Light therapy	0	0	1	1	1	0	0	0	0
Beck *et al.*, 2002[140]	Other	1	0	1	1	0	0	1	0	0
Bianchetti *et al.*, 1997[139]	Changing environment	0	0	0	1	1	0	1	0	0
Bourgeois *et al.*, 1997[106]	Behaviour therapy	1	0	0	1	1	0	0	0	0
Buettner *et al.*, 1996[48]	Activities	1	0	0	1	0	0	1	0	0
Buettner and Ferrario, 1997[46]	Activities	1	0	1	0.5	0	0	1	0	0
Buettner and Fitzsimmons, 2004[122]	Activities	0	0	0	1	1	0	1	0	0
Burns *et al.*, 2011[97]	Aromatherapy	1	1	1	0.5	1	0	1	1	1
Burns *et al.*, 2009[83]	Light therapy	1	0	1	1	1	1	1	1	0.5
Camberg *et al.*, 1999[138]	Simulated Presence therapy	1	1	1	1	1	0	0	0	0
Cameron 2012[102]	Aromatherapy	1	1	1	0	0	0	1	0	1
Chang *et al.*, 2010[117]	Music therapy	0	0	0	1	0	0	1	0	0
Chenoweth and Jeon, 2007[82]	DCM plus behavioural intervention	0	0	0	1	0	0	1	0	0
Chenoweth *et al.*, 2009[75]	Education	1	0	1	1	1	1	1	1	0.5
Clark *et al.*, 1998[111]	Music therapy	1	0	0	1	1	0	0	0	0
Cohen-Mansfield *et al.*, 2006[197]	Individualised intervention	1	0	0	1	0	0	1	0	0

10. Randomisation/ control procedures adequate	11. Reliable outcome measure	12. All participants accounted for	13. Statistical methods appropriate	14 Reliable diagnosis of dementia	QS (range 1–14, sum of 14 individual quality scores)	Good-quality RCT[a]	Total participants	Level of evidence allocated	Reason for allocation
1	0	0	1	1	**7.5**	0	42	**2b**	RCT with QS ≥ 6
1	1	1	1	1	**8**	0	50	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	0	1	1	**6**	0	92	**2b**	RCT with QS ≥ 6
1	1	1	1	1	**6**	0	56	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	1	1	0	**6**	0	72	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**7**	0	66	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	1	1	0	**7**	0	96	**2b**	RCT with QS ≥ 6
1	1	1	0.5	0	**6.5**	0	16	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	1	1	1	**7**	0	7	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**7**	0	36	**2b**	RCT with QS ≥ 6
1	1	1	0.5	0	**7**	0	66	**2b**	RCT with QS ≥ 6
1	1	1	0.5	0	**6.5**	0	20	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	1	**12.5**	1	94	**1b**	'Good-quality RCT'* with QS ≥ 10
1	1	1	1	1	**12.5**	1	48	**1b**	'Good-quality RCT'* with QS ≥ 10
0	1	1	1	0	**8**	0	54	**2b**	RCT with QS ≥ 6
1	1	0	0	0	**7**	0	18	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**6**	0	47	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	0	**6**	0	35	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	0	**11.5**	1	180	**1b**	'Good-quality RCT'* with QS ≥ 10
1	1	1	0.5	0	**6.5**	0	18	**2b**	RCT with QS ≥ 6
0	1	1	1	0	**6**	0	105	**2b**	RCT with QS ≥ 6

continued

TABLE 26 Details of scoring and levels of evidence for all level 1b, 2b and 2c studies ($n = 97$) (*continued*)

Study	Overall category	1. RCT	2. Participant blinding	3. Rater blinding	4. 80% follow-up rate at 1 month	5. Intention-to-treat analysis	6. Sufficiently powered to measure agitation	7. Valid outcome measure	8. Power calculation carried out	9. Power calculation – full details given
Cooke *et al.*, 2010[53]	Music therapy	1	0	1	1	1	1	1	1	0.5
Darby 1990[135]	Changing environment	0	0	0	1	1	0	0	0	0
Detweiler *et al.*, 2008[133]	Changing environment	0	0	0	1	0	0	1	0	0
Deudon *et al.*, 2009[81]	Education	1	0	0.5	1	0	0	1	0	0
Dowling *et al.*, 2007[84]	Light therapy	1	0	0	1	0	0	1	0	0
Eggermont *et al.*, 2010[121]	Exercise	1	0	0	0.5	1	1	0	1	0
Elmstahl *et al.*, 1997[95]	Changing environment	0	0	0	1	0	0	1	0	0
Finnema *et al.*, 2005[130]	Education	1	0	0	0.5	0	0	1	1	0.5
Fitzsimmons and Buettner, 2002[47]	Individualised intervention	1	0	0	1	0	0	1	0	0
Fitzsimmons and Buettner, 2003[49]	Activities	0	0	0	1	1	0	1	0	0
Galik *et al.*, 2008[131]	Education	0	0	0	1	0	0	1	0	0
Garland *et al.*, 2007[110]	Music therapy	1	0	1	1	1	0	0	0	0
Gerdner 2000[112]	Music therapy	1	0	0	1	0	0	1	0	0
Gerdner *et al.*, 2008[72]	Sensory	0	0	1	1	0	0	1	0	0
Gerdner 2005[114]	Music therapy	0	0	0	1	1	0	1	0	0
Gerdner 1997[118]	Music therapy	0	0	0	1	1	0	1	0	0
Gormley *et al.*, 2001[105]	Behaviour therapy	1	0	1	1	1	1	1	1	0.5
Groene 1993[58]	Music therapy	1	0	0	1	1	0	0	0	0
Haffmans *et al.*, 2001[92]	Light therapy	0	0	0	0.5	0	0	1	0	0
Haupt *et al.*, 2000[109]	Education	0	0	1	1	1	0	1	0	0

10. Randomisation/ control procedures adequate	11. Reliable outcome measure	12. All participants accounted for	13. Statistical methods appropriate	14 Reliable diagnosis of dementia	QS (range 1–14, sum of 14 individual quality scores)	Good-quality RCT[a]	Total participants	Level of evidence allocated	Reason for allocation
1	1	1	1	0	**11.5**	1	47	**1b**	'Good-quality RCT'* with QS ≥ 10
1	1	1	1	0	**6**	0	9	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	0	**6**	0	34	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	1	1	1	**7.5**		306	**2b**	RCT with QS ≥ 6
0	1	0	1	1	**6**	0	70	**2b**	RCT with QS ≥ 6
0	0	1	1	0	**6.5**	0	112	**2b**	RCT with QS ≥ 6
1	1	1	1	1	**7**	0	103	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	1	1	1	**8**	0	146	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**7**	0	29	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**7**	0	12	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	0	**6**	0	46	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	0	**8**	0	30	**2b**	RCT with QS ≥ 6
0	1	1	1	0	**6**	0	45	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**7**	0	9	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	0	**7**	0	8	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	0	0	**6**	0	5	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	1	1	1	**11.5**	1	65	**1b**	'Good-quality RCT'* with QS ≥ 10
0	0	1	1	1	**6**	0	30	**2b**	RCT with QS ≥ 6
1	1	1	1	1	**6.5**	0	10	**2c**	Not an RCT, QS = 6–9 inclusive
1	1	1	1	1	**9**	0	14	**2c**	Not a RCT, QS = 6–9 inclusive

continued

TABLE 26 Details of scoring and levels of evidence for all level 1b, 2b and 2c studies ($n = 97$) (*continued*)

Study	Overall category	1. RCT	2. Participant blinding	3. Rater blinding	4. 80% follow-up rate at 1 month	5. Intention-to-treat analysis	6. Sufficiently powered to measure agitation	7. Valid outcome measure	8. Power calculation carried out	9. Power calculation – full details given
Hawranik *et al.*, 2008[68]	Sensory	1	1	1	0	0	0	1	1	0
Hicks-Moore and Robinson, 2008[70]	Music therapy	1	0	0	1	0	0	1	0	0
Hoeffer *et al.*, 1997[79]	Education	0	0	0	1	0	0	1	0	0
Holmberg 1997[120]	Exercise	0	0	1	1	1	0	0	0	0
Holmes *et al.*, 2002[100]	Aromatherapy	0	0	1	1	1	0	1	0	0
Hong 2011[124]	Sensory	1	0	0	1	0	0	1	0	0
Huang *et al.*, 2003[107]	Education	1	0	1	1	0	0	1	0	0
Hussian and Brown, 1987[136]	Changing environment	0	0	0	1	1	0	0	0	0
Jennings and Vance, 2002[61]	Music therapy	0	0	0	1	1	0	1	0	0
Kanamori *et al.*, 2001[126]	Pet therapy	0	0	0	1	1	0	1	0	0
Kolanowski *et al.*, 2005[51]	Individualised intervention	1	1	1	1	0	1	1	1	0.5
Kolanowski *et al.*, 2011[50]	Individualised intervention	1	1	1	1	1	1	1	1	0.5
Kovach *et al.*, 2003[43]	Individualised intervention	1	0	1	0.5	0	0	0	1	1
Lee and Kim, 2008[45]	Activities	0	0	0	1	1	0	1	0	0
Libin and Cohen-Mansfield, 2004[128]	Pet therapy	0	0	0	1	1	0	1	0	0
Lin *et al.*, 2009[44]	Activities	1	0	1	1	0	0	1	0	0
Lin *et al.*, 2007[98]	Aromatherapy	1	0	0	1	1	1	1	1	0
Lin *et al.*, 2011[57]	Music therapy	1	0	0	1	0	0	1	1	0.5
Lovell *et al.*, 1995[87]	Light therapy	0	0	0	1	1	0	1	0	0
Lyketsos *et al.*, 1999[84]	Light therapy	1	0	1	0.5	1	0	1	0	0
Magai *et al.*, 2002[129]	Education	1	0	1	1	0	0	1	0	0

10. Randomisation/ control procedures adequate	11. Reliable outcome measure	12. All participants accounted for	13. Statistical methods appropriate	14 Reliable diagnosis of dementia	QS (range 1–14, sum of 14 individual quality scores)	Good-quality RCT[a]	Total participants	Level of evidence allocated	Reason for allocation
0	1	0	1	0	**7**	0	51	**2b**	RCT with QS ≥ 6
0	1	1	1	0	**6**	0	32	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**6**	0	11	**2c**	Not a RCT, QS = 6–9 inclusive
1	0	1	1	0	**6**	0	11	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	1	**9**	0	15	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	0	**7**	0	55	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**8**	0	59	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**6**	0	8	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	0	**7**	0	16	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	0	1	**7**	0	7	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	1	1	1	**11.5**	1	30	**1b**	'Good-quality RCT'* with QS ≥ 10
1	1	1	1	1	**13.5**	1	128	**1b**	'Good-quality RCT'* with QS ≥ 10
0	1	1	1	0	**7.5**	0	78	**2b**	RCT with QS ≥ 6
1	0	1	1	1	**7**	0	23	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	0	0	**6**	0	9	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	0	1	0	**6**	0	133	**2b**	RCT with QS ≥ 6
0	1	1	1	1	**10**	0	35	**2b**	RCT with QS ≥ 6
1	1	1	1	1	**9.5**	0	104	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**7**	0	6	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	1	0	1	**7.5**	0	15	**2b**	RCT with QS ≥ 6
0	1	1	0.5	0	**6.5**	0	91	**2b**	RCT with QS ≥ 6

continued

TABLE 26 Details of scoring and levels of evidence for all level 1b, 2b and 2c studies ($n = 97$) (*continued*)

Study	Overall category	1. RCT	2. Participant blinding	3. Rater blinding	4. 80% follow-up rate at 1 month	5. Intention-to-treat analysis	6. Sufficiently powered to measure agitation	7. Valid outcome measure	8. Power calculation carried out	9. Power calculation – full details given
Matthews *et al.*, 1996[132]	Education	0	0	0	1	0	0	1	0	0
McCallion *et al.*, 1999[76]	Education	1	0	1	1	1	1	1	1	0
McCallion *et al.*, 1999[77]	Education	1	0	1	0	1	0	1	0	0
McGilton *et al.*, 2003[137]	Other – wayfinding intervention	1	0	1	1	0	0	1	1	0.5
Mossello *et al.*, 2011[127]	Pet therapy	0	0	0	1	1	0	1	0	0
Moyle *et al.*, 2011[63]	Sensory	0	0	0	1	0	0	1	0	0
Park and Specht, 2009[113]	Music therapy	0	0	0	1	1	0	1	1	0.5
Perivolaris *et al.*, 2006[134]	Changing environment	0	0	0	1	0	0	1	0	0
Raglio *et al.*, 2008[59]	Music therapy	0	0	1	1	1	0	1	0	0
Ragneskog *et al.*, 1996[116]	Music therapy	0	0	1	1	0	0	1	0	0
Reimer *et al.*, 2004[95]	Changing environment	0	0	0	1	1	0	1	0	0
Remington, 2002[66]	Music therapy	1	0	0.5	1	1	1	1	1	0.5
Robichaud *et al.*, 1994[123]	Sensory	1	0	1	1	1	1	1	1	0.5
Satlin *et al.*, 1992[88]	Light therapy	0	0	0	1	1	0	0	0	0
Skjerve *et al.*, 2004[91]	Light therapy	0	0	0	1	0	0	1	0	0
Sloane *et al.*, 2004[80]	Education	1	0	0	1	0	0	1	0	0
Staal *et al.*, 2007[69]	Sensory	1	0	0	1	1	0	1	0	0
Sung *et al.*, 2006[55]	Music therapy	1	0	0	1	0	0	1	0	0
Sung *et al.*, 2012[54]	Music therapy	1	0	0	1	1	1	1	1	0.5
Suzuki, 2007[62]	Music therapy	0	0	1	1	0	0	1	0	0

10. Randomisation/ control procedures adequate	11. Reliable outcome measure	12. All participants accounted for	13. Statistical methods appropriate	14 Reliable diagnosis of dementia	QS (range 1–14, sum of 14 individual quality scores)	Good-quality RCT[a]	Total participants	Level of evidence allocated	Reason for allocation
1	1	1	1	0	**6**	0	40	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	1	1	0	**10**	1	66	**1b**	'Good-quality RCT'* with QS ≥ 10
0	1	0	1	0	**6**	0	105	**2b**	RCT with QS ≥ 6
1	0	0	1	0	**7.5**	0	32	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**7**	0	10	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	0	**6**	0	27	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	0	**8.5**	0	15	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	0	**6**	0	13	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	1	**9**	0	59	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	1	**8**	0	24	**c2**	Not an RCT, QS = 6–9 inclusive
1	1	1	1	0	**7**	0	185	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	0	**11**	0	68	**2b**	RCT with QS ≥ 6
0	1	1	1	1	**11.5**	1	40	**1b**	'Good-quality RCT'* with QS ≥ 10
1	0	1	1	1	**6**	0	10	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	1	**7**	0	11	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	1	1	0	**6**	0	73	**2b**	RCT with QS ≥ 6
0	1	1	1	0	**7**		24	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**7**	0	40	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**10.5**	0	55	**2b**	No RCT, QS > 9 ≤ 11
1	1	0	1	1	**7**	0	16	**2c**	Not a RCT, QS = 6–9 inclusive

continued

TABLE 26 Details of scoring and levels of evidence for all level 1b, 2b and 2c studies ($n = 97$) (*continued*)

Study	Overall category	1. RCT	2. Participant blinding	3. Rater blinding	4. 80% follow-up rate at 1 month	5. Intention-to-treat analysis	6. Sufficiently powered to measure agitation	7. Valid outcome measure	8. Power calculation carried out	9. Power calculation – full details given
Svansdottir and Snaedal, 2006[60]	Music therapy	0	0	1	1	0	0	1	0	0
Tabloski 1995[115]	Music therapy	0	0	0	1	1	0	1	0	0
Teri *et al.*, 2005[78]	Education	1	0	1	1	1	0	1	0	0
Thorpe *et al.*, 2000[86]	Light therapy	0	0	0	1	1	0	1	0	0
Toseland 1997[125]	Dementia specific therapy	1	0	1	0.5	0	0	1	0	0
Tuet and Lam, 2006[56]	Music therapy	0	0	0	1	0	0	1	0	0
van Weert *et al.*, 2005[47]	Sensory	1	0	0	1	1	1	1	1	0
Verbeek *et al.*, 2010[93]	Changing environment	0	0	0	0.5	1	1	1	1	1
Weiner *et al.*, 2002[232]	Behaviour therapy	1	0	1	0.5	1	1	1	1	0.5
Whall *et al.*, 1997[73]	Sensory	0	0	0	1	1	0	1	0	0
Woods *et al.*, 2005[65]	Sensory	1	1	1	1	1	0	1	0	0
Woods and Dimond, 2002[71]	Sensory	0	0	1	1	1	0	1	0	0
Woods *et al.*, 2009[67]	Sensory	1	1	1	1	0	0	1	0	0
Wright *et al.*, 2001[108]	Education	1	0	0	1	1	0	1	0	0
Yang *et al.*, 2007[64]	Sensory	0	0	0	0	0	0	1	0	0

QS, quality score.

a At least single blind, follow-up rates ≥ 80%, sufficiently powered; used intention-to-treat analysis, valid outcome measures and findings reported with relatively narrow CIs.

10. Randomisation/ control procedures adequate	11. Reliable outcome measure	12. All participants accounted for	13. Statistical methods appropriate	14 Reliable diagnosis of dementia	QS (range 1–14, sum of 14 individual quality scores)	Good-quality RCT[a]	Total participants	Level of evidence allocated	Reason for allocation
1	1	1	0.5	1	**7.5**	0	20	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	0	**7**	0	20	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	1	1	0	**8**	0	31	**2b**	RCT with QS ≥ 6
1	1	1	1	1	**8**	0	16	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	1	1	0	**6.5**	0	33	**2b**	RCT with QS ≥ 6
1	1	1	1	0	**6**	0	16	**2c**	Not a RCT, QS = 6–9 inclusive
0	1	1	1	1	**10**	0	125	**2b**	RCT with QS ≥ 6
1	1	1	1	1	**10.5**	0	259	**2b**	Not a RCT, QS> 9 ≤ 11
0	1	1	1	1	**11**	1	77	**1b**	'Good-quality RCT'* with QS ≥ 10
0	1	1	1	1	**7**	0	31	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	1	**11**	0	60	**2b**	RCT with QS ≥ 6
0	1	1	1	1	**8**	0	10	**2c**	Not a RCT, QS = 6–9 inclusive
1	1	1	1	1	**11**	0	64	**2b**	RCT with QS ≥ 6
0	1	1	1	0	**7**	0	93	**2b**	RCT with QS ≥ 6
1	1	1	1	1	**6**	0	31	**2c**	Not a RCT, QS = 6–9 inclusive

Appendix 2 List of excluded studies and reasons for exclusion

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$)

Reference	Reason for exclusion
100th Anniversary of H Kh Buniatian/International Symposium on Actual Problems in Neurochemistry and Neuroimmunology, Yerevan, Armenia, September 24–28, 2007. *Neurochem Res* 2008;**33**:1150–67	No participants with dementia/not separately analysed
82nd Congress of the Deutschen-Gesellschaft-fur-Neurologie, Nurnberg, Germany, September 23–26, 2009. *Akt Neurol* 2009;**36**(Suppl. 2):S47–215	No participants with dementia/not separately analysed
Abernethy AP, Farrell TW. Pain and palliative care pharmacotherapy literature summaries and analyses. *J Pain Palliative Care Pharmacother* 2009;**23**:62–8	No participants with dementia/not separately analysed
Abuhamdah S, Huang L, Elliott MS, Howes MJ, Ballard C, Holmes C, *et al*. Pharmacological profile of an essential oil derived from *Melissa officinalis* with anti-agitation properties: focus on ligand-gated channels. *J Pharmacy Pharmacol* 2008;**60**:377–84	No participants with dementia/not separately analysed
Adib-Samii P, Brice G, Martin RJ, Markus HS. Clinical spectrum of CADASIL and the effect of cardiovascular risk factors on phenotype study in 200 consecutively recruited individuals. *Stroke* 2010;**41**:630–4	No participants with dementia/not separately analysed
Adriani W, Ognibene E, Heuland E, Ghirardi O, Caprioli A, Laviola G. Motor impulsivity in APP-SWE mice: a model of Alzheimer's disease. *Behav Pharmacol* 2006;**17**:525–33	No participants with dementia/not separately analysed
Agarwal V, O'Neill PJ, Cotton BA, Pun BT, Haney S, Thompson J, *et al*. Prevalence and risk factors for development of delirium in burn intensive care unit patients. *J Burn Care Res* 2010;**31**:706–15	No participants with dementia/not separately analysed
Agueera-Ortiz LF. Memantine in the pharmacologic treatment of moderately severe to severe Alzheimer's disease in Spain (MEMORY study). *Rev Neurol* 2010;**51**:525–34	Not a psychological, behavioural, sensory or environmental intervention
Ahmed MB. Alzheimer's disease: recent advances in aetiology, diagnosis, and management. *Texas Med* 2001;**97**:50–8	Not primary research
Akashi T, Arima K, Maruyama N, Ando S, Inose T. Severe cerebral atrophy in progressive supranuclear palsy – a case-report. *Clin Neuropathol* 1989;**8**:195–9	No participants with dementia/not separately analysed
Akhondzadeh S, Noroozian M, Mohammadi M, Ohadinia S, Jamshidi AH, Khani M. Salvia officinalis extract in the treatment of patients with mild to moderate Alzheimer's disease: a double blind, randomised and placebo-controlled trial. *J Clin Pharmacy Therap* 2003;**28**:53–9	No outcome measuring agitation
Akil M, Schwartz JA, Dutchak D, Yuzbasiyangurkan V, Brewer GJ. The psychiatric presentations of Wilsons-Disease. *J Neuropsychiatry Clin Neurosci* 1991;**3**:377–82	No participants with dementia/not separately analysed
Aleman A, Kahn RS. Effects of the atypical antipsychotic risperidone on hostility and aggression in schizophrenia: a meta-analysis of controlled trials. *Eur Neuropsychopharmacol* 2001;**11**:289–93	No participants with dementia/not separately analysed
Alessi CA, Schnelle JF. Approach to sleep disorders in the nursing home setting. *Sleep Med Rev* 2000;**4**:45–56	No participants with dementia/not separately analysed
Alessi CA, Yoon EJ, Schnelle JF, Al Samarrai NR, Cruise PA. A randomised trial of a combined physical activity and environmental intervention in nursing home residents: Do sleep and agitation improve? *J Am Geriatr Soc* 1999;**47**:784–91	No participants with dementia/not separately analysed
Alexander G, Hanna A, Serna V, Younkin L, Younkin S, Janus C. Increased aggression in males in transgenic Tg2576 mouse model of Alzheimer's disease. *Behav Brain Res* 2011;**216**:77–83	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Alexopoulos GS, Jeste DV, Chung H, Carpenter D, Ross R, Docherty JP. The expert consensus guideline series. Treatment of dementia and its behavioural disturbances. Introduction: methods, commentary, and summary. *Postgrad Med* 2005;Spec No.:6–22	No participants with dementia/not separately analysed
Alexopoulos GS, Streim J, Carpenter D, Docherty JP. Introduction: methods, commentary, and summary. *J Clin Psychiatry* 2004;**65**:5–99	Not primary research
Algase D, Son GR, Beel-Bates C, Song J, Yao L, Beattie E, *et al*. Initial psychometric evaluation of the wayfinding effectiveness scale. *West J Nurs Res* 2007;**29**:1015–32	No participants with dementia/not separately analysed
Algase DL, Antonakos C, Yao L, Beattie ER, Hong GRS, Beel-Bates CA. Are wandering and physically nonaggressive agitation equivalent? *Am J Geriatr Psychiatry* 2008;**16**:293–9	No participants with dementia/not separately analysed
Algase DL, Antonakos CL, Beattie E, Beel-Bates CA, Yao L. New parameters for daytime wandering. *Res Gerontol Nurs* 2009;**2**:58–68	Not intervention study
Algase DL, Beattie ER, Antonakos C, Beel-Bates CA, Yao L. Wandering and the physical environment. *Am J Alzheimers Dis Other Demen* 2010;**25**:340–6	Not intervention study
Algase DL, Beattie ER, Bogue EL, Yao L. The Algase Wandering Scale: initial psychometrics of a new caregiver reporting tool. *Am J Alzheimers Dis Other Demen* 2001;**16**:141–52	No participants with dementia/not separately analysed
Algase DL, Beattie ERA. Training allies to reduce variance in a nursing home study: a communication intervention. *Int J Geriatr Psychiatry* 1996;**11:**889–93	No participants with dementia/not separately analysed
Algase DL. Wandering in dementia. *Annu Rev Nurs Res* 1999;**17**:185–217	Not primary research
Algase DL. What's new about wandering behaviour? An assessment of recent studies. *Int J Older People Nurs* 2006;**1**:226–34	Not primary research
Algozzine TW, Pitner JK, Mintzer JE, Jackson CW. Evaluation of the effectiveness of lorazepam for the treatment of agitation in the demented elderly. *Pharmacotherapy* 1996;**16**:499	Not a psychological, behavioural, sensory or environmental intervention
Allain H, Schuck S, Mauduit N, Djemai M. Comparative effects of pharmacotherapy on the maintenance of cognitive function. *Eur Psychiatry* 2001;**16**:35S–41S	Not primary research
Allain H, Tessier C, Bentue-Ferrer D, Tarral A, Le Breton S, Gandon JM, *et al*. Effects of risperidone on psychometric and cognitive functions in healthy elderly volunteers. *Psychopharmacology* 2003;**165**:419–29	No participants with dementia/not separately analysed
Allegri RF, Sarasola D, Serrano CM, Taragano FE, Arizaga RL, Butman J, *et al*. Neuropsychiatric symptoms as a predictor of caregiver burden in Alzheimer's disease. *Neuropsychiatr Dis Treat* 2006;**2**:105–10	No participants with dementia/not separately analysed
Allen RS, Burgio LD, Fisher SE, Hardin JM, Shuster JL. Behavioural characteristics of agitated nursing home residents with dementia at the end of life. *Gerontologist* 2005;**45**:661–6	Not intervention study
Allen-Burge R, Stevens AB, Burgio LD. Effective behavioural interventions for decreasing dementia-related challenging behaviour in nursing homes. *Int J Geriatr Psychiatry* 1999;**14**:213–28	Not primary research
Altes MK, Kurz A. Antidepressants for demented patients. *Z Gerontol Geriatr* 2000;**33**:396–400	Not primary research
Alves G, Forsaa EB, Pedersen KF, Gjerstad MD, Larsen JP. Epidemiology of Parkinson's disease. *J Neurol* 2008;**255**:18–32	No participants with dementia/not separately analysed
Amano N, Matsuishi T, Akagi M, Yokoi S. The outpatient clinic for the aged in the department of psychiatry of Yokohama City University Hospital Japan. *Yokohama Med J* 1986;**37**:527–34	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Ambree O, Touma C, Goertz N, Keyvani K, Paulus W, Palme R, *et al*. Activity changes and marked stereotypic behaviour precede A beta pathology in TgCRND8 Alzheimer mice. *Neurobiol Ageing* 2006;**27**:955–64	No participants with dementia/not separately analysed
Amer-Ferrer G, de la Pena A, Soriano MTG, Martin AG. Main components of neuropsychiatric inventory in Alzheimer's disease. Definition of behavioural syndromes. *Neurologia* 2005;**20**:9–16	Not intervention study
Aminoff BZ, Adunsky A. Dying dementia patients: too much suffering, too little palliation. *Am J Alzheimers Dis Other Demen* 2004;**19**:243–7	Not intervention study
Ancill RJ, Carlyle WW, Liang RA, Holliday SG. Agitation in the demented elderly – a role for benzodiazepines. *Int Clin Psychopharmacol* 1991;**6**:141–6	Not a psychological, behavioural, sensory or environmental intervention
Ancoli-Israel S, Cole R, Alessi C, Chambers M, Moorcroft W, Pollak CP. The role of actigraphy in the study of sleep and circadian rhythms. *Sleep* 2003;**26**:342–92	No participants with dementia/not separately analysed
Ancoliisrael S, Klauber MR, Gillin JC, Campbell SS, Hofstetter CR. Sleep in noninstitutionalized Alzheimers-disease patients. *Ageing* 1994;**6**:451–8	Not intervention study
Anderson KE, Marshall FJ. Behavioural symptoms associated with Huntington's disease. *Adv Neurol* 2005;**96**:197–208	No participants with dementia/not separately analysed
Anderson MA, Wendler MC, Congdon JC. Entering the world of dementia: CNA interventions for nursing home residents. *J Gerontol Nurs* 1998;**24**:31–7	No quantitative outcome
Andre VM, Cepeda C, Levine MS. Dopamine and glutamate in Huntington's disease: a balancing act. *CNS Neurosci Ther* 2010;**16**:163–78	No participants with dementia/not separately analysed
Andrianov AM, Akhrem AA. Spatial structure of peptide rp142 containing the immunodominant epitope of the HIV-1 protein gp120. Theoretical study. *Biofizika* 1999;**44**:10–17	No participants with dementia/not separately analysed
Angelini A, Bendini C, Neviani F, Neri M. Behavioural and psychological symptoms of dementia (BPSD) in elderly demented subjects: is the long lasting use of atypical antipsychotic drugs useful and safe? *Arch Gerontol Geriatr* 2007;**44**:35–43	Not a psychological, behavioural, sensory or environmental intervention
Ansell BJ. Visual tracking behaviour in low functioning head-injured adults. *Arch Phys Med Rehabil* 1995;**76**:726–31	No participants with dementia/not separately analysed
Antai-Otong D. Managing geriatric psychiatric emergencies: delirium and dementia. *Nurs Clin North Am* 2003;**38**:123	Not primary research
Antai-Otong D. Pharmacological management of psychosis in Alzheimer's disease: clinical challenges associated with second-generation antipsychotic medications. *Persp Psychiatr Care* 2008;**44**:120–3	Not primary research
Antonini A. The role of I-ioflupane SPECT dopamine transporter imaging in the diagnosis and treatment of patients with dementia with Lewy bodies. *Neuropsychiatr Dis Treat* 2007;**3**:287–92	Not primary research
Antonsson H, Graneheim U, Lundstrom M, Astrom S. Caregivers' reflections on their interactions with adult people with learning disabilities. *J Psychiatr Mental Health Nurs* 2008;**15**:484–91	No participants with dementia/not separately analysed
Apostolova LG, Cummings JL. Neuropsychiatric manifestations in mild cognitive impairment: a systematic review of the literature. *Dementia Geriatr Cogn Disord* 2008;**25**:115–26	No participants with dementia/not separately analysed
Arbus C, Gardette V, Bui E, Cantet C, Andrieu S, Nourhashemi F, *et al*. Antidepressant use in Alzheimer's disease patients: results of the REAL.FR cohort. *Int Psychogeriatr* 2010;**22**:120–8	Not intervention study

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Areosa SA, Sheriff F, McShane R. Memantine for dementia. *Cochrane Database Syst Rev* 2005;**2**:CD003154	Not primary research
Arlien-Soborg P, Bruhn P, Christensen EL, Gyldensted C, Damgaard M. Chronic painter's disease: a follow-up investigation of 26 former house painters with occupational toxic encephalopathy. *Ugeskr Laeger* 1981;**143**:3069–74	No participants with dementia/not separately analysed
Arney D. Sheep behaviour, needs, housing and care. *Scand J Lab Animal Sci* 2009;**36**:69–73	No participants with dementia/not separately analysed
Aronson MK, Post DC, Guastadisegni P. Dementia, agitation, and care in the nursing-home. *J Am Geriatr Soc* 1993;**41**:507–12	Not intervention study
Aronstein Z, Olsen R, Schulman E. The nursing assistants use of recreational interventions for behavioural management of residents with Alzheimer's disease. *Am J Alzheimers Dis Other Demen* 1996;**11**:26–31	No outcome measuring agitation
Arrieta-Cruz I, Pfaff DW. Definition of arousal and mechanistic studies in intact and brain-damaged mice. *Disord Consciousness* 2009;**1157**:24–31	No participants with dementia/not separately analysed
Arrigo AP. sHsp as novel regulators of programmed cell death and tumorigenicity. *Pathologie Biologie* 2000;**48**:280–8	No participants with dementia/not separately analysed
Arriola E, Ignacio Diago J, Antonio Buron J, Gallego R. Open-label, observational study of the effects of risperidone on the behavioural and psychological symptoms of dementia and caregiver stress in the community setting. *Am J Geriatr Pharmacother* 2005;**3**:8–16	Not a psychological, behavioural, sensory or environmental intervention
Arsland D. Drug treatment of emotional and cognitive dysfunctions in Alzheimer's disease. *Tidssk Nor Laegeforen*1998;**118**:560–5	Not primary research
Askenasy JJM. Sleep disturbances in Parkinsonism. *J Neural Transmission* 2003;**110**:125–50	No participants with dementia/not separately analysed
Astell AJ. *The Impact of Relaxation on Stress and Agitation in Dementia*. National Research Register; 2006	Conference presentation only
Aszalos Z. Some neurological and psychiatric complications in the disorders of the hypothalamus and the pituitary gland. *Orvosi Hetilap* 2007;**148**:723–30	No participants with dementia/not separately analysed
Ata T, Terada S, Yokota O, Ishihara T, Fujisawa Y, Sasaki K, *et al.* Wandering and faecal smearing in people with dementia. *Int Psychogeriatr* 2010; **22**:493–500	Not intervention study
Auchus AP, Bissey-Black C. Pilot study of haloperidol, fluoxetine, and placebo for agitation in Alzheimer's disease. *J Neuropsychiatry Clin Neurosci* 1997;**9**:591–3	Not a psychological, behavioural, sensory or environmental intervention
Aud MA, Parker-Oliver D, Bostick J, Schwarz B, Tofle RB. Social model care units for persons with dementia: the Missouri Demonstration Project. *Alzheimers Care Q* 2005;**6**:306–15	No quantitative outcome
Ayalon L, Arean P, Bornfeld H, Beard R. Long term care staff beliefs about evidence based practices for the management of dementia and agitation. *Int J Geriatr Psychiatry* 2009;**24**:118–24	No participants with dementia/not separately analysed
Ayalon L, Bornfeld H, Gum AM, Arean PA. The use of problem-solving therapy and restraint-free environment for the management of depression and agitation in long-term care. *Clin Gerontologist* 2009;**32**:77–90	No comparator
Ayalon L, Gum AM, Feliciano L, Arean PA. Effectiveness of nonpharmacological interventions for the management of neuropsychiatric symptoms in patients with dementia – a systematic review. *Arch Intern Med* 2006;**166**:2182–8	Not primary research
Bacalman S, Farzin F, Bourgeois JA, Cogswell J, Goodlin-Jones BL, Gane LW, *et al.* Psychiatric phenotype of the fragile X-associated tremor/ataxia syndrome (FXTAS) in males: newly described fronto-subcortical dementia. *J Clin Psychiatry* 2006;**67**:87–94	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Bachinskaya N, Hoerr R, Ihl R. Alleviating neuropsychiatric symptoms in dementia: the effects of *Ginkgo biloba* extract EGb 761. Findings from a randomised controlled trial. *Neuropsychiatr Dis Treat* 2011;**7**:209–15	Not a psychological, behavioural, sensory or environmental intervention
Bachman D, Rabins P. "Sundowning" and other temporally associated agitation states in dementia patients. *Annu Rev Med* 2006;**57**:499–511	Not primary research
Bachman DL. Sleep disorders with ageing – evaluation and treatment. *Geriatrics* 1992;**47**:53	No participants with dementia/not separately analysed
Bachurin S, Bukatina E, Lermontova N, Tkachenko S, Afanasiev A, Grigoriev V, *et al*. Antihistamine agent dimebon as a novel neuroprotector and a cognition enhancer. *Neuroprotective Agents* 2001;**939**:425–35	Not primary research
Baillon S, Van Diepen E, Prettyman R, Redman J, Rooke N, Campbell R. A comparison of the effects of Snoezelen and reminiscence therapy on the agitated behaviour of patients with dementia. *Int J Geriatr Psychiatry* 2004;**19**:1047–52	No quantitative outcome
Baiyewu O, Smith-Gamble V, Akinbiyi A, Lane KA, Hall KS, Ogunniyi A, *et al*. Behavioural and caregiver reaction of dementia as measured by the neuropsychiatric inventory in Nigerian community residents. *Int Psychogeriatr* 2003;**15**:399–409	No participants with dementia/not separately analysed
Baker F. The effects of live, taped, and no music on people experiencing posttraumatic amnesia. *J Music Therapy* 2001;**38**:170–92	No participants with dementia/not separately analysed
Baker J, Keady J, Hardman P, Kay J, Jones L, Jolley D. Psychotropic PRN use among older people's inpatient mental health services. *J Psychiatr Mental Health Nurs* 2010;**17**:463–8	No participants with dementia/not separately analysed
Bakey AA, Kunik ME, Orengo CA, Molinari VA, Workman RH, Hamilton JD. Outcome of psychiatric hospitalisation for very low-functioning demented patients. *J Geriatr Psychiatry Neurol* 1997;**10**:55–7	Not intervention study
Bakke BL, Kvale S, Burns T, McCarten JR. Multicomponent intervention for agitated behaviour in a person with Alzheimers-disease. *J Appl Behav Anal* 1994;**27**:175–6	No comparator
Bakker TJEM, Duivenvoorden HJ, van der Lee J, Trijsburg RW. Prevalence of psychiatric function disorders in psychogeriatric patients at referral to nursing home care – the relation to cognition, activities of daily living and general details. *Dementia Geriatr Cogn Disord* 2005;**20**:215–24	Not intervention study
Balas MC, Deutschman CS, Sullivan-Marx EM, Strumpf NE, Alston RP, Richmond TS. Katz index of independence in activities of daily living. *J Nurs Scholar* 2007;**39**:147–54	Not intervention study
Ball V, Snow A, Steele AB, Morgan RO, Davila JA, Wilson N, *et al*. Quality of relationships as a predictor of psychosocial functioning in patients with dementia. *J Geriatr Psychiatry Neurol* 2010;**23**:109–14	Not intervention study
Ball VL, Hudson S, Davila J, Morgan R, Walder A, Graham DP, *et al*. Post-traumatic stress disorder and prediction of aggression in persons with dementia. *Int J Geriatr Psychiatry* 2009;**24**:1285–90	Not intervention study
Ballard C, Corbett A, Chitramohan R, Aarsland D. Management of agitation and aggression associated with Alzheimer's disease: controversies and possible solutions. *Curr Opin Psychiatry* 2009;**22**:532–40	Not primary research
Ballard C, Corbett A. Management of neuropsychiatric symptoms in people with dementia. *CNS Drugs* 2010;**24**:729–39	Not primary research
Ballard C, Creese B, Corbett A, Aarsland D. Atypical antipsychotics for the treatment of behavioural and psychological symptoms in dementia, with a particular focus on longer term outcomes and mortality. *Ex Opin Drug Saf* 2011;**10**:35–43	Not primary research

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Ballard C, Day S, Sharp S, Wing G, Sorensen S. Neuropsychiatric symptoms in dementia: Importance and treatment considerations. *Int Rev Psychiatry* 2008;**20**:396–404	Not primary research
Ballard C, Grey A, Ayre G. Psychotic symptoms, aggression and restlessness in dementia. *Revue Neurologique* 1999;**155**(Suppl. 4):44–52	Not primary research
Ballard C, Margallo-Lana M, Juszczak E, Douglas S, Swann A, Thomas A, *et al*. Quetiapine and rivastigmine and cognitive decline in Alzheimer's disease: randomised double blind placebo controlled trial. *BMJ* 2005;**330**:874–7	Not a psychological, behavioural, sensory or environmental intervention
Ballard C, Waite J. The effectiveness of atypical antipsychotics for the treatment of aggression and psychosis in Alzheimer's disease. *Cochrane Database Syst Rev* 2006;**1**	Not primary research
Ballard C. Agitation and psychosis in dementia. *Am J Geriatr Psychiatry* 2007;**15**:913–17	Not primary research
Ballard CG, Gauthier S, Cummings JL, Brodaty H, Grossberg GT, Robert P, *et al*. Management of agitation and aggression associated with Alzheimer disease. *Nature Rev Neurol* 2009;**5**:245–55	Not primary research
Ballard CG, Margallo-Lana M, Fossey J, Reichelt K, Myint P, Potkins D, *et al*. A 1-year follow-up study of behavioral and psychological symptoms in dementia among people in care environments. *J Clin Psychiatry* 2001;**62**:631–6	Not intervention study
Ballard CG, Thomas A, Fossey J, Lee L, Jacoby R, Lana MM, *et al*. A 3-month, randomized, placebo-controlled, neuroleptic discontinuation study in 100 people with dementia: the neuropsychiatric inventory median cutoff is a predictor of clinical outcome. *J Clin Psychiatry* 2004;**65**:114–19	Not a psychological, behavioural, sensory or environmental intervention
Ban TA, Morey LC, Fjetland OK, Rengo F, Ferrara N, Agnetti V, *et al*. Early manifestations of dementing illness – treatment with glycosaminoglycan polysulfate. *Progr Neuro-Psychopharmacol Biol Psychiatry* 1992;**16**:661–76	Not a psychological, behavioural, sensory or environmental intervention
Banerjee S, Samsi K, Petrie CD, Alvir J, Treglia M, Schwam EM, *et al*. What do we know about quality of life in dementia? A review of the emerging evidence on the predictive and explanatory value of disease specific measures of health related quality of life in people with dementia. *Int J Geriatr Psychiatry* 2009;**24**:15–24	Not primary research
Baquero M, Blasco R, Campos-Garcia A, Garces M, Fages EM, Andreu-Catala M. Descriptive study of behavioural disorders in mild cognitive impairment. *Rev Neurol* 2004;**38**:323–6	No participants with dementia/not separately analysed
Barba R, Garay J, Martin-Alvarez H, Herrainz C, Castellanos V, Gonzalez-Anglada I, *et al*. Use of neuroleptics in a general hospital. *BMC Geriatr* 2002;**2**:2	Not intervention study
Barone P, Amboni M, Vitale C, Bonavita V. Treatment of nocturnal disturbances and excessive daytime sleepiness in Parkinson's disease. *Neurology* 2004; **63**:S35–8	No participants with dementia/not separately analysed
Bartels SJ, Horn SD, Smout RJ, Dums AR, Flaherty E, Jones JK, *et al*. Agitation and depression in frail nursing home elderly patients with dementia – treatment characteristics and service use. *Am J Geriatr Psychiatry* 2003;**11**:231–8	Not intervention study
Bartko G. [New formulations of olanzapine in the treatment of acute agitation.] *Neuropsychopharmacol Hung* 2006;**8**:171–8	No participants with dementia/not separately analysed
Barton S, Findlay D, Blake RA. The management of inappropriate vocalisation in dementia: a hierarchical approach. *Int J Geriatr Psychiatry* 2005;**20**:1180–6	Not primary research

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Baskys A, Fang L. Antipsychotic quetiapine at low concentrations reduces N–methyl–D–aspartate–induced cell death in organotypic hippocampal cultures without altering N–methyl–D–aspartate–mediated responses: implications for treatment of Lewy body dementia. *Soc Neurosci Abstract View Itinerary Plan* 2003	No participants with dementia/not separately analysed
Baskys A, Segal J, Fang LW. Neuroprotective properties of topiramate in organotypic hippocampal cultures: implications for treatment of vascular and other dementias. *Drug Devel Res* 2002;**56**:393–400	No participants with dementia/not separately analysed
Bassetti CL. Nonmotor disturbances in Parkinson's disease. *Neurodegen Dis* 2011;**8**:95–108	No participants with dementia/not separately analysed
Battaglia J, Lindborg SR, Alaka K, Meehan K, Wright P. Calming versus sedative effects of intramuscular olanzapine in agitated patients. *AmJ Emerg Med* 2003;**21**:192–8	No participants with dementia/not separately analysed
Battaglia J. Pharmacological management of acute agitation. *Drugs* 2005;**65**:1207–22	No participants with dementia/not separately analysed
Bavazzano A, Magnolfi SU, Calvani D, Valente C, Boni F, Baldini A, *et al*. Functional evaluation of Alzheimer patients during clinical trials: a review. *Arch Gerontol Geriatr* 1998;27–32	Not primary research
Bayer E, Goettsch S, Mueller JW, Griewel B, Guiberman E, Mayr LM, *et al*. Structural analysis of the mitotic regulator hPin1 in solution – insights into domain architecture and substrate binding. *J Biol Chem* 2003;**278**:26183–93	No participants with dementia/not separately analysed
Beattie ERA, Algase DL, Song J. Keeping wandering nursing home residents at the table: improving food intake using a behavioural communication intervention. *Ageing Mental Health* 2004;**8**:109–16	No comparator
Beattie ERA, Algase DL. Improving table-sitting behaviour of wanderers via theoretic substruction. Designing an Intervention. *J Gerontol Nurs* 2002;**28**:6–11	Not primary research
Beck C, Richards K, Lambert C, Doan R, Landes RD, Whall A, *et al*. Factors associated with problematic vocalizations in nursing home residents with dementia. *Gerontologist* 2011;**51**:389–405	Not intervention study
Beck CK, Shue VM. Interventions for treating disruptive behaviour in demented elderly people. *Nurs Clin North Am* 1994;**29**:143–55	Not primary research
Beck S, Paton C, Euba R, Goddard C. Atypical antipsychotics in the elderly. *Int J Psychiatry Clin Prac* 2001;**5**:257–61	No participants with dementia/not separately analysed
Becker PM, Feussner JR, Mulrow CD, Williams BC, Vokaty KA. The role of lumbar puncture in the evaluation of dementia – the Durham-Veterans-Administration Duke-University study. *J Am Geriatr Soc* 1985;**33**:392–6	Not a psychological, behavioural, sensory or environmental intervention
Bedard A, Landreville P. Preliminary studies of non-pharmacological intervention to reduce verbal agitation in people affected by dementia. *Can J Aging* 2005;**24**:319–28	No comparator
Bedrosian TA, Herring KL, Weil ZM, Nelson RJ. Altered temporal patterns of anxiety in aged and amyloid precursor protein (APP) transgenic mice. *Proc Natl Acad Sci U.S.A.* 2011;**108**:11686–91	No participants with dementia/not separately analysed
Beeri MS, Werner P, Davidson M, Noy S. The cost of behavioral and psychological symptoms of dementia (BPSD) in community dwelling Alzheimer's disease patients. *Int J Geriatr Psychiatry* 2002;**17**:403–8	Not intervention study
Behavior Genetics Association. 30th Annual Meeting of the Behavior Genetics Association, Burlington, VT, USA, 30 June 2000. *Behav Genet* 2000;**30**:397–423	Not primary research
Beier MT. Pharmacotherapy for behavioral and psychological symptoms of dementia in the elderly. *Am J Health-Syst Pharm* 2007;**64**:S9–17	Not primary research

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Bekelman DB, Black BS, Shore AD, Kasper JD, Rabins PV. Hospice care in a cohort of elders with dementia and mild cognitive impairment. *J Pain Symptom Manag* 2005;**30**:208–14	Not intervention study
Belanger HG, King-Kallimanis B, Nelson AL, Schonfeld L, Scott SG, Vanderploeg RD. Characterizing wandering behaviors in persons with traumatic brain injury residing in Veterans Health Administration nursing homes. *Arch Phys Med Rehabil* 2008;**89**:244–50	No participants with dementia/not separately analysed
Bellnier TJ. Continuum of care: stabilizing the acutely agitated patient. *Am J Health-Syst Pharm* 2002;**59**:S12–18	Not primary research
Belzie LR. Risperidone for AIDS-associated dementia: a case series. *AIDS Patient Care STDs* 1996;**10**:246–9	Not a psychological, behavioural, sensory or environmental intervention
Benoit M, Arbus C, Blanchard F, Camus V, Cerase V, Clement JP, *et al*. Professional consensus on the treatment of agitation, aggressive behaviour, oppositional behaviour and psychotic disturbances in dementia. *J Nutr Health Aging* 2006;**10**:410–5	Not primary research
Benoit M, Robert PH, Staccini P, Brocker P, Guerini O, Lechowshi L, *et al*. One-year longitudinal evaluation of neuropsychiatric symptoms in Alzheimer's disease. The REAL.FR study. *J Nutr Health Aging* 2005;**9**:95–9	Not intervention study
Berg D. Movement disorders associated with disturbances of brain iron metabolism. *Eur J Neurol* 2006;**13**:304	No participants with dementia/not separately analysed
Berger K. Non-opioid analgesics and the risk of restless leg syndrome – a spurious association? *Sleep Med* 2003;**4**:351–2	No participants with dementia/not separately analysed
Bergeron N, Dubois MJ, Dumont M, Dial S, Skrobik Y. Intensive Care Delirium Screening Checklist: evaluation of a new screening tool. *Intens Care Med* 2001;**27**:859–64	No participants with dementia/not separately analysed
Bergman J, Lerner V. Successful use of donepezil for the treatment of psychotic symptoms in patients with Parkinson's disease. *Clin Neuropharmacol* 2002;**25**:107–10	No participants with dementia/not separately analysed
Berlow YA, Wells WM, Ellison JM, Sung YH, Renshaw PF, Harper DG. Neuropsychiatric correlates of white matter hyperintensities in Alzheimer's disease. *Int J Geriatr Psychiatry* 2010;**25**:780–8	Not intervention study
Bernardo CG, Singh V, Thompson PM. Safety and efficacy of psychopharmacological agents used to treat the psychiatric sequelae of common neurological disorders. *Exp Opin Drug Saf* 2008;**7**:435–45	Not primary research
Berrios GE, Wagle AC, Markova IS, Wagle SA, Rosser A, Hodges JR. Psychiatric symptoms in neurologically asymptomatic Huntington's disease gene carriers: a comparison with gene negative at risk subjects. *Acta Psychiatr Scand* 2002;**105**:224–30	No participants with dementia/not separately analysed
Bezzant K. Practice development: providing benefits for both managers and older patients with delerium and dementia. *J Nurs Manag* 2008;**16**:141–6	Not primary research
Bhana N, Spencer CM. Risperidone – a review of its use in the management of the behavioural and psychological symptoms of dementia. *Drugs Aging* 2000;**16**:451–71	Not primary research
Bharani N, Snowden M. Evidence-based interventions for nursing home residents with dementia-related behavioral symptoms. *Psychiatric Clin North Am* 2005;**28**:985	Not primary research
Bharucha AJ, Vasilescu M, Dew MA, Begley A, Stevens S, Degenholtz H, *et al*. Prevalence of behavioral symptoms: comparison of the minimum data set assessments with research instruments. *J Am Med Direct Assoc* 2008;**9**:244–50	Not intervention study
Bianchetti A, Trabucchi M. Behavioural and psychological symptoms of dementia: clinical aspects. *Neurosci Res Comm* 2004;**35**:173–83	Not primary research

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Bidzan L, Bidzan M. [Assessment of behavioural and psychotic symptoms and functional status of nursing home residents with a diagnosis of dementia.] *Psychiatria Polska* 2006;**40**:833–43	Not intervention study
Bidzan L, Bidzan M. Reliability of The Cohen-Mansfield Agitation Inventory Polish version among demented and non-demented nursing home residents. *Psychiatria Polska* 2007;**41**:789–97	No participants with dementia/not separately analysed
Billig N. Management of agitation in nursing home patients – treatment options. *Drugs Aging* 1996;**9**:93–100	Not primary research
Bird M, Jones RH, Kortent A, Smlthers H. A controlled trial of a predominantly psychosocial approach to BPSD: treating causality. *Int Psychogeriatr* 2007;**19**:874–91	Multidisciplinary team input including pharmacological intervention
Bird M, Llewellyn-Jones R, Smithers H, Andrews C, Cameron I, Cottee A, *et al*. Challenging behaviours in dementia: a project at Hornsby Ku-Ring-Gai Hospital. *Aus J Ageing* 1998;**17**:10–15	Protocol only
Bird M, Llewellyn-Jones R. Psychosocial approaches to challenging behaviour in dementia: results of an intervention study. *Austr J Ageing* 2000;**19**:64–5	Conference Presentation Only
Bird M, Llewellyn-Jones RH, Korten A. An evaluation of the effectiveness of a case-specific approach to challenging behaviour associated with dementia. *Aging Mental Health* 2009;**13**:73–83	No outcome measuring agitation
Bird M. Challenging behaviour in dementia: a critical role for psychology. *Aus Psychol* 1999;**34**:144–8	Not primary research
Birks J, Flicker L. Selegiline for Alzheimer's disease. *Cochrane Database Syst Rev* 2003;**1**:CD000442	Not primary research
Bishara D, Taylor D, Howard RJ, Abdel-Tawab R. Expert opinion on the management of behavioural and psychological symptoms of dementia (BPSD) and investigation into prescribing practices in the UK. *Int J Geriatr Psychiatry* 2009;**24**:944–54	No participants with dementia/not separately analysed
Biswas J, Jayachandran M, Thang PV, Fook VFS, Choo TS, Qiang Q, *et al*. Agitation monitoring of persons with dementia based on acoustic sensors, pressure sensors and ultrasound sensors: a feasibility study. *Able Data* 2006;**8**:3–14	Not intervention study
Bittner DM, Gron G. Alzheimer's disease – diagnostic and therapeutic approaches. *Nervenheilkunde* 2005;**24**:591	Not primary research
Blair DT. Assaultive behavior. Does provocation begin in the front office? *J Psychosoc Nurs Mental Health Serv* 1991;**29**:21–6	No participants with dementia/not separately analysed
Blanco-Munez O, Suarez-Gauthier A, Martin-Garcia H, Diaz-Konrad V, Antonio-Roman V, Cabello A. Unusual cortical compromise in a case of Wernicke's encephalopathy. *Rev Neurol* 2006;**42**:596–9	No participants with dementia/not separately analysed
Bliwise DL, Greenaway MC. Will APPLES hit a ceiling? *Sleep* 2011;**34**:249–50	No participants with dementia/not separately analysed
Bliwise DL, Yesavage JA, Tinklenberg JR. Sundowning and rate of decline in mental function in Alzheimers-disease. *Dementia* 1992;**3**:335–41	Not intervention study
Bliwise DL. Sleep disorders in Alzheimer's disease and other dementias. *Clin Cornerstone* 2004;**6**(Suppl. 1A):S16–28	Not primary research
Boada M, Cejudo JC, Tarraga L, Lopez OL, Kaufer D. Neuropsychiatric Inventory Questionnaire (NPI-Q): Spanish validation of a brief clinical form of the Neuropsychiatric inventory (NPI). *Neurologia* 2002;**17**:317–23	No participants with dementia/not separately analysed
Boada M, Tarraga L, Modinos G, Diego S, Reisberg B. Behavioural pathology in Alzheimer's disease rating scale (BEHAVE-AD): Spanish validation. *Neurologia* 2006;**21**:19–25	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Bobin SA, Currie JR, Merz PA, Miller DL, Styles J, Walker WA, *et al*. The comparative immunoreactivities of brain amyloids in Alzheimers disease and Scrapie. *Acta Neuropathologica* 1987;**74**:313–23	No participants with dementia/not separately analysed
Bodick NC, Offen WW, Levey AI, Cutler NR, Gauthier SG, Satlin A, *et al*. Effects of xanomeline, a selective muscarinic receptor agonist, on cognitive function and behavioural symptoms in Alzheimer disease. *Arch Neurol* 1997;**54**:465–73	Not a psychological, behavioural, sensory or environmental intervention
Bodick NC, Offen WW, Shannon HE, Satterwhite J, Lucas R, van Lier R, *et al*. The selective muscarinic agonist xanomeline improves both the cognitive deficits and behavioural symptoms of Alzheimer disease. *Alzheimer Dis Assoc Disord* 1997;**11**:S16–22	Not a psychological, behavioural, sensory or environmental intervention
Boillet D, Szoke A. Psychiatric symptoms as single manifestation of hypothyroidism. *Encephale Rev Psychiatr Clin Biol Therap* 1998;**24**:65–8	No participants with dementia/not separately analysed
Bolea-Alamanac BM, Davies SJ, Christmas DM, Baxter H, Cullum S, Nutt DJ. Cyproterone to treat aggressivity in dementia: a clinical case and systematic review. *J Psychopharmacol* 2011;**25**:141–5	Not primary research
Bolivar VJ, Ganus JS, Messer A. The development of behavioural abnormalities in the motor neuron degeneration (MND) mouse. *Brain Res* 2002;**937**:74–82	No participants with dementia/not separately analysed
Bonelli RM, Hofmann P. A review of the treatment options for Huntington's disease. *Exp Opin Pharmacother* 2004;**5**:767–76	No participants with dementia/not separately analysed
Boockvar KS, Lachs MS. Predictive value of nonspecific symptoms for acute illness in nursing home residents. *J Am Geriatr Soc* 2003;**51**:1111–15	No participants with dementia/not separately analysed
Borbasi S, Emmanuel E, Farrelly B, Ashcroft J. A nurse practitioner initiated model of service delivery in caring for people with dementia. *Contemp Nurse* 2010;**36**:49–60	No participants with dementia/not separately analysed
Borbasi S, Emmanuel E, Farrelly B, Ashcroft J. Report of an evaluation of a Nurse-led Dementia Outreach Service for people with the behavioural and psychological symptoms of dementia living in residential aged care facilities. *Perspect Public Health* 2011;**131**:124–30	No outcome measuring agitation
Borgenicht K, Carty E, Feigenbaum LZ. Community resources for frail older patients. *West J Med* 1997;**167**:291–4	No participants with dementia/not separately analysed
Borroni B, Agosti C, Padovani A. Behavioral and psychological symptoms in dementia with Lewy-bodies (DLB): frequency and relationship with disease severity and motor impairment. *Arch Gerontol Geriatr* 2008;**46**:101–6	Not intervention study
Bouman A, I, Ettema T, Wetzels R, van Beek A, de Lange J, Droes R. Evaluation of Qualidem: a dementia-specific quality of life instrument for persons with dementia in residential settings; scalability and reliability of subscales in four Dutch field surveys. *Int J Geriatr Psychiatry* 2011;**26**:711–22	No participants with dementia/not separately analysed
Bourbonnais A, Ducharme F. The meanings of screams in older people living with dementia in a nursing home. *Int Psychogeriatr* 2010;**22**:1172–84	Not intervention study
Bowen JD, Malter AD, Sheppard L, Kukull WA, McCormick WC, Teri L, *et al*. Predictors of mortality in patients diagnosed with probable Alzheimer's disease. *Neurology* 1996;**47**:433–9	Not intervention study
Bower FL, McCullough CS, Pille BL. Synthesis of research findings regarding the care of people with Alzheimer's disease – part II. *Online J Knowledge Synth Nurs* 2002;**9**(4)	Not primary research
Boyer P, Ondo W, Allen R, Earley C, Menzies S, Chen XL, *et al*. Neuropathologic evaluation of the central nervous system in restless legs syndrome: case report and review of literature. *Soc Neurosci Abstracts* 2000;**26**	No participants with dementia/not separately analysed
Bozeat S, Gregory CA, Ralph MAL, Hodges JR. Which neuropsychiatric and behavioural features distinguish frontal and temporal variants of frontotemporal dementia from Alzheimer's disease? *J Neurol Neurosurg Psychiatry* 2000;**69**:178–86	Not intervention study

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Braak H, Braak E. Neuropathological staging of Alzheimer-related changes. *Acta Neuropathologica* 1991;**82**:239–59	No participants with dementia/not separately analysed
Branconnier RJ, Cole JO. Memory assessment technique for use in geriatric psychopharmacology – drug efficacy trial with naftidrofuryl. *J Am Geriatr Soc* 1977;**25**:186–8	No participants with dementia/not separately analysed
Brenner HD, Alberti L, Keller F, Schaffner L. Pharmacotherapy of agitational states in psychiatric gerontology – double-blind-study – Febarbamat-Pipamperon. *Neuropsychobiology* 1984;**11**:187–90	Not a psychological, behavioural, sensory or environmental intervention
Bridges-Parlet S, Knopman D, Steffes S. Withdrawal of neuroleptic medications from institutionalized dementia patients: results of a double-blind, baseline-treatment-controlled pilot study. *J Geriatr Psychiatry Neurol* 1997; **10**:119–26	Not a psychological, behavioural, sensory or environmental intervention
Bridges-Parlet S, Knopman D, Thompson T. A descriptive study of physically aggressive behavior in dementia by direct observation. *J Am Geriatr Soc* 1994;**42**:192–7	Not intervention study
Broadway J, Mintzer J. The many faces of psychosis in the elderly. *Curr Opin Psychiatry* 2007;**20**:551–8	Not primary research
Brodaty H, Ames D, Snowdon J, Woodward M, Kirwan J, Clarnette R, *et al*. A randomized placebo-controlled trial of risperidone for the treatment of aggression, agitation, and psychosis of dementia. *J Clin Psychiatry* 2003;**64**:134–43	Not a psychological, behavioural, sensory or environmental intervention
Brodaty H, Ames D, Snowdon J, Woodward M, Kirwan J, Clarnette R, *et al*. Risperidone for psychosis of Alzheimer's disease and mixed dementia: results of a double-blind, placebo-controlled trial. *Int J Geriatr Psychiatry* 2005;**20**:1153–7	Not a psychological, behavioural, sensory or environmental intervention
Brodaty H, Draper B, Saab D, Low LF, Richards V, Paton H, *et al*. Psychosis, depression and behavioural disturbances in Sydney nursing home residents: prevalence and predictors. *Int J Geriatr Psychiatry* 2001;**16**:504–12	Not intervention study
Brodaty H, Draper BM, Low LF. Behavioural and psychological symptoms of dementia: a seven-tiered model of service delivery. *Med J Aus* 2003;**178**:231–4	No participants with dementia/not separately analysed
Brodaty H, Low LF. Aggression in the elderly. *J Clin Psychiatry* 2003;**64**:36–43	Not primary research
Brodaty H, Woodward M, Boundy K, Barnes N, Allen G. A naturalistic study of galantamine for Alzheimer's disease. *CNS Drugs* 2006;**20**:935–43	Not a psychological, behavioural, sensory or environmental intervention
Broniatowski M, Grundfest-Broniatowski S, Tyler DJ, Scolieri P, Abbass F, Tucker HM, *et al*. Dynamic laryngotracheal closure for aspiration: a preliminary report. *Laryngoscope* 2001;**111**:2032–40	No participants with dementia/not separately analysed
Brooker DJ, Woolley RJ, Lee D. Enriching opportunities for people living with dementia in nursing homes: an evaluation of a multi-level activity-based model of care. *Aging Mental Health* 2007;**11**:361–70	No outcome measuring agitation
Brooker DJ, Woolley RJ. Enriching opportunities for people living with dementia: the development of a blueprint for a sustainable activity-based model. *Aging Mental Health* 2007;**11**:371–83	No participants with dementia/not separately analysed
Brooker DJR, Snape M, Johnson E, Ward D, Payne M. Single case evaluation of the effects of aromatherapy and massage on disturbed behaviour in severe dementia. *Br J Clin Psychol* 1997;**36**:287–96	No comparator
Brotons M, Koger SM, Pickett-Cooper P. Music and dementias: a review of literature. *J Music Ther* 1997;**34**:204–45	Not primary research
Brown P, Gajdusek DC. Survival of Scrapie virus after 3 years internment. *Lancet* 1991;**337**:269–70	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Brummel-Smith K, London MR, Drew N, Krulewitch H, Singer C, Hanson L. Outcomes of pain in frail older adults with dementia. *J Am Geriatr Soc* 2002;**50**:1847–51	Not intervention study
Brusco LI, Fainstein I, Marquez M, Cardinali DP. Effect of melatonin in selected populations of sleep-disturbed patients. *Biol Signals Receptors* 1999;**8**:126–31	Not a psychological, behavioural, sensory or environmental intervention
Brusco LI, Marquez M, Cardinali DP. Melatonin treatment stabilizes chronobiologic and cognitive symptoms in Alzheimer's disease. *Neuroendocrinol Lett* 2000;**21**:39–42	Not a psychological, behavioural, sensory or environmental intervention
Brusco LI, Marquez M, Cardinali DP. Monozygotic twins with Alzheimer's disease treated with melatonin: case report. *J Pineal Res* 1998;**25**:260–3	Not a psychological, behavioural, sensory or environmental intervention
Buck D, Gregson BA, Bamford CH, McNamee P, Farrow GN, Bond J, *et al*. Psychological distress among informal supporters of frail older people at home and in institutions – the resource implications study group of the MRC cognitive function and ageing study. *Int J Geriatr Psychiatry* 1997;**12**:737–44.	No participants with dementia/not separately analysed
Buckwalter KC, Stolley JM, Farran CJ. Managing cognitive impairment in the elderly: conceptual, intervention and methodological issues. *Online J Knowledge Synth Nurs* 1999;**6**:10	Not primary research
Buerger K, Mergner R, Arbusow V, Padberg F, Hampel H. Late onset Huntington's disease: a differential diagnosis of Alzheimer's disease. *Nervenarzt* 2002;**73**:870–3	No participants with dementia/not separately analysed
Buettner L, Fitzsimmons S. Recreational therapy interventions: a fresh approach to treating apathy and mixed behaviors in dementia. *Non-Pharmacol Ther Dementia* 2011;**1**:27–42	No participants with dementia/not separately analysed
Buettner L, Fitzsimmons S. Mixed behaviors in dementia – the need for a paradigm shift. *J Gerontol Nurs* 2006;**32**:15–22	Not intervention study
Buettner L, Kolanowski A. Practice guidelines for recreation therapy in the care of people with dementia (CE). *Geriatr Nurs* 2003;**24**:18–25	Not primary research
Buettner LL, Fitzsimmons S, Atav AS. Predicting outcomes of therapeutic recreation interventions for older adults with dementia and behavioral symptoms. *Ther Recreation J* 2006;**40**:33–47	No quantitative outcome
Buettner LL, Fitzsimmons S, Dudley WN. Impact of underlying depression on treatment of neuropsychiatric symptoms in older adults with dementia. *Res Gerontol Nurs* 2010;**3**:221–32	Not primary research
Buffington J, Chapman LE, Stobierski MG, Hierholzer JC, Gary HE, Guskey LE, *et al*. Epidemic keratoconjunctivitis in a chronic care facility – risk-factors and measures for control. *J Am Geriatr Soc* 1993;**41**:1177–81	No participants with dementia/not separately analysed
Buldyrev SV, Cruz L, Gomez-Isla T, Gomez-Tortosa E, Havlin S, Le R, *et al*. Description of microcolumnar ensembles in association cortex and their disruption in Alzheimer and Lewy body dementias. *Proc Natl Acad Sci USA* 2000;**97**:5039–43	No participants with dementia/not separately analysed
Bungener C, Jouvent R, Derouesne C. Affective disturbances in Alzheimer's disease. *J Am Geriatr Soc* 1996;**44**:1066–71	Not intervention study
Burgio LD, Butler FR, Roth DL, Hardin JM, Hsu CC, Ung K. Agitation in nursing home residents: the role of gender and social context. *Int Psychogeriatr* 2000;**12**:495–511	Not intervention study
Burgio LD, Scilley K, Hardin JM, Hsu C. Temporal patterns of disruptive vocalization in elderly nursing home residents. *Int J Geriatr Psychiatry* 2001;**16**:378–86	Not intervention study
Burgio LD, Sinnott J. Behavioral treatments and pharmacotherapy – acceptability ratings by elderly individuals in residential settings. *Gerontologist* 1990; **30**:811–16	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Burgio LD, Stevens A, Burgio KL, Roth DL, Paul P, Gerstle J. Teaching and maintaining behavior management skills in the nursing home. *Gerontologist* 2002;**42**:487–96	No participants with dementia/not separately analysed
Burke AD, Tariot PN. Atypical antipsychotics in the elderly: a review of therapeutic trends and clinical outcomes. *Ex Opin Pharmacother* 2009;**10**:2407–14	Not primary research
Burney-Puckett M. Sundown syndrome: etiology and management. *J Psychosoc Nurs Mental Health Serv* 1996;**34**:40–3	Not primary research
Burns A, De Deyn PP. Risperidone for the treatment of neuropsychiatric features in dementia. *Drugs Aging* 2006;**23**:887–96	Not primary research
Burns A, Mittelman M, Cole C, Morris J, Winter J, Page S, *et al.* Transcultural influences in dementia care: observations from a psychosocial intervention study. *Dementia Geriatr Cogn Disord* 2010;**30**:417–23	No participants with dementia/not separately analysed
Buron B. Levels of personhood: a model for dementia care. *Geriatr Nurs* 2008;**29**:324–32	No participants with dementia/not separately analysed
Byrne J. *A Randomised Controlled Trial of Bright Light Therapy for Agitation and Sleep Disturbance in Dymptoms of Dementia*. National Research Register; 2000	No outcome reported
Caballero J, Hitchcock M, Scharre D, Beversdorf D, Nahata MC. Cognitive effects of atypical antipsychotics in patients with Alzheimer's disease and comorbid psychiatric or behavioral problems: a retrospective study. *Clin Ther* 2006;**28**:1695–700	Not a psychological, behavioural, sensory or environmental intervention
Cacabelos R, Franco-Maside A, Alvarez XA. Influence of the somatotropinergic system on mental function and psychomotor activity: Environmental factors, development, cognition, and neuropsychiatric disorders. *Int Congress Series* 1992;**973**:161–72	No participants with dementia/not separately analysed
Cacabelos R, Rodriguez B, Carrera C, Caamano J, Beyer K, Lao JI, *et al*. APOE-related frequency of cognitive and noncognitive symptoms in dementia. *Methods Findings Exp Clin Pharmacol* 1996;**18**:693–706	Not intervention study
Cahn LA, Diesfeld HF. Use of neuroleptics in treatment of dementia in old-age – critical analysis with reference to an experiment with a long-acting oral neuroleptic (Penfluridol Janssen). *Psychiatria Neurologia Neurochirurgia* 1973;**76**:411–20	Not a psychological, behavioural, sensory or environmental intervention
Caine ED. Clinical perspectives on atypical antipsychotics for treatment of agitation. *J Clin Psychiatry* 2006;**67**:22–31	Not primary research
Camberg L, Woods P, Ooi WL, Hurley A, Volicer L, Ashley J, *et al*. Evaluation of simulated presence: a personalized approach to enhance well-being in persons with Alzheimer's disease. *J Am Geriatr Soc* 1999;**47**:446–52	Protocol only
Campbell NL, Khan BA, Farber M, Campbell T, Perkins AJ, Hui SL, *et al*. Improving delirium care in the intensive care unit: the design of a pragmatic study. *Trials* 2011;**12**	No participants with dementia/not separately analysed
Cantillon M, Brunswick R, Molina D, Bahro M. Buspirone vs haloperidol – a double-blind trial for agitation in a nursing home population with Alzheimer's disease. *Am J Geriatr Psychiatry* 1996;**4**:263–7	Not a psychological, behavioural, sensory or environmental intervention
Cantillon M, Molina D, Brunswick R. Anxiety as a factor in agitation in the demented institutionalized elderly – randomized single-blind treatment with azapirones versus neuroleptics. *Biol Psychiatry* 1994;**35**:629	Not a psychological, behavioural, sensory or environmental intervention
Caparros-Lefebvre D, Dewailly D. Preliminary PILOTE study of cyproterone acetate for the treatment of aggressive behavior associated with severe dementia. *Revue Neurologique* 2005;**161**:1071–8	Not a psychological, behavioural, sensory or environmental intervention

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Capote B, Parikh N. Cyclandelate in treatment of senility – controlled-study. *J Am Geriatr Soc* 1978;**26**:360–2	Not a psychological, behavioural, sensory or environmental intervention
Cardinali DP, Furio AM, Brusco LI. Clinical aspects of melatonin intervention in Alzheimer's disease progression. *Curr Neuropharmacol* 2010;**8**:218–27	Not primary research
Carlyle W, Ancill RJ, Sheldon L. Aggression in the demented patient – a double-blind study of loxapine versus haloperidol. *Int Clin Psychopharmacol* 1993;**8**:103–8	Not a psychological, behavioural, sensory or environmental intervention
Cassidy EL, Sheikh JI. Pre-intervention assessment for disruptive behaviour problems: a focus on staff needs. *Aging Mental Health* 2002;**6**:166–71	No participants with dementia/not separately analysed
Cassimjee N, Stuart AD, Marchetti-Mercer M. Non-cognitive disturbances and patient characteristics: prevalence and relationship in Alzheimer's disease. *South Afr J Psychol* 2005;**35**:225–43	Not intervention study
Ceraso D, Duenas-Castel C, Raimondi N, Celis E, Carrillo R, Ugarte Ubiergo S, *et al*. Latin American survey on delirium in critical patients. *Medicina Intensiva* 2010;**34**:495–505	No participants with dementia/not separately analysed
Chafetz PK. Behavioral and cognitive outcomes of SCU care. *Clin Gerontol* 1991;**11**:19–38	No outcome measuring agitation
Chan A, Shea TB. Apolipoprotein E3 as a risk factor for Alzheimer's disease under conditions of nutritional imbalance. *J Alzheimers Dis* 2010;**21**:49–55	No participants with dementia/not separately analysed
Chan DC, Kasper JD, Black BS, Rabins PV. Prevalence and correlates of behavioral and psychiatric symptoms in community-dwelling elders with dementia or mild cognitive impairment: the Memory and Medical Care Study. *Int J Geriatr Psychiatry* 2003;**18**:174–82	Not intervention study
Chan S, Fung MY, Tong CW, Thompson D. The clinical effectiveness of a multisensory therapy on clients with developmental disability. *Res Develop Disabil* 2005;**26**:131–42	No participants with dementia/not separately analysed
Chan WC, Lam LC, Tam CW, Lui VW, Leung GT, Lee AT, *et al*. Neuropsychiatric symptoms are associated with increased risks of progression to dementia: a 2-year prospective study of 321 Chinese older persons with mild cognitive impairment. *Age Ageing* 2011;**40**:30–5	No participants with dementia/not separately analysed
Chan WC, Lam LCW, Choy CNP, Leung VPY, Li SW, Chiu HFK. A double-blind randomised comparison of risperidone and haloperidol in the treatment of behavioural and psychological symptoms in Chinese dementia patients. *Int J Geriatr Psychiatry* 2001;**16**:1156–62	Not a psychological, behavioural, sensory or environmental intervention
Chan WC, Lam LC-W, Tam CW-C, Lui VW-C, Chan SS-M, Chan WM, *et al*. Prevalence of neuropsychiatric symptoms in Chinese older persons with mild cognitive impairment–a population-based study. *Am J Geriatr Psychiatry* 2010;**18**:948–54	No participants with dementia/not separately analysed
Chandler JD. Geriatric psychiatry. *Primary Care* 1987;**14**:761–72	Not primary research
Chapman SB, Weiner ME, Rackley A, Hynan LS, Zientz J. Effects of cognitive-communication-stimulation for Alzheimer's disease patients treated with donepezil. *J Speech Language Hearing Res* 2004;**47**:1149–63	Not a psychological, behavioural, sensory or environmental intervention
Chappell NL, Reid RC. Dimensions of care for dementia sufferers in long-term care institutions: are they related to outcomes? *J Gerontol Series B* 2000; **55**:S234–44	Not intervention study
Charles E, Bouby-Serieys V, Thomas P, Clement J. Links between life events, traumatism and dementia; an open study including 565 patients with dementia. *Encephale Rev Psychiatr Clin Biol Therap* 2006;**32**:746–52	Not intervention study
Chatterton W, Baker F, Morgan K. The singer or the singing: who sings individually to persons with dementia and what are the effects? *Am J Alzheimers Dis Other Demen* 2010;**25**:641–9	Not primary research

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Chazot PL. Drug evaluation: safinamide for the treatment of Parkinson's disease, epilepsy and restless legs syndrome. *Curr Opin Invest Drugs* 2007;**8**:570–9	No participants with dementia/not separately analysed
Chela CM, Campbell ID, Siankanga Z. Clinical care as part of integrated Aids management in a Zambian rural community. *AIDS Care* 1989;**1**:319–26	No participants with dementia/not separately analysed
Chemerinski E, Petracca G, Manes F, Leiguarda R, Starkstein SE. Prevalence and correlates of anxiety in Alzheimer's disease. *Depression Anxiety* 1998;**7**:166–70	Not intervention study
Chemerinski E, Petracca G, Teson A, Sabe L, Leiguarda R, Starkstein SE. Prevalence and correlates of aggressive behavior in Alzheimer's disease. *J Neuropsychiatry Clin Neurosci* 1998;**10**:421–5	Not intervention study
Chemerinski E, Sabe L, Petracca G, Teson A, Starkstein S. Prevalence and clinical correlates of aggressive behavior in Alzheimer's disease (AD). *J Neurol Sci* 1997;**150**:S19	Not intervention study
Chen ST, Sultzer DL, Hinkin CH, Mahler ME, Cummings JL. Executive dysfunction in Alzheimer's disease: association with neuropsychiatric symptoms and functional impairment. *J Neuropsychiatry Clin Neuroscie* 1998;**10**:426–32	Not intervention study
Chen YH, Lin LC, Watson R. Evaluation of the psychometric properties and the clinical feasibility of a Chinese version of the Doloplus-2 scale among cognitively impaired older people with communication difficulty. *Int J Nurs Studies* 2010;**47**:78–88	No participants with dementia/not separately analysed
Chengappa KNR, Levine J, Ulrich R, Parepally H, Brar JS, Atzert R, *et al*. Impact of risperidone on seclusion and restraint at a state psychiatric hospital. *Can J Psychiatry* 2000;**45**:827–32	No participants with dementia/not separately analysed
Cherry DL, Vickrey BG, Schwankovsky L, Heck E, Plauche M, Yep R. Interventions to improve quality of care: the Kaiser Permanente – Alzheimer's Association Dementia Care Project. *Am J Managed Care* 2004;**10**:553–60	No participants with dementia/not separately analysed
Cheung DS, Chien WT, Lai CK. Conceptual framework for cognitive function enhancement in people with dementia. *J Clin Nurs* 2011;**20**:1533–41	No participants with dementia/not separately analysed
Chiabrando G, Bianchi S, Poluzzi E, Montanaro N, Scanavacca P. Profile of atypical-antipsychotics use in patients affected by dementia in the University Hospital of Ferrara. *Eur J Clin Pharmacol* 2010;**66**:661–9	Not intervention study
Chibnall JT, Tait RC, Harman B, Luebbert RA. Effect of acetaminophen on behavior, well-being, and psychotropic medication use in nursing home residents with moderate-to-severe dementia. *J Am Geriatr Soc* 2005;**53**:1921–9	Not a psychological, behavioural, sensory or environmental intervention
Chilukoti N, Early K, Sandhu S, Riley-Doucet C, Debnath D. Assistive technology for promoting physical and mental exercise to delay progression of cognitive degeneration in patients with dementia. 2007 IEEE Biomedical Circuits and Systems Conference 2007;235–8	No participants with dementia/not separately analysed
Chiu YC, Algase D, Whall A, Liang L, Liu HC, Lin KN, *et al*. Getting lost: directed attention and executive functions in early Alzheimer's disease patients. *Dementia Geriatr Cogn Disord* 2004;**17**:174–80	Not intervention study
Choi SH, Park KW, Na DL, Han HJ, Kim EJ, Shim YS, *et al*. Tolerability and efficacy of memantine add-on therapy to rivastigmine transdermal patches in mild to moderate Alzheimer's disease: a multicenter, randomized, open-label, parallel-group study. *Curr Med Res Opin* 2011;**27**:1375–83	Not a psychological, behavioural, sensory or environmental intervention
Chokroverty S. Sleep and neurodegenerative diseases. *Semin Neurol* 2009;**29**:446–67	No participants with dementia/not separately analysed
Chouza C, Romero S, Lorenzo J, Camano JL, Fontana AP, Alterwain P, *et al*. Clinical-trial of tiapride in patients with dyskinesia. *Semaine des Hopitaux* 1982;**58**:725–33	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Chrispal A, Mathews KP, Surekha V. The clinical profile and association of delirium in geriatric patients with hip fractures in a tertiary care hospital in India. *J Assoc Phys India* 2010;**58**:15–19	No participants with dementia/not separately analysed
Christensen DB, Benfield WR. Alprazolam as an alternative to low-dose haloperidol in older, cognitively impaired nursing facility patients. *J Am Geriatr Soc* 1998;**46**:620–5	Not a psychological, behavioural, sensory or environmental intervention
Chui HC, Lyness SA, Sobel E, Schneider LS. Extrapyramidal signs and psychiatric-symptoms predict faster cognitive decline in Alzheimers-disease. *Arch Neurol* 1994;**51**:676–81	Not intervention study
Chung JA, Cummings JL. Neurobehavioral and neuropsychiatric symptoms in Alzheimer's disease – characteristics and treatment. *Neurol Clin* 2000;**18**:829	Not primary research
Chung JC, Lai CK, Chung PM, French HP. Snoezelen for dementia. *Cochrane Database Syst Rev* 2002;**4**:CD003152	Not primary research
Cifu DX, Anderson JC, Lopez E. Agitation in the older adult with traumatic brain injury. *Neurorehabilitation* 1995;**5**:245–54	No participants with dementia/not separately analysed
Citrome L. Schizophrenia and valproate. *Psychopharmacol Bull* 2003; **37**(Suppl. 2):74–88	No participants with dementia/not separately analysed
Ciurli P, Formisano R, Bivona U, Cantagallo A, Angelelli P. Neuropsychiatric disorders in persons with severe traumatic brain injury: prevalence, phenomenology, and relationship with demographic, clinical, and functional features. *J Head Trauma Rehabil* 2011;**26**:116–26	No participants with dementia/not separately analysed
Clark WS, Street JS, Feldman PD, Breier A. The effects of olanzapine in reducing the emergence of psychosis among nursing home patients with Alzheimer's disease. *J Clin Psychiatry* 2001;**62**:34–40	Not a psychological, behavioural, sensory or environmental intervention
Clarke DE, Ko JY, Kuhl EA, van Reekum R, Salvador R, Marin RS. Are the available apathy measures reliable and valid? A review of the psychometric evidence. *J Psychosom Res* 2011;**70**:73–97	No participants with dementia/not separately analysed
Clarke DE, van Reekum R, Simard M, Streiner DL, Conn D, Cohen T, *et al*. Apathy in dementia: clinical and sociodemographic correlates. *J Neuropsychiatry Clin Neurosci* 2008;**20**:337–47	Not intervention study
Close Kirkwood S, Siemers E, Viken RJ, Hodes ME, Conneally PM, Christian JC, *et al*. Evaluation of psychological symptoms among presymptomatic HD gene carriers as measured by selected MMPI scales. *J Psychiatric Res* 2002;**36**:377–82	No participants with dementia/not separately analysed
Coccaro EF, Kramer E, Zemishlany Z, Thorne A, Rice CM, Giordani B, *et al*. Pharmacological treatment of noncognitive behavioral disturbances in elderly demented patients. *Am J Psychiatry* 1990;**147**:1640–5	Not a psychological, behavioural, sensory or environmental intervention
Cohen E, Paulsson JF, Blinder P, Burstyn-Cohen T, Du D, Estepa G, *et al*. Reduced IGF-1 signaling delays age-associated proteotoxicity in mice. *Cell* 2009;**139**:1157–69	No participants with dementia/not separately analysed
Cohen-Mansfield J, Dakheel-Ali M, Marx MS. Engagement in persons with dementia: the concept and its measurement. *Am J Geriatr Psychiatry* 2009;**17**:299–307	No participants with dementia/not separately analysed
Cohen-Mansfield J, Garfinkel D, Lipson S. Melatonin for treatment of sundowning in elderly persons with dementia – a preliminary study. *Arch Gerontol Geriatr* 2000;**31**:65–76	Not a psychological, behavioural, sensory or environmental intervention
Cohen-Mansfield J, Jensen B. Assessment and treatment approaches for behavioral disturbances associated with dementia in the nursing home: self-reports of physicians' practices. *J Am Med Direct Assoc* 2008;**9**:406–13	No participants with dementia/not separately analysed
Cohen-Mansfield J, Jensen B. Nursing home physicians knowledge of and attitudes toward nonpharmacological interventions for treatment of behavioral disturbances associated with dementia. *J Am Med Direct Assoc* 2008;**9**:491–8	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Cohen-Mansfield J, Libin A. Verbal and physical non-aggressive agitated behaviors in elderly persons with dementia: robustness of syndromes. *J Psychiatr Res* 2005;**39**:325–32	Not intervention study
Cohen-Mansfield J, Lipson S, Werner P, Billig N, Taylor L, Woosley R. Withdrawal of haloperidol, thioridazine, and lorazepam in the nursing home – A controlled, double-blind study. *Arch Intern Med* 1999;**159**:1733–40	No participants with dementia/not separately analysed
Cohen-Mansfield J, Marx MS, Dakheel-Ali M, Regier NG, Thein K. Can persons with dementia be engaged with stimuli? *Am J Geriatr Psychiatry* 2010; **18**:351–62	No outcome measuring agitation
Cohen-Mansfield J, Marx MS, Lipson S, Werner P. Predictors of mortality in nursing home residents. *J Clin Epidemiol* 1999;**52**:273–80	Not intervention study
Cohen-Mansfield J, Marx MS, Regier NG, Dakheel-Ali M. The impact of personal characteristics on engagement in nursing home residents with dementia. *Int J Geriatr Psychiatry* 2009;**24**:755–63	Not intervention study
Cohen-Mansfield J, Marx MS, Rosenthal AS. Dementia and agitation in nursing-home residents – how are they related. *Psychol Aging* 1990;**5**:3–8	Not intervention study
Cohen-Mansfield J, Marx MS, Thein K, Dakheel-Ali M. The impact of past and present preferences on stimulus engagement in nursing home residents with dementia. *Aging Mental Health* 2010;**14**:67–73	No outcome measuring agitation
Cohen-Mansfield J, Marx MS, Thein K, Dakheel-Ali M. The impact of stimuli on affect in persons with dementia. *J Clin Psychiatry* 2011;**72**:480–6	No outcome measuring agitation
Cohen-Mansfield J, Mintzer JE. Time for change: the role of non-pharmacological interventions in treating behavior problems in nursing home residents with dementia. *Alzheimer Dis Assoc Disord* 2005;**19**:37–40	Not primary research
Cohen-Mansfield J, Parpura-Gill A. Bathing: a framework for intervention focusing on psychosocial, architectural and human factors considerations. *Arch Gerontol Geriatr* 2007;**45**:121–35	No comparator
Cohen-Mansfield J, Thein K, Dakheel-Ali M, Marx MS. Engaging nursing home residents with dementia in activities: the effects of modeling, presentation order, time of day, and setting characteristics. *Aging Mental Health* 2010;**14**:471–80	No outcome measuring agitation
Cohen-Mansfield J, Waldhorn R, Werner P, Billig N. Validation of sleep observations in a nursing-home. *Sleep* 1990;**13**:512–25	No participants with dementia/not separately analysed
Cohen-Mansfield J, Werner P. Predictors of aggressive behaviors: a longitudinal study in senior day care centers. *J Gerontol Series B* 1998;**53**:300–10	Not intervention study
Cohen-Mansfield J, Werner P. Typology of disruptive vocalizations in older persons suffering from dementia. *Int J Geriatr Psychiatry* 1997;**12**:1079–91	No participants with dementia/not separately analysed
Cohen-Mansfield J, Werner P, Freedman L. Sleep and agitation in agitated nursing-home residents – an observational study. *Sleep* 1995;**18**:674–80	Not intervention study
Cohen-Mansfield J, Werner P. Management of verbally disruptive behaviors in nursing home residents. *J Gerontol Series A* 1997;**52**:M369–77	Not a psychological, behavioural, sensory or environmental intervention
Cohen-Mansfield J, Werner P. Outdoor wandering parks for persons with dementia: a survey of characteristics and use. *Alzheimer Dis Assoc Disord* 1999;**13**:109–17	No participants with dementia/not separately analysed
Cohen-Mansfield J. Assessment of agitation. *Int Psychogeriatr* 1996;**8**:233–45	No participants with dementia/not separately analysed
Cohen-Mansfield J. Heterogeneity in dementia: challenges and opportunities. *Alzheimer Dis Assoc Disord* 2000;**14**:60–3	Not primary research

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Cohen-Mansfield J. Nonpharmacologic interventions for inappropriate behaviors in dementia – a review, summary, and critique. *Am J Geriatr Psychiatry* 2001;**9**:361–81	Not primary research
Cohen-Mansfield J. Use of patient characteristics to determine nonpharmacologic interventions for behavioral and psychological symptoms of dementia. *Int Psychogeriatr* 2000;**12**:373–80	Not primary research
Colantonio A, Cohen C, Corlett S. Support needs of elderly caregivers of persons with dementia. *Can J Ageing* 1998;**17**:330–45	No participants with dementia/not separately analysed
Colenda CC, Hamer RM. Antecedents and interventions for aggressive-behavior of patients at a geropsychiatric state-hospital. *Hosp Community Psychiatry* 1991;**42**:287–92	No quantitative outcome
Colenda CC, Rapp SR, Leist JC, Poses RM. Clinical variables influencing treatment decisions for agitated dementia patients: survey of physician judgments. *J Am Geriatr Soc* 1996;**44**:1375–9	No participants with dementia/not separately analysed
Colombo M, Vitali S, Cairati M, Vaccaro R, Andreoni G, Guaita A. Behavioral and psychotic symptoms of dementia (BPSD) improvements in a special care unit: a factor analysis. *Arch Gerontol Geriatr* 2007;**44**:113–20	No participants with dementia/not separately analysed
Comella CL. Sleep disorders in Parkinson's disease: an overview. *Movement Disord* 2007;**22**:S367–73	No participants with dementia/not separately analysed
Como PG, Rubin AJ, Obrien CF, Lawler K, Hickey C, Rubin AE, *et al*. A controlled trial of fluoxetine in nondepressed patients with Huntington's disease. *Movement Disord* 1997;**12**:397–401	No participants with dementia/not separately analysed
Conn D, Thorpe L. Assessment of behavioural and psychological symptoms associated with dementia. *Can J Neurol Sci* 2007;**34**:S67–71	No participants with dementia/not separately analysed
Conn DK, Lee V, Steingart A, Silberfeld M. Psychiatric-services – a survey of nursing-homes and homes for the aged in Ontario. *Can J Psychiatry* 1992;**37**:525–30	No participants with dementia/not separately analysed
Conn DK, Seitz DP. Advances in the treatment of psychiatric disorders in long-term care homes. *Curr Opin Psychiatry* 2010;**23**:516–21	Not primary research
Conn LM, Lion JR. Pharmacologic approaches to violence. *Psychiatr Clin North Am* 1984;**7**:879–86	No participants with dementia/not separately analysed
Conney J, Kaston B. Pharmacoeconomic and health outcome comparison of lithium and divalproex in a VA geriatric nursing home population: influence of drug-related morbidity on total cost of treatment. *Am J Manag Care* 1999;**5**:197–204	No participants with dementia/not separately analysed
Coogle CL, Parham IA, Cotter JJ, Welleford EA, Netting FE. A professional development program in geriatric interdisciplinary teamwork: implications for managed care and quality of care. *J Appl Gerontol* 2005;**24**:142–59	No participants with dementia/not separately analysed
Cooney C, Howard R, Lawlor B. Abuse of vulnerable people with dementia by their carers: can we identify those most at risk? *Int J Geriatr Psychiatry* 2006;**21**:564–71	Not intervention study
Cooper C, Selwood A, Blanchard M, Livingston G. Abusive behaviour experienced by family carers from people with dementia: the CARD (caring for relatives with dementia) study. *J Neurol Neurosurg Psychiatry* 2010;**81**:592–6	Not intervention study
Cooper C, Selwood A, Blanchard M, Walker Z, Blizard R, Livingston G. The determinants of family carers' abusive behaviour to people with dementia: results of the CARD study. *J Affect Disord* 2010;**121**:136–42	No participants with dementia/not separately analysed
Cooper JK. Drug-treatment of Alzheimers-disease. *Arch Intern Med* 1991;**151**:245–9	Not primary research

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Cooper JW. Nonpharmacologic and pharmacologic treatment of dementia-associated agitation, aggression and disruptive behavior. *J Geriatr Drug Ther* 1999;**12**:5–28	Not primary research
Cooper T. Who manages the managers. *J Neurosurg* 1989;**71**:311–15	No participants with dementia/not separately analysed
Coppin AK, Shumway-Cook A, Saczynski JS, Patel KV, Ble A, Ferrucci L, *et al*. Association of executive function and performance of dual-task physical tests among older adults: analyses from the InChianti study. *Age Ageing* 2006;**35**:619–24	No participants with dementia/not separately analysed
Coreybloom J, Galasko D. Adjunctive therapy in patients with Alzheimers disease – a practical approach. *Drugs Aging* 1995;**7**:79–8	Not primary research
Corrigan PW, Yudofsky SC, Silver JM. Pharmacological and behavioral treatments for aggressive psychiatric inpatients. *Hosp Community Psychiatry* 1993;**44**:125–33	Not primary research
Cott CA, Dawson P, Sidani T, Wells T. The effects of a walking/talking program on communication, ambulation, and functional status in residents with Alzheimer disease. *Alzheimer Dis Assoc Disord* 2002;**16**:81–7	No outcome measuring agitation
Cotter VT. Restraint free care in older adults with dementia. *Keio J Med* 2005;**54**:80–4	Not primary research
Cotter VT. The burden of dementia. *Am J Manag Care* 2007;**13**:S193–7	Not primary research
Coulson BS, Fenner SG, Almeida OP. Successful treatment of behavioural problems in dementia using a cholinesterase inhibitor: the ethical questions. *Aus N Z J Psychiatry* 2002;**36**:259–62	Not a psychological, behavioural, sensory or environmental intervention
Covington JS. Alleviating agitation, apprehension, and related symptoms in geriatric patients – double-blind comparison of a phenothiazine and a benzodiazepine. *South Med J* 1975;**68**:719–24	Not a psychological, behavioural, sensory or environmental intervention
Covinsky KE, Eng C, Lui LY, Sands LP, Yaffe K. The last 2 years of life: functional trajectories of frail older people. *J Am Geriatr Soc* 2003;**51**:492–8	Not intervention study
Craig D, Hart DJ, Carson R, McIlroy SP, Passmore AP. Allelic variation at the A218C tryptophan hydroxylase polymorphism influences agitation and aggression in Alzheimer's disease. *Neurosci Lett* 2004;**363**:199–202	Not intervention study
Craig D, Hart DJ, Carson R, McIlroy SP, Passmore AP. Psychotic symptoms in Alzheimer's disease are not influenced by polymorphic variation at the dopamine receptor DRD3 gene. *Neurosci Lett* 2004;**368**:33–6	Not intervention study
Craufurd D, Thompson JC, Snowden JS. Behavioral changes in Huntington disease. *Neuropsychiatry Neuropsychol Behav Neurol* 2001;**14**:219–26	No participants with dementia/not separately analysed
Cronin-Stubbs D. Interventions for cognitive impairment and neurobehavioral disturbances of older adults. *Annu Rev Nurs Res* 1997;**15**:35–56	Not primary research
Crotty M, Halbert J, Rowett D, Giles L, Birks R, Williams H, *et al*. An outreach geriatric medication advisory service in residential aged care: a randomised controlled trial of case conferencing. *Age Ageing* 2004;**33**:612–17	No participants with dementia/not separately analysed
Crystal HA, Dickson DW, Lizardi JE, Davies P, Wolfson LI. Antemortem diagnosis of Diffuse Lewy Body disease. *Neurology* 1990;**40**:1523–8	Not intervention study
Cubit K. Informed consent for research involving people with dementia: a grey area. *Contemp Nurse* 2010;**34**:230–6	Not intervention study
Cubo E, Leurgans S, Goetz CG. Short-term and practice effects of metronome pacing in Parkinson's disease patients with gait freezing while in the 'on' state: randomized single blind evaluation. *Parkinsonism Related Disord* 2004;**10**:507–10	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Cuellar NG, Strumpf NE, Ratcliffe SJ. Symptoms of restless legs syndrome in older adults: outcomes on sleep quality, sleepiness, fatigue, depression, and quality of life. *J Am Geriatr Soc* 2007;**55**:1387–92	No participants with dementia/not separately analysed
Culebras A. Update on disorders of sleep and the sleep-wake cycle. *Psychiatr Clin North Am* 1992;**15**:467–89	No participants with dementia/not separately analysed
Cummings JL, Back C. The cholinergic hypothesis of neuropsychiatric symptoms in Alzheimer's disease. *Am J Geriatr Psychiatry* 1998;**6**:S64–78	Not primary research
Cummings JL, Farlow MR, Meng X, Tekin S, Olin JT. Rivastigmine transdermal patch skin tolerability results of a 1-year clinical trial in patients with mild-to-moderate Alzheimer's disease. *Clin Drug Invest* 2010;**30**:41–9	Not a psychological, behavioural, sensory or environmental intervention
Cummings JL, Kaufer D. Neuropsychiatric aspects of Alzheimer's disease: the cholinergic hypothesis revisited. *Neurology* 1996;**47**:876–83	Not primary research
Cummings JL, Mackell J, Kaufer D. Behavioral effects of current Alzheimer's disease treatments: a descriptive review. *Alzheimers Demen* 2008;**4**:49–60	Not primary research
Cummings JL, McPherson S. Neuropsychiatric assessment of Alzheimer's disease and related dementias. *Aging Clin Exp Res* 2001;**13**:240–6	Not primary research
Cummings JL, McRae T, Zhang R. Effects of donepezil on neuropsychiatric symptoms in patients with dementia and severe behavioral disorders. *Am J Geriatr Psychiatry* 2006;**14**:605–12	Not a psychological, behavioural, sensory or environmental intervention
Cummings JL, Nadel A, Masterman D, Cyrus PA. Efficacy of metrifonate in improving the psychiatric and behavioral disturbances of patients with Alzheimer's disease. *J Geriatr Psychiatry Neurol* 2001;**14**:101–8	Not a psychological, behavioural, sensory or environmental intervention
Cummings JL, Schneider E, Tariot PN, Graham SM. Behavioral effects of memantine in Alzheimer disease patients receiving donepezil treatment. *Neurology* 2006;**67**:57–63	Not a psychological, behavioural, sensory or environmental intervention
Cummings JL, Street J, Masterman D, Clark WS. Efficacy of olanzapine in the treatment of psychosis in dementia with Lewy bodies. *Demen Geriatr Cogn Disord* 2002;**13**:67–73	Not a psychological, behavioural, sensory or environmental intervention
Cummings JL, Tractenberg RE, Gamst A, Teri L, Masterman D, Thal LJ. Regression to the mean: Implications for clinical trials of psychotropic agents in dementia. *Curr Alzheimer Res* 2004;**1**:323–8	Not a psychological, behavioural, sensory or environmental intervention
Cummings JL. Behavioral manifestations of Alzheimer's disease. 2001. pp. 84–8	Not primary research
Cummings JL. Cognitive and behavioral heterogeneity in Alzheimer's disease: seeking the neurobiological basis. *Neurobiol Aging* 2000;**21**:845–61	Not primary research
Cummings JL. Neuropsychiatric and behavioral alterations and their management in moderate to severe Alzheimer disease. *Neurology* 2005; **65**:S18–24	Not primary research
Cummings JL. Use of cholinesterase inhibitors in clinical practice – evidence-based recommendations. *Am J Geriatr Psychiatry* 2003;**11**:131–45	Not primary research
Cunningham J, Williams KN. A case study of resistiveness to care and elderspeak. *Res Theory Nurs Prac* 2007;**21**:45–56	Not intervention study
Currier GW, Chou JCY, Feifel D, Bossie CA, Turkoz I, Mahmoud RA, *et al*. Acute treatment of psychotic agitation: a randomized comparison of oral treatment with risperidone and lorazepam versus intramuscular treatment with haloperidol and lorazepam. *J Clin Psychiatry* 2004;**65**:386–94	No participants with dementia/not separately analysed
Currier GW, Simpson GM. Risperidone liquid concentrate and oral lorazepam versus intramuscular haloperidol and intramuscular lorazepam for treatment of psychotic agitation. *J Clin Psychiatry* 2001;**62**:153–7	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Daiello LA, Ott BR, Lapane KL, Reinert SE, Machan JT, Dore DD. Effect of discontinuing cholinesterase inhibitor therapy on behavioral and mood symptoms in nursing home patients with dementia. *Am J Geriatr Pharmacother* 2009;**7**:74–83	Not intervention study
Daiello LA. Atypical antipsychotics for the treatment of dementia-related behaviors: an update. *Medicine Health* 2007;**90**:191–4	Not primary research
Daniel DG. Antipsychotic treatment of psychosis and agitation in the elderly. *J Clin Psychiatry* 2000;**61**:49–52	Not primary research
Darreh-Shori T, Jelic V. Safety and tolerability of transdermal and oral rivastigmine in Alzheimer's disease and Parkinson's disease dementia. *Ex Opin Drug Saf* 2010;**9**:167–76	Not primary research
Daselaar SM, Veltman DJ, Rombouts SARB, Raaijmakers JGW, Lazeron RHC, Jonker C. Medial temporal lobe activity during semantic classification using a flexible fMRI design. *Behav Brain Res* 2002;**136**:399–404	No participants with dementia/not separately analysed
Dauvilliers Y. Insomnia in patients with neurodegenerative conditions. *Sleep Med* 2007;**8**:S27–34	Not primary research
Davidson M. Other options in pharmacological management of behavioural disorders. *Int J Neuropsychopharmacol* 2004;**7**:S110	Not primary research
Davidson PW, Cain NN, Sloanereeves JE, Vanspeybroech A, Segel J, Gutkin J, *et al*. Characteristics of community-based individuals with mental-retardation and aggressive behavioral-disorders. *Am J Mental Retard* 1994;**98**:704–16	No participants with dementia/not separately analysed
Davis LL, Buckwalter K, Burgio LD. Measuring problem behaviors in dementia: developing a methodological agenda. *Adv Nurs Sci* 1997;**20**:40–55	No participants with dementia/not separately analysed
De Deyn PP, Buitelaar J. Risperidone in the management of agitation and aggression associated with psychiatric disorders. *Eur Psychiatry* 2006;**21**:21–8	Not primary research
De Deyn PP, Katz IR, Brodaty H, Lyons B, Greenspan A, Burns A. Management of agitation, aggression, and psychosis associated with dementia: a pooled analysis including three randomized, placebo-controlled double-blind trials in nursing home residents treated with risperidone. *Clin Neurol Neurosurg* 2005;**107**:497–508	Not a psychological, behavioural, sensory or environmental intervention
De Deyn PP, Katz IR. Control of aggression and agitation in patients with dementia: efficacy and safety of risperidone. *Int J Geriatr Psychiatry* 2000;**15**:S14–29	Not primary research
De Deyn PP, Rabheru K, Rasmussen A, Bocksberger JP, Dautzenberg PLJ, Eriksson S, *et al*. A randomized trial of risperidone, placebo, and haloperidol for behavioral symptoms of dementia. *Neurology* 1999;**53**:946–55	Not a psychological, behavioural, sensory or environmental intervention
de Jonghe A, Korevaar J, van Munster B, de Rooij S. Effectiveness of melatonin treatment on circadian rhythm disturbances in dementia. Are there implications for delirium? A systematic review. *Int J Geriatr Psychiatry* 2010;**25**:1201–8	Not primary research
de Medeiros K, Robert P, Gauthier S, Stella F, Politis A, Leoutsakos J, *et al*. The Neuropsychiatric Inventory-Clinician rating scale (NPI-C): reliability and validity of a revised assessment of neuropsychiatric symptoms in dementia. *Int Psychogeriatr* 2010;**22**:984–94	No participants with dementia/not separately analysed
de Rooij SE, van Munster BC, Korevaar JC, Casteelen G, Schuurmans MJ, van der Mast RC, *et al*. Delirium subtype identification and the validation of the Delirium Rating Scale – Revised-98 (Dutch version) in hospitalized elderly patients. *Int J Geriatr Psychiatry* 2006;**21**:876–82	No participants with dementia/not separately analysed
de Tommaso M, Difruscolo O, Sciruicchio V, Specchio N, Livrea P. Abnormalities of the contingent negative variation in Huntington's disease: correlations with clinical features. *J Neurol Sci* 2007;**254**:84–9	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
de Vasconcelos Cunha UG, Lopes Rocha F, Avila de Melo R, Alves Valle E, de Souza Neto JJ, Mendes Brega R, *et al*. A placebo-controlled double-blind randomized study of venlafaxine in the treatment of depression in dementia. *Dementia Geriatr Cogn Disord* 2007;**24**:36–41	Not a psychological, behavioural, sensory or environmental intervention
de Vugt ME, Stevens F, Aalten P, Lousberg R, Jaspers N, Winkens I, *et al.* Do caregiver management strategies influence patient behaviour in dementia? *Int J Geriatr Psychiatry* 2004;**19**:85–92	Not intervention study
de Winter C, Jansen A, Evenhuis H. Physical conditions and challenging behaviour in people with intellectual disability: a systematic review. *J Intellectual Disabil Res* 2011;**55**:675–98	No participants with dementia/not separately analysed
Dealberto MJ, Pajot N, Courbon D, Alperovitch A. Breathing disorders during sleep and cognitive performance in an older community sample: the EVA study. *J Am Geriatr Soc* 1996;**44**:1287–94	No participants with dementia/not separately analysed
Deberdt WG, Dysken MW, Rappaport SA, Feldman PD, Young CA, Hay DP, *et al*. Comparison of olanzapine and risperidone in the treatment of psychosis and associated behavioral disturbances in patients with dementia. *Am J Geriatr Psychiatry* 2005;**13**:722–30	Not a psychological, behavioural, sensory or environmental intervention
Dechamps A, Jutand MA, Onifade C, Richard-Harston S, Bourdel-Marchasson I. Co-occurrence of neuropsychiatric syndromes in demented and psychotic institutionalized elderly. *Int J Geriatr Psychiatry* 2008;**23**:1182–90	Not intervention study
Degner D, Bleich S, Kropp S, Landen H, Ruther E. Tolerability and efficacy of zuclopenthixol in the treatment of gerontopsychiatric patients – a prospective study. *Psychopharmakotherapie* 2001;**8**:152–7	No participants with dementia/not separately analysed
Deguchi A, Suzumura E, Nakamura S, Kawamura N, Kawamura K, Hamaguchi H, *et al*. Night Spa bathing for patients with senile dementia. *J Japan Assoc Phys Med Balneol Climatol* 2001;**64**:71–5	No outcome measuring agitation
Delong GR, Rosenberger PB, Hildreth S, Silver I. The 14-Associated and 6-Associated Clinical Complex – a rejected hypothesis revisited. *J Child Neurol* 1987;**2**:117–27	No participants with dementia/not separately analysed
Dening TR, Berrios GE. Wilsons-Disease – a longitudinal-study of psychiatric-symptoms. *Biol Psychiatry* 1990;**28**:255–65	No participants with dementia/not separately analysed
Denney A. Quiet music. An intervention for mealtime agitation? *J Gerontol Nurs* 1997;**23**:16–23	No quantitative outcome
Derouesne C, Piquard A, Thibault S, Baudouin-Madec V, Lacomblez L. Noncognitive symptoms in Alzheimer's disease. A study of 150 community-dwelling patients using a questionnaire completed by the caregiver. *Revue Neurologique* 2001;**157**:162–77	Not intervention study
Deslauriers S, Landreville P, Dicaire L, Verreault R. Validity and reliability of the French version of the Cohen-Mansfield agitation. *Can J Aging* 2001;**20**:373–84	No participants with dementia/not separately analysed
Dettmore D, Kolanowski A, Boustani M. Aggression in persons with dementia: use of nursing theory to guide clinical practice. *Geriatr Nurs* 2009;**30**:8–17	Not primary research
Deutsch LH, Bylsma FW, Rovner BW, Steele C, Folstein MF. Psychosis and physical aggression in probable Alzheimers disease. *Am J Psychiatry* 1991;**148**:1159–63	Not intervention study
Deutsch LH, Rovner BW. Agitation and other noncognitive abnormalities in Alzheimers disease. *Psychiatr Clin North Am* 1991;**14**:341–51	Not primary research
Devanand DP, Levy SR. Neuroleptic treatment of agitation and psychosis in dementia. *J Geriatr Psychiatry Neurol* 1995;**8**:S18–27	Not primary research

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Devanand DP, Marder K, Michaels KS, Sackeim HA, Bell K, Sullivan MA, *et al*. A randomized, placebo-controlled dose-comparison trial of haloperidol for psychosis and disruptive behaviors in Alzheimer's disease. *Am J Psychiatry* 1998;**155**:1512–20	Not a psychological, behavioural, sensory or environmental intervention
Devanand DP, Pelton GH. A 6-month, Randomized, double-blind, placebo-controlled pilot discontinuation trial following response to haloperidol treatment of psychosis and agitation in Alzheimer's disease. *Biol Psychiatry* 2011;**69**:35S-6S	Not a psychological, behavioural, sensory or environmental intervention
Devanand DP, Sackeim HA, Mayeux R. Psychosis, behavioral disturbance, and the use of neuroleptics in dementia. *Comprehens Psychiatry* 1988;**29**:387–401	Not primary research
Devanand DP. Use of the Columbia University Scale to assess psychopathology in Alzheimer's disease. *Int Psychogeriatr* 1997;**9**(Suppl. 1):137	No participants with dementia/not separately analysed
Dewing J. Care for older people with a dementia in acute hospital settings. *Nurs Older People* 2001;**13**:18–20	Not primary research
Dewing J. Responding agitation in people with dementia. *Nurs Older People* 2010;**22**:18–25	Not primary research
Dewing J. Screening for wandering among older persons with dementia. *Nurs Older People* 2005;**17**:20–4	Not primary research
Dewing J. Sundowning in older people with dementia: evidence base, nursing assessment and interventions. *Nurs Older People* 2003;**15**:24–32	Not primary research
Dewing J. Wandering into the future: reconceptualizing wandering 'a natural and good thing'. *Int J Older People Nurs* 2006;**1**:239–49	Not primary research
DeYoung S, Just G, Harrison R. Decreasing aggressive, agitated, or disruptive behavior: perticipation in a behavior management unit. *J Gerontol Nurs* 2002;**28**:22–31	Some participants <50 years old
Di Carlo A, Baldereschi M, Amaducci L, Maggi S, Grigoletto F, Scarlato G, *et al*. Cognitive impairment without dementia in older people: Prevalence, vascular risk factors, impact on disability. The Italian longitudinal study on aging. *J Am Geriatr Soc* 2000;**48**:775–82	No participants with dementia/not separately analysed
Di Iulio F, Palmer K, Blundo C, Casini AR, Gianni W, Caltagirone C, *et al*. Occurrence of neuropsychiatric symptoms and psychiatric disorders in mild Alzheimer's disease and mild cognitive impairment subtypes. *Int Psychogeriatr* 2010;**22**:629–40	Not intervention study
Dickson TC, Chuckowree JA, Chuah MI, West AK, Vickers JC. alpha-internexin immunoreactivity reflects variable neuronal vulnerability in Alzheimer's disease and supports the role of the beta-amyloid plaques in inducing neuronal injury. *Neurobiol Dis* 2005;**18**:286–95	No participants with dementia/not separately analysed
Diehl J, Mayer T, Kurz A, Forstl H. Features of frontotemporal dementia from the perspective of a special support group. *Nervenarzt* 2003;**74**:445	No participants with dementia/not separately analysed
Diesfeldt HFA. [Behavior that is difficult to manage and psychological interventions.] *Tijdschr Gerontol Geriatr* 2005;**36**:98–9	Not primary research
Ditzler K. Efficacy and tolerability of memantine in patients with dementia syndrome – a double-blind, placebo controlled trial. *Arzneimittel-Forschung* 1991;**41–2**:773–80	Not a psychological, behavioural, sensory or environmental intervention
Diwan S, Phillips VL. Agitation and dementia-related problem behaviors and case management in long-term care. *Int Psychogeriatr* 2001;**13**:5–21	Not intervention study
do Prado RCP, Barbosa ER. Depression in Parkinson's disease – study of 60 cases. *Arquivos de Neuro-Psiquiatria* 2005;**63**:766–71	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Dobrohotoff JT, Llewellyn-Jones RH. Psychogeriatric inpatient unit design: a literature review. *Int Psychogeriatr* 2011;**23**:174–89	No participants with dementia/not separately analysed
Dobson CM. Experimental investigation of protein folding and misfolding. *Methods* 2004;**34**:4–14	No participants with dementia/not separately analysed
Dolder CR, Davis LN, McKinsey J. Use of psychostimulants in patients with dementia. *Ann Pharmacother* 2010;**44**:1624–32	Not primary research
Dombrovski AY, Mulsant BH, Ferrell RE, Lotrich FE, Rosen JI, Wallace M, *et al*. Serotonin transporter triallelic genotype and response to citalopram and risperidone in dementia with behavioral symptoms. *Int Clin Psychopharmacol* 2010;**25**:37–45	Not a psychological, behavioural, sensory or environmental intervention
Doody RS, Stevens JC, Beck C, Dubinsky RM, Kaye JA, Gwyther L, *et al*. Practice parameter: management of dementia (an evidence-based review) – report of the quality standards subcommittee of the American Academy of Neurology. *Neurology* 2001;**56**:1154–66	Not primary research
dos Santos-Neto LL, de Vilhena Toledo MA, Medeiros-Souza P, de Souza GA. The use of herbal medicine in Alzheimer's disease – a systematic review. *Evidence-Based Complement Alt Med* 2006;**3**:441–5	Not primary research
Draper B, Meares S, McIntosh H. A psychogeriatric outreach service to nursing homes in Sydney. *Aus J Ageing* 1998;**17**:184–6	Not intervention study
Druckenbrod RW, Rosen J, Cluxton RJ. As-needed dosing of antipsychotic-drugs – limitations and guidelines for use in the elderly agitated patient. *Ann Pharmacother* 1993;**27**:645–8	Not primary research
Dubois B, McKeith I, Orgogozo JM, Collins O, Meulien D. A multicentre, randomized, double-blind, placebo-controlled study to evaluate the efficacy, tolerability and safety of two doses of metrifonate in patients with mild-to-moderate Alzheimer's disease: the malt study. *Int J Geriatr Psychiatry* 1999;**14**:973–82	Not a psychological, behavioural, sensory or environmental intervention
Duckett S. Managing the sundowning patient. *J Rehabil* 1993;**59**:24–9	Not primary research
Duff K, Beglinger LJ, O'Rourke ME, Nopoulos P, Paulson HL, Paulsen JS. Risperidone and the treatment of psychiatric, motor, and cognitive symptoms in Huntington's disease. *Ann Clin Psychiatry* 2008;**20**:1–3	No participants with dementia/not separately analysed
Duignan D, Hedley L, Milverton R. Exploring dance as a therapy for symptoms and social interaction in a dementia care unit. *Nurs Times* 2009;**105**:19–22	No quantitative outcome
Dunkin JJ, Anderson-Hanley C. Dementia caregiver burden – a review of the literature and guidelines for assessment and intervention. *Neurology* 1998;**51**:S53–60	Not primary research
Dunn JC, Thiru-Chelvam B, Beck CHM. Interdisciplinary care. Bathing: pleasure or pain? *J Gerontol Nurs* 2002;**28**:6–13	No outcome measuring agitation
Dunn NR, Pearce GL, Shakir SAW. Adverse effects associated with the use of donepezil in general practice in England. *J Psychopharmacol* 2000;**14**:406–8	Not intervention study
Dvir H, Silman I, Harel M, Rosenberry TL, Sussman JL. Acetylcholinesterase: from 3D structure to function. *Chemico-Biol Interact* 2010;**187**:10–22	No participants with dementia/not separately analysed
Eagles JM, Gilleard CJ. The demented elderly admitted to a psychogeriatric assessment unit – changes in disability and outcome from 1977–1982. *Br J Psychiatry* 1984;**144**:314–16	Not intervention study
Earley CJ. Disorders associated with difficulty in initiating or maintaining sleep. *Neurologist* 1997;**3**:77–94	No participants with dementia/not separately analysed
Edell WS, Tunis SL. Antipsychotic treatment of behavioral and psychological symptoms of dementia in geropsychiatric inpatients. *Am J Geriatr Psychiatry* 2001;**9**:289–97	Not a psychological, behavioural, sensory or environmental intervention

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Edvardsson D, Sandman P, Noy R, Karlsson S. Associations between the working characteristics of nursing staff and the prevalence of behavioral symptoms in people with dementia in residential care. *Int Psychogeriatr* 2008;**20**:764–76	Not intervention study
Edwards AM, Phillips RA, Watkins NW, Freeman MP, Murphy EJ, Afanasyev V, *et al*. Revisiting Levy flight search patterns of wandering albatrosses, bumblebees and deer. *Nature* 2007;**449**:1044-U5	No participants with dementia/not separately analysed
Eeles EM, Stephens M, Benedict C, Beaverstock J, Gupta M, Page M. Sleep in dementia assessment may require a multidisciplinary approach. *Am J Geriatr Psychiatry* 2006;**14**:986–7	Not a psychological, behavioural, sensory or environmental intervention
Egan MY, Munroe S, Hubert C, Rossiter T, Gauthier A, Eisner M, *et al*. Caring for residents with dementia and aggressive behavior – impact of life history knowledge. *J Gerontol Nurs* 2007;**33**:24–30	No comparator
Eichelman B, Hartwig A. The Carolina Nosology of Destructive Behavior (CNDB). *J Neuropsychiatry Clin Neurosci* 1990;**2**:288–96	No participants with dementia/not separately analysed
Elie D, Gagnon P, Gagnon B, Giguere A. Using psychostimulants in end-of-life patients with hypoactive delirium and cognitive disorders: a literature review. *Can J Psychiatry* 2010;**55**:386–93	No participants with dementia/not separately analysed
Elie M, Boss K, Cole M, McCusker J, Belzile E, Ciampi A. A retrospective, exploratory, secondary analysis of the association between antipsychotic use and mortality in elderly patients with delirium. *Int Psychogeriatr* 2009;**21**:588–92	No participants with dementia/not separately analysed
Ellison JM, Harper DG, Berlow Y, Zeranski L. Beyond the "C" on MCI: noncognitive symptoms in amnestic and non-amnestic mild cognitive impairment. *CNS Spectrums* 2008;**13**:66–72	No participants with dementia/not separately analysed
Ely EW, Shintani A, Truman B, Speroff T, Gordon SM, Harrell FE, *et al*. Delirium as a predictor of mortality in mechanically ventilated patients in the intensive care unit. *JAMA* 2004;**291**:1753–62	No participants with dementia/not separately analysed
Engelborghs S, Maertens K, Nagels G, Vloeberghs E, Marien P, Symons A, *et al*. Neuropsychiatric symptoms of dementia: cross-sectional analysis from a prospective, longitudinal Belgian study. *Int J Geriatr Psychiatry* 2005; **20**:1028–37	Not intervention study
Engelhart MJ, Geerlings MI, Ruitenberg A, van Swieten JC, Holman A, Witteman JCM, *et al*. Dietary intake of antioxidants and risk of Alzheimer disease. *JAMA* 2002;**287**:3223–9	No participants with dementia/not separately analysed
Ernst E. Is reflexology an effective intervention? A systematic review of randomised controlled trials. *Med J Aus* 2009;**191**:263–6	Not primary research
Ersek M, Herr K, Neradilek MB, Buck HG, Black B. Comparing the psychometric properties of the Checklist of Nonverbal Pain Behaviors (CNPI) and the Pain Assessment in Advanced Dementia (PAIN-AD) instruments. *Pain Med* 2010;**11**:395–404	No participants with dementia/not separately analysed
Estes ML, Chimowitz MI, Awad IA, Mcmahon JT, Furlan AJ, Ratliff NB. Sclerosing vasculopathy of the central-nervous-system in nonelderly demented patients. *Arch Neurol* 1991;**48**:631–6	Not intervention study
Ettema TP, Droes RM, de Lange J, Mellenbergh GJ, Ribbe MW. QUALIDEM: Development and evaluation of a dementia specific quality of life instrument. Scalability, reliability and internal structure. *Int J Geriatr Psychiatry* 2007;**22**:549–56	No participants with dementia/not separately analysed
Eustace A, Coen R, Walsh C, Cunningham CJ, Walsh JB, Coakley D, *et al*. A longitudinal evaluation of behavioural and psychological symptoms of probable Alzheimer's disease. *Int J Geriatr Psychiatry* 2002;**17**:968–73	Not intervention study

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Evers MM, Marin DB. Mood disorders – effective management of major depressive disorder in the geriatric patient. *Geriatrics* 2002;**57**:36–40	No participants with dementia/not separately analysed
Fabrega H, Mezzich J, Ulrich RF. Black-white differences in psychopathology in an urban psychiatric population. *Comprehens Psychiatry* 1988;**29**:285–97	No participants with dementia/not separately analysed
Factor SA, Molho ES, Brown DL. Acute delirium after withdrawal of amantadine in Parkinson's disease. *Neurology* 1998;**50**:1456–8	No participants with dementia/not separately analysed
Factor SA, Molho ES. Emergency department presentations of patients with Parkinson's disease. *Am J Emerg Med* 2000;**18**:209–15	No participants with dementia/not separately analysed
Falsetti AE. Risperidone for control of agitation in dementia patients. *Am J Health-Syst Pharm* 2000;**57**:862–74	Not primary research
Farlow MR, Graham SM, Alva G. Memantine for the treatment of Alzheimer's disease. *Drug Saf* 2008;**31**:577–85	Not a psychological, behavioural, sensory or environmental intervention
Farran CJ, Gilley DW, McCann JJ, Bienias JL, Lindeman DA, Evans DA. Efficacy of behavioral interventions for dementia caregivers. *West J Nurs Res* 2007;**29**:944–60	No participants with dementia/not separately analysed
Farrell Miller M. Physical aggressive resident behavior during hygienic care. *J Gerontol Nurs* 1997;**23**:24–39	No participants with dementia/not separately analysed
Fauth E, Zarit S, Femia E, Hofer S, Stephens M. Behavioral and psychological symptoms of dementia and caregivers' stress appraisals: Intra-individual stability and change over short-term observations. *Aging Mental Health* 2006; **10**:563–73	Not intervention study
Feinberg MV, Michocki RJ. Clinical and regulatory concerns in Alzheimer's disease management: role of the pharmacist. *Am J Health-Syst Pharm* 1998; **55**:S26–31	No participants with dementia/not separately analysed
Feldt KS, Ryden MB. Aggressive behavior. Educating nursing assistants. *J Gerontol Nurs* 1992;**18**:3–12	No participants with dementia/not separately analysed
Feliciano L, Steers ME, Elite-Marcandonatou A, Mclane M, Arean PA. Applications of preference assessment procedures in depression and agitation management in elders with dementia. *Clin Gerontol* 2009;**32**:239–59	No comparator
Ferini-Strambi L, Fantini ML, Zucconi M, Castronovo V, Marelli S, Oldani A, *et al*. REM sleep behaviour disorder. *Neurol Sci* 2005;**26**:S186–92	No participants with dementia/not separately analysed
Fernandez HH, Lapane KL, Ott BR, Friedman JH. Gender differences in the frequency and treatment of behavior problems in Parkinson's disease. *Movement Disord* 2000;**15**:490–6	No participants with dementia/not separately analysed
Fernandez-Martinez M, Castro J, Molano A, Zarranz JJ, Rodrigo RM, Ortega R. Prevalence of neuropsychiatric symptoms in Alzheimer's disease and vascular dementia. *Curr Alzheimer Res* 2008;**5**:61–9	Not intervention study
Ferran J, Wilson K, Doran M, Ghadiali E, Johnson F, Cooper P, *et al*. The early onset dementias: a study of clinical characteristics and service use. *Int J Geriatr Psychiatry* 1996;**11**:863–9	Not intervention study
Ferre Jodra A, Capdevila Ordonez M, Garcia Lidon E, Almenar Monforte C. Evaluation of the activity in a mean stay unit of psychogeriatrics. *Revista Espanola de Geriatria y Gerontologia* 2002;**37**:190–7	No participants with dementia/not separately analysed
Ferris SH, Mackell JA, Mohs R, Schneider LS, Galasko D, Whitehouse PJ, *et al*. A multicenter evaluation of new treatment efficacy instruments for Alzheimer's disease clinical trials: overview and general results. *Alzheimer Dis Assoc Disord* 1997;**11**(Suppl. 2):S1–12	No participants with dementia/not separately analysed
Ferris SH, Sathananthan G, Gershon S, Clark C. Senile dementia – treatment with deanol. *J Am Geriatr Soc* 1977;**25**:241–4	Not a psychological, behavioural, sensory or environmental intervention

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Ferris SH, Steinberg G, Shulman E, Kahn R, Reisberg B. Institutionalisation of Alzheimer's disease patients: reducing precipitating factors through family counseling. *Home Health Care Serv Q* 1987;**8**:23–51	No outcome measuring agitation
Filali M, Lalonde R, Rivest S. Cognitive and non-cognitive behaviors in an APPswe/PS1 bigenic model of Alzheimer's disease. *Genes Brain Behav* 2009;**8**:143–8	No participants with dementia/not separately analysed
Finfgeld-Connett D. Management of aggression among demented or brain-injured patients. *Clin Nurs Res* 2009;**18**:272–87	Not primary research
Finkel SI, Lyons J. Nursing home research from investigators' perspective. *Int Psychogeriatr* 1996;**8**(Suppl. 3):371	Not primary research
Finkel SI, Lyons JS, Anderson RL, Sherrell K, Davis J, Cohen-Mansfield J, *et al*. A randomized, placebo-controlled trial of thiothixene in agitated, demented nursing-home patients. *Int J Geriatr Psychiatry* 1995;**10**:129–36	Not a psychological, behavioural, sensory or environmental intervention
Finkel SI, Mintzer JE, Dysken M, Krishnan KRR, Burt T, McRae T. A randomized, placebo-controlled study of the efficacy and safety of sertraline in the treatment of the behavioral manifestations of Alzheimer's disease in outpatients treated with donepezil. *Int J Geriatr Psychiatry* 2004;**19**:9–18	Not a psychological, behavioural, sensory or environmental intervention
Finkel SI. Effects of rivastigmine on behavioral and psychological symptoms of dementia in Alzheimer's disease. *Clin Ther* 2004;**26**:980–90	Not primary research
Finkel SI. Managing the behavioral and psychological signs and symptoms of dementia. *Int Clin Psychopharmacol* 1997;**12**:S25–8	Not primary research
Fischer T, Spahn C, Kovach C. [Targeted management of challenging behavior in persons with dementia: the "Serial Trial Intervention" (STI).] *Pflege Zeitschrift* 2007;**60**:370–3	Not primary research
Fischer-Terworth C, Probst P, Glanzmann PG, Knorr CC. Psychological interventions in dementia: an evaluative review. *Zeitschrift fur Psychiatrie Psychologie und Psychotherapie* 2009;**57**:195–206	Not primary research
Fisher JE, Swingen DN. Contextual factors in the assessment and management of aggression in dementia patients. *Cogn Behav Prac* 1997;**4**:171–90	Not primary research
Fisher R, Blair M, Shedletsky R, Lundell A, Napoliello M, Steinberg S. An open dose finding study of melperone in treatment of agitation and irritability associated with dementia. *Can J Psychiatry* 1983;**28**:193–6	Not a psychological, behavioural, sensory or environmental intervention
Fitten LJ, Ortiz F, Siembieda DW, O'Neill J, Halgren E, Fisher A. Reduction of motoric agitation and restlessness by AF102B and tacrine in the macaque. *J Neuropsychiatry Clin Neurosci* 1999;**11**:79–85	No participants with dementia/not separately analysed
Fitzpatrick AL, Buchanan CK, Nahin RL, DeKosky ST, Atkinson HH, Carlson MC, *et al*. Associations of gait speed and other measures of physical function with cognition in a healthy cohort of elderly persons. *J Gerontol Series A* 2007;**62**:1244–51	No participants with dementia/not separately analysed
Flannery RB, Peterson B, Walker AP. Precipitants of elderly psychiatric patient assaults on staff: preliminary empirical inquiry. *Psychiatr Q* 2005;**76**:167–75	No participants with dementia/not separately analysed
Flannery RBJ. Characteristics of assaultive psychiatric inpatients: updated review of findings, 1995–2000. *Am J Alzheimers Dis Other Demen* 2001;**16**:153–6	No participants with dementia/not separately analysed
Flannery RBJ. Domestic violence and elderly dementia sufferers. *Am J Alzheimers Dis Other Demen* 2003;**18**:21–3	Not primary research
Fleming KC, Evans JM. Pharmacological therapies in dementia. *Mayo Clin Proc* 1995;**70**:1116–23	Not primary research
Fleminger S. Long-term psychiatric disorders after traumatic brain injury. *Eur J Anaesthesiol* 2008;**25**:123–30	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Flint AJ, van Reekum R. The pharmacologic treatment of Alzheimer's disease: a guide for the general psychiatrist. *Can J Psychiatry* 1998;**43**:689–97	Not primary research
Flynn BL, Ranno AE. Pharmacologic management of Alzheimer disease part II: antioxidants, antihypertensives, and ergoloid derivatives. *Ann Pharmacother* 1999;**33**:188–97	Not primary research
Fook VFS, Tay SC, Jayachandran M, Biswas J, Zhang DQ. An ontology-based context model in monitoring and handling agitation behaviour for persons with dementia. Fourth Annual IEEE International Conference on Pervasive Computing and Communications Workshops, Proceedings 2006;560–4	No participants with dementia/not separately analysed
Forbes DA. Review: sparse evidence supports non-pharmacological interventions for preventing wandering in people with dementia. *Evidence-Based Nurs* 2007;**10**:15	Not primary research
Ford GR, Goode KT, Barrett JJ, Harrell LE, Haley WE. Gender roles and caregiving stress: an examination of subjective appraisals of specific primary stressors in Alzheimer's caregivers. *Aging Mental Health* 1997;**1**:158–65	No participants with dementia/not separately analysed
Forlenza OV, Cretaz E, de Oliveira Diniz BS. The use of antipsychotics in patients with dementia. *Revista Brasileira de Psiquiatria* 2008;**30**:265–70	Not primary research
Fossey J, Ballard C, Juszczak E, James I, Aldler N, Jacoby R, *et al*. Effect of enhanced psychosocial care on antipsychotic use in nursing home residents with severe dementia: cluster randomised trial. *BMJ* 2006;**332**:756–8A	No participants with dementia/not separately analysed
Foster HG, Hillbrand M, Chi CC. Efficacy of carbamazepine in assaultive patients with frontal-lobe dysfunction. *Prog Neuro-Psychopharmacol Biol Psychiatry* 1989;**13**:865–74	Not a psychological, behavioural, sensory or environmental intervention
Fountoulakis KN, Tsolaki M, Kazis A. Target symptoms for fluvoxamine in old age depression. *Int J Psychiatry Clin Prac* 2000;**4**:127–34	No participants with dementia/not separately analysed
Franco KN, Messinger-Rapport B. Pharmacological treatment of neuropsychiatric symptoms of dementia: a review of the evidence. *J Am Med Direct Assoc* 2006;**7**:201–2	Not primary research
Frank L, Kleinman L, Ciesla G, Rupnow MFT, Brodaty H. The effect of risperidone on nursing burden associated with caring for patients with dementia. *J Am Geriatr Soc* 2004;**52**:1449–55	No participants with dementia/not separately analysed
Frenchman IB. Risperidone, haloperidol, and olanzapine for the treatment of behavioral disturbances in nursing home patients: a retrospective analysis. *Curr Ther Res* 2000;**61**:742–50	Not a psychological, behavioural, sensory or environmental intervention
Freudenreich O. Drug-induced sialorrhea. *Drugs Today* 2005;**41**:411–8	No participants with dementia/not separately analysed
Freund LY, Basun H, Cederholm T, Faxén IG, Garlind A, Grut M, *et al*. Omega-3 supplementation in mild to moderate Alzheimer's disease: effects on neuropsychiatric symptoms. *Int J Geriatr Psychiatry* 2008;**23**:161–9	Not a psychological, behavioural, sensory or environmental intervention
Freund-Levi Y, Basun H, Cederholm T, Faxén-Irving G, Garlind A, Grut M, *et al*. Omega-3 supplementation in mild to moderate Alzheimer's disease: effects on neuropsychiatric symptoms. *Int J Geriatr Psychiatry* 2008;**23**:161–9	Not a psychological, behavioural, sensory or environmental intervention
Freyne A, Wrigley M. Aggressive incidents towards staff by elderly patients with dementia in a long-stay ward. *Int J Geriatr Psychiatry* 1996;**11**:57–63	No participants with dementia/not separately analysed
Frost RE, Messiha FS. Clinical uses of lithium-salts. *Brain Res Bull* 1983; **11**:219–31	Not a psychological, behavioural, sensory or environmental intervention
Frumin M, Chisholm T, Dickey CC, Daffner KR. Psychiatric and behavioral problems. *Neurol Clin* 1998;**16**:521	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Fuchs-Lacelle S, Hadjistavropoulos T. Development and preliminary validation of the pain assessment checklist for seniors with limited ability to communicate (PACSLAC). *Pain Manag Nurs* 2004;**5**:37–49	Not primary research
Fuentes P, Slachevsky A, Reyes P, Cartier L. Frontotemporal dementia non familial and generalized epilepsy. *Arq Neuropsiquiatr* 2005;**63**:1016–20	Not intervention study
Fuglum E, Schillinger A, Andersen JB, Belstad BE, Jensen D, Muller F, *et al*. Zuclopenthixol and haloperidol levomepromazine in the treatment of elderly patients with symptoms of aggressiveness and agitation – a double-blind, multi-centre study. *Pharmatherapeutica* 1989;**5**:285–91	Not a psychological, behavioural, sensory or environmental intervention
Fuh JL, Lam L, Hirono N, Senanarong V, Cummings JL. Neuropsychiatric Inventory workshop: behavioral and psychologic symptoms of dementia in Asia. *Alzheimer Dis Assoc Disord* 2006;**20**:314–7	No participants with dementia/not separately analysed
Fuh JL. Study of behavioral and psychological symptoms of dementia in Taiwan. *Acta Neurol Taiwan* 2006;**15**:154–60	Not primary research
Fujikawa T, Takahashi T, Kinoshita A, Kajiyama H, Kurata A, Yamashita H, *et al*. Quetiapine treatment for behavioral and psychological symptoms in patients with senile dementia of Alzheimer type. *Neuropsychobiology* 2004;**49**:201–4	Not a psychological, behavioural, sensory or environmental intervention
Fujimoto C, Ito K, Iwasaki S, Nakao K, Sugasawa M. Reversible impairment of auditory callosal pathway in 5-fluorouracil-induced leukoencephalopathy: parallel changes in function and imaging. *Otol Neurotol* 2006;**27**:716–19	No participants with dementia/not separately analysed
Fujita T, Kurihara M, Hasegawa K. Short-term therapeutic prognosis of cognitive impairment with cerebrovascular diseases in chronic stages. *Japan J Geriatr* 1989;**26**:499–506	No participants with dementia/not separately analysed
Futrell M, Melillo KD, Remington R, Schoenfelder DP. Evidence-based guideline. Wandering. *J Gerontol Nurs* 2010;**36**:6–16	Not primary research
Gaber S, Ronzoni S, Bruno A, Biagi A. Sertraline versus small doses of haloperidol in the treatment of agitated behavior in patients with dementia. *Arch Gerontol Geriatr* 2001;159–62	Not a psychological, behavioural, sensory or environmental intervention
Gagnon J, Petit D, Latreille V, Montplaisir J. Neurobiology of sleep disturbances in neurodegenerative disorders. *Curr Pharmaceut Design* 2008;**14**:3430–45	No participants with dementia/not separately analysed
Galasko D. An integrated approach to the management of Alzheimer's disease: assessing cognition, function and behaviour. *Eur J Neurol* 1998;**5**:S9–17	Not primary research
Galinsky T, Feng HA, Streit J, Brightwell W, Pierson K, Parsons K, *et al*. Risk factors associated with patient assaults of home healthcare workers. *Rehabil Nurs* 2010;**35**:206–15	No participants with dementia/not separately analysed
Gallagher D, Coen R, Kilroy D, Belinski K, Bruce I, Coakley D, *et al*. Anxiety and behavioural disturbance as markers of prodromal Alzheimer's disease in patients with mild cognitive impairment. *Int J Geriatr Psychiatry* 2011;**26**:166–72	No participants with dementia/not separately analysed
Gallagher M. Evaluating a protocol to train hospice staff in administering individualized music. *Int J Palliative Nurs* 2011;**17**:195–201	Protocol only
Gallagher-Thompson D, Brooks JO, Bliwise D, Leader J, Yesavage JA. The relations among caregiver stress, sundowning symptoms, and cognitive decline in Alzheimers disease. *J Am Geriatr Soc* 1992;**40**:807–10	Not intervention study
Gallarda T, Olie JP. An update on biological treatment of behavioral and psychological signs and symptoms of dementia. *Encephale Rev Psychiatr Clin Biol Therap* 2000;**26**:72–80	Not primary research
Garcia-Alberca J, Pablo Lara J, Gonzalez-Baron S, Barbancho M, Porta D, Berthier M. Prevalence and comorbidity of neuropsychiatric symptoms in Alzheimer's disease. *Actas Esp Psiquiatr* 2008;**36**:265–70	Not intervention study

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Garcia-Alloza M, Hirst WD, Chen CPLH, Lasheras B, Francis PT, Ramirez MJ. Differential involvement of 5-HT1B/1D and 5-HT6 receptors in cognitive and non-cognitive symptoms in Alzheimer's disease. *Neuropsychopharmacology* 2004;**29**:410–16	No participants with dementia/not separately analysed
Gareri P, Cotroneo A, Lacava R, Seminara G, Marigliano N, Loiacono A, *et al*. Comparison of the efficacy of new and conventional antipsychotic drugs in the treatment of behavioral and psychological symptoms of dementia (BPSD). *Arch Gerontol Geriatr* 2004;207–15	Not a psychological, behavioural, sensory or environmental intervention
Gareri P, Cotroneo A, Marchisio U, Curcio M, De Sarro G. Risperidone in the treatment of behavioral disorders in elderly patients with dementia. *Arch Gerontol Geriatr* 2001;173–82	Not a psychological, behavioural, sensory or environmental intervention
Gareri P, De Fazio P, Cotroneo A, Lacava R, Gallelli L, De Fazio S, *et al*. Anticholinergic drug-induced delirium in an elderly Alzheimer's dementia patient. *Arch Gerontol Geriatr* 2007;**44**:199–206	No participants with dementia/not separately analysed
Gareri P, Lacava R, Cotroneo A, Bambara V, Marigliano N, Castagna A, *et al*. Valproate-induced delirium in a demented patient. *Arch Gerontol Geriatr* 2009;**49**:113–18	Not intervention study
Garre-Olmo J, Lopez-Pousa S, Vilalta-Franch J, Gracia Blanco M, Bulbena Vilarrasa A. Grouping and trajectories of neuropsychiatric symptoms in patients with Alzheimer's disease, part II: two-year patient trajectories. *J Alzheimers Dis* 2010;**22**:1169–80	Not intervention study
Garre-Olmo J, Lopez-Pousa S, Vilalta-Franch J, Gracia Blanco M, Bulbena Vilarrasa A. Grouping and trajectories of the neuropsychiatric symptoms in patients with Alzheimer's disease, part I: symptom clusters. *J Alzheimers Dis* 2010;**22**:1157–67	No participants with dementia/not separately analysed
Garvey DS, Saenz de Tejada I, Earl RA, Khanapure SP, inventors; NitroMed I, assignee. Nitrosated and nitrosylated phosphodiesterase inhibitors, compositions and methods of use. US 6462044. 2002 Oct. 8	No participants with dementia/not separately analysed
Gates DM, Fitzwater E, Meyer U. Violence against caregivers in nursing homes. Expected, tolerated, and accepted. *J Gerontol Nurs* 1999;**25**:12–22	No participants with dementia/not separately analysed
Gatto E, Parisi V, Persi G, Luis Etcheverry J, Martin C. Restless legs: evaluation of sensitivity, specificity of a self-administered survey. *Neurology* 2011;**76**:A585	No participants with dementia/not separately analysed
Gauthier S, Feldman H, Hecker J, Vellas B, Ames D, Subbiah P, *et al*. Efficacy of donepezil on behavioral symptoms in patients with moderate to severe Alzheimer's disease. *Int Psychogeriatr* 2002;**14**:389–404	Not a psychological, behavioural, sensory or environmental intervention
Gauthier S, Juby A, Dalziel W, Rehel B, Schecter R. Effects of rivastigmine on common symptomatology of Alzheimer's disease (EXPLORE). *Curr Med Res Opin* 2010;**26**:1149–60	Not a psychological, behavioural, sensory or environmental intervention
Gauthier S, Juby A, Rehel B, Schecter R. EXACT: rivastigmine improves the high prevalence of attention deficits and mood and behaviour symptoms in Alzheimer's disease. *Int J Clin Prac* 2007;**61**:886–95	Not a psychological, behavioural, sensory or environmental intervention
Gauthier S, Loft H, Cummings J. Improvement in behavioural symptoms in patients with moderate to severe Alzheimer's disease by memantine: a pooled data analysis. *Int J Geriatr Psychiatry* 2008;**23**:537–45	Not a psychological, behavioural, sensory or environmental intervention
Gauthier S, Wirth Y, Mobius HJ. Effects of memantine on behavioural symptoms in Alzheimer's disease patients: an analysis of the Neuropsychiatric Inventory (NPI) data of two randomised, controlled studies. *Int J Geriatr Psychiatry* 2005;**20**:459–64	Not primary research
Geda YE, Roberts RO, Knopman DS, Petersen RC, Christianson TJ, Pankratz VS, *et al*. Prevalence of neuropsychiatric symptoms in mild cognitive impairment and normal cognitive aging – population-based study. *Arch Gen Psychiatry* 2008;**65**:1193–8	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Gedye A. Serotonergic treatment for aggression in a Downs syndrome adult showing signs of Alzheimers disease. *J Mental Defic Res* 1991;**35**:247–58	No participants with dementia/not separately analysed
Gehrman PR, Connor DJ, Martin JL, Shochat T, Corey-Bloom J, Ancoli-Israel S. Melatonin fails to improve sleep or agitation in double-blind randomized placebo-controlled trial of institutionalized patients with Alzheimer disease. *Am J Geriatr Psychiatry* 2009;**17**:166–9	Not a psychological, behavioural, sensory or environmental intervention
Genazzani AR, Spinetti A, Gallo R, Bernardi F. Menopause and the central nervous system: intervention options. *Maturitas* 1999;**31**:103–10	No participants with dementia/not separately analysed
Georgotas A. Affective disorders in the elderly – diagnostic and research considerations. *Age Ageing* 1983;**12**:1–10	No participants with dementia/not separately analysed
Gerdner LA. Individualized music intervention protocol. *J Gerontol Nurs* 1999;**25**:10–16	Protocol only
Gerritsen D, Achterberg W, Steverink N, Pot A, Frijters D, Ribbe M. The MDS challenging behavior profile for long-term care. *Aging Mental Health* 2008;**12**:116–23	No participants with dementia/not separately analysed
Gianni S, Ivarsson Y, De Simone A, Travaglini-Allocatelli C, Brunori M, Vendruscolo M. Structural characterization of a misfolded intermediate populated during the folding process of a PDZ domain. *Nature Struct Mol Biol* 2010;**17**:1431–U57	No participants with dementia/not separately analysed
Giasson BI, Van Deerlin VM. Mutations in LRRK2 as a cause of Parkinson's disease. *Neurosignals* 2008;**16**:99–105	No participants with dementia/not separately analysed
Giehm L, Otzen DE. Strategies to increase the reproducibility of protein fibrillization in plate reader assays. *Anal Biochem* 2010;**400**:270–81	No participants with dementia/not separately analysed
Gilbert AM, Stack GP. 8-aza-bicyclo[3.2.1]octan-3-ol derivatives of 2,3-dihydro-1,4-benzodioxan as 5-HT1A antagonists. *Official Gazette of the United States Patent and Trademark Office Patents* 2003;**1277**(1)	No participants with dementia/not separately analysed
Gilley DW, Bienias JL, Wilson RS, Bennett DA, Beck TL, Evans DA. Influence of behavioral symptoms on rates of institutionalization for persons with Alzheimer's disease. *Psychol Med* 2004;**34**:1129–35	Not intervention study
Gilley DW, Wilson RS, Beckett LA, Evans DA. Psychotic symptoms and physically aggressive behavior in Alzheimer's disease. *J Am Geriatr Soc* 1997;**45**:1074–9	Not intervention study
Gillioz AS, Villars H, Voisin T, Cortes F, Gillette-Guyonnet S, Andrieu S, *et al*. Spared and impaired abilities in community-dwelling patients entering the severe stage of Alzheimer's disease. *Dementia Geriatr Cogn Disord* 2009;**28**:427–32	Not intervention study
Gitlin LN, Corcoran MA. Managing dementia at home: the role of home environmental modifications. *Topics Geriatr Rehabil* 1996;**12**:28–39	No participants with dementia/not separately analysed
Gitlin LN, Hodgson N, Jutkowitz E, Pizzi L. The cost-effectiveness of a nonpharmacologic Intervention for individuals with dementia and family caregivers: the Tailored Activity Program. *Am J Geriatr Psychiatry* 2010; **18**:510–19	No participants with dementia/not separately analysed
Gitlin LN, Winter L, Burke J, Chernett N, Dennis MP, Hauck WW. Tailored activities to manage neuropsychiatric behaviors in persons with dementia and reduce caregiver burden: a randomized pilot study. *Am J Geriatr Psychiatry* 2008;**16**:229–39	No outcome measuring agitation
Gleason RP, Schneider LS. Carbamazepine treatment of agitation in Alzheimers outpatients refractory to neuroleptics. *J Clin Psychiatry* 1990;**51**:115–18	Not a psychological, behavioural, sensory or environmental intervention
Glenn MB. Sudden cardiac death and stroke with the use of antipsychotic medications: implications for clinicians treating individuals with traumatic brain injury. *J Head Trauma Rehabil* 2010;**25**:68–70	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Glick ID, Murray SR, Vasudevan P, Marder SR, Hu RJ. Treatment with atypical antipsychotics: new indications and new populations. *J Psychiatr Res* 2001;**35**:187–91	Not primary research
Glueckauf RL, Ketterson TU, Loomis JS, Dages P. Online support and education for dementia caregivers: overview, utilization, and initial program evaluation. *Telemed J E-Health* 2004;**10**:223–32	No participants with dementia/not separately analysed
Glueckauf RL, Loomis JS. Alzheimer's Caregiver Support Online: lessons learned, initial findings and future directions. *Neurorehabilitation* 2003;**18**:135–46	No participants with dementia/not separately analysed
Gobbi G, Gaudreau PO, Leblanc N. Efficacy of topiramate, valproate, and their combination on aggression/agitation behavior in patients with psychosis. *J Clin Psychopharmacol* 2006;**26**:467–73	No participants with dementia/not separately analysed
Goddaer J, Abraham IL. Effects of relaxing music on agitation during meals among nursing home residents with severe cognitive impairment. *Arch Psychiatr Nurs* 1994;**8**:150–8	No participants with dementia/not separately analysed
Goff DC, Cather C, Freudenreich O, Henderson DC, Evins A, Culhane MA, *et al*. A placebo-controlled study of sildenafil effects on cognition in schizophrenia. *Psychopharmacology* 2009;**202**:411–17	No participants with dementia/not separately analysed
Gohier B, Verny C, Ricalens J, Allain P, Bouneau D, Garre J. Evaluation of depression in Huntington disease: a crossing semiology. *Int J Neuropsychopharmacol* 2004;**7**:S205	No participants with dementia/not separately analysed
Gokalsing E, Robert PH, Lafont V, Medecin I, Baudu C, Boyer P, *et al*. Evaluation of the supervisory system in elderly subjects with and without disinhibition. *Eur Psychiatry* 2000;**15**:407–15	No participants with dementia/not separately analysed
Golini L, Colangeli R, Tranquillo V, Mariscoli M. Association between neurologic and cognitive dysfunction signs in a sample of aging dogs. *J Vet Behav-Clin Applic Res* 2009;**4**:25–30	No participants with dementia/not separately analysed
Goodnick PJ, Barrios CA. Use of olanzapine in non-psychotic psychiatric disorders. *Ex Opin Pharmacother* 2001;**2**:667–80	Not primary research
Gotell E, Brown S, Ekman SL. The influence of caregiver singing and background music on vocally expressed emotions and moods in dementia care: a qualitative analysis. *Int J Nurs Stud* 2009;**46**:422–30	No outcome measuring agitation
Grau-Veciana JM. Treatment of non cognitive symptoms of Alzheimer's disease. *Rev Neurol* 2006;**42**:482–8	Not primary research
Grey KF. Managing agitation and difficult behavior in dementia. *Clin Geriatr Med* 2004;**20**:69	Not primary research
Green BH, Dewey ME, Copeland JRM, Saunders PA, Sharma V, Larkin B, *et al*. Prospective data on the prevalence of abnormal involuntary movements among elderly people living in the community. *Acta Psychiatr Scand* 1993;**87**:418–21	No participants with dementia/not separately analysed
Greenberg SM, Tennis MK, Brown LB, Gomez-Isla T, Hayden DL, Schoenfeld DA, *et al*. Donepezil therapy in clinical practice – a randomized crossover study. *Arch Neurol* 2000;**57**:94–9	Not a psychological, behavioural, sensory or environmental intervention
Greendyke RM, Kanter DR, Schuster DB, Verstreate S, Wootton J. Propranolol treatment of assaultive patients with organic brain disease – a double-blind crossover, placebo-controlled study. *J Nervous Mental Dis* 1986;**174**:290–4	Not a psychological, behavioural, sensory or environmental intervention
Greendyke RM, Kanter DR. Therapeutic effects of pindolol on behavioral disturbances associated with organic brain disease – a double-blind study. *J Clin Psychiatry* 1986;**47**:423–6	Not a psychological, behavioural, sensory or environmental intervention
Gregg TR. Cortical and limbic neural circuits mediating aggressive behavior. *Neurobiol Aggression* 2003;1–20	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Gregory CA, Serra-Mestres J, Hodges JR. Early diagnosis of the frontal variant of frontotemporal dementia: how sensitive are standard neuroimaging and neuropsychologic tests? *Neuropsychiatry Neuropsychol Behav Neurol* 1999;**12**:128–35	No participants with dementia/not separately analysed
Greve M, O'Connor D. A survey of Australian and New Zealand old age psychiatrists' preferred medications to treat behavioral and psychological symptoms of dementia (BPSD). *Int Psychogeriatr* 2005;**17**:195–205	Not intervention study
Grossberg G, Manes F, Allegri R, Gutierrez Robledo LM, Gloger S, Xie L, *et al*. Benefits of extended-release memantine (28 mg, once daily) on caregiver distress: results of a multinational, double-blind, placebo-controlled trial in moderate to severe Alzheimer's disease. *Neurology* 2010;**74**:A271	Not a psychological, behavioural, sensory or environmental intervention
Grossberg GT, Grossberg AL. Treating psychiatric disorders in the nursing home: a focus on Alzheimer's disease. *Bull Menninger Clin* 1999;**63**:A22–30	Not primary research
Grossberg GT, Lake JT. The role of the psychiatrist in Alzheimer's disease. *J Clin Psychiatry* 1998;**59**:3–6	No participants with dementia/not separately analysed
Grossberg GT, Pejovic V, Miller ML, Graham SM. Memantine therapy of behavioral symptoms in community-dwelling patients with moderate to severe Alzheimer's disease. *Dementia Geriatr Cogn Disord* 2009;**27**:164–72	Not primary research
Grossman F. A review of anticonvulsants in treating agitated demented elderly patients. *Pharmacotherapy* 1998;**18**:600–6	Not primary research
Grossman M, Armstrong C, Onishi K, Thompson H, Schaefer B, Robinson K, *et al.* Patterns of cognitive impairment in relapsing-remitting and chronic progressive multiple-sclerosis. *Neuropsychiatry Neuropsychol Behav Neurol* 1994;**7**:194–210	No participants with dementia/not separately analysed
Gruber-Baldini AL, Boustani M, Sloane PD, Zimmerman S. Behavioral symptoms in residential care/assisted living facilities: prevalence, risk factors, and medication management. *J Am Geriatr Soc* 2004;**52**:1610–17	No participants with dementia/not separately analysed
Guay DR. Inappropriate sexual behaviors in cognitively impaired older individuals. *Am J Geriatr Pharmacother* 2008;**6**:269–88	Not primary research
Guay DRP. Drug forecast: memantine, prototype of a new approach to treatment of dementia. *Consult Pharm* 2003;**18**:625–34	Not primary research
Guerin O, Andrieu S, Schneider SM, Cortes F, Cantet C, Gillette-Guyonnet S, *et al.* Characteristics of Alzheimer's disease patients with a rapid weight loss during a six-year follow-up. *Clin Nutr* 2009;**28**:141–6	Not intervention study
Gurevitz SL, Costakis T, Leiter J. Do atypical antipsychotics cause weight gain in nursing home dementia residents? *Consult Pharm* 2004;**19**:809–12	Not a psychological, behavioural, sensory or environmental intervention
Gustafson L. Clinical picture of frontal-lobe degeneration of non-Alzheimer type. *Dementia* 1993;**4**:143–8	Not primary research
Gustafson Y, Lundstrom M, Bucht G, Edlund A. [Delirium in old age can be prevented and treated.] *Tidsskr Nor Lageforen* 2002;**122**:810–14	No participants with dementia/not separately analysed
Guttman R, Altman RD, Nielsen NH. Alzheimer disease – report of the council on scientific affairs. *Arch Fam Med* 1999;**8**:347–53	No participants with dementia/not separately analysed
Gutzmann H, Kuhl KP, Kanowski S, Khan-Boluki J. Measuring the efficacy of psychopharmacological treatment of psychomotoric restlessness in dementia: clinical evaluation of tiapride. *Pharmacopsychiatry* 1997;**30**:6–11	Not a psychological, behavioural, sensory or environmental intervention
Ha TM, Cho DM, Park SW, Joo MJ, Lee BJ, Kong BG, *et al*. Evaluating associations between 5-HTTLPR polymorphism and Alzheimer's disease for Korean patients. *Dementia Geriatr Cogn Disord* 2005;**20**:31–4	Not intervention study

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Haber S. Anatomical relationship between the basal ganglia and the basal nucleus of meynert in human and monkey forebrain. *Proc Natl Acad Sci USA* 1987;**84**:1408–12	No participants with dementia/not separately analysed
Hachinski V. Stroke and vascular cognitive impairment – a transdisciplinary, translational and transactional approach. *Stroke* 2007;**38**:1396–403	No participants with dementia/not separately analysed
Haddad PM, Dursun SM. Neurological complications of psychiatric drugs: clinical features and management. *Hum Psychopharmacol* 2008;**23**:15–26	Not primary research
Hagen BF, Sayers D. When caring leaves bruises: the effects of staff education on resident aggression. *J Gerontol Nurs* 1995;**21**:7–16	No participants with dementia/not separately analysed
Hall GR, Buckwalter KC, Stolley JM, Gerdner LA, Garand L, Ridgeway S, *et al*. Standardized care plan. Managing Alzheimer's patients at home. *J Gerontol Nurs* 1995;**21**:37–47	Not primary research
Hall KA, Keks NA, O'Connor DW. Transdermal estrogen patches for aggressive behavior in male patients with dementia: a randomized, controlled trial. *Int Psychogeriatr* 2005;**17**:165–78	Not a psychological, behavioural, sensory or environmental intervention
Hallberg IR, Norberg A. Strain among nurses and their emotional-reactions during 1 year of systematic clinical supervision combined with the implementation of individualized care in dementia nursing. *J Adv Nurs* 1993;**18**:1860–75	No participants with dementia/not separately analysed
Hamazaki T, Sawazaki S, Itomura M, Asaoka E, Nagao Y, Nishimura N, *et al*. The effect of docosahexaenoic acid on aggression in young adults – a placebo-controlled double-blind study. *J Clin Invest* 1996;**97**:1129–33	No participants with dementia/not separately analysed
Handratta V, Hsu E, Vento J, Yang C, Tanev K. Neuroimaging findings and brain-behavioral correlates in a former boxer with chronic traumatic brain injury. *Neurocase* 2010;**16**:125–34	No participants with dementia/not separately analysed
Happe S. Excessive daytime sleepiness and sleep disturbances in patients with neurological diseases – epidemiology and management. *Drugs* 2003;**63**:2725–37	No participants with dementia/not separately analysed
Harinath M, Rosen J, Marin R. Neuropsychiatric sequelae of cerebrovascular disease. *Neurologist* 1995;**1**:219–31	No participants with dementia/not separately analysed
Harris MK, Shneyder N, Borazanci A, Korniychuk E, Kelley RE, Minagar A. Movement disorders. *Med Clin North Am* 2009;**93**:371	No participants with dementia/not separately analysed
Hart BD, Wells DL. The effects of language used by caregivers on agitation in residents with dementia. *CNS* 1997;**11**:20–3	Not a psychological, behavioural, sensory or environmental intervention
Hart DJ, Craig D, Compton SA, Critchlow S, Kerrigan BM, McIlroy SP, *et al*. A retrospective study of the behavioural and psychological symptoms of mid and late phase Alzheimer's disease. *Int J Geriatr Psychiatry* 2003;**18**:1037–42	Not intervention study
Harwood DG, Kalechstein A, Barker WW, Strauman S, George-Hyslop PS, Iglesias C, *et al*. The effect of alcohol and tobacco consumption, and apolipoprotein E genotype, on the age of onset in Alzheimer's disease. *Int J Geriatr Psychiatry* 2010;**25**:511–18	Not intervention study
Harwood DG, Ownby RL, Barker WW, Duara R. The factor structure of the Cornell Scale for depression in dementia among probable Alzheimer's disease patients. *Am J Geriatr Psychiatry* 1998;**6**:212–20	Not intervention study
Harwood DG, Sultzer DL, Wheatley MV. Impaired insight in Alzheimer disease: association with cognitive deficits, psychiatric symptoms, and behavioral disturbances. *Neuropsychiatry Neuropsychol Behav Neurol* 2000;**13**:83–8	Not intervention study
Harwood DG, Sultzer DL. "Life is not worth living": hopelessness in Alzheimer's disease. *J Geriatr Psychiatry Neurol* 2002;**15**:38–43	Not intervention study
Haspel T. Beta-blockers and the treatment of aggression. *Harvard Rev Psychiatry* 1995;**2**:274–81	Not primary research

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Hastings SN, Thompson-Heisterman A, Farrell SP. Identifying and treating agitated behaviors in the long-term care setting. *Lippincott's Prim Care Prac* 1999;**3**:204–15	Not primary research
Hattori H. [Depression in the elderly.] *Nihon Ronen Igakkai Zasshi* 2008;**45**:451–61	No participants with dementia/not separately analysed
Haupt M, Cruz-Jentoft A, Jeste D. Mortality in elderly dementia patients treated with risperidone. *J Clin Psychopharmacol* 2006;**26**:566–70	Not a psychological, behavioural, sensory or environmental intervention
Haupt M, Kurz A, Greifenhagen A. Depression in Alzheimer's disease – phenomenological features and association with severity and progression of cognitive and functional impairment. *Int J Geriatr Psychiatry* 1995;**10**:469–76	Not intervention study
Haupt M, Kurz A, Janner M. A 2-year follow-up of behavioural and psychological symptoms in Alzheimer's disease. *Dementia Geriatr Cogn Disord* 2000;**11**:147–52	Not intervention study
Haupt M. The course of behavioural symptoms and their psychosocial treatment in dementia sufferers. *Z Gerontol Geriatr* 1999;**32**:159–66	Not primary research
Hausdorff JM, Lertratanakul A, Cudkowicz ME, Peterson AL, Kaliton D, Goldberger AL. Dynamic markers of altered gait rhythm in amyotrophic lateral sclerosis. *J Appl Physiol* 2000;**88**:2045–53	No participants with dementia/not separately analysed
Haveman MJ, Maaskant MA, Lantman HMV, Urlings HFJ, Kessels AGH. Mental-health problems in elderly people with and without Down's syndrome. *J Intellect Disabil Res* 1994;**38**:341–55	No participants with dementia/not separately analysed
Haviv H, Wong DM, Greenblatt HM, Carlier PR, Pang YP, Silman I, *et al*. Crystal packing mediates enantioselective ligand recognition at the peripheral site of acetylcholinesterase. *J Am Chem Soc* 2005;**127**:11029–36	No participants with dementia/not separately analysed
Hayashi Y, Ishida Y, Inoue T, Udagawa M, Takeuchi K, Yoshimuta H, *et al*. Treatment of behavioral and psychological symptoms of Alzheimer-type dementia with Yokukansan in clinical practice. *Prog Neuro-Psychopharmacol Biol Psychiatry* 2010;**34**:541–5	Not a psychological, behavioural, sensory or environmental intervention
Hebert LE, Scherr PA, Beckett LA, Funkenstein HH, Albert MS, Chown MJ, *et al*. Relation of smoking and alcohol consumption to incident Alzheimers-disease. *Am J Epidemiol* 1992;**135**:347–55	No participants with dementia/not separately analysed
Held C. [Management of behavioral disorders in patients with dementia. Significance, diagnosis, non-medicamentous and medicamentous therapy.] *Praxis* 2000;**89**:1376–85	Not primary research
Helmes E, Csapo KG, Short JA. Standardization and validation of the multidimensional observation scale for elderly subjects (Moses). *J Gerontol* 1987;**42**:395–405	No participants with dementia/not separately analysed
Herman RE, Williams KN. Elderspeak's influence on resistiveness to care: focus on behavioral events. *Am J Alzheimers Dis Other Demen* 2009;**24**:417–23	Not intervention study
Hermans D, Hla HU, McShane R. Non-pharmacological interventions for wandering of people with dementia in the domestic setting. *Cochrane Database Syst Rev* 2007;**1**	Not primary research
Hernandez-Vara J. Brain parenchyma sonography in the study of movement disorders. *Rev Neurol* 2010;**50**:486–94	No participants with dementia/not separately analysed
Herrmann F, Grandjean R, Izard I, Giannakopoulos P, Vaucher M. Incidence of behavioral disturbances in geriatric psychiatry. *Med Hyg* 2004;**62**:1433	Not primary research

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Herrmann N, Cappell J, Eryavec GM, Lanctot KL. Changes in nursing burden following memantine for agitation and aggression in long-term care residents with moderate to severe Alzheimer's disease: an open-label pilot study. *CNS Drugs* 2011;**25**:425–33	Not a psychological, behavioural, sensory or environmental intervention
Herrmann N, Gauthier S, Lysy PG. Clinical practice guidelines for severe Alzheimer's disease. *Alzheimers Demen* 2007;**3**:385–97	Not primary research
Herrmann N, Gauthier S. Diagnosis and treatment of dementia: 6. Management of severe Alzheimer disease. *Can Med Assoc J* 2008;**179**:1279–87	No participants with dementia/not separately analysed
Herrmann N, Lanctot KL, Rothenburg LS, Eryavec G. A placebo-controlled trial of valproate for agitation and aggression in Alzheimer's disease. *Dementia Geriatr Cogn Disord* 2007;**23**:116–19	Not a psychological, behavioural, sensory or environmental intervention
Herrmann N, Lanctot KL. From transmitters to treatment: the pharmacotherapy of behavioural disturbances in dementia. *Can J Psychiatry* 1997;**42**:S51–64	Not primary research
Herrmann N, Lanctot KL. Pharmacologic management of neuropsychiatric symptoms of Alzheimer disease. *Can J Psychiatry* 2007;**52**:630–46	No participants with dementia/not separately analysed
Herrmann N, Li A, Lanctot K. Memantine in dementia: a review of the current evidence. *Ex Opin Pharmacother* 2011;**12**:787–800	Not primary research
Herrmann N, Rabheru K, Wang J, Binder C. Galantamine treatment of problematic behavior in Alzheimer disease – post-hoc analysis of pooled data from three large trials. *Am J Geriatr Psychiatry* 2005;**13**:527–34	Not a psychological, behavioural, sensory or environmental intervention
Herrmann N, Rothenburg LS, Black SE, Ryan M, Liu BA, Busto UE, *et al*. Methylphenidate for the treatment of apathy in Alzheimer disease: prediction of response using dextroamphetamine challenge. *J Clin Psychopharmacol* 2008;**28**:296–301	Not a psychological, behavioural, sensory or environmental intervention
Herrmann N. Recommendations for the management of behavioral and psychological symptoms of dementia. *Can J NeurolSci* 2001;**28**:S96–107	Not primary research
Herrmann N. Valproic acid treatment of agitation in dementia. *Can J Psychiatry* 1998;**43**:69–72	Not a psychological, behavioural, sensory or environmental intervention
Herz LR, Volicer L, Ross V, Rheaume Y. Pharmacotherapy of agitation in dementia. *Am J Psychiatry* 1992;**149**:1757–8	Not a psychological, behavioural, sensory or environmental intervention
Hewawasam L. Floor patterns limit wandering of people with Alzheimer's. *Nursing Times* 1996;**92**:41–4	No comparator
Hicks S. Relaxing music at mealtime in nursing homes: effects on agitated patients with dementia. *J Gerontol Nurs* 2005;**31**:26–32	No participants with dementia/not separately analysed
Hilbe J, Schulc E, Linder B, Them C. Development and alarm threshold evaluation of a side rail integrated sensor technology for the prevention of falls. *Int J Med Inform* 2010;**79**:173–80	No participants with dementia/not separately analysed
Hock C, Wettstein A, Giannakopoulos P, Schupbach B, Muller-Spahn F. [Diagnosis and therapy of behavior disorders in dementia.] *Praxis* 2000;**89**:1907–13	Not primary research
Hodgkinson B, Koch S, Nay R, Lewis M. Managing the wandering behaviour of people living in a residential aged care facility. *Int J Evid Based Healthc* 2007;**5**:406–36	Not primary research
Hodgson NA, Andersen S. The clinical efficacy of reflexology in nursing home residents with dementia. *J Alt Complement Med* 2008;**14**:269–75	No outcome measuring agitation
Hoe J, Katona C, Orrell M, Livingston G. Quality of life in dementia: care recipient and caregiver perceptions of quality of life in dementia: the LASER-AD study. *Int J Geriatr Psychiatry* 2007;**22**:1031–6	Not intervention study

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Hoeffer B, Talerico KA, Rasin J, Mitchell C, Stewart BJ, McKenzie D, *et al*. Assisting cognitively impaired nursing home residents with bathing: effects of two bathing interventions on caregiving. *Gerontologist* 2006;**46**:524–32	No participants with dementia/not separately analysed
Hoffman D, Ryan JP. An animal model of Alzheimer's disease implications for spatial disorientation memory loss and wandering behavior. *Soc Neurosci Abstracts* 1991;**17**:1065	No participants with dementia/not separately analysed
Hofmann N. Understanding the neuropsychiatric symptoms of Huntington's disease. *J Neurosci Nurs* 1999;**31**:309–13	No participants with dementia/not separately analysed
Hokkanen L, Rantala L, Remes AM, Harkonen B, Viramo P, Winblad I. Dance/movement therapeutic methods in management of dementia. *J Am Geriatr Soc* 2003;**51**:576–7	No outcome measuring agitation
Holliday-Welsh DM, Gessert CE, Renier CM. Massage in the management of agitation in nursing home residents with cognitive impairment. *Geriatr Nurs* 2009;**30**:108–17	No participants with dementia/not separately analysed
Holm A, Michel M, Stern GA, Hung TM, Klein T, Flaherty L, *et al*. The outcomes of an inpatient treatment program for geriatric patients with dementia and dysfunctional behaviors. *Gerontologist* 1999;**39**:668–76	Not a psychological, behavioural, sensory or environmental intervention
Holmberg SK. A walking program for wanderers: volunteer training and development of an evening Walker's group. *Geriatr Nurs* 1997;**18**:160–5	No outcome measuring agitation
Holmes C, Smith H, Ganderton R, Arranz M, Collier D, Powell J, *et al*. Psychosis and aggression in Alzheimer's disease: the effect of dopamine receptor gene variation. *J Neurol Neurosurg Psychiatry* 2001;**71**:777–9	Not intervention study
Holmes C, Wilkinson D, Dean C, Clare C, El Okl M, Hensford C, *et al*. Risperidone and rivastigmine and agitated behaviour in severe Alzheimer's disease: a randomised double blind placebo controlled study. *Int J Geriatr Psychiatry* 2007;**22**:380–1	Not a psychological, behavioural, sensory or environmental intervention
Holroyd S, Currie LJ, Abraham IL. Aggression in a rural psychogeriatric outreach program. *Int J Geriatr Psychiatry* 1996;**11**:529–33	Not intervention study
Holtzer R, Tang MX, Devanand DP, Albert SM, Wegesin DJ, Marder K, *et al*. Psychopathological features in Alzheimer's disease: course and relationship with cognitive status. *J Am Geriatr Soc* 2003;**51**:953–60	Not intervention study
Homma A, Niina R, Ishii T, Hasegawa K. Behavioral-evaluation of Alzheimer-disease in clinical-trials – development of the Japanese version of the Gbs scale. *Alzheimer Dis Assoc Disord* 1991;**5**:S40–8	No participants with dementia/not separately analysed
Hong GRS, Song JA. Relationship between familiar environment and wandering behaviour among Korean elders with dementia. *J Clin Nurs* 2009;**18**:1365–73	Not intervention study
Hongratanaworakit T, Buchbauer G. Relaxing effect of ylang ylang oil on humans after transdermal absorption. *Phytother Res* 2006;**20**:758–63	No participants with dementia/not separately analysed
Hoogendijk WJ, Meynen G, Feenstra MG, Eikelenboom P, Kamphorst W, Swaab DF. [Increased activity of stress-regulating systems in Alzheimer disease.] *Tijdschr Gerontol Geriatr* 2001;**32**:17–23	No participants with dementia/not separately analysed
Hopman-Rock M, Staats PGM, Tak ECPM, Droes RM. The effects of a Psychomotor Activation Programme for use in groups of cognitively impaired people in homes for the elderly. *Int J Geriatr Psychiatry* 1999;**14**:633–42	No participants with dementia/not separately analysed
Hou JGG, Lai EC. Non-motor symptoms of Parkinson's disease. *Int J Gerontol* 2007;**1**:53–64	No participants with dementia/not separately analysed
Howard R, Ballard C, O'Brien J, Burns A. Guidelines for the management of agitation in dementia. *Int J Geriatr Psychiatry* 2001;**16**:714–17	Not primary research

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Howard RJ, Juszczak E, Ballard CG, Bentham P, Brown RG, Bullock R, *et al*. Donepezil for the treatment of agitation in Alzheimer's disease. *N Engl J Med* 2007;**357**:1382–92	Not a psychological, behavioural, sensory or environmental intervention
Howes K, Schmidt B, Church-Kopish J, Pulukuri S, Frederick J, Sitaramayya A, *et al*. AMD-Like Retinal Degeneration in S100B Transgenic Mice. ARVO Annual Meeting Abstract Search and Program Planner 2002;2812	No participants with dementia/not separately analysed
Hozumi S, Hori H, Okawa M, Hishikawa Y, Sato K. Favorable effect of transcranial electrostimulation on behavior disorders in elderly patients with dementia: a double-blind study. *Int J Neurosci* 1996;**88**:1–10	Not a psychological, behavioural, sensory or environmental intervention
Hsieh CJ, Chang CC, Lin CC. Neuropsychiatric profiles of patients with Alzheimer's disease and vascular dementia in Taiwan. *Int J Geriatr Psychiatry* 2009;**24**:570–7	Not intervention study
Huang HL, Shyu YIL, Chen ST, Hsu WC. Caregiver self-efficacy for managing behavioural problems of older people with dementia in Taiwan correlates with care receivers' behavioural problems. *J Clin Nurs* 2009;**18**:2588–95	Not intervention study
Huang L, Abuhamdah S, Howes MJ, Elliot MS, Ballard C, Holmes C, *et al*. Pharmacological profile of essential oils derived from Lavandula angustifolia and Melissa officinalis with anti-agitation properties: focus on ligand-gated channels. *J Pharm Pharmacol* 2008;**60**:1515–22	No participants with dementia/not separately analysed
Huang ZW, Gabriel JM, Baldwin MA, Fletterick RJ, Prusiner SB, Cohen FE. Proposed 3-dimensional structure for the cellular prion protein. *Proc Natl Acad Sci USA* 1994;**91**:7139–43	No participants with dementia/not separately analysed
Huber CG, Lambert M, Naber D, Schacht A, Hundemer HP, Wagner TT, *et al*. Validation of a Clinical Global Impression Scale for Aggression (CGI-A) in a sample of 558 psychiatric patients. *Schizophrenia Res* 2008;**100**:342–8	No participants with dementia/not separately analysed
Huell M, Voigt-Radloff S. Nonmedical treatment of dementia. *Nervenarzt* 2008;**79**:159–64	Not primary research
Huertas D, Alino JJ, Molina JD, Chamorro L, Balanza J, Jimenez MP, *et al*. Antiaggressive effect of cyproterone versus haloperidol in Alzheimer's disease: a randomized double-blind pilot study. *J Clin Psychiatry* 2007;**68**:439–44	Not a psychological, behavioural, sensory or environmental intervention
Hughes TL, Medina-Walpole AM. Implementation of an interdisciplinary behavior management program. *J Am Geriatr Soc* 2000;**48**:581–7	Multidisciplinary team input including pharmacological intervention
Hurt C, Bhattacharyya S, Burns A, Camus V, Liperoti R, Marriott A, *et al*. Patient and caregiver perspectives of quality of life in dementia – an investigation of the relationship to behavioural and psychological symptoms in dementia. *Dementia Geriatr Cogn Disord* 2008;**26**:138–46	Not intervention study
Husebo BS, Ballard C, Sandvik R, Nilsen OB, Aarsland D. Efficacy of treating pain to reduce behavioural disturbances in residents of nursing homes with dementia: cluster randomised clinical trial. *BMJ* 2011;**343**	Not a psychological, behavioural, sensory or environmental intervention
Hwang JP, Tsai SJ, Yang CH, Liu KM, Lirng JF. Persecutory delusions in dementia. *J Clin Psychiatry* 1999;**60**:550–3	Not intervention study
Iijima S. Prevention and treatment of dementia what should we do today? *Japan J Geriatr* 1991;**28**:465–9	Not intervention study
Ikeda K, Akiyama H, Arai T, Matsushita M, Tsuchiya K, Miyazaki H. Clinical aspects of argyrophilic grain disease. *Clin Neuropathol* 2000;**19**:278–84	Not intervention study
Nelson JC, Tune LE, Daiello LA, Porsteinsson A. Interactive grand rounds: mood stabilizers in dementia. *Geriatrics* 2002;**57**:A2–5	Not a psychological, behavioural, sensory or environmental intervention
Iqbal MM, Rahman A, Husain Z, Mahmud SZ, Ryan WG, Feldman JM. Clozapine: a clinical review of adverse effects and management. *Ann Clin Psychiatry* 2003;**15**:33–48	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Irvine A, Bourgeois M, Billow M, Seeley JR. Internet training for nurse aides to prevent resident aggression. *J Am Med Direct Assoc* 2007;**8**:519–26	No participants with dementia/not separately analysed
Ishii S, Streim JE, Saliba D. Potentially reversible resident factors associated with rejection of care behaviors. *J Am Geriatr Soc* 2010;**58**:1693–700	No participants with dementia/not separately analysed
Ismail M, Dagerman K, Tariot PN, Abbott S, Kavanagh S, Schneider LS. National Institute of Mental Health clinical antipsychotic trials of intervention effectiveness- Alzheimer's disease (CATIE-AD): baseline characteristics. *Curr Alzheimer Res* 2007;**4**:325–35	Not intervention study
Ismail MS, Schneider LS, Tariot P, Dagerman KS, Davis S. NIMH comparative effectiveness of antipsychotic medications in patients with Alzheimer's disease (CATIE-AD): clinical course. *Neurobiol Aging* 2004;**25**:S188	Not a psychological, behavioural, sensory or environmental intervention
Issa AM, Keyserlingk EW. Current and future clinical trials for Alzheimer's disease: evolving ethical concerns. *Prog Neuro-Psychopharmacol Biol Psychiatry* 2000;**24**:1229–49	Not primary research
Jackson CW, Pitner JK, Mintzer JE. Zolpidem for the treatment of agitation in elderly demented patients. *J Clin Psychiatry* 1996;**57**:372–3	Not a psychological, behavioural, sensory or environmental intervention
Jacobs HE, Lynch M, Cornick J, Slifer K. Behavior management of aggressive sequela after Reyes syndrome. *Arch Phys Med Rehabil* 1986;**67**:558–63	No participants with dementia/not separately analysed
Jacquy J. [Treatment of Alzheimer's disease: the current situation?] *Revue Med Brux* 2010;**31**:357–62	Not primary research
Jagmin MG. Postoperative mental status in elderly hip surgery patients. *Orthopaedic Nurs* 1998;**17**:32–42	No participants with dementia/not separately analysed
Jahangir A, Shen WK, Neubauer SA, Ballard DJ, Hammill SC, Hodge DO, *et al*. Relation between mode of pacing and long-term survival in the very elderly. *J Am Coll Cardiol* 1999;**33**:1208–16	No participants with dementia/not separately analysed
Jahnel M. [The case of a 86-years old woman first diagnosed with Huntington's disease.] *Psychiatr Prax* 2004;**31**:S134–6	No participants with dementia/not separately analysed
James IA. Stuff and nonsense in the treatment of older people: essential reading for the over-45s. *Behav Cogn Psychother* 2008;**36**:735–47	No participants with dementia/not separately analysed
Jankovic J. Treatment of hyperkinetic movement-disorders with tetrabenazine – a double-blind crossover study. *Ann Neurol* 1982;**11**:41–7	No participants with dementia/not separately analysed
Jarrott SE, Kwack HR, Relf D. An observational assessment of a dementia-specific horticultural therapy program. *Horttechnology* 2002; **12**:403–10	No outcome measuring agitation
Jarzebska E. [Stroke patients' apathy.] *Pol Merkur Lekarski* 2007;**22**:280–2	No participants with dementia/not separately analysed
Javadpour A, Ahmadzadeh L, Bahredar MJ. An educative support group for female family caregivers: impact on caregivers' psychological distress and patient's neuropsychiatry symptoms. *Int J Geriatr Psychiatry* 2009;**24**:469–71	No outcome measuring agitation
Jehel L, Paterniti S, Brunet A, Louville P, Guelfi J. Peritraumatic distress prospectively predicts PTDS symptoms in assault victims. *Encephale Rev Psychiatr Clin Biol Therap* 2006;**32**:953–6	No participants with dementia/not separately analysed
Jentoft AJC. Older patients agitation treatment. *Rev Clin Esp* 2003;**203**:346–8	Not primary research
Jessen F, Kaduszkiewicz H, Daerr M, Bickel H, Pentzek M, Riedel-Heller S, *et al*. Anticholinergic drug use and risk for dementia: target for dementia prevention. *Eur Arch Psychiatry Clin Neuroscie* 2010;**260**:S111–15	Not intervention study
Jeste DV, Blazer D, Casey D, Meeks T, Salzman C, Schneider L, *et al*. ACNP white paper: update on use of antipsychotic drugs in elderly persons with dementia. *Neuropsychopharmacology* 2008;**33**:957–70	Not primary research

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Johnson JC. Delirium in the elderly. *Emerg Med Clin North Am* 1990;**8**:255–66	No participants with dementia/not separately analysed
Johnston JE. Sleep problems in the elderly. *J Am Acad Nurse Pract* 1994;**6**:161–6	No participants with dementia/not separately analysed
Jones R. A review comparing the safety and tolerability of memantine with the acetylcholinesterase inhibitors. *Int J Geriatr Psychiatry* 2010;**25**:547–53	Not primary research
Josephs KA, Whitwell JL, Weigand SD, Senjem ML, Boeve BF, Knopman DS, *et al*. Predicting functional decline in behavioural variant frontotemporal dementia. *Brain* 2011;**134**:432–48	Not intervention study
Jost BC, Grossberg GT. The evolution of psychiatric symptoms in Alzheimer's disease: a natural history study. *J Am Geriatr Soc* 1996;**44**:1078–81	Not intervention study
Juszczak LJ. Comparative vibrational spectroscopy of intracellular tau and extracellular collagen I reveals parallels of gelation and fibrillar structure. *J Biol Chem* 2004;**279**:7395–404	No participants with dementia/not separately analysed
Kalapatapu RK, Schimming C. Update on neuropsychiatric symptoms of dementia: antipsychotic use. *Geriatrics* 2009;**64**:10–18	Not primary research
Kalayam B, Alexopoulos GS. Prefrontal dysfunction and treatment response in geriatric depression. *Arch Gen Psychiatry* 1999;**56**:713–18	No participants with dementia/not separately analysed
Kalman J, Kalman S, Pakaski M. [Recognition and treatment of behavioral and psychological symptoms of dementias: lessons from the CATIE-AD study.] *Neuropsychopharmacol Hung* 2008;**10**:233–49	Not primary research
Kamboj SK, Curran HV. Scopolamine induces impairments in the recognition of human facial expressions of anger and disgust. *Psychopharmacology* 2006;**185**:529–35	No participants with dementia/not separately analysed
Kamei J, Miyata S, Ohsawa M. Involvement of the benzodiazepine system in the anxiolytic-like effect of Yokukansan (Yi-gan San). *Prog Neuro-Psychopharmacol Biol Psychiatry* 2009;**33**:1431–7	No participants with dementia/not separately analysed
Kamei S, Oishi M, Takasu T. Evaluation of fasudil hydrochloride treatment for wandering symptoms in cerebrovascular dementia with P-31-magnetic resonance spectroscopy and Xe-computed tomography. *Clin Neuropharmacol* 1996;**19**:428–38	Not a psychological, behavioural, sensory or environmental intervention
Kanno H, Sekiguchi K, Yamaguchi T, Terawaki K, Yuzurihara M, Kase Y, *et al*. Effect of yokukansan, a traditional Japanese medicine, on social and aggressive behaviour of para-chloroamphetamine-injected rats. *J Pharm Pharmacol* 2009;**61**:1249–56	No participants with dementia/not separately analysed
Kant R, Bogyi AM, Carosella NW, Fishman E, Kane V, Coffey CE. ECT as a therapeutic option in severe brain injury. *Convuls Ther* 1995;**11**:45–50	No participants with dementia/not separately analysed
Karki SD. Evaluation of the cost impact of different atypical antipsychotics in management of agitation in residents with dementia in New York State nursing homes. *J Am Geriatr Soc* 2003;**51**:S103	No participants with dementia/not separately analysed
Karlsson I. Pharmacologic treatment of noncognitive symptoms of dementia. *Acta Neurologica Scand* 1996;**93**:101–4	Not primary research
Karp BPI, Juliano DM, Berman KF, Weinberger DR. Neurological outcome of patients with dorsolateral prefrontal leukotomy. *J Neuropsychiatry Clin Neurosci* 1992;**4**:415–21	No participants with dementia/not separately analysed
Kasckow JW, McElroy SL, Cameron RL, Mahler LL, Fudala SJ. A pilot study on the use of divalproex sodium in the treatment of behavioral agitation in elderly patients with dementia: assessment with the BEHAVE-AD and CGI rating scales. *Curr Ther Res* 1997;**58**:981–9	Not a psychological, behavioural, sensory or environmental intervention

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Kasckow JW, Mulchahey JJ, Mohamed S. The use of novel antipsychotics in the older patient with neurodegenerative disorders in the long-term care setting. *J Am Med Direct Assoc* 2004;**5**:242–8	Not primary research
Katona C, Livingston G, Manela M, Leek C, Mullan E, Orrell M, *et al*. The symptomatology of depression in the elderly. *Int Clin Psychopharmacol* 1997;**12**:S19–23	No participants with dementia/not separately analysed
Katz I, De Deyn PP, Mintzer J, Greenspan A, Zhu Y, Brodaty H. The efficacy and safety of risperidone in the treatment of psychosis of Alzheimer's disease and mixed dementia: a meta-analysis of 4 placebo-controlled clinical trials. *Int J Geriatr Psychiatry* 2007;**22**:475–84	Not primary research
Katz IR, Jeste DV, Mintzer JE, Clyde C, Napolitano J, Brecher M. Comparison of risperidone and placebo for psychosis and behavioral disturbances associated with dementia: a randomized, double-blind trial. *J Clin Psychiatry* 1999;**60**:107	Not a psychological, behavioural, sensory or environmental intervention
Katz IR, Rupnow M, Kozma C, Schneider L. Risperidone and falls in ambulatory nursing home residents with dementia and psychosis or agitation – secondary analysis of a double-blind, placebo-controlled mal. *Am J Geriatr Psychiatry* 2004;**12**:499–508	Not primary research
Kaufer A. Treatment of neuropsychiatric symptoms in Alzheimer's disease. *Rev Neurol* 2002;**35**:846	Not primary research
Kaufer D. Beyond the cholinergic hypothesis: The effect of metrifonate and other cholinesterase inhibitors on neuropsychiatric symptoms in Alzheimer's disease. *Dementia Geriatr Cogn Disord* 1998;**9**:8–14	Not a psychological, behavioural, sensory or environmental intervention
Kaufer DI, Cummings JL, Christine D. Effect of tacrine on behavioral symptoms in Alzheimer's disease: an open-label study. *J Geriatr Psychiatry Neurol* 1996;**9**:1–6	Not a psychological, behavioural, sensory or environmental intervention
Keady J, Jones L. Investigating the causes of behaviours that challenge in people with dementia. *Nurs Older People* 2010;**22**:25–9	Not primary research
Keatinge D, Scarfe C, Bellchambers H, McGee J, Oakham R, Probert C, *et al*. The manifestation and nursing management of agitation in institutionalised residents with dementia. *Int J Nurs Prac* 2000;**6**:16–25	Not intervention study
Keller HH, Gibbs AJ, Boudreau LD, Goy RE, Pattillo MS, Brown HM. Prevention of weight loss in dementia with comprehensive nutritional treatment. *J Am Geriatr Soc* 2003;**51**:945–52	No outcome measuring agitation
Keller HH, Gibbs-Ward A, Randall-Simpson A, Bocock MA, Dimou E. Meal rounds: an essential aspect of quality nutrition services in long-term care. *J Am Med Direct Assoc* 2006;**7**:40–5	Not primary research
Kellison IL, Kirsch-Darrow L, Fernandez H, Okun MS, Bowers D. Apathy in non-demented Parkinson disease: relationship to executive dysfunction? *Neurology* 2007;**68**:A20	No participants with dementia/not separately analysed
Kennedy DO, Scholey AB. The psychopharmacology of European herbs with cognition-enhancing properties. *Curr Pharm Design* 2006;**12**:4613–23	Not primary research
Kennedy J, Deberdt W, Siegal A, Micca J, Degenhardt E, Ahl J, *et al*. Olanzapine does not enhance cognition in non-agitated and non-psychotic patients with mild to moderate Alzheimer's dementia. *Int J Geriatr Psychiatry* 2005;**20**:1020–7	Not a psychological, behavioural, sensory or environmental intervention
Kennedy JS, Bymaster FP, Schuh L, Calligaro DO, Nomikos G, Felder CC, *et al*. A current review of olanzapine's safety in the geriatric patient: from pre-clinical pharmacology to clinical data. *Int J Geriatr Psychiatry* 2001;**16**:S33–61	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Kennedy JS, Zagar A, Bymaster F, Nomikos G, Trzepacz PT, Gilmore JA, *et al*. The central cholinergic system profile of olanzapine compared with placebo in Alzheimer's disease. *Int J Geriatr Psychiatry* 2001;**16**:S24–32	Not a psychological, behavioural, sensory or environmental intervention
Khachaturian ZS. A chapter in the development of Alzheimer's disease research: a case study of public policies on the development & funding of research program. *Alzheimers Demen* 2007;**3**:243–58	No participants with dementia/not separately analysed
Kheterpal I, Williams A, Murphy C, Bledsoe B, Wetzel R. Structural features of the A beta amyloid fibril elucidated by limited proteolysis. *Biochemistry* 2001;**40**:11757–67	No participants with dementia/not separately analysed
Kidd PM. Omega-3 DHA and EPA for cognition, behavior, and mood: clinical findings and structural-functional synergies with cell membrane phospholipids. *Alt Med Rev* 2007;**12**:207–27	No participants with dementia/not separately analysed
Kiely DK, Morris JN, Algase DL. Resident characteristics associated with wandering in nursing homes. *Int J Geriatr Psychiatry* 2000;**15**:1013–20	Not intervention study
Kim H, Whall AL. Factors associated with psychotropic drug usage among nursing home residents with dementia. *Nurs Res* 2006;**55**:252–8	Not intervention study
Kim Y, Wilkins KM, Tampi RR. Use of gabapentin in the treatment of behavioural and psychological symptoms of dementia – A review of the evidence. *Drugs Aging* 2008;**25**:187–96	Not primary research
Kindermann SS, Dolder CR, Bailey A, Katz IR, Jeste DV. Pharmacological treatment of psychosis and agitation in elderly patients with dementia – four decades of experience. *Drugs Aging* 2002;**19**:257–76	Not primary research
King T, Mallet L. Brachial-plexus palsy with the use of haloperidol and a geriatric chair. *DICP Ann Pharmacother* 1991;**25**:1072–4	Not intervention study
King-Kallimanis B, Schonfeld L, Molinari VA, Algase D, Brown LM, Kearns WD, *et al*. Longitudinal investigation of wandering behavior in department of veterans affairs nursing home care units. *Int J Geriatr Psychiatry* 2010; **25**:166–74	Not intervention study
Kinon BJ, Stauffer VL, McGuire HC, Kaiser CJ, Dickson RA, Kennedy JS. The effects of antipsychotic drug treatment on prolactin concentrations in elderly patients. *J Am Med Direct Assoc* 2003;**4**:189–94	Not a psychological, behavioural, sensory or environmental intervention
Kinoshita T, Hanabusa H. Issues facing home-based medical support services. *Psychogeriatrics* 2010;**10**:90–4	Not a psychological, behavioural, sensory or environmental intervention
Kirbach S, Simpson K, Nietert PJ, Mintzer J. A Markov model of the cost effectiveness of olanzapine treatment for agitation and psychosis in Alzheimer's disease. *Clin Drug Invest* 2008;**28**:291–303	Not primary research
Kirkwood SC, Siemers E, Viken R, Hodes ME, Conneally PM, Christian JC, *et al*. Longitudinal personality changes as measured by the MMPI in presymptomatic HD gene carriers. *Am J Hum Genet* 2000;**67**:138	No participants with dementia/not separately analysed
Kirkwood SC, Siemers E, Viken R, Hodes ME, Conneally PM, Christian JC, *et al*. Longitudinal personality changes among presymptomatic Huntington disease gene carriers. *Neuropsychiatry Neuropsychol Behav Neurol* 2002;**15**:192–7	No participants with dementia/not separately analysed
Kittur SD, Ruskin P. Environmental modification for treatment of agitation in Alzheimer's patients. *Neurorehabilitation* 1999;**12**:211–14	No comparator
Kleijer B, van Marum R, Egberts A, Jansen P, Frijters D, Heerdink E, *et al*. The course of behavioral problems in elderly nursing home patients with dementia when treated with antipsychotics. *Int Psychogeriatr* 2009;**21**:931–40	Not intervention study
Klein DA, Steinberg M, Galik E, Steele C, Sheppard JM, Warren A, *et al*. Wandering behaviour in community-residing persons with dementia. *Int J Geriatr Psychiatry* 1999;**14**:272–9	Not intervention study

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Kleinman L, Frank L, Ciesla G, Rupnow M, Brodaty H. Psychometric performance of an assessment scale for strain in nursing care: the M-NCAS. *Health Qual Life Outcomes* 2004;**2**:62	No participants with dementia/not separately analysed
Klosterkötter J, Ebel H, Schultzeö-Lutter F, Steinmeyer EM. Diagnostic validity of basic symptoms. *Eur Arch Psychiatry Clin Neurosci* 1996;**246**:147–54	No participants with dementia/not separately analysed
Kluger A, Ferris SH. Scales for the assessment of Alzheimer's disease. *Psychiatric Clin North Am* 1991;**14**:309–26	No participants with dementia/not separately analysed
Knecht S, Wersching H, Lohmann H, Berger K, Ringelstein EB. How much does hypertension affect cognition? Explained variance in cross-sectional analysis of non-demented community-dwelling individuals in the SEARCH study. *J Neurol Sci* 2009;**283**:149–52	No participants with dementia/not separately analysed
Knopman DS, Morris JC. An update on primary drug therapies for Alzheimer disease. *Arch Neurol* 1997;**54**:1406–9	Not primary research
Knorr U, Vinberg M, Klose M, Feldt-Rasmussen U, Hilsted L, Gade A, *et al.* Rationale and design of the participant, investigator, observer, and data-analyst-blinded randomized AGENDA trial on associations between gene-polymorphisms, endophenotypes for depression and antidepressive intervention: the effect of escitalopram versus placebo on the combined dexamethasone-corticotrophine releasing hormone test and other potential endophenotypes in healthy first-degree relatives of persons with depression. *Trials* 2009;**10**:66	No participants with dementia/not separately analysed
Kobayashi DT, Chen KS. Behavioral phenotypes of amyloid-based genetically modified mouse models of Alzheimer's disease. *Genes Brain Behav* 2005;**4**:173–96	No participants with dementia/not separately analysed
Koga H, Yuzuriha T, Yao H, Endo K, Hiejima S, Takashima Y, *et al*. Quantitative MRI findings and cognitive impairment among community dwelling elderly subjects. *J Neurol Neurosurg Psychiatry* 2002;**72**:737–41	No participants with dementia/not separately analysed
Kogoj A, Darovec J, Velikonja I, Kocmur M, Denislic M, Mursec M, *et al*. Regulatory issues concerning behavioural and psychological symptoms of dementia in Slovenia: guidelines. *Eur J Psychiatry* 2004;**18**:171–80	Not primary research
Kohler CG, Pickholtz J, Ballas C. Neurosyphilis presenting as schizophrenialike psychosis. *Neuropsychiatry Neuropsychol Behav Neurol* 2000;**13**:297–302	No participants with dementia/not separately analysed
Kolanowski A, Litaker M. Social interaction, premorbid personality, and agitation in nursing home residents with dementia. *Arch Psychiatr Nurs* 2006;**20**:12–20	Not intervention study
Kolcaba K, Miller CA. Geropharmacology treatment: behavioral problems extend nursing responsibility. *J Gerontol Nurs* 1989;**15**:29–35	Not primary research
Koller D, Eisele M, Kaduszkiewicz H, Schoen G, Steinmann S, Wiese B, *et al*. Ambulatory health services utilization in patients with dementia – is there an urban–rural difference? *Int J Health Geo* 2010;**9**:1–8	Not intervention study
Kong EH, Evans LK, Guevara JP. Nonpharmacological intervention for agitation in dementia: a systematic review and meta-analysis. *Aging Mental Health* 2009;**13**:512–20	Not primary research
Kontsevoy VA, Andrusenko MP, Medvedev AV, Safarova TP. Application of clopixole in therapy of aged mental patients. *Zhurnal Nevropatologii I Psikhiatrii Imeni S S Korsakova* 2000;**100**:29–34	Not intervention study
Koopmans RT, van der Molen M, Raats M, Ettema TP. Neuropsychiatric symptoms and quality of life in patients in the final phase of dementia. *Int J Geriatr Psychiatry* 2009;**24**:25–32	Not intervention study
Kopecky HJ, Yudofsky SC. Agitation: Conceptualization, measurement, and treatment. *Bull Menninger Clin* 1999;**63**:A31–5	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Kopetz S, Steele CD, Brandt J, Baker A, Kronberg M, Galik E, *et al*. Characteristics and outcomes of dementia residents in an assisted living facility. *Int J Geriatr Psychiatry* 2000;**15**:586–93	Not intervention study
Kotlercope S, Camp CJ. Anosognosia in Alzheimer-disease. *Alzheimer Dis Assoc Disord* 1995;**9**:52–6	Not intervention study
Kovach CR, Logan BR, Simpson MR, Reynolds S. Factors associated with time to identify physical problems of nursing home residents with dementia. *Am J Alzheimers Dis Other Demen* 2010;**25**:317–23	Not intervention study
Kovach CR, Schlidt AM. The agitation-activity interface of people with dementia in long-term care. *Am J Alzheimers Dis Other Demen* 2001;**16**:240–6	Not intervention study
Kovach CR. Sensoristasis and imbalance in persons with dementia. *J Nurs Scholarship* 2000;**32**:379–84	No participants with dementia/not separately analysed
Krasucki C, Howard R, Mann A. The relationship between anxiety disorders and age. *Int J Geriatr Psychiatry* 1998;**13**:79–99	No participants with dementia/not separately analysed
Kreutzer JS, Marwitz JH, Witol AD. Interrelationships between crime, substance-abuse, and aggressive behaviors among persons with traumatic brain injury. *Brain Inj* 1995;**9**:757–68	No participants with dementia/not separately analysed
Krishnan S, Cairns R, Howard R. Cannabinoids for the treatment of dementia. *Cochrane Database Syst Rev* 2009;**2**:CD007204	Not primary research
Kruger G, Haubitz I. Classification of organic brain syndromes by cluster-analysis. *Archiv Psychiatr Nervenkrankheiten* 1980;**228**:299–315	No participants with dementia/not separately analysed
Kukoc M. Confessions and the post-communist conflict of civilizations. *Drustvena Istrazivanja* 1995;**4**:937–49	No participants with dementia/not separately analysed
Kulisevsky J, Litvan I, Berthier ML, Pascual-Sedano B, Paulsen JS, Cummings JL. Neuropsychiatric assessment of Gilles de la Tourette patients: comparative study with other hyperkinetic and hypokinetic movement disorders. *Move Disord* 2001;**16**:1098–104	No participants with dementia/not separately analysed
Kulkarni J, de Castella A, Headey B, Marston N, Sinclair K, Lee S, *et al*. Estrogens and men with schizophrenia: is there a case for adjunctive therapy? *Schizophrenia Res* 2011;**125**:278–83	No participants with dementia/not separately analysed
Kumar V, Durai NB, Jobe T. Pharmacologic management of Alzheimer's disease. *Clin Geriatr Med* 1998;**14**:129	Not primary research
Kunik M. Preventing development of aggression in dementia: epidemiological intervention development. *Gerontologist* 2010;**50**:199–200	Not intervention study
Kunik ME, Cully JA, Snow AL, Souchek J, Sullivan G, Ashton CM. Treatable comorbid conditions and use of VA health care services among patients with dementia. *Psychiatr Serv* 2005;**56**:70–5	Not intervention study
Kunik ME, Ponce H, Molinari V, Orengo C, Emenaha I, Workman R. The benefits of psychiatric hospitalization for older nursing home residents. *J Am Geriatr Soc* 1996;**44**:1062–5	No participants with dementia/not separately analysed
Kunik ME, Snow A, Davila JA, Steele AB, Balasubramanyam V, Doody RS, *et al*. Causes of aggressive behavior in patients with dementia. *J Clin Psychiatry* 2010;**71**:1145–52	Not intervention study
Kunik ME, Walgama JP, Snow A, Davila JA, Schulz PE, Steele AB, *et al*. Documentation, assessment, and treatment of aggression in patients with newly diagnosed dementia. *Alzheimer Dis Assoc Disord* 2007;**21**:115–21	Not intervention study
Kurita A, Katayama K, Morita M, Kurita M, Inoue K. [Relationship between cognitive deficits, behavioral disturbances and falls in patients with dementia.] *Nihon Ronen Igakkai zasshi* 1997;**34**:662–7	Not intervention study

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Kurlan R, Cummings J, Raman R, Thal L. Quetiapine for agitation or psychosis in patients with dementia and parkinsonism. *Neurology* 2007;**68**:1356–63	Not a psychological, behavioural, sensory or environmental intervention
Kurz A, Schwalen S, Schmitt A. Effects of risperidone on behavioral and psychological symptoms associated with dementia in clinical practice. *Int Psychogeriatr* 2005;**17**:605–16	Not a psychological, behavioural, sensory or environmental intervention
Kurz AF, Erkinjuntti T, Small GW, Lilienfeld S, Damaraju CRV. Long-term safety and cognitive effects of galantamine in the treatment of probable vascular dementia or Alzheimer's disease with cerebrovascular disease. *Eur J Neurol* 2003;**10**:633–40	Not a psychological, behavioural, sensory or environmental intervention
Kushnir SL. Pimozide in the management of psychotically agitated demented patients. *J Am Geriatr Soc* 1987;**35**:457–9	Not a psychological, behavioural, sensory or environmental intervention
Kutner NG, Brown PJ, Stavisky RC, Clark WS, Green RC. "Friendship" interactions and expression of agitation among residents of a dementia care unit – six-month observational data. *Res Aging* 2000;**22**:188–205	Not intervention study
Kverno KS, Black BS, Blass DM, Geiger-Brown J, Rabins PV. Neuropsychiatric symptom patterns in hospice-eligible nursing home residents with advanced dementia. *J Am Med Direct Assoc* 2008;**9**:509–15	Not intervention study
Kwok H, Cheung PW. Co-morbidity of psychiatric disorder and medical illness in people with intellectual disabilities. *Curr Opin Psychiatry* 2007;**20**:443–9	No participants with dementia/not separately analysed
Kyomen HH, Hennen J, Gottlieb GL, Wei JY. Estrogen therapy and noncognitive psychiatric signs and symptoms in elderly patients with dementia. *Am J Psychiatry* 2002;**159**:1225–7	Not a psychological, behavioural, sensory or environmental intervention
Kyomen HH, Satlin A, Hennen J, Wei JY. Estrogen therapy and aggressive behavior in elderly patients with moderate-to-severe dementia – results from a short-term, randomized, double-blind trial. *Am J Geriatr Psychiatry* 1999;**7**:339–48	Not a psychological, behavioural, sensory or environmental intervention
Lacasse H, Perreault MM, Williamson DR. Systematic review of antipsychotics for the treatment of hospital-associated delirium in medically or surgically ill patients. *Ann Pharmacother* 2006;**40**:1966–73	No participants with dementia/not separately analysed
Lackner TE, Wyman JF, McCarthy TC, Monigold M, Davey C. Randomized, placebo-controlled trial of the cognitive effect, safety, and tolerability of oral extended-release oxybutynin in cognitively impaired nursing home residents with urge urinary incontinence. *J Am Geriatr Soc* 2008;**56**:862–70	Not a psychological, behavioural, sensory or environmental intervention
Lagerstrom M, Magnusson D. Behavior at 10-years and 13-years of age for children with low-birth-weight. *Perceptual Motor Skills* 1990;**71**:579–94	No participants with dementia/not separately analysed
Lagomasino I, Daly R, Stoudemire A. Medical assessment of patients presenting with psychiatric symptoms in the emergency setting. *Psychiatr Clin North Am* 1999;**22**:819	No participants with dementia/not separately analysed
Lai CK, Yeung JH, Mok V, Chi I. Special care units for dementia individuals with behavioural problems. *Cochrane Database Syst Rev* 2009;**4**:CD006470	Not primary research
Lai CKY, Arthur DG. Wandering behaviour in people with dementia. *J Adv Nurs* 2003;**44**:173–82	Not primary research
Lai MK, Tsang SW, Esiri MM, Francis PT, Wong PT, Chen CP. Differential involvement of hippocampal serotonin(1A) receptors and re-uptake sites in non-cognitive behaviors of Alzheimer's disease. *Psychopharmacology* 2011;**213**:431–9	No participants with dementia/not separately analysed
Lai MK, Tsang SW, Esiri MM, Keene J, Hope T, Francis PT, *et al*. Serotonin 5-HT2A receptor alterations in the postmortem neocortex of behaviorally assessed Alzheimer patients. *J Neurochem* 2003;**87**:106	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Laks J, Miotto R, Morinho V, Engelhardt E. Use of aripiprazole for psychosis and agitation in dementia. *Int Psychogeriatr* 2006;**18**:335–40	Not a psychological, behavioural, sensory or environmental intervention
Lancioni GE, Perilli V, Singh NN, O'Reilly MF, Cassano G. A man with severe Alzheimer's disease stops wandering during a picture colouring activity. *Develop Neurorehabil* 2011;**14**:242–6	No comparator
Lanctot KL, Bowles SK, Herrmann N, Best TS, Naranjo CA. Drugs mimicking dementia – dementia symptoms associated with psychotropic drugs in institutionalised cognitively impaired patients. *CNS Drugs* 2000;**14**:381–90	Not intervention study
Lanctot KL, Herrmann N, Eryavec G, van Reekum R, Reed K, Naranjo CA. Central serotonergic activity is related to the aggressive behaviors of Alzheimer's disease. *Neuropsychopharmacology* 2002;**27**:646–54	No participants with dementia/not separately analysed
Lanctot KL, Herrmann N, van Reekum R, Eryavec G, Naranjo CA. Gender, aggression and serotonergic function are associated with response to sertraline for behavioral disturbances in Alzheimer's disease. *Int J Geriatr Psychiatry* 2002;**17**:531–41	Not a psychological, behavioural, sensory or environmental intervention
Landreville P, Bedard A, Verreault R, Desrosiers J, Champoux N, Monette J, *et al*. Non-pharmacological interventions for aggressive behavior in older adults living in long-term care facilities. *Int Psychogeriatr* 2006;**18**:47–73	Not primary research
Landreville P, Dicaire L, Verreault R, Levesque L. A training program for managing agitation of residents in long-term care facilities: description and preliminary findings. *J Gerontol Nurs* 2005;**31**:34–42	No participants with dementia/not separately analysed
Landreville P, LeBlanc V. Older adults' acceptability ratings of treatments for verbal agitation in persons with dementia. *Am J Alzheimers Dis Other Demen* 2010;**25**:134–41	No participants with dementia/not separately analysed
Landsberg G, Denenberg S, Araujo J. Cognitive dysfunction in cats: a syndrome we used to dismiss as 'old age'. *J Feline Med Surg* 2010;**12**:837–48	No participants with dementia/not separately analysed
Lange RT, Hopp GA, Kang N. Psychometric properties and factor structure of the Neuropsychiatric Inventory Nursing Home version in an elderly neuropsychiatric population. *Int J Geriatr Psychiatry* 2004;**19**:440–8	No participants with dementia/not separately analysed
Lann-Wolcott H, Medvene LJ, Williams K. Measuring the person-centeredness of caregivers working with nursing home residents with dementia. *Behav Ther* 2011;**42**:89–99	No participants with dementia/not separately analysed
Lantz MS, Marin D. Pharmacologic treatment of agitation in dementia: a comprehensive review. *J Geriatr Psychiatry Neurol* 1996;**9**:107–19	Not primary research
Lara DR, Cruz MRS, Xavier F, Souza DO, Moriguchi EH. Allopurinol for the treatment of aggressive behaviour in patients with dementia. *Int Clin Psychopharmacol* 2003;**18**:53–5	Not a psychological, behavioural, sensory or environmental intervention
Larue A, Watson J, Plotkin DA. First symptoms of dementia – a study of relatives' reports. *Int J Geriatr Psychiatry* 1993;**8**:239–45	Not intervention study
Lawlor B, Ni Bhriain S. Psychosis and behavioural symptoms of dementia: defining the role of neuroleptic interventions. *Int J Geriatr Psychiatry* 2001;**16**:S2–6	Not primary research
Lawlor B. Effective behavioral interventions for decreasing dementia-related challenging behavior in nursing homes – commentary. *Int J Geriatr Psychiatry* 1999;**14**:230–2	Not primary research
Lawlor BA, Ryan TM, Schmeidler J, Mohs RC, Davis KL. Clinical symptoms associated with age at onset in Alzheimers disease. *Am J Psychiatry* 1994;**151**:1646–9	Not intervention study
Lawlor BA. Behavioral and psychological symptoms in dementia: the role of atypical antipsychotics. *J Clin Psychiatry* 2004;**65**:5–10	Not primary research

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Lawrence JM, Davidoff DA, Katt-Lloyd D, Connell A, Berlow YA, Savoie JA. Is large-scale community memory screening feasible? Experience from a regional memory-screening day. *J Am Geriatr Soc* 2003;**51**:1072–8	No participants with dementia/not separately analysed
Lebert F, Pasquier F, Petit H. Behavioral-effects of trazodone in Alzheimers disease. *J Clin Psychiatry* 1994;**55**:536–8	Not a psychological, behavioural, sensory or environmental intervention
Lebert F, Pasquier F. Treatment of psychiatric and behavioural symptoms in Alzheimer's disease. *Revue Neurologique* 2003;**159**:825–30	Not primary research
Lebert F, Stekke W, Hasenbroekx C, Pasquier F. Frontotemporal dementia: a randomised, controlled trial with trazodone. *Dementia Geriatr Cogn Disord* 2004;**17**:355–9	Not a psychological, behavioural, sensory or environmental intervention
Lebert F. Selective serotonine reuptake inhibitors for depression in Alzheimer-type and other dementias. *Presse Med* 2003;**32**:1181–6	Not primary research
Leblhuber F. Treatment of behavioral abnormalities in demented patients with citalopram. *Acta Med Austriaca* 1994;**21**:104–6	Not a psychological, behavioural, sensory or environmental intervention
Lee KS, Cho HS, Hong CH, Kim DG, Oh BH. Differences in neuropsychiatric symptoms according to mild cognitive impairment subtypes in the community. *Dementia Geriatr Cogn Disord* 2008;**26**:212–17	No participants with dementia/not separately analysed
Lee SB, Kim KW. Nonpharmacological interventions for Alzheimer's disease. *J Korean Med Assoc* 2009;**52**:1069–76	Not primary research
Leehey MA. Fragile X-Associated Tremor/Ataxia Syndrome: clinical phenotype, diagnosis, and treatment. *J Invest Med* 2009;**57**:830–6	No participants with dementia/not separately analysed
Lefroy RB, McHale P, Hyndman J, Hobbs MST. Understanding the behaviour of people in special dementia units: the contribution of rating scales. *Aus J Ageing* 1996;**15**:105–10	No participants with dementia/not separately analysed
Leger JM, Moulias R, Robert P, Vellas B, Chapuy PH, Monfort JC, *et al*. Agitation and aggressiveness among the elderly population living in nursing or retirement homes in France. *Int Psychogeriatr* 2002;**14**:405–16	No participants with dementia/not separately analysed
Lehninger FW, Ravindran VL, Stewart JT. Management strategies for problem behaviors in the patient with dementia. *Geriatrics* 1998;**53**:55	Not primary research
Lemay M, Landreville P. Verbal agitation in dementia: the role of discomfort. *Am J Alzheimers Dis Other Demen* 2010;**25**:193–201	Not primary research
Lemke MR, Stuhlmann W. Carbamazepine treatment of agitated behavior in gerontopsychiatric inpatients. *Psychiatr Prax* 1994;**21**:147–50	Not a psychological, behavioural, sensory or environmental intervention
Leocani L, Martinelli V, Santuccio G, Possa F, Magnani G, Comi G. Neurophysiological evaluation of executive functions in multiple sclerosis. *Recent Adv Hum Neurophysiol* 1998;**1162**:1081–8	No participants with dementia/not separately analysed
Leonard DP, Kidson MA, Brown JGE, Shannon PJ, Taryan S. Double-blind trial of lithium-carbonate and haloperidol in Huntingtons-Chorea. *Aus N Z J Psychiatry* 1975;**9**:115–18	No participants with dementia/not separately analysed
Leonard R, Tinetti ME, Allore HG, Drickamer MA. Potentially modifiable resident characteristics that are associated with physical or verbal aggression among nursing home residents with dementia. *Arch Int Med* 2006;**166**:1295–300	Not intervention study
Leone E, Deudon A, Bauchet M, Laye M, Bordone N, Lee JH, *et al*. Management of apathy in nursing homes using a teaching program for care staff: the STIM-EHPAD study. *Int J Geriatr Psychiatry* 2013;**28**:383–92	No outcome measuring agitation
Leroi I, Michalon M. Treatment of the psychiatric manifestations of Huntington's disease: a review of the literature. *Can J Psychiatry* 1998;**43**:933–40	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Lesser JM, Hughes SV. Psychosis-related disturbances – psychosis, agitation and disinhibition in Alzheimer's disease: definitions and treatment options. *Geriatrics* 2006;**61**:14	Not primary research
Leverenz JB, Miller MA, Dobie DJ, Peskind ER, Raskind MA. Increased alpha 2-adrenergic receptor binding in locus coeruleus projection areas in dementia with Lewy bodies. *Neurobiol Aging* 2001;**22**:555–61	No participants with dementia/not separately analysed
Levitsky AM, Owens NJ. Pharmacologic treatment of hypersexuality and paraphilias in nursing home residents. *J Am Geriatr Soc* 1999;**47**:231–4	Not primary research
Levy MA, Burgio LD, Sweet R, Bonino P, Janosky J, Perel J. A trial of buspirone for the control of disruptive behaviours in community-dwelling patients with dementia. *Int J Geriatr Psychiatry* 1994;**9**:841–8	Not a psychological, behavioural, sensory or environmental intervention
Levy ML, Cummings JL, Fairbanks LA, Bravi D, Calvani M, Carta A. Longitudinal assessment of symptoms of depression, agitation, and psychosis in 181 patients with Alzheimer's disease. *Am J Psychiatry* 1996;**153**:1438–43	Not intervention study
Levy ML, Cummings JL, Kahn-Rose R. Neuropsychiatric symptoms and cholinergic therapy for Alzheimer's disease. *Gerontology* 1999;**45**:15–22	Not primary research
Levy ML, Miller BL, Cummings JL, Fairbanks LA, Craig A. Alzheimer disease and frontotemporal dementias – behavioural distinctions. *Arch Neurol* 1996; **53**:687–90	Not intervention study
Lewis CF. Successfully treating aggression in mentally ill prison inmates. *Psychiatr Q* 2000;**71**:331–43	No participants with dementia/not separately analysed
Lewis DO, Shanok SS, Pincus JH, Giammarino M. The medical assessment of seriously delinquent boys – a comparison of pediatric, psychiatric, neurological, and hospital record data. *J Adolesc Health* 1982;**3**:160–4	No participants with dementia/not separately analysed
Lewis JA. The effect of the N.E.S.T. approach on a dementia-specific unit. *Am J Recreation Ther* 200;**6**:32–8	No participants with dementia/not separately analysed
Li DW, Mohanty S, Irback A, Huo S. Formation and growth of oligomers: a Monte Carlo study of an amyloid tau fragment. *PLoS Compu Biol* 2008;**4**:e1000238	No participants with dementia/not separately analysed
Li L, von Bergen M, Mandelkow EM, Mandelkow E. Structure, stability, and aggregation of paired helical filaments from tau protein and FTDP-17 mutants probed by tryptophan scanning mutagenesis. *J Biol Chem* 2002;**277**:41390–400	No participants with dementia/not separately analysed
Lian W, Gu YR, Pedersen B, Kukar T, Govindasamy L, Agbandje-McKenna M, *et al*. Crystallization and preliminary X-ray crystallograph is studies on recombinant rat choline acetyltransferase. *Acta Crystallographica Section D* 2004;**60**:374–5	No participants with dementia/not separately analysed
Liberski PP, Yanagihara R, Wells GAH, Gibbs CJ, Gajdusek DC. Comparative ultrastructural neuropathology of naturally-occurring bovine spongiform encephalopathy and experimentally induced Scrapie and Creutzfeldt-Jakob Disease. *J Comp Pathol* 1992;**106**:361–81	No participants with dementia/not separately analysed
Liem-Moolenaar M, Rad M, Zamuner S, Cohen AF, Lemme F, Franson KL, *et al*. Central nervous system effects of the interaction between risperidone (single dose) and the 5-HT(6) antagonist SB742457 (repeated doses) in healthy men. *Br J Clin Pharmacol* 2011;**71**:907–16	No participants with dementia/not separately analysed
Lillquist PP. Challenges in surveillance of dementias in New York State. *Prevent Chronic Dis* 2004;**1**:A08	No participants with dementia/not separately analysed
Lim PP, Sahadevan S, Choo GK, Anthony P. Burden of caregiving in mild to moderate dementia: an Asian experience. *Int Psychogeriatr* 1999;**11**:411–20	No participants with dementia/not separately analysed
Lin ST, Yang P, Lai CY, Su YY, Yeh YC, Huang MF, *et al*. Mental health implications of music: insight from neuroscientific and clinical studies. *Harvard Rev Psychiatry* 2011;**19**:34–46	Not primary research

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Lindborg SR, Beasley CM, Alaka K, Taylor CC. Effects of intramuscular olanzapine vs. haloperidol and placebo on QTc intervals in acutely agitated patients. *Psychiatry Res* 2003;**119**:113–23	Not a psychological, behavioural, sensory or environmental intervention
Linde K, ter Riet G, Hondras M, Vickers A, Saller R, Melchart D. Systematic reviews of herbal medicines – an annotated bibliography. *Forsch Komplement Med* 2003;**10**:17–27	No participants with dementia/not separately analysed
Lindenmayer JP, Kotsaftis A. Use of sodium valproate in violent and aggressive behaviours: a critical review. *J Clin Psychiatry* 2000;**61**:123–8	No participants with dementia/not separately analysed
Lindenmayer JP. The pathophysiology of agitation. *J Clin Psychiatry* 2000;**61**:5–10	No participants with dementia/not separately analysed
Lindgren C, Hallberg IR, Norberg A. Diagnostic reasoning in the care of a vocally disruptive severely demented patient. A case report. *Scand J Caring Sci* 1992;**6**:97–103	No comparator
Liperoti R, Pedone C, Corsonello A. Antipsychotics for the treatment of behavioral and psychological symptoms of dementia (BPSD). *Curr Neuropharmacol* 2008;**6**:117–24	Not primary research
Little JT, Satlin A, Sunderland T, Volicer L. Sundown syndrome in severely demented patients with probable Alzheimers disease. *J Geriatr Psychiatry Neurol* 1995;**8**:103–6	Not intervention study
Littner M, Kushida CA, Anderson M, Bailey D, Berry RB, Davila DG, *et al*. Practice parameters for the role of actigraphy in the study of sleep and circadian rhythms: an update for 2002 – an American academy of sleep medicine report. *Sleep* 2003;**26**:337–41	No participants with dementia/not separately analysed
Litvinenko IV, Odinak MM, Mogil'naya VI, Perstnev SV. Use of memantine (akatinol) for the correction of cognitive impairments in Parkinson's disease complicated by dementia. *Neurosci Behav Physiol* 2010;**40**:149–55	No participants with dementia/not separately analysed
Liukkonen A. [Disruptive behavior; what is it, how prevalent is it and how much nursing care does it require in geriatric departments?] *Hoitotiede* 1993;**5**:64–71	No participants with dementia/not separately analysed
Livingston G, Katona C. The place of memantine in the treatment of Alzheimer's disease: a number needed to treat analysis. *Int J Geriatr Psychiatry* 2004;**19**:919–25	Not primary research
Livingston G, Walker A, Katona C, Cooper C. Antipsychotics and cognitive decline in Alzheimer's disease: the LASER-Alzheimer's disease longitudinal study. *J Neurol Neurosurg Psychiatry* 2007;**78**:25–9	Not intervention study
Lobaugh NJ, Karaskov V, Rombough V, Rovet J, Bryson S, Greenbaum R, *et al*. Piracetam therapy does not enhance cognitive functioning in children with Down syndrome. *Arch Pediatr Adolesc Med* 2001;**155**:442–8	No participants with dementia/not separately analysed
Loehle M, Storch A, Reichmann H. Beyond tremor and rigidity: non-motor features of Parkinson's disease. *J Neural Transmission* 2009;**116**:1483–92	No participants with dementia/not separately analysed
Logsdon RG, McCurry SM, Teri L. Evidence-based psychological treatments for disruptive behaviors in individuals with dementia. *Psychol Aging* 2007;**22**:28–36	Not primary research
Logsdon RG, Teri L, McCurry SM, Gibbons LE, Kukull WA, Larson EB. Wandering: a significant problem among community-residing individuals with Alzheimer's disease. *J Gerontol Series B* 1998;**53**:294–9	Not intervention study
Lonergan E, Luxenberg J, Colford J. Haloperidol for agitation in dementia. *Cochrane Database Syst Rev* 2002;**2**:CD002852	Not primary research
Lopez OL, Becker JT, Sweet RA, Klunk W, Kaufer DI, Saxton J, *et al*. Patterns of change in the treatment of psychiatric symptoms in patients with probable Alzheimer's disease from 1983 to 2000. *J Neuropsychiatry Clin Neurosci* 2003;**15**:67–73	Not intervention study

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Lopez OL, Becker JT. Factors that modify the natural course of Alzheimer's disease. *Rev Neurol* 2003;**37**:149–55	Not primary research
Lopez OL, Wisniewski SR, Becker JT, Boller F, DeKosky ST. Psychiatric medication and abnormal behavior as predictors of progression in probable Alzheimer disease. *Arch Neurol* 1999;**56**:1266–72	Not intervention study
Lopez-Pousa S, Garre-Olmo J, Vilalta-Franch J, Turon-Estrada A, Pericot-Nierga I. Trazodone for Alzheimer's disease: a naturalistic follow-up study. *Arch Gerontol Geriatr* 2008;**47**:207–15	Not intervention study
Lopez-Pousa S, Garre-Olmo J, Vilalta-Franch J. Galanthamine versus donepezil in the treatment of Alzheimer's disease. *Revista de Neurologia* 2007;**44**:677–84	Not primary research
Lou MF. The use of music to decrease agitated behaviour of the demented elderly: the state of the science. *Scand J Caring Sci* 2001;**15**:165–73	Not primary research
Louis ED, Benito-Leon J, Bermejo-Pareja F. Population-based prospective study of cigarette smoking and risk of incident essential tremor. *Neurology* 2008;**70**:1682–7	No participants with dementia/not separately analysed
Lovera J, Frohman E, Brown T, Bandari D, Nguyen L, Yadav V, *et al*. Memantine for cognitive impairment in multiple sclerosis: a randomized placebo-controlled trial. *Multiple Sclerosis* 2010;**16**:715–23	Not a psychological, behavioural, sensory or environmental intervention
Lu CJ, Tune LE. Chronic exposure to anticholinergic medications adversely affects the course of Alzheimer disease. *Am J Geriatr Psychiatry* 2003;**11**:458–61	Not a psychological, behavioural, sensory or environmental intervention
Lucero M, Hutchinson S, Leger-Krall S, Wilson HS. Wandering in Alzheimer's dementia patients. *Clin Nurs Res* 1993;**2**:160–75	Not intervention study
Lucero M, Pearson R, Hutchinson S, Leger-Krall S, Rinalducci E. Products for Alzheimer's self-stimulatory wanderers. *Am J Alzheimer's Dis Other Demen* 2001;**16**:43–50	Not intervention study
Lucero M. Intervention strategies for exit-seeking wandering behaviour in dementia residents. *Am J Alzheimer's Dis Other Demen* 2002;**17**:277–80	Not primary research
Lyketsos CG, Lopez O, Jones B, Fitzpatrick AL, Breitner J, DeKosky S. Prevalence of neuropsychiatric symptoms in dementia and mild cognitive impairment – results from the Cardiovascular Health Study. *JAMA* 2002;**288**:1475–83	Not intervention study
Lyketsos CG, Sheppard JME, Steinberg M, Tschanz JAT, Norton MC, Steffens DC, *et al*. Neuropsychiatric disturbance in Alzheimer's disease clusters into three groups: the Cache County study. *Int J Geriatr Psychiatry* 2001;**16**:1043–53	Not intervention study
Lyketsos CG, Steele C, Galik E, Rosenblatt A, Steinberg M, Warren A, *et al*. Physical aggression in dementia patients and its relationship to depression. *Am J Psychiatry* 1999;**156**:66–71	Not intervention study
Lyketsos CG, Steinberg M, Tschanz JT, Norton MC, Steffens DC, Breitner JCS. Mental and behavioral disturbances in dementia: findings from the Cache County Study on memory in aging. *Am J Psychiatry* 2000;**157**:708–14	Not intervention study
Lyons MK. Deep brain stimulation: current and future clinical applications. *Mayo Clin Proc* 2011;**86**:662–72	No participants with dementia/not separately analysed
Mack JL, Patterson MB. The evaluation of behavioral disturbances in Alzheimers disease – the utility of 3 rating scales. *J Geriatr Psychiatry Neurol* 1994;**7**:99–115	No participants with dementia/not separately analysed
Madhusoodanan S, Brenner R, Cohen CI. Role of atypical antipsychotics in the treatment of psychosis and agitation associated with dementia. *CNS Drugs* 1999;**12**:135–50	Not primary research
Madhusoodanan S, Shah P, Brenner R, Gupta S. Pharmacological treatment of the psychosis of Alzheimer's disease – what is the best approach? *CNS Drugs* 2007;**21**:101–15	Not primary research

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Mador JE, Giles L, Whitehead C, Crotty M. A randomized controlled trial of a behavior advisory service for hospitalized older patients with confusion. *Int J Geriatr Psychiatry* 2004;**19**:858–63	No participants with dementia/not separately analysed
Maeda J, Higuchi M, Suhara T. [Evaluation of imaging biomarker by transgenic mouse models.] *Nihon shinkei seishin yakurigaku zasshi* 2009;**29**:73–8	No participants with dementia/not separately analysed
Maeda J, Higuchi M, Suhara T. Evaluation of imaging biomarker by transgenic mouse models. *Japan J Neuropsychopharmacol* 2009;**29**:73–8	No participants with dementia/not separately analysed
Mahlberg R, Walther S, Eichmann U, Tracik F, Kunz D. Effects of rivastigmine on actigraphically monitored motor activity in severe agitation related to Alzheimer's disease: a placebo-controlled pilot study. *Arch Gerontol Geriatr* 2007;**45**:19–26	Not a psychological, behavioural, sensory or environmental intervention
Mancini M, Agozzino B, Bompani E. Clinical and therapeutic effects of *Ginkgo biloba* extract (Egb) compared to placebo in the treatment of patients affected by senile psychoorganic dementia on an arteriosclerotic basis. *Gazz Med Ital Arch Sci Med* 1993;**152**:69–80	Not a psychological, behavioural, sensory or environmental intervention
Mann WC, Hurren MD, Charvat BA, Tomita MR. Changes over one year in assistive device use and home modifications by home-based older persons with Alzheimer's disease. *Topics Geriatr Rehabil* 1996;**12**:9–16	Not intervention study
Marcantonio ER, Simon SE, Bergmann MA, Jones RN, Murphy KM, Morris JN. Delirium symptoms in post-acute care: prevalent, persistent, and associated with poor functional recovery. *J Am Geriatr Soc* 2003;**51**:4–9	No participants with dementia/not separately analysed
Marder SR, Sorsaburu S, Dunayevich E, Karagianis JL, Dawe IC, Falk DM, *et al*. Case reports of postmarketing adverse event experiences with olanzapine intramuscular treatment in patients with agitation. *J Clin Psychiatry* 2010;**71**:433–41	No participants with dementia/not separately analysed
Margallo-Lana M, Swann A, O'Brien J, Fairbairn A, Reichelt K, Potkins D, *et al*. Prevalence and pharmacological management of behavioural and psychological symptoms amongst dementia sufferers living in care environments. *Int J Geriatr Psychiatry* 2001;**16**:39–44	Not intervention study
Marin DB, Green CR, Schmeidler J, Harvey PD, Lawlor BA, Ryan TM, *et al*. Noncognitive disturbances in Alzheimer's disease: frequency, longitudinal course, and relationship to cognitive symptoms. *J Am Geriatr Soc* 1997;**45**:1331–	Not intervention study
Marksteiner J, Schmidt R. Treatment strategies in Alzheimer's disease with a focus on early pharmacological interventions. *Drugs Aging* 2004;**21**:415–26	Not primary research
Marquardt G. Wayfinding for people with dementia: a review of the role of architectural design. *HERD* 2011;**4**:75–90	Not primary research
Marshall FJ, Walker F, Frank S, Oakes D, Plumb S, Factor SA, *et al*. Tetrabenazine as antichorea therapy in Huntington disease – a randomized controlled trial. *Neurology* 2006;**66**:366–72	No participants with dementia/not separately analysed
Marshall MC, Soucy MD. Delirium in the intensive care unit. *Crit Care Nurs Q* 2003;**26**:172–8	No participants with dementia/not separately analysed
Martin H, Slyk MP, Deymann S, Cornacchione MJ. Safety profile assessment of risperidone and olanzapine in long-term care patients with dementia. *J Am Med Direct Assoc* 2003;**4**:183–8	Not a psychological, behavioural, sensory or environmental intervention
Martin J, Marler M, Shochat T, Ancoli-Israel S. Circadian rhythms of agitation in institutionalized patients with Alzheimer's disease. *Chronobiol Int* 2000;**17**:405–18	Not intervention study
Martinon-Torres G, Fioravanti M, Grimley EJ. Trazodone for agitation in dementia. *Cochrane Database Syst Rev* 2004;**4**:CD004990	Not primary research

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Martinosaltzman D, Blasch BB, Morris RD, McNeal LW. Travel behavior of nursing-home residents perceived as wanderers and nonwanderers. *Gerontologist* 1991;**31**:666–72	Not intervention study
Mast BT. Impact of cognitive impairment on the phenomenology of geriatric depression. *Am J Geriatr Psychiatry* 2005;**13**:694–700	Not intervention study
Mather JA, Nemecek D, Oliver K. The effect of a walled garden on behavior of individuals with Alzheimer's. *Am J Alzheimers Dis Other Demen* 1997;**12**:252–7	No outcome measuring agitation
Matsui T, Nakaaki S, Murata Y, Sato J, Shinagawa Y, Tatsumi H, *et al*. Determinants of the quality of life in Alzheimer's disease patients as assessed by the Japanese version of the quality of life – Alzheimer's disease scale. *Dementia Geriatr Cogn Disord* 2006;**21**:182–91	No participants with dementia/not separately analysed
Matteson MA, Linton A. Wandering behaviors in institutionalized persons with dementia. *J Gerontol Nurs* 1996;**22**:39–46	Not intervention study
Mausbach BT, Aschbacher K, Patterson TL, Ancoli-Israel S, von Kanel R, Mills PJ, *et al*. Avoidant coping partially mediates the relationship between patient problem behaviors and depressive symptoms in spousal Alzheimer caregivers. *Am J Geriatr Psychiatry* 2006;**14**:299–306	No participants with dementia/not separately analysed
Mayers K, Griffin M. The play project–use of stimulus objects with demented patients. *J Gerontol Nurs* 1990;**16**:32–7	No outcome measuring agitation
Mazeh D, Zemishlani H, Barak Y, Mirecki I, Paleacu D. Donepezil for negative signs in elderly patients with schizophrenia: an add-on, double-blind, crossover, placebo-controlled study. *Int Psychogeriatr* 2006;**18**:429–36	No participants with dementia/not separately analysed
McAiney CA, Stolee P, Hillier LM, Harris D, Hamilton P, Kessler L, *et al*. Evaluation of the sustained implementation of a mental health learning initiative in long-term care. *Int Psychogeriatr* 2007;**19**:842–58	No participants with dementia/not separately analysed
McCurry SM, Reynolds CF, Ancoli-Israel S, Teri L, Vitiello MV. Treatment of sleep disturbance in Alzheimer's disease. *Sleep Med Rev* 2000;**4**:603–28	Not primary research
Mcdonald WM, Krishnan KRR. Pharmacological management of the symptoms of dementia. *Am Fam Phys* 1990;**42**:123–32	Not a psychological, behavioural, sensory or environmental intervention
McGaffigan S, Bliwise DL. The treatment of sundowning – a selective review of pharmacological and nonpharmacological studies. *Drugs Aging* 1997;**10**:10–17	Not primary research
McGauran N, Wieseler B, Kreis J, Schueler YB, Koelsch H, Kaiser T. Reporting bias in medical research – a narrative review. *Trials* 2010;**11**	No participants with dementia/not separately analysed
McGee SB, Orengo CA, Kunik ME, Molinari VA, Workman RH. Delirium in geropsychiatric patients: patient characteristics and treatment outcomes. *J Geriatr Psychiatry Neurol* 1997;**10**:7–10	Not intervention study
McGeer EG, McGeer PL. Mini-review – The importance of inflammatory mechanisms in Alzheimer disease. *Exp Gerontol* 1998;**33**:371–8	Not primary research
McGeer P, McGeer E. Mechanisms of cell death in Alzheimer disease: immunopathology. *J Neural Trans Suppl* 1998;**54**:159–66	No participants with dementia/not separately analysed
McGeer PL, McGeer EG. Glial cell reactions in neurodegenerative diseases: pathophysiology and therapeutic interventions. *Alzheimer Dis Assoc Disord* 1998;**12**:S1–6	No participants with dementia/not separately analysed
McGilton K, Wells J, Teare G, Davis A, Rochon E, Calabrese S, *et al*. Rehabilitating patients with dementia who have had a hip frature – part I: behavioral symptoms that influence care. *Topics Geriatr Rehabil* 2007;**23**:161–73	Not intervention study
McGilton KS, Boscart V, Fox M, Sidani S, Rochon E, Sorin-Peters R. A systematic review of the effectiveness of communication interventions for health care providers caring for patients in residential care settings. *Worldviews Evidence-Based Nurs* 2009;**6**:149–59	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
McGough EL, Kelly VE, Logsdon RG, McCurry SM, Cochrane BB, Engel JM, *et al*. Associations between physical performance and executive function in older adults with mild cognitive impairment: gait speed and the timed "up & go" test. *Phys Ther* 2011;**91**:1198–207	No participants with dementia/not separately analysed
McHenry M, Wilson R. The challenge of unintelligible speech following traumatic brain injury. *Brain Injury* 1994;**8**:363–75	No participants with dementia/not separately analysed
McKeage K. Memantine a review of its use in moderate to severe Alzheimer's disease. *CNS Drugs* 2009;**23**:881–97	Not primary research
McKee SA, Harris GT, Rice ME, Silk L. Effects of a Snoezelen room on the behavior of three autistic clients. *Res Develop Disabil* 2007;**28**:304–1	No participants with dementia/not separately analysed
McKeith IG. Dementia with Lewy bodies. *Clin Manag* 2001:175–9	Not primary research
McMinn B, Draper B. Vocally disruptive behaviour in dementia: development of an evidence based practice guideline. *Aging Ment Health* 2005;**9**:16–24	Not primary research
McNeal KM, Meyer RP, Lukacs K, Senseney A, Mintzer J. Using risperidone for Alzheimer's dementia-associated psychosis. *Ex Opin Pharmacother* 2008;**9**:2537–43	Not primary research
McShane R, Keene J, Gedling K, Fairburn C, Jacoby R, Hope T. Do neuroleptic drugs hasten cognitive decline in dementia? Prospective study with necropsy follow up. *BMJ* 1997;**314**:266–70	Not intervention study
McShane R, Sastre AA, Minakaran N. Memantine for dementia. *Cochrane Database Syst Rev* 2006;**2**:CD003154	Not primary research
McWalter G, Toner H, McWalter A, Eastwood J, Marshall M, Turvey T. A community needs assessment: the care needs assessment pack for dementia (CarenapD) – its development, reliability and validity. *Int J Geriatr Psychiatry* 1998;**13**:16–22	No participants with dementia/not separately analysed
Meares S, Draper B. Treatment of vocally disruptive behaviour of multifactorial aetiology. *Int J Geriatr Psychiatry* 1999;**14**:285–90	No participants with dementia/not separately analysed
Meehan KM, Wang HE, David SR, Nisivoccia JR, Jones B, Beasley CM, *et al*. Comparison of rapidly acting intramuscular olanzapine, lorazepam, and placebo: a double-blind, randomized study in acutely agitated patients with dementia. *Neuropsychopharmacology* 2002;**26**:494–504	Not a psychological, behavioural, sensory or environmental intervention
Mega MS, Dinov ID, Lee L, O'Connor SM, Masterman DM, Wilen B, *et al*. Orbital and dorsolateral frontal perfusion defect associated with behavioral response to cholinesterase inhibitor therapy in Alzheimer's disease. *J Neuropsychiatry Clin Neurosci* 2000;**12**:209–18	Not intervention study
Mega MS, Lee L, Dinov ID, Mishkin F, Toga AW, Cummings JL. Cerebral correlates of psychotic symptoms in Alzheimer's disease. *J Neurol Neurosurg Psychiatry* 2000;**69**:167–71	No participants with dementia/not separately analysed
Mega MS, Masterman DM, O'Connor SM, Barclay TR, Cummings JL. The spectrum of behavioral responses to cholinesterase inhibitor therapy in Alzheimer disease. *Arch Neurol* 1999;**56**:1388–93	Not a psychological, behavioural, sensory or environmental intervention
Meguro K, Yamaguchi S, Shimada M, Itoh M, Yamadori A. Striatal dopaminergic transmission and neocortical glucose utilization in Alzheimer's disease: a triple-tracer positron emission tomography study. *Arch Gerontol Geriatr* 2000;**31**:147–58	No participants with dementia/not separately analysed
Meiland FJM, Kat MG, van Tilburg W, Jonker C, Droes RM. The emotional impact of psychiatric symptoms in dementia on partner caregivers – do caregiver, patient, and situation characteristics make a difference? *Alzheimer Dis Assoc Disord* 2005;**19**:195–201	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Meinhold JM, Blake LM, Mini LJ, Welge JA, Schwiers M, Hughes A. Effect of divalproex sodium on behavioural and cognitive problems in elderly dementia. *Drugs Aging* 2005;**22**:615–26	Not intervention study
Mendelowitz AJ. The utility of intramuscular ziprasidone in the management of acute psychotic agitation. *Ann Clin Psychiatry* 2004;**16**:145–54	Not primary research
Menon AS, Gruber-Baldini AL, Hebel JR, Kaup B, Loreck D, Zimmerman SI, *et al*. Relationship between aggressive behaviors and depression among nursing home residents with dementia. *Int J Geriatr Psychiatry* 2001;**16**:139–46	Not intervention study
Merrick GS, Butler WM, Wallner KE, Galbreath RW, Lief JH. Long-term urinary quality of life after permanent prostate brachytherapy. *Int J Rad Oncol Biol Phys* 2003;**56**:454–61	No participants with dementia/not separately analysed
Mervis JR, Ganzell S, Fitten LJ, Daum G, Tripodis K, Takayesu S. Comparison of carbamazepine and trazodone in the control of aggression agitation in demented, institutionalized patients – a randomized double-blind parallel study. *J Am Geriatr Soc* 1991;**39**:A75	Not a psychological, behavioural, sensory or environmental intervention
Mestre T, Ferreira J, Coelho MM, Rosa M, Sampaio C. Therapeutic interventions for symptomatic treatment in Huntington's disease. *Cochrane Database Syst Rev (Online)* 2009;**3**:CD006456	No participants with dementia/not separately analysed
Meyer J, Schalock R, Genaidy H. Aggression in psychiatric hospitalized geriatric-patients. *Int J Geriatr Psychiatry* 1991;**6**:589–92	Not intervention study
Meyer JS, Welch KMA, Deshmukh VD, Perez F, I, Jacob RH, Haufrect DB, *et al*. Neuro transmitter precursor amino-acids in the treatment of multi infarct dementia and Alzheimers disease. *J Am Geriatr Soc* 1977;**25**:289–98	Not a psychological, behavioural, sensory or environmental intervention
Michaelis ML. Drugs targeting Alzheimer's disease: some things old and some things new. *J Pharmacol Exp Ther* 2003;**304**:897–904	Not primary research
Michel B, Luciani V, Geda Y, Sambuchi N, Paban V, Azorin J. In Alzheimer's disease, the clinical expression of behavioral and psychological signs and symptoms is early and specific of neuropathological stages. *Encephale Rev Psychiatr Clin Biol Therap* 2010;**36**:314–25.	Not intervention study
Mihaescu R, Detmar SB, Cornel MC, van der Flier WM, Heutink P, Hol EM, *et al*. Translational research in genomics of Alzheimer's disease: a review of current practice and future perspectives. *J Alzheimers Dis* 2010;**20**:967–80	Not primary research
Millán-Calenti JC, Gandoy-Crego M, Antelo-Martelo M, López-Martinez M, Riveiro-López MP, Mayán-Santos JM. Helping the family carers of Alzheimer's patients: from theory... to practice. A preliminary study. *Arch Gerontol Geriatr* 2000;**30**:131–8	No participants with dementia/not separately analysed
Miller CA. How to try this: Communication difficulties in hospitalized older adults with dementia. *Am J Nurs* 2008;**108**:58–67	Not primary research
Miller EA, Schneider LS, Rosenheck RA. Predictors of nursing home admission among Alzheimer's disease patients with psychosis and/or agitation. *Int Psychogeriatr* 2011;**23**:44–53	Not intervention study
Miller LJ. The use of cognitive enhancers in behavioral disturbances of Alzheimer's disease. *Consult Pharm* 2007;**22**:754–62	Not primary research
Millichap D, Oliver C, McQuillan S, Kalsy S, Lloyd V, Hall S. Descriptive functional analysis of behavioral excesses shown by adults with Down syndrome and dementia. *Int J Geriatr Psychiatry* 2003;**18**:844–54	Not intervention study
Mimica N, Glamuzina K, Vucic K, Gatin M, Dajcic M, Dajcic T, *et al*. Art therapy for people with dementia – case report. 25th International Conference of Alzheimers Disease International 2010;95–9	No comparator

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Mimica N, Kalinic D. Art therapy may be benefitial for reducing stress – related behaviours in people with dementia – case report. *Psychiatria Danubina* 2011;**23**:125–8	No comparator
Mintzer J, Brawman-Mintzer O, Mirski DF, Unger R, Nietert P, Meeks A, *et al*. Fenfluramine challenge test as a marker of serotonin activity in patients with Alzheimer's dementia and agitation. *Biol Psychiatry* 1998;**44**:918–21	Not a psychological, behavioural, sensory or environmental intervention
Mintzer J, Faison W, Street JS, Sutton VK, Breier A. Olanzapine in the treatment of anxiety symptoms due to Alzheimer's disease: a post hoc analysis. *Int J Geriatr Psychiatry* 2001;**16**:S71–7	Not primary research
Mintzer JE, Colenda C, Waid LR, Lewis L, Meeks A, Stuckey M, *et al*. Effectiveness of a continuum of care using brief and partial hospitalization for agitated dementia patients. *Psychiatr Serv* 1997;**48**:1435–9	Multidisciplinary team input including pharmacological intervention
Mintzer JE, Hoernig KS, Mirski DF. Treatment of agitation in patients with dementia. *Clin Geriatr Med* 1998;**14**:147	Not primary research
Mintzer JE, Tune LE, Breder CD, Swanink R, Marcus RN, McQuade RD, *et al*. Aripiprazole for the treatment of psychoses in institutionalized patients with Alzheimer dementia: a multicenter, randomized, double-blind, placebo-controlled assessment of three fixed doses. *Am J Geriatr Psychiatry* 2007;**15**:918–31	Not a psychological, behavioural, sensory or environmental intervention
Mintzer JE. Underlying mechanisms of psychosis and aggression in patients with Alzheimer's disease. *J Clin Psychiatry* 2001;**62**:23–5	Not primary research
Mirza NR, Peters D, Sparks RG. Xanomeline and the antipsychotic potential of muscarinic receptor subtype selective agonists. *CNS Drug Rev* 2003;**9**:159–86	No participants with dementia/not separately analysed
Mittelman MS, Roth DL, Haley WE, Zarit SH. Effects of a caregiver intervention on negative caregiver appraisals of behavior problems in patients with Alzheimer's disease: results of a randomized trial. *J Gerontol Series B* 2004;**59**:27–34	No outcome measuring agitation
Miura T, Yoda M, Tsutsumi C, Murayama K, Takeuchi H. Conformational regulation of amyloid beta-peptide by lipid membranes and metal ions. *Yakugaku Zasshi* 2010;**130**:495–501	No participants with dementia/not separately analysed
Miyamoto Y, Ito H, Otsuka T, Kurita H. Caregiver burden in mobile and non-mobile demented patients: a comparative study. *Int J Geriatr Psychiatry* 2002;**17**:765–73	Not intervention study
Miyaoka T, Furuya M, Yasuda H, Hayashia M, Inagaki T, Horiguchi J. Yi-gan san for the treatment of borderline personality disorder: an open-label study. *Prog Neuro-Psychopharmacol Biol Psychiatry* 2008;**32**:150–4	No participants with dementia/not separately analysed
Mizrahi R, Starkstein SE, Jorge R, Robinson RG. Phenomenology and clinical correlates of delusions in Alzheimer disease. *Am J Geriatr Psychiatry* 2006;**14**:573–81	Not intervention study
Mizukami K, Asada T, Kinoshita T, Tanaka K, Sonohara K, Nakai R, *et al*. A randomized cross-over study of a traditional Japanese medicine (kampo), yokukansan, in the treatment of the behavioural and psychological symptoms of dementia. *Int J Neuropsychopharmacol* 2009;**12**:191–9	Not a psychological, behavioural, sensory or environmental intervention
Mizukami K, Hatanaka K, Ishii T, Iwakiri M, Sodeyama N, Tanaka Y, *et al*. Effects of sodium valproate on behavioral disturbances in elderly outpatients with dementia. *Geriatr Gerontol Int* 2010;**10**:324–6	Not a psychological, behavioural, sensory or environmental intervention
Mizukami K. Kampo therapy as an alternative to pharmacotherapy using antipsychotic medicines for behavioral and psychological symptoms of dementia (BPSD). *Psychogeriatrics* 2008;**8**:137–41	Not primary research

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Mizuno E, Hosak T, Ogihara R, Higano H, Mano Y. Effectiveness of a stress management program for family caregivers of the elderly at home. *J Med Dent Sci* 1999;**46**:145–53	No participants with dementia/not separately analysed
Mogoanta L, Marinescu D, Udristoiu T, Udristoiu I, Pirici D. Neuroprotective effect of cerebrolysin and erythropoietin versus haloperidol in an Alzheimer's disease – animal model. *Eur Neuropsychopharmacol* 2010;**20**:S565–6	No participants with dementia/not separately analysed
Mohamed S, Rosenheck R, Lyketsos CG, Schneider LS. Caregiver burden in Alzheimer disease: cross-sectional and longitudinal patient correlates. *Am J Geriatr Psychiatry* 2010;**18**:917–27	Not intervention study
Mohr P, Pecenak J, Svestka J, Swingler D, Treuer T. Treatment of acute agitation in psychotic disorders. *Neuroendocrinol Lett* 2005;**26**:327–35	No participants with dementia/not separately analysed
Mohundro BL, Pope K, Shaw V, Hitchcock K. Which drugs are best when aggressive Alzheimer's patients need medication? *J Fam Prac* 2010;**59**:595–604	Not a psychological, behavioural, sensory or environmental intervention
Mok V, Wong A, Ho S, Leung T, Lam WWM, Wong KS. Rivastigmine in Chinese patients with subcortical vascular dementia. *Neuropsychiatr Dis Treat* 2007;**3**:943–8	Not a psychological, behavioural, sensory or environmental intervention
Mokhber N, Azarpazhooh MR, Khajehdaluee M, Velayati A, Hopwood M. Randomized, single-blind, trial of sertraline and buspirone for treatment of elderly patients with generalized anxiety disorder. *Psychiatry Clin Neurosci* 2010;**64**:128–33	No participants with dementia/not separately analysed
Mollenhauer B, Foerstl H, Deuschl G, Storch A, Oertel W, Trenkwalder C. Lewy Body and Parkinsonian dementia: common, but often misdiagnosed conditions. *Deutsches Arzteblatt Int* 2010;**107**:684–U31	Not primary research
Monastero R, Mangialasche F, Camarda C, Ercolani S, Camarda R. A systematic review of neuropsychiatric symptoms in mild cognitive impairment. *J Alzheimers Dis* 2009;**18**:11–30	No participants with dementia/not separately analysed
Moniz-Cook E, Stokes G, Agar S. Difficult behaviour and dementia in nursing homes: five cases of psychosocial intervention. *Clin Psychol Psychother* 2003;**10**:197–208	No comparator
Moniz-Cook E, Woods R, Gardiner E, Silver M, Agar S. The Challenging Behaviour Scale (CBS): development of a scale for staff caring for older people in residential and nursing homes. *Br J Clin Psychol* 2001;**40**:309–22	No participants with dementia/not separately analysed
Moniz-Cook E, Woods R, Gardiner E. Staff factors associated with perception of behaviour as 'challenging' in residential and nursing homes. *Aging Mental Health* 2000;**4**:48–55	No participants with dementia/not separately analysed
Moniz-Cook E, Woods RT, Richards K. Functional analysis of challenging behaviour in dementia: the role of superstition. *Int J Geriatr Psychiatry* 2001;**16**:45–56	No comparator
Monsch AU, Giannakopoulos P. Effects of galantamine on behavioural and psychological disturbances and caregiver burden in patients with Alzheimer's disease. *Curr Med Res Opin* 2004;**20**:931–8	Not a psychological, behavioural, sensory or environmental intervention
Montejo A, Majadas S, Mayoral F, Sanjuan J, Ros S, Olivares J, *et al*. Analysis of prescription patterns of antipsychotic agents in psychiatry. *Actas Esp Psiquiatr* 2006;**34**:323–9	No participants with dementia/not separately analysed
Moore D, Algase DL, Powell-Cope G, Applegarth S, Beattie ER. A framework for managing wandering and preventing elopement. *AmJ Alzheimers Dis Other Dementias* 2009;**24**:208–19	Not primary research
Moretti R, Torre P, Antonello RM, Cattaruzza T, Cazzato G, Bava A. Olanzapine as a possible treatment for anxiety due to vascular dementia: an open study. *Am J Alzheimers Dis Other Demen* 2004;**19**:81–8	Not a psychological, behavioural, sensory or environmental intervention

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Moretti R, Torre P, Antonello RM, Cazzato G, Bava A. Gabapentin for the treatment of behavioural alterations in dementia – preliminary 15-month investigation. *Drugs Aging* 2003;**20**:1035–40	Not a psychological, behavioural, sensory or environmental intervention
Moretti R, Torre P, Antonello RM, Cazzato G, Griggio S, Bava A. An open-label pilot study comparing rivastigmine and low-dose aspirin for the treatment of symptoms specific to patients with subcortical vascular dementia. *Curr Ther Res* 2002;**63**:443–58	Not a psychological, behavioural, sensory or environmental intervention
Morinaga A, Hasegawa K, Nomura R, Ookoshi T, Ozawa D, Goto Y, *et al*. Critical role of interfaces and agitation on the nucleation of A beta amyloid fibrils at low concentrations of A beta monomers. *Biochim Biophys Acta* 2010;**1804**:986–95	No participants with dementia/not separately analysed
Moss R, Damico S, Maletta G. Mental dysfunction as a sign of organic illness in the elderly. *Geriatrics* 1987;**42**:35	No participants with dementia/not separately analysed
Mowla A, Pani A. Comparison of topiramate and risperidone for the treatment of behavioural disturbances of patients with Alzheimer disease: a double-blind, randomised clinical trial. *J Clin Psychopharmacol* 2010;**30**:40–3	Not a psychological, behavioural, sensory or environmental intervention
Mulchahey JJ, Malik MS, Sabai M, Kasckow JW. Serotonin-selective reuptake inhibitors in the treatment of geriatric depression and related disorders. *Int J Neuropsychopharmacol* 1999;**2**:121–7	Not primary research
Mullan E, Katona C, Bellew M. Patterns of sleep disorders and sedative hypnotic use in seniors. *Drugs Aging* 1994;**5**:49–58	No participants with dementia/not separately analysed
Mulsant BH, Gharabawi GM, Bossie CA, Mao L, Martinez RA, Tune LE, *et al*. Correlates of anticholinergic activity in patients with dementia and psychosis treated with risperidone or olanzapine. *J Clin Psychiatry* 2004;**65**:1708–14	Not a psychological, behavioural, sensory or environmental intervention
Mulsant BH, Mazumdar S, Pollock BG, Sweet RA, Rosen J, Lo K. Methodological issues in characterizing treatment response in demented patients with behavioral disturbances. *Int J Geriatr Psychiatry* 1997;**12**:537–47	Not intervention study
Murakami Y, Zhao Q, Harada K, Tohda M, Watanabe H, Matsumoto K. Choto-san, a Kampo formula, improves chronic cerebral hypoperfusion-induced spatial learning deficit via stimulation of muscarinic M-1 receptor. *Pharmacol Biochem Behav* 2005;**81**:616–25	No participants with dementia/not separately analysed
Murgod UA, Saleem Q, Anand A, Brahmachari SK, Jain S, Muthane UB. A clinical study of patients with genetically confirmed Huntington's disease from India. *J Neurol Sci* 2001;**190**:73–8	No participants with dementia/not separately analysed
Murphy S, Churchill S, Bry L, Chueh H, Weiss S, Lazarus R, *et al*. Instrumenting the health care enterprise for discovery research in the genomic era. *Genome Res* 2009;**19**:1675–81	No participants with dementia/not separately analysed
Nagaratnam N, Lewis-Jones M, Scott D, Palazzi L. Behavioral and psychiatric manifestations in dementia patients in a community: caregiver burden and outcome. *Alzheimer Dis Assoc Disord* 1998;**12**:330–4	Not intervention study
Nagaratnam N, Patel I, Whelan C. Screaming, shrieking and muttering: the noise-makers amongst dementia patients. *Arch Gerontol Geriatr* 2003;**36**:247–58	Not intervention study
Nagaratnam N, Phan TA, Barnett C, Ibrahim N. Angular gyrus syndrome mimicking depressive pseudodementia. *J Psychiatry Neurosci* 2002;**27**:364–8	No participants with dementia/not separately analysed
Nagaratnam N, Wong M, Gunja N. Dementia-related behavioral changes – a physician's office-based study. *Arch Gerontol Geriatr* 2001;**32**:67–76	Not intervention study
Nakaoka A, Suto S, Makimoto K, Yamakawa M, Shigenobu K, Tabushi K. Pacing and lapping movements among institutionalized patients with dementia. *Am J Alzheimers Dis Other Demen* 2010;**25**:167–72	Not intervention study

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Nakimuli-Mpungu E, Musisi S, Mpungu SK, Katabira E. Primary mania versus HIV-related secondary mania in Uganda. *Am J Psychiatry* 2006;**163**:1349–54	No participants with dementia/not separately analysed
Namazi KH, Rosner TT, Calkins MP. Visual barriers to prevent ambulatory Alzheimers patients from exiting through an emergency door. *Gerontologist* 1989;**29**:699–702	No quantitative outcome
Narevic E, Giles GM, Rajadhyax R, Managuelod E, Monis F, Diamond F. The effects of enhanced program review and staff training on the management of aggression among clients in a long-term neurobehavioral rehabilitation program. *Aging Mental Health* 2011;**15**:103–12	No participants with dementia/not separately analysed
Narumoto J, Miya H, Shibata K, Nakamae T, Okamura A, Matsuoka T, *et al*. Challenging behavior of patients with frontal dysfunction managed successfully with behavioral intervention. *Psychogeriatrics* 2009;**9**:147–50	No comparator
Nassisi D, Korc B, Hahn S, Bruns J Jr, Jagoda A. The evaluation and management of the acutely agitated elderly patient. *Mount Sinai J Med* 2006;**73**:976–84	No participants with dementia/not separately analysed
Navarrete F, Perez-Ortiz J, Femenia T, Garcia-Gutierrez M, Garcia-Paya M, Leiva-Santana C, *et al*. Methods to evaluate cognitive disorders in animal models. *Rev Neurol* 2008;**47**:137–45	No participants with dementia/not separately analysed
Nelson RJ, Trainor BC. Neural mechanisms of aggression. *Nature Rev Neurosci* 2007;**8**:536–46	No participants with dementia/not separately analysed
Neugroschl J. Agitation – how to manage behavior disturbances in the older patient with dementia. *Geriatrics* 2002;**57**:33–7	No participants with dementia/not separately analysed
Newhouse PA, Sunderland T, Tariot PN, Weingartner H, Thompson K, Mellow AM, *et al*. The effects of acute scopolamine in geriatric depression. *Arch Gen Psychiatry* 1988;**45**:906–12	No participants with dementia/not separately analysed
Ng B, Camacho A, Lara DR, Brunstein MG, Pinto OC, Akiskal HS. A case series on the hypothesized connection between dementia and bipolar spectrum disorders: bipolar type VI? *J Affect Disord* 2008;**107**:307–15	Not intervention study
Nguyen Qa, Paton C. The use of aromatherapy to treat behavioural problems in dementia. *Int J Geriatr Psychiatry* 2008;**23**:337–46	Not primary research
Nguyen VT, Love AR, Kunik ME. Preventing aggression in persons with dementia. *Geriatrics* 2008;**63**:21–6	Not primary research
Nickel C, Labmann C, Tritt K, Muehlbacher M, Kaplan P, Kettler C, *et al*. Topiramate in treatment of depressive and anger symptoms in female depressive patients: a randomized, double-blind, placebo-controlled study. *J Affect Disord* 2005;**87**:243–52	No participants with dementia/not separately analysed
Niederhofer H. Acetylcholinesterase inhibitors may improve efficacy and reduce adverse effects of tricyclic antidepressants for depression. *Drugs Aging* 2008;**25**:715	No participants with dementia/not separately analysed
Niemeijer AR, Frederiks BJ, Riphagen II, Legemaate J, Eefsting JA, Hertogh CM. Ethical and practical concerns of surveillance technologies in residential care for people with dementia or intellectual disabilities: an overview of the literature. *Int Psychogeriatr* 2010;**22**:1129–42	Not primary research
Nishtala PS, McLachlan AJ, Bell J, Chen TF. Determinants of antipsychotic medication use among older people living in aged care homes in Australia. *Int J Geriatr Psychiatry* 2010;**25**:449–57	Not intervention study
Nobili A, Riva E, Tettamanti M, Lucca U, Liscio M, Petrucci B, *et al*. The effect of a structured intervention on caregivers of patients with dementia and problem behaviours – a randomised controlled pilot study. *Alzheimer Dis Assoc Disord* 2004;**18**:75–82	No outcome measuring agitation

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Nolan BAD, Mathews RM. Facilitating resident information seeking regarding meals in a special care unit: an environmental design intervention. *J Gerontol Nurs* 2004;**30**:12	No participants with dementia/not separately analysed
Nooyens AC, van Gelder BM, Verschuren W. Smoking and cognitive decline among middle-aged men and women: the Doetinchem Cohort Study. *Am J Public Health* 2008;**98**:2244–50	No participants with dementia/not separately analysed
Nordheim J, Liebich M. Dementia and challenging behavior: results of a study on the structured care concept "Serial Trial Intervention". *Z Gerontol Geriatr* 2010;**43**:70–1	Conference Presentation Only
Nordheim J. Reduction of challenging behavioural pattern in people with dementia: serial trial intervention as strategy for nurses. Development and examination of a German frame with the STI-D-study. *Z Gerontol Geriatr* 2008;**41**:41–2	Conference Presentation Only
Norton MJ, Allen RS, Snow A, Hardin J, Burgio LD. Predictors of need-driven behaviors in nursing home residents with dementia and associated certified nursing assistant burden. *Aging Mental Health* 2010;**14**:303–9	Not intervention study
Norwitz ER, Repke JT. Obstetric issues in women with neurologic diseases. *Curr Problems Obstet Gynecol Fertil* 1997;**20**:191–230	No participants with dementia/not separately analysed
Nygaard HA, Bakke K, Brudvik E, Elgen K, Lien GK. Dosing of neuroleptics in elderly demented patients with aggressive and agitated behavior – a double-blind study with zuclopenthixol. *Curr Med Res Opin* 1994;**13**:222–32	Not a psychological, behavioural, sensory or environmental intervention
Nygaard HA, Fuglum E, Elgen K. Zuclopenthixol, Melperone and haloperidol levomepromazine in the elderly – metaanalysis of 2 double-blind trials at 15 nursing-homes in Norway. *Curr Med Res Opin* 1992;**12**:615–22	No participants with dementia/not separately analysed
Nyman S, Almqvist EW. Aggression in Huntington's disease: measure instrument for assessment of interventions and guidelines for strategies in aggressive behaviour. *J Neurol Neurosurg Psychiatry* 2005;**76**:A27–A54	No participants with dementia/not separately analysed
Nyth AL, Gottfries CG. The clinical efficacy of citalopram in treatment of emotional disturbances in dementia disorders – a Nordic multicenter study. *Br J Psychiatry* 1990;**157**:894–901	Not a psychological, behavioural, sensory or environmental intervention
O'Connor DW, Ames D, Gardner B, King M. Psychosocial treatments of psychological symptoms in dementia: a systematic review of reports meeting quality standards. *Int Psychogeriatr* 2009;**21**:241–51	Not primary research
Ohadinia S, Noroozian M, Shahsavand S, Saghafi S. Evaluation of insomnia and daytime napping in Iranian Alzheimer disease patients – relationship with severity of dementia and comparison with normal adults. *Am J Geriatr Psychiatry* 2004;**12**:517–22	Not intervention study
Okura T, Plassman BL, Steffens DC, Llewellyn D, Potter GG, Langa KM. Prevalence of neuropsychiatric symptoms and their association with functional limitations in older adults in the United States: the Aging, Demographics, and Memory study. *J Am Geriatr Soc* 2010;**58**:330–7	Not intervention study
Okura T, Plassman BL, Steffens DC, Llewellyn DJ, Potter GG, Langa KM. Neuropsychiatric symptoms and the risk of institutionalization and death: the Aging, Demographics, and Memory study. *J Am Geriatr Soc* 2011;**59**:473–81	Not intervention study
Olafsson K, Jorgensen S, Jensen HV, Bille A, Arup P, Andersen J. Fluvoxamine in the treatment of demented elderly patients – a double-blind, placebo-controlled study. *Acta Psychiatrica Scandinavica* 1992;**85**:453–6	Not a psychological, behavioural, sensory or environmental intervention
Olin JT, Fox LS, Pawluczyk S, Taggart NA, Schneider LS. A pilot randomized trial of carbamazepine for behavioral symptoms in treatment-resistant outpatients with Alzheimer disease. *Am J Geriatr Psychiatry* 2001;**9**:400–5	Not a psychological, behavioural, sensory or environmental intervention

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Onega LL, Abraham IL. Factor structure of the Dementia Mood Assessment Scale in a cohort of community-dwelling elderly. *Int Psychogeriatr* 1997;**9**:449–57	No participants with dementia/not separately analysed
Onor ML, Saina M, Trevisiol M, Cristante T, Aguglia E. Clinical experience with risperidone in the treatment of behavioural and psychological symptoms of dementia. *Prog Neuro-Psychopharmacol Biol Psychiatry* 2007;**31**:205–9	Not a psychological, behavioural, sensory or environmental intervention
Opie J, Doyle C, O'Connor DW. Challenging behaviours in nursing home residents with dementia: a randomized controlled trial of multidisciplinary interventions. *Int J Geriatr Psychiatry* 2002;**17**:6–13	Multidisciplinary team input including pharmacological intervention
Orengo CA, Kunik ME, Molinari VA, Teasdale TA, Workman RH, Yudofsky SC. Association of serum cholesterol and triglyceride levels with agitation and cognitive function in a geropsychiatry unit. *J Geriatr Psychiatry Neurol* 1996;**9**:53–6	No participants with dementia/not separately analysed
Orsulic-Jeras S, Schneider NM, Camp CJ. Special Feature: Montessori-based activities for long-term care residents with dementia. *Topics Geriatr Rehabil* 2000;**16**:78–91	No quantitative outcome
Orth M, Handley OJ, Schwenke C, Dunnett SB, Craufurd D, Ho AK, *et al*. Observing Huntington's Disease: the European Huntington's Disease Network's REGISTRY. *PLOS Curr* 2010;**2**	No participants with dementia/not separately analysed
Osborn GG, Saunders AV. Current treatments for patients with Alzheimer disease. *J Am Osteopath Assoc* 2010;**110**(Suppl. 8):S16–26	Not primary research
O'Shea E, Devane D, Murphy K, Cooney A, Casey D, Jordan F, *et al*. Effectiveness of a structured education reminiscence-based programme for staff on the quality of life of residents with dementia in long-stay units: a study protocol for a cluster randomised trial. *Trials* 2011;**12**:41	Protocol only
Osterkamp L, Mathews RM, Burgio LD, Hardin JM. Social workers' acceptability ratings of behavioral treatments and pharmacotherapy for the management of geriatric behavior problems. *Educ Gerontol* 1997;**23**:425–35	No participants with dementia/not separately analysed
Ott A, Andersen K, Dewey ME, Letenneur L, Brayne C, Copeland JRM, *et al*. Effect of smoking on global cognitive function in nondemented elderly. *Neurology* 2004;**62**:920–4	No participants with dementia/not separately analysed
Ott BR, Lapane KL, Gambassi G. Gender differences in the treatment of behavior problems in Alzheimer's disease. *Neurology* 2000;**54**:427–32	Not intervention study
Ottaviani M, Mazzeo R, Cangiotti M, Fiorani L, Majoral JP, Caminade AM, *et al*. Time evolution of the aggregation process of peptides involved in neurodegenerative diseases and preventing aggregation effect of phosphorus dendrimers studied by EPR. *Biomacromolecules* 2010;**11**:3014–21	No participants with dementia/not separately analysed
Ouldred E, Bryant C. Dementia care. Part 2: understanding and managing behavioural challenges. *Br J Nurs* 2008;**17**:242–7	Not primary research
Overall KL. Natural animal models of human psychiatric conditions: assessment of mechanism and validity. *Prog Neuro-Psychopharmacol Biol Psychiatry* 2000;**24**:727–76	No participants with dementia/not separately analysed
Overshott R, Byrne J, Burns A. Nonpharmacological and pharmacological interventions for symptoms in Alzheimer's disease. *Ex Rev Neurother* 2004;**4**:809–21	Not primary research
Overshott R, Karim S, Burns A. Cholinesterase inhibitors for delirium. *Cochrane Database Syst Rev* 2008;**1**:CD005317	No participants with dementia/not separately analysed
Ownby RL. Quetiapine and rivastigmine for agitation in Alzheimer's disease. *Curr Psychiatry Rep* 2006;**8**:10	Not a psychological, behavioural, sensory or environmental intervention

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Ozakbas S, Ormeci B, Akdede BBK, Alptekin K, Idiman E. Utilization of the auditory consonant trigram test to screen for cognitive impairment in patients with multiple sclerosis: comparison with the paced auditory serial addition test. *Multiple Sclerosis* 2004;**10**:686–9	No participants with dementia/not separately analysed
Ozdemir L, Karabulut E. Nurse education regarding agitated patients and its effects on clinical practice. *Contemp Nurse* 2009;**34**:119–28	No participants with dementia/not separately analysed
Padberg F, Stubner S, Buch K, Boetsch T, Ehrhardt T, Moller HJ, *et al*. Current therapeutic strategies in Alzheimer's dementia. *Medizinische Welt* 1999;**50**:105–13	Not primary research
Padovani A, Agosti C, Premi E, Bellelli G, Borroni B. Extrapyramidal symptoms in frontotemporal dementia: prevalence and clinical correlations. *Neurosci Lett* 2007;**422**:39–42	Not intervention study
Paleacu D, Mazeh D, Mirecki I, Even M, Barak Y. Donepezil for the treatment of behavioral symptoms in patients with Alzheimer's disease. *Clin Neuropharmacol* 2002;**25**:313–17	Not a psychological, behavioural, sensory or environmental intervention
Palijan TZ, Radeljak S, Kovac M, Kovacevic D. Relationship between comorbidity and violence risk assessment in forensic psychiatry – the implicaton of neuroimaging studies. *Psychiatr Danub* 2010;**22**:253–6	No participants with dementia/not separately analysed
Palmstierna T, Wistedt B. Staff Observation Aggression Scale, SOAS – presentation and evaluation. *Acta Psychiatrica Scand* 1987;**76**:657–63	No participants with dementia/not separately analysed
Palop JJ, Mucke L. Epilepsy and cognitive impairments in Alzheimer disease. *Arch Neurol* 2009;**66**:435–40	Not primary research
Pancrazi MP, Metais P. Clinical characteristics. *Presse Med* 2003;**32**:742–9	No participants with dementia/not separately analysed
Pancrazi MP, Metais P. Treatment of the psychological and behavioural disorders of Alzheimer's disease. *Presse Med* 2005;**34**:667–72	Not primary research
Pandharipande P, Cotton BA, Shintani A, Thompson J, Pun BT, Morris JA, *et al*. Prevalence and risk factors for development of delirium in surgical and trauma intensive care unit patients. *J Trauma-Injury Infect Crit Care* 2008;**65**:34–41	No participants with dementia/not separately analysed
Paniagua MA, Paniagua EW. The demented elder with insomnia. *Clin Geriatr Med* 2008;**24**:69	Not primary research
Panov A, Kubalik N, Brooks BR, Shaw CA. In vitro effects of cholesterol beta-d-glucoside, cholesterol and cycad phytosterol glucosides on respiration and reactive oxygen species generation in brain mitochondria. *J Membr Biol* 2010;**237**:71–7	No participants with dementia/not separately analysed
Papageorgiou C, Grapsa E, Christodoulou NG, Zerefos N, Stamatelopoulos S, Christodoulou GN. Association of serum nitric oxide levels with depressive symptoms: a study with end-stage renal failure patients. *Psychother Psychosomat* 2001;**70**:216–20	No participants with dementia/not separately analysed
Pariel-Madjlessi S, Madjlessi A, Fremont P, Belmin J. Typology of the old patients hospitalised in psychiatry: importance of the psychiatric antecedents before the age of 60 years. *Encephale Rev Psychiatr Clin Biol Therap* 2001;**27**:423–8	Not intervention study
Park H. Effect of music on pain for home-dwelling persons with dementia. *Pain Manag Nurs* 2010;**11**:141–7	No outcome measuring agitation
Parke B, Beaith A, Slater L, Clarke AM. Contextual factors influencing success or failure of emergency department interventions for cognitively impaired older people: a scoping and integrative review. *J Adv Nurs* 2011;**67**:1426–48	No participants with dementia/not separately analysed
Parnetti L, Brooks JO, Pippi M, Caputo N, Chionne F, Senin U, *et al*. Diagnosing Alzheimer's disease in very elderly patients – Relevance of some functional and psychobehavioral aspects assessed by the Gottfries-Brane-Steen Rating Scale for dementia. *Gerontology* 1997;**43**:335–42	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Pasman HRW, Onwuteaka-Philipsen BD, Kriegsman DMW, Onms ME, Ribbe MW, Van der Wal G. Discomfort in nursing home patients with severe dementia in whom artificial nutrition and hydration is forgone. *Arch Intern Med* 2005;**165**:1729–35	Not intervention study
Pasman HRW, Onwuteaka-Philipsen BD, Kriegsman DMW, Ooms ME, Ribbe MW, Van der Wal G. [Degree of discomfort following the decision to discontinue artificial nutrition and hydration in institutionalised psychogeriatric patients with severe dementia who no longer or scarcely eat or drink.] *Ned Tijdschr Geneeskd* 2006;**150**:243–8	Not intervention study
Pasman HRW, Onwuteaka-Philipsen BD, Kriegsman DMW, Ooms ME, van der Wall G, Ribbe MW. Predictors of survival in nursing home patients with severe dementia in whom artificial nutrition and hydration forgone. *Int Psychogeriatr* 2006;**18**:227–40	Not intervention study
Pasquier F, Lebert F, Lavenu I, Guillaume B. The clinical picture of frontotemporal dementia: diagnosis and follow-up. *Dementia Geriatr Cogn Disord* 1999;**10**:10–14	Not intervention study
Passmore MJ, Gardner DM, Polak Y, Rabheru K. Alternatives to atypical antipsychotics for the management of dementia-related agitation. *Drugs Aging* 2008;**25**:381–98	Not primary research
Patat A, Alberini H, Bonhomme D, Soubrane C, Allain H, Gandon JM. Effects of tiapride on electroencephalograms and cognitive functions in the elderly. *Int Clin Psychopharmacol* 1999;**14**:199–208	No participants with dementia/not separately analysed
Peak JS, Cheston RIL. Using simulated presence therapy with people with dementia. *Aging Mental Health* 2002;**6**:77–81	No comparator
Pelton GH, Devanand DP, Bell K, Marder K, Marston K, Liu XH, *et al*. Usefulness of plasma haloperidol levels for monitoring clinical efficacy and side effects in Alzheimer patients with psychosis and behavioral dyscontrol. *Am J Geriatr Psychiatry* 2003;**11**:186–93	Not a psychological, behavioural, sensory or environmental intervention
Pepersack T. [End of life of demented patients: ethical aspects.] *Revue Med Brux* 2010;**31**:333–41	Not primary research
Perls TT, Herget M. Higher Respiratory-infection rates on an Alzheimers special care unit and successful intervention. *J Am Geriatr Soc* 1995;**43**:1341–4	Not intervention study
Perneczky R. The therapy of frontotemporal dementia. *Zeitschr Psychiatr Psychol Psychotherap* 2008;**56**:47–9	Not primary research
Perri R, Koch G, Carlesimo GA, Serra L, Fadda L, Pasqualetti P, *et al*. Alzheimer's disease and frontal variant of frontotemporal dementia – a very brief battery for cognitive and behavioural distinction. *J Neurol* 2005;**252**:1238–44	No participants with dementia/not separately analysed
Peskind ER, Tsuang DW, Bonner LT, Pascualy M, Riekse RG, Snowden MB, *et al*. Propranolol for disruptive behaviors in nursing home residents with probable or possible Alzheimer disease – a placebo-controlled study. *Alzheimer Dis Assoc Disord* 2005;**19**:23–8	Not a psychological, behavioural, sensory or environmental intervention
Peters KR, Rockwood K, Black SE, Bouchard R, Gauthier S, Hogan D, *et al*. Characterizing neuropsychiatric symptoms in subjects referred to dementia clinics. *Neurology* 2006;**66**:523–8	Not intervention study
Peters KR, Rockwood K, Black SE, Hogan DB, Gauthier SG, Loy-English I, *et al*. Neuropsychiatric symptom clusters and functional disability in cognitively-impaired-not-demented individuals. *Am J Geriatr Psychiatry* 2008;**16**:136–44	No participants with dementia/not separately analysed
Petersen RC. Aging, mild cognitive impairment, and Alzheimer's disease. *Neurol Clin* 2000;**18**:789	Not primary research

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Peters-Libeu CA, Newhouse Y, Hall SC, Witkowska H, Weisgraber KH. Apolipoprotein E center dot dipalmitoylphosphatidylcholine particles are ellipsoidal in solution. *J Lipid Res* 2007;**48**:1035–44	No participants with dementia/not separately analysed
Petkova AT, Yau WM, Tycko R. Experimental constraints on quaternary structure in Alzheimer's beta-amyloid fibrils. *Biochemistry* 2006;**45**:498–512	No participants with dementia/not separately analysed
Petrie WM, Ban TA. Psycho-pharmacology for the elderly. *Prog Neuro-Psychopharmacol* 1981;**5**:335–42	Not a psychological, behavioural, sensory or environmental intervention
Petrovic M, Hurt C, Collins D, Burns A, Camus V, Liperoti R, *et al*. Clustering of behavioural and psychological symptoms in dementia (BPSD): a European Alzheimer's disease consortium (EADC) study. *Acta Clinica Belgica* 2007;**62**:426–32	No participants with dementia/not separately analysed
Philipsen M, Rosenbeck-Hansen JV, Waldemar G. [Behavioral disorders in nursing home residents. 147 consecutive referrals to an interdisciplinary team of consulting specialists.] *Ugeskr Laeger* 1999;**161**:5915–19	Not intervention study
Phillips C, Polakoff D, Maue SK, Mauch R. Assessment of constipation management in long-term care patients. *J Am Med Direct Assoc* 2001;**2**:149–54	No participants with dementia/not separately analysed
Phillips LR. Abuse of aging caregivers – test of a nursing intervention. *Adv Nurs Sci* 2008;**31**:164–81	No participants with dementia/not separately analysed
Phillips VL, Diwan S, Egner A. Development of a tool for assessment and care planning for dementia-related problem behaviors in home and community-based services programs: the Problem Behavior Inventory. *Home Health Care Serv Q* 2002;**21**:29–45	No participants with dementia/not separately analysed
Piani A, Brotini S, Dolso P, Budai R, Gigli GL. Sleep disturbances in elderly: a subjective evaluation over 65. *Arch Gerontol Geriatr* 2004;325–31	Not intervention study
Picardi A, Pasquini P, Abeni D, Fassone G, Mazzotti E, Fava GA. Psychosomatic assessment of skin diseases in clinical practice. *Psychother Psychosomat* 2005;**74**:315–22	No participants with dementia/not separately analysed
Pieper MJC, Achterberg WP, Francke AL, van der Steen JT, Scherder EJA, Kovach CR. The implementation of the serial trial intervention for pain and challenging behaviour in advanced dementia patients (STA OP!): a clustered randomized controlled trial. *BMC Geriatr* 2011;**11**:12	Protocol only
Pinheiro D. Anticonvulsant mood stabilizers in the treatment of behavioral and psychological symptoms of dementia (BPSD). *Encephale Rev Psychiatr Clin Biol Therap* 2008;**34**:409–15	Not primary research
Pirttila T, Wilcock G, Truyen L, Damaraju CV. Long-term efficacy and safety of galantamine in patients with mild-to-moderate Alzheimer's disease: multicenter trial. *Eur J Neurol* 2004;**11**:734–41	Not a psychological, behavioural, sensory or environmental intervention
Pitkala KH, Laurila JV, Strandberg TE, Tilvis RS. Behavioral symptoms and the administration of psychotropic drugs to aged patients with dementia in nursing homes and in acute geriatric wards. *Int Psychogeriatr* 2004;**16**:61–74	Not intervention study
Plosker GL, Gauthier S. Cerebrolysin: a review of its use in dementia. *Drugs Aging* 2009;**26**:893–915	Not primary research
Politis AM, Vozzella S, Mayer LS, Onyike CU, Baker AS, Lyketsos CG. A randomized, controlled, clinical trial of activity therapy for apathy in patients with dementia residing in long-term care. *Int J Geriatr Psychiatry* 2004;**19**:1087–94	No outcome measuring agitation
Pollak P. Psychic disorders. *Revue Neurologique* 2002;**158**:S125–31	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Pollero A, Gimenez M, Allegri RF, Taragano FE. [Neuropsychiatric symptoms in patients with Alzheimer disease.] *Vertex* (Buenos Aires, Argentina) 2004;**15**:5–9	Not intervention study
Pollock BG, Mulsant BH, Rosen J, Mazumdar S, Blakesley RE, Houck PR, *et al*. A double-blind comparison of citalopram and risperidone for the treatment of behavioral and psychotic symptoms associated with dementia. *Am J Geriatr Psychiatry* 2007;**15**:942–52	Not a psychological, behavioural, sensory or environmental intervention
Pollock BG, Mulsant BH, Rosen J, Sweet RA, Mazumdar S, Bharucha A, *et al*. Comparison of citalopram, perphenazine, and placebo for the acute treatment of psychosis and behavioral disturbances in hospitalized, demented patients. *Am J Psychiatry* 2002;**159**:460–5	Not a psychological, behavioural, sensory or environmental intervention
Pollock BG, Mulsant BH. Behavioral disturbances of dementia. *J Geriatr Psychiatry Neurol* 1998;**11**:206–12	Not primary research
Pontius AA. Fastest fight/flight reaction via amygdalar visual pathway implicates simple face drawing as its marker: neuroscientific data consistent with neuropsychological findings. *Aggression Violent Behav* 2005;**10**:363–73	No participants with dementia/not separately analysed
Porsteinsson AP, Tariot PN, Erb R, Cox C, Smith E, Jakimovich L, *et al*. Placebo-controlled study of divalproex sodium for agitation in dementia. *Am J Geriatr Psychiatry* 2001;**9**:58–66	Not a psychological, behavioural, sensory or environmental intervention
Porsteinsson AP, Tariot PN, Jakimovich LJ, Kowalski N, Holt C, Erb R, *et al*. Valproate therapy for agitation in dementia – open-label extension of a double-blind trial. *Am J Geriatr Psychiatry* 2003;**11**:434–40	Not a psychological, behavioural, sensory or environmental intervention
Porsteinsson AP. Divalproex sodium for the treatment of behavioural problems associated with dementia in the elderly. *Drugs Aging* 2006;**23**:877–86	Not primary research
Pot AM, van Dyck R, Jonker C, Deeg DJH. Verbal and physical aggression against demented elderly by informal caregivers in the Netherlands. *Soc Psychiatry Psychiatr Epidemiol* 1996;**31**:156–62	Not intervention study
Priano L, Gasco MR, Mauro A. Transdermal treatment options for neurological disorders – impact on the elderly. *Drugs Aging* 2006;**23**:357–75	No participants with dementia/not separately analysed
Price JD, Hermans DG, Grimley EJ. Subjective barriers to prevent wandering of cognitively impaired people. *Cochrane Database Syst Rev* 2000;**4**:CD001932	Not primary research
Pritchard A, Harris J, Pritchard C, Coates J, Haque S, Holder R, *et al*. The effect of the apolipoprotein E gene polymorphisms and haplotypes on behavioural and psychological symptoms in probable Alzheimer's disease. *J Neurol Neurosurg Psychiatry* 2007;**78**:123–6	No participants with dementia/not separately analysed
Pritchard AL, Harris J, Pritchard CW, Coates J, Haque S, Holder R, *et al*. Role of 5HT(2A) and 5HT(2C) polymorphisms in behavioural and psychological symptoms of Alzheimer's disease. *Neurobiol Aging* 2008;**29**:341–7	Not primary research
Pritchard AL, Pritchard CW, Bentham P, Lendon CL. Investigation of the role of the dopamine transporter in susceptibility to behavioural and psychological symptoms of patients with probable Alzheimer's disease. *Dementia Geriatr Cogn Disord* 2008;**26**:257–60	Not intervention study
Pritchard AL, Pritchard CW, Bentham P, Lendon CL. Role of serotonin transporter Polymorphisms in the behavioural and psychological symptoms in probable Alzheimer disease patients. *Dementia Geriatr Cogn Disord* 2007;**24**:201–6	Not intervention study
Pritchard AL, Ratcliffe L, Sorour E, Haque S, Holder R, Bentham P, *et al*. Investigation of dopamine receptors in susceptibility to behavioural and psychological symptoms in Alzheimer's disease. *Int J Geriatr Psychiatry* 2009;**24**:1020–5	Not intervention study
Profenno L, Loy R, Ryan M, Tariot P, Federoff H, Coleman P. Preliminary expression analysis of valproate-regulated serum proteins in Alzheimer's disease using SELDI protein chips. *Soc Neurosci Abstracts* 2001;**27**:2567	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Profenno LA, Jakimovich L, Holt CJ, Porsteinsson A, Tariot PN. A randomized, double-blind, placebo-controlled pilot trial of safety and tolerability of two doses of divalproex sodium in outpatients with probable Alzheimer's disease. *Curr Alzheimer Res* 2005;**2**:553–8	Not a psychological, behavioural, sensory or environmental intervention
Profenno LA, Tariot PN. Pharmacologic management of agitation in Alzheimer's disease. *Dementia Geriatr Cogn Disord* 2004;**17**:65–77	Not primary research
Proitsi P, Hamilton G, Tsolaki M, Lupton M, Daniilidou M, Hollingworth P, *et al*. A Multiple Indicators Multiple Causes (MIMIC) model of Behavioural and Psychological Symptoms in Dementia (BPSD). *Neurobiol Aging* 2011;**32**:434–42	No participants with dementia/not separately analysed
Pugh PL, Ahmed SF, Smith MI, Upton N, Hunter AJ. A behavioural characterisation of the FVB/N mouse strain. *Behav Brain Res* 2004;**155**:283–9	No participants with dementia/not separately analysed
Pugh PL, Richardson JC, Bate ST, Upton N, Sunter D. Non-cognitive behaviours in an APP/PS1 transgenic model of Alzheimer's disease. *Behav Brain Res* 2007;**178**:18–28	No participants with dementia/not separately analysed
Pulsford D, Duxbury J. Aggressive behaviour by people with dementia in residential care settings: a review. *J Psychiatr Mental Health Nurs* 2006;**13**:611–18	Not primary research
Rabinowicz AL, Starkstein SE, Leiguarda RC, Coleman AE. Transient epileptic amnesia in dementia: a treatable unrecognized cause of episodic amnestic wandering. *Alzheimer Dis Assoc Disord* 2000;**14**:231–3	Not intervention study
Rabinowitz J, Katz I, De Deyn PP, Greenspan A, Brodaty H. Treating behavioral and psychological symptoms in patients with psychosis of Alzheimer's disease using risperidone. *Int Psychogeriatr* 2007;**19**:227–40	Not primary research
Rabins PV. Developing treatment guidelines for Alzheimer's disease and other dementias. *J Clin Psychiatry* 1996;**57**:37–8	Not primary research
Raglio A, Bellelli G, Traficante D, Gianotti M, Ubezio M, Gentile S, *et al*. Efficacy of music therapy treatment based on cycles of sessions: a randomised controlled trial. *Aging Mental Health* 2010;**14**:900–4	No outcome measuring agitation
Ragneskog H, Asplund K, Kihlgren M, Norberg A. Individualized music played for agitated patients with dementia: analysis of video-recorded sessions. *Int J Nurs Prac* 2001;**7**:146–55	No comparator
Ragneskog H, Kihlgren M, Karlsson I, Norberg A. Dinner music for demented patients: analysis of video-recorded observations. *Clin Nurs Res* 1996;**5**:262	No outcome measuring agitation
Ragneskog H, Kihlgren M. Music and other strategies to improve the care of agitated patients with dementia – interviews with experienced staff. *Scand J Caring Sci* 1997;**11**:176–82	Not intervention study
Rainer M, Anderle E, Masching A, Sepandj A, Haushofer M. Prevalence and management of non-cognitive symptoms of Alzheimer's disease. *Neuropsychiatrie* 1996;**10**:161–3	Not intervention study
Rainer M, Haushofer M, Pfolz H, Struhal C, Wick W. Quetiapine versus risperidone in elderly patients with behavioural and psychological symptoms of dementia: efficacy, safety and cognitive function. *Eur Psychiatry* 2007;**22**:395–403	Not a psychological, behavioural, sensory or environmental intervention
Rainer MK, Mucke HAM, Kruger-Rainer C, Haushofer M, Kasper S. Zotepine for behavioural and psychological symptoms in dementia – an open-label study. *CNS Drugs* 2004;**18**:49–55	Not a psychological, behavioural, sensory or environmental intervention
Ramadan FH, Naughton BJ, Bassanelli AG. Treatment of verbal agitation with a selective serotonin reuptake inhibitor. *J Geriatr Psychiatry Neurol* 2000;**13**:56–9	Not a psychological, behavioural, sensory or environmental intervention
Ranen NG, Peyser CE, Folstein SE. ECT as a treatment for depression in Huntingtons-Disease. *J Neuropsychiatry Clin Neurosci* 1994;**6**:154–9	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Rao V, Rosenberg P, Bertrand M, Salehinia S, Spiro J, Vaishnavi S, *et al*. Aggression after traumatic brain injury: prevalence and correlates. *J Neuropsychiatry Clin Neurosci* 2009;**21**:420–9	No participants with dementia/not separately analysed
Rapp M, Treusch Y, Heinz A, Gutzmann H. "Challenging behavior in dementia" in nursing homes: evaluation of a project tandem nursing and physician guides prepared VIDEANT. *Z Gerontol Geriatr* 2010;**43**:71	Conference Presentation Only
Rappaport SA, Marcus RN, Manos G, McQuade RD, Oren DA. A randomized, double-blind, placebo-controlled tolerability study of intramuscular aripiprazole in acutely agitated patients with Alzheimer's, vascular, or mixed dementia. *J Am Med Direct Assoc* 2009;**10**:21–7	Not a psychological, behavioural, sensory or environmental intervention
Raskind MA, Peskind ER. Alzheimer's disease and related disorders. *Med Clin North Am* 2001;**85**:803	Not primary research
Raskind MA, Peskind ER. Neurobiological bases of noncognitive behavioral problems in Alzheimer disease. *Alzheimer Dis Assoc Disord* 1994;**8**:54–60	No participants with dementia/not separately analysed
Raskind MA, Sadowsky CH, Sigmund WR, Beitler PJ, Auster SB. Effect of tacrine on language, praxis, and noncognitive behavioral problems in Alzheimer disease. *Arch Neurol* 1997;**54**:836–40	Not primary research
Raskind MA. Evaluation and management of aggressive behavior in the elderly demented patient. *J Clin Psychiatry* 1999;**60**:45–9	Not primary research
Raskind MA. Psychopharmacology of noncognitive abnormal behaviors in Alzheimer's disease. *J Clin Psychiatry* 1998;**59**:28–32	Not primary research
Ratey JJ, Gutheil CM. The measurement of aggressive behavior: reflections on the use of the Overt Aggression Scale and the Modified Overt Aggression Scale. *J Neuropsychiatry Clin Neurosci* 1991;**3**:S57–60	No participants with dementia/not separately analysed
Ravona-Springer R, Beeri MS, Goldbourt U. Repetitive thinking as a psychological cognitive style in midlife is associated with lower risk for dementia three decades later. *Dementia Geriatr Cogn Disord* 2009;**28**:513–20	No participants with dementia/not separately analysed
Rayner AV, O'Brien JG, Shoenbachler B. Behavior disorders of dementia: recognition and treatment. *Am Fam Phys* 2006;**73**:647–52	Not primary research
Reichman WE. Alzheimer's disease: Clinical treatment options. *Am J Manag Care* 2000;**6**:S1125–38	Not primary research
Reilly DF, McNeely MJ, Doerner D, Greenberg DL, Staiger TO, Geist MJ, *et al*. Self-reported exercise tolerance and the risk of serious perioperative complications. *Arch Intern Med* 1999;**159**:2185–92	No participants with dementia/not separately analysed
Reimer MA, Slaughter S, Donaldson C, Currie G, Eliasziw M. Special care facility compared with traditional environments for dementia care: a longitudinal study of quality of life. *J Am Geriatr Soc* 2004;**52**:1085–92	Not intervention study
Reitz C, den Heijer T, van Duijn C, Hofman A, Breteler M. Relation between smoking and risk of dementia and Alzheimer disease – the Rotterdam Study. *Neurology* 2007;**69**:998–1005	No participants with dementia/not separately analysed
Renwick S, Fox C, Edwards C. Operationalising anger and aggression in mental health settings. The application of validated theories of anger to interventions for people with dementia. *Neurobiol Aging* 2002;**23**:S545	Not intervention study
Rhodes-Kropf J, Cheng H, Castillo EH, Fulton AT. Managing the patient with dementia in long-term care. *Clin Geriatr Med* 2011;**27**:135	Not primary research
Rhodes-Kropf J, Lantz MS. Alternative medicine – achieving balance between herbal remedies and medical therapy. *Geriatrics* 2001;**56**:44	Not a psychological, behavioural, sensory or environmental intervention
Rhymes JA, McCullough LB, Luchi RJ, Teasdale TA, Wilson N. Withdrawing very low-burden interventions in chronically ill patients. *JAMA* 2000;**283**:1061–3	Not primary research

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Rialle V, Ollivet C, Guigui C, Herve C. What do family caregivers of Alzheimer's disease patients desire in smart home technologies? *Methods Inform Med* 2008;**47**:63–9	No participants with dementia/not separately analysed
Richeson NE, Neill DJ. Therapeutic recreation music intervention to decrease mealtime agitation and increase. *Am J Recreation Ther* 2004;**3**:37–41	No quantitative outcome
Richeson NE. Effects of animal-assisted therapy on agitated behaviors and social interactions of older adults with dementia. *Am J Alzheimers Dis Other Demen* 2003;**18**:353–8	No outcome measuring agitation
Richter JM, Roberto KA, Bottenberg DJ. Communicating with persons with Alzheimers disease – experiences of family and formal caregivers. *Arch Psychiatr Nurs* 1995;**9**:279–85	Not intervention study
Richy F, Makaroff L, Pietri G, Moorcroft E, Winkelman J. Restless Legs Syndrome (RLS) and Subsequent Cardiovascular (CV) Risk in a US observational setting. *Neurology* 2011;**76**:A549	No participants with dementia/not separately analysed
Riemersma-van der Lek R, Swaab DF, Twisk J, Hol EM, Hoogendijk WJ, Van Someren EJ. Effect of bright light and melatonin on cognitive and noncognitive function in elderly residents of group care facilities – a randomized controlled trial. *JAMA* 2008;**299**:2642–55	No participants with dementia/not separately analysed
Rigaud AS, Pino M, Wu YH, De Rotrou J, Boulay M, Seux ML, *et al*. Support for patients with Alzheimer's disease and their caregivers by gerontechnology. *Geriatr Psychol Neuropsychiatr Vieil* 2011;**9**:91–100	Not primary research
Rikkert MGMO, Rigaud ASP. Melatonin in elderly patients with insomnia – a systematic review. *Z Gerontol Geriatr* 2001;**34**:491–7	No participants with dementia/not separately analysed
Risse SC, Lampe TH, Cubberley L. Very low-dose neuroleptic treatment in 2 patients with agitation associated with Alzheimers disease. *J Clin Psychiatry* 1987;**48**:207–8	Not a psychological, behavioural, sensory or environmental intervention
Rivail L, Chipot C, Maigret B, Bestel I, Sicsic S, Tarek M. Large-scale molecular dynamics of a G protein-coupled receptor, the human 5-HT4 serotonin receptor, in a lipid bilayer. *J Mol Structure-Theochem* 2007;**817**:19–26	No participants with dementia/not separately analysed
Rivas-Vazquez RA, Carrazana EJ, Rey GJ, Blais MA, Racher DA. Alzheimer's disease: pharmacological treatment and management. *Clin Neuropsychol* 2000;**14**:93–109	Not primary research
Riveravazquez AB, Noriegasanchez A, Ramirezgonzalez R, Martinezmaldonado M. Acute hypercalcemia in hemodialysis patients – distinction from dialysis dementia. *Nephron* 1980;**25**:243–6	No participants with dementia/not separately analysed
Roberge RF. Agitation in elderly people – diagnostic and therapeutic approach. *Can Fam Phys* 1996;**42**:2392–8	No participants with dementia/not separately analysed
Robert PH, Allain H. Clinical management of agitation in the elderly with tiapride. *Eur Psychiatry* 2001;**16**:42S-7S	Not primary research
Roberts C. The management of wandering in older people with dementia. *J Clin Nurs* 1999;**8**:322–3	No quantitative outcome
Robinson L, Bamford C, Briel R, Spencer J, Whitty P. Improving patient-centered care for people with dementia in medical encounters: an educational intervention for old age psychiatrists. *Int Psychogeriatr* 2010;**22**:129–38	No participants with dementia/not separately analysed
Robinson L, Brittain K, Lindsay S, Jackson D, Olivier P. Keeping In Touch Everyday (KITE) project: developing assistive technologies with people with dementia and their carers to promote independence. *Int Psychogeriatr* 2009;**21**:494–502	Not intervention study

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Robinson L, Hutchings D, Corner L, Beyer F, Dickinson H, Vanoli A, *et al*. A systematic literature review of the effectiveness of non-pharmacological interventions to prevent wandering in dementia and evaluation of the ethical implications and acceptability of their use. *Health Technol Assess* 2006;**10**(26)	Not primary research
Robinson L, Hutchings D, Corner L, Finch T, Hughes J, Brittain K, *et al*. Balancing rights and risks: conflicting perspectives in the management of wandering in dementia. *Health Risk Soci* 2007;**9**:389–406	Not intervention study
Robinson L, Hutchings D, Dickinson H, Corner L, Beyer F, Finch T, *et al*. Effectiveness and acceptability of non-pharmacological interventions to reduce wandering in dementia: a systematic review. *Int J Geriatr Psychiatry* 2007;**22**:9–22	Not primary research
Editorial Staff. Robotherapy in dementia care: a pilot project using artificial reality in dementia care. *Can Nurs Home* 2005;**16**:19–22	No quantitative outcome
Rockwell E, Jackson E, Vilke G, Jeste DV. A study of delusions in a large cohort of Alzheimers disease patients. *Am J Geriatr Psychiatry* 1994;**2**:157–64	Not intervention study
Rockwood K, Black SE, Robillard A, Lussier I. Potential treatment effects of donepezil not detected in Alzheimer's disease clinical trials: a physician survey. *Int J Geriatr Psychiatry* 2004;**19**:954–60	Not intervention study
Rockwood K, Dobbs AR, Rule BG, Howlett SE, Black WR. The impact of pacemaker implantation on cognitive-functioning in elderly patients. *J Am Geriatr Soc* 1992;**40**:142–6	No participants with dementia/not separately analysed
Rockwood K, Moorhouse PK, Song X, MacKnight C, Gauthier S, Kertesz A, *et al*. Disease progression in vascular cognitive impairment: cognitive, functional and behavioural outcomes in the Consortium to Investigate Vascular Impairment of Cognition (CIVIC) cohort study. *J Neurol Sci* 2007;**252**:106–12	Not intervention study
Rodda J, Morgan S, Walker Z. Are cholinesterase inhibitors effective in the management of the behavioral and psychological symptoms of dementia in Alzheimer's disease? A systematic review of randomized, placebo-controlled trials of donepezil, rivastigmine and galantamine. *Int Psychogeriatr* 2009;**21**:813–24	Not primary research
Roger M, Gerard D, Leger JM. Agitation in elderly: interest of tiapride. A review. *Encephale Rev Psychiatr Clin Biol Therap* 1998;**24**:462–8	No participants with dementia/not separately analysed
Rohde A, Marneros A. Psychoses during puerperium – symptoms, course and long-term prognosis. *Geburtshilfe Frauenheilkunde* 1993;**53**:800–10	No participants with dementia/not separately analysed
Rojas-Fernandez CH, Lanctot KL, Allen DD, MacKnight C. Pharmacotherapy of behavioral and psychological symptoms of dementia: time for a different paradigm? *Pharmacotherapy* 2001;**21**:74–102	Not primary research
Rolland Y, Andrieu S, Cantet C, Morley JE, Thomas D, Nourhashemi F, *et al*. Wandering behavior and Alzheimer disease. The REAL.FR prospective study. *Alzheimer Dis Assoc Disord* 2007;**21**:31–8	Not intervention study
Rolland Y, Payoux P, Lauwers-Cances V, Voisin T, Esquerre JP, Vellas B. A SPECT study of wandering behavior in Alzheimer's disease. *Int J Geriatr Psychiatry* 2005;**20**:816–20	Not intervention study
Rolland Y, Van Kan G, Hermabessiere S, Gerard S, Guyonnet-Gillette S, Vellas B. Descriptive study of nursing home residents from the REHPA network. *J Nutr Health Aging* 2009;**13**:679–83	No participants with dementia/not separately analysed
Romero B, Wenz M. Results of a multimodal treatment programme for persons with dementia and family caregivers in the Alzheimer Therapy Centre Bad Aibling. *Z Gerontol Geriatr* 2002;**35**:118–28	No outcome measuring agitation
Romero B, Wenz M. Self-maintenance therapy in Alzheimer's disease. *Neuropsychol Rehabil* 2001;**11**:333–55	Not a psychological, behavioural, sensory or environmental intervention

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Rongve A, Boeve BF, Aarsland D. Frequency and correlates of caregiver-reported sleep disturbances in a sample of persons with early dementia. *J Am Geriatr Soc* 2010;**58**:480–6	Not intervention study
Rosato-Siri M, Cattaneo A, Cherubini E. Nicotine-induced enhancement of synaptic plasticity at CA3-CA1 synapses requires GABAergic interneurons in adult anti-NGF mice. *J Physiol* 2006;**576**:361–77	No participants with dementia/not separately analysed
Rose KM, Beck C, Tsai PF, Liem PH, Davila DG, Kleban M, *et al*. Sleep disturbances and nocturnal agitation behaviors in older adults with dementia. *Sleep* 2011;**34**:779–86	Not intervention study
Rosen H, Swigar ME. Depression and normal pressure hydrocephalus – dilemma in neuropsychiatric differential-diagnosis. *J Nervous Mental Dis* 1976;**163**:35–40	No participants with dementia/not separately analysed
Rosen I. Electroencephalography as a diagnostic tool in dementia. *Dementia Geriatr Cogn Disord* 1997;**8**:110–16	No participants with dementia/not separately analysed
Rosen J, Bohon S, Gershon S. Antipsychotics in the elderly. *Acta Psychiatrica Scand Suppl* 1990;**358**:170–5	No participants with dementia/not separately analysed
Rosen J, Mittal V, Mulsant BH, Degenholtz H, Castle N, Fox D. Educating the families of nursing home residents: a pilot study using a computer-based system. *J Am Med Direct Assoc* 2003;**4**:128–34	No participants with dementia/not separately analysed
Rosen J, Mulsant BH, Kollar M, Kastango KB, Mazumdar S, Fox D. Mental health training for nursing home staff using computer-based interactive video: a 6-month randomized trial. *J Am Med Direct Assoc* 2002;**3**:291–6	No participants with dementia/not separately analysed
Rosen T, Lachs MS, Bharucha AJ, Stevens SM, Teresi JA, Nebres F, *et al.* Resident-to-resident aggression in long-term care facilities: Insights from focus groups of nursing home residents and staff. *J Am Geriatr Soc* 2008;**56**:1398–408	No participants with dementia/not separately analysed
Rosen T, Lachs MS, Pillemer K. Sexual aggression between residents in nursing homes: literature synthesis of an underrecognized problem. *J Am Geriatr Soc* 2010;**58**:1970–9	Not primary research
Rosen T, Pillemer K, Lachs M. Resident-to-resident aggression in long-term care facilities: an understudied problem. *Aggression Violent Behav* 2008;**13**:77–87	No participants with dementia/not separately analysed
Rosenheck RA, Leslie DL, Sindelar JL, Miller EA, Tariot PN, Dagerman KS, *et al*. Cost–benefit analysis of second-generation antipsychotics and placebo in a randomized trial of the treatment of psychosis and aggression in Alzheimer disease. *Arch Gen Psychiatry* 2007;**64**:1259–68	Not a psychological, behavioural, sensory or environmental intervention
Rosenthal GE, Fortinsky RH. Differences in the treatment of patients with acute myocardial-infarction according to patient age. *J Am Geriatr Soc* 1994;**42**:826–32	No participants with dementia/not separately analysed
Rosler M, Frey U. Influence of treatment with acetyl-cholinesterase inhibitors on psychopathological symptoms in Alzheimer's disease. *Fortschr Neurol Psychiatr* 2002;**70**:78–83	Not primary research
Roth DL, Stevens AB, Burgio LD, Burgio KL. Timed-event sequential analysis of agitation in nursing home residents during personal care interactions with nursing assistants. *J Gerontol Series B* 2002;**57**:461–8	No participants with dementia/not separately analysed
Roth J. Huntington's Disease. *Ceska Slov Neurologie Neurochirurgie* 2010;**73**:107–23	No participants with dementia/not separately analysed
Rothman M, Dubin WR. Patients released after psychiatric commitment evaluation – comparison with the committed. *J Clin Psychiatry* 1982;**43**:90–3	No participants with dementia/not separately analysed
Rott HD. Chorea huntington – demonstration of extrapyramidal muscular activity by M-mode ultrasound. *Ultraschall in der Medizin* 1986;**7**:193–4	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Rouquet JP, Bezaury JP. Treatment of agitation in dementia – a comparative open trial of tiapride versus lorazepam. *Semaine des Hopitaux* 1984;**60**:3086–8	No participants with dementia/not separately analysed
Rovner BW, Steele CD, Shmuely Y, Folstein MF. A randomized trial of dementia care in nursing homes. *J Am Geriatr Soc* 1996;**44**:7–13	No outcome measuring agitation
Rowe MA, Vandeveer SS, Greenblum CA, List CN, Fernandez RM, Mixson NE, *et al*. Persons with dementia missing in the community: is it wandering or something unique? *BMC Geriatr* 2011;**11**:28	Not intervention study
Rowland T, Depalma L. Current neuropharmacologic interventions for the management of brain injury agitation. *Neurorehabilitation* 1995;**5**:219–32	No participants with dementia/not separately analysed
Rubin EH, Morris JC, Berg L. The progression of personality changes in senile dementia of the Alzheimer's type. *J Am Geriatr Soc* 1987;**35**:723–5	Not intervention study
Rummans TA, Lauterbach EC, Coffey CE, Royall DR, Cummings JL, Salloway S, *et al*. Pharmacologic efficacy in neuropsychiatry: a review of placebo-controlled treatment trials – a report of the ANPA committee on research. *J Neuropsychiatry Clin Neurosci* 1999;**11**:176–89	No participants with dementia/not separately analysed
Rusanen M, Kivipelto M, Quesenberry CP, Zhou J, Whitmer RA. Heavy smoking in midlife and long-term risk of Alzheimer disease and vascular dementia. *Arch Intern Med* 2010;**170**	No participants with dementia/not separately analysed
Ruths S, Straand J, Nygaard HA, Bjorvatn B, Pallesen S. Effect of antipsychotic withdrawal on behavior and sleep/wake activity in nursing home residents with dementia: a randomized, placebo-controlled, double-blinded study the Bergen District Nursing Home study. *J Am Geriatr Soc* 2004;**52**:1737–43	Not a psychological, behavioural, sensory or environmental intervention
Ryan JM. Pharmacologic approach to aggression in neuropsychiatric disorders. *Semin Clin Neuropsychiatry* 2000;**5**:238–49	No participants with dementia/not separately analysed
Sachdev P, Kruk J. Restlessness: the anatomy of a neuropsychiatric symptom. *Aus N Z J Psychiatry* 1996;**30**:38–53	No participants with dementia/not separately analysed
Sachs GS. A review of agitation in mental illness: Burden of illness and underlying pathology. *J Clin Psychiatry* 2006;**67**:5–12	Not primary research
Sajatovic M, Ramsay E, Nanry K, Thompson T. Lamotrigine therapy in elderly patients with epilepsy, bipolar disorder or dementia. *Int J Geriatr Psychiatry* 2007;**22**:945–50	Not primary research
Saletu B, Grunberger J, Anderer R. On brain protection of co-dergocrine mesylate (hydergine) against hypoxic hypoxidosis of different severity – double-blind placebo-controlled quantitative EEG and psychometric studies. *Int J Clin Pharmacol Ther* 1990;**28**:510–24	No participants with dementia/not separately analysed
Saletu M, Grunberger J, Saletu B, Mader R. Accelerated remission of alcoholic organic brain-syndrome with Emd-21657 – double-blind clinical and psychometric trials. *Arzneimittel-Forschung* 1978;**28–2**:1525–7	No participants with dementia/not separately analysed
Salvador MTG, Lopez CA, Lyketsos CG. Treatment of agitation in dementia patients. *Med Clin* 1999;**113**:592–7	Not primary research
Salzman C, Jeste DV, Meyer RE, Cohen-Mansfield J, Cummings J, Grossberg GT, *et al*. Elderly patients with dementia-related symptoms of severe agitation and aggression: consensus statement on treatment options, clinical trials methodology, and policy. *J Clin Psychiatry* 2008;**69**:889–98	Not intervention study
Salzman C. *Psychiatric Medications for Older Adults: The Concise Guide*. New York, NY: The Guildford Press: 2001	No participants with dementia/not separately analysed
Sanchez-Barcelo E, Mediavilla M, Tan D, X, Reiter R. Clinical uses of melatonin: evaluation of human trials. *Curr Med Chem* 2010;**17**:2070–95	Not primary research
Sander K, Bickel H, Horn C, Huntgeburth U, Poppert H, Sander D. Peripheral arterial disease: predictors and treatment, based on the two-year data of the INVADE study. *Deutsche Medizinische Wochenschrift* 2008;**133**:455–9	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Sands LP, Xu H, Craig BA, Eng C, Covinsky KE. Predicting change in functional status over quarterly intervals for older adults enrolled in the PACE community-based long-term care program. *Aging Clin Exp Res* 2008;**20**:419–27	No participants with dementia/not separately analysed
Sano M, Mackell JA, Ponton M, Ferreira P, Wilson J, Pawluczyk S, *et al*. The Spanish instrument protocol: design and implementation of a study to evaluate treatment efficacy instruments for Spanish-speaking patients with Alzheimer's disease. *Alzheimer Dis Assoc Disord* 1997;**11**:S57–64	Protocol only
Sasaki M, Dawson VL, Dawson TM. The NO signaling pathway in the brain: neural injury, neurological disorders, and aggression. Contemporary Neuroscience Cerebral signal transduction: from first to fourth messengers 2000;151–74	No participants with dementia/not separately analysed
Areosa SA, Sherriff F, McShane R. Memantine for dementia. *Cochrane Database Syst Rev* 2005;**3**:CD003154	Not primary research
Sato S, Mizukami K, Moro K, Tanaka Y, Asada T. Efficacy of perospirone in the management of aggressive behavior associated with dementia. *Prog Neuropsychopharmacol Biol Psychiatry* 2006;**30**:679–83	Not a psychological, behavioural, sensory or environmental intervention
Sattar SP, Padala PR, McArthur-Miller D, Roccaforte WH, Wengel SP, Burke WJ. Impact of problem alcohol use on patient behavior and caregiver burden in a geriatric assessment clinic. *J Geriatr Psychiatry Neurol* 2007;**20**:120–7	Not intervention study
Saunders K, Brain S, Ebmeier KP. Diagnosing and managing psychosis in primary care. *Practitioner* 2011;**255**:17	No participants with dementia/not separately analysed
Savage T, Crawford I, Nashed Y. Decreasing assault occurrence on a psychogeriatric ward: an agitation management model. *J Gerontol Nurs* 2004;**30**:30–7	No participants with dementia/not separately analysed
Savaskan E, Schnitzler C, Schroeder C, Cajochen C, Mueller-Spahn F, Wirz-Justice A. Treatment of behavioural, cognitive and circadian rest-activity cycle disturbances in Alzheimer's disease: haloperidol vs. quetiapine. *Int J Neuropsychopharmacol* 2006;**9**:507–16	Not a psychological, behavioural, sensory or environmental intervention
Scarmeas N, Brandt J, Blacker D, Albert M, Hadjigeorgiou G, Dubois B, *et al*. Disruptive behavior as a predictor in Alzheimer disease. *Arch Neurol* 2007;**64**:1755–61	Not intervention study
Schaefer PW. Diffusion-weighted imaging as a problem-solving tool in the evaluation of patients with acute strokelike syndromes. *TMRI* 2000;**11**:300–9	No participants with dementia/not separately analysed
Scheifes A, Stolker J, Egberts A, Nijman H, Heerdink E. Representation of people with intellectual disabilities in randomised controlled trials on antipsychotic treatment for behavioural problems. *J Intellect Disabil Res* 2011;**55**:650–64	No participants with dementia/not separately analysed
Schmidt R, Assem-Hilger E, Benke T, Dal Bianco P, Delazer M, Ladurner G, *et al*. Sex differences in Alzheimer disease. *Neuropsychiatrie* 2008;**22**:1–15	Not primary research
Schmitt JAJ, Wingen M, Ramaekers JG, Evers EAT, Riedel WJ. Serotonin and human cognitive performance. *Curr Pharm Design* 2006;**12**:2473–86	No participants with dementia/not separately analysed
Schmitz WD, Brenner AB, Bronson JJ, Ditta JL, Griffin CR, Li YW, *et al*. 5-Arylamino-1,2,4-triazin-6(1H)-one CRF(1) receptor antagonists. *Bioorgan Med Chem Lett* 2010;**20**:3579–83	No participants with dementia/not separately analysed
Schneider LS, Dagerman K, Insel PS. Efficacy and adverse effects of atypical antipsychotics for dementia: meta-analysis of randomized, placebo-controlled trials. *Am J Geriatr Psychiatry* 2006;**14**:191–210	Not primary research
Schneider LS, Dagerman KS, Insel P. Risk of death with atypical antipsychotic drug treatment for dementia – meta-analysis of randomized placebo-controlled trials. *JAMA* 2005;**294**:1934–43	Not primary research

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Schneider LS, Dagerman KS. Psychosis of Alzheimer's disease: clinical characteristics and history. *J Psychiatr Res* 2004;**38**:105–11	Not primary research
Schneider LS, Ismail MS, Dagerman K, Davis S, Olin J, McManus D, *et al*. Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE): Alzheimer's disease trial. *Schizophrenia Bull* 2003;**29**:57–72	Protocol only
Schneider LS, Katz IR, Park S, Napolitano J, Martinez RA, Azen SP. Psychosis of Alzheimer disease – validity of the construct and response to risperidone. *Am J Geriatr Psychiatry* 2003;**11**:414–25	Not primary research
Schneider LS, Pollock VE, Lyness SA. A metaanalysis of controlled trials of neuroleptic treatment in dementia. *J Am Geriatr Soc* 1990;**38**:553–63	Not primary research
Schneider LS, Pollock VE, Zemansky MF, Gleason RP, Palmer R, Sloane RB. A pilot study of low-dose L-deprenyl in Alzheimer's disease. *J Geriatr Psychiatry Neurol* 1991;**4**:143–8	Not a psychological, behavioural, sensory or environmental intervention
Schneider LS, Tariot PN, Dagerman KS, Davis SM, Hsiao JK, Ismail M, *et al*. Effectiveness of atypical antipsychotic drugs in patients with Alzheimer's disease. *N Engl J Med* 2006;**355**:1525–38	Not a psychological, behavioural, sensory or environmental intervention
Schneider LS, Tariot PN, Lyketsos CG, Dagerman KS, Davis KL, Davis S, *et al*. National Institute of Mental Health Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) – Alzheimer disease trial methodology. *Am J Geriatr Psychiatry* 2001;**9**:346–60	Protocol only
Schneider LS. Efficacy of treatment for geropsychiatric patients with severe mental illness. *Psychopharmacol Bull* 1993;**29**:501–24	Not primary research
Schoenmakers B, Buntinx F, De Lepeleire J. Can pharmacological treatment of behavioural disturbances in elderly patients with dementia lower the burden of their family caregiver? *Fam Prac* 2009;**26**:279–86	No participants with dementia/not separately analysed
Schonfeld L, King-Kallimanis B, Brown LM, Davis DM, Kearns WD, Molinari VA, *et al*. Wanderers with cognitive impairment in department of veterans affairs nursing home care units. *J Am Geriatr Soc* 2007;**55**:692–9	Not intervention study
Schreinzer D, Ballaban T, Brannath W, Lang T, Hilger E, Fasching P, *et al*. Components of behavioral pathology in dementia. *Int J Geriatr Psychiatry* 2005;**20**:137–45	No participants with dementia/not separately analysed
Schrijnemaekers VJ, van Rossum E, Candel M, Frederiks CM, Derix MM, Sielhorst H, *et al*. [Effects of emotion-oriented care on elderly people with cognitive impairment and behavioral problems in residential homes.] *Tijdschr Gerontol Geriatr* 2003;**34**:151–61	No participants with dementia/not separately analysed
Schuck S, Allain H, Bentue-Ferrer D, Gerard D. Double blind study of tiapride versus haloperidol and placebo in agitation and aggressiveness in elderly patients with cognitive impairment. *Fund Clin Pharmacol* 2000;**14**:286	Not a psychological, behavioural, sensory or environmental intervention
Schulte-Herbrueggen O, Heuser I. Affective and behavioral disorders in dementia: diagnosis and treatment. *Nervenheilkunde* 2007;**26**:663	Not primary research
Scripnikov A, Khomenko A, Napryeyenko O. Effects of *Ginkgo biloba* extract EGb 761 on neuropsychiatric symptoms of dementia: findings from a randomised controlled trial. *Wiener medizinische Wochenschrift* (1946) 2007;**157**:295–300	Not a psychological, behavioural, sensory or environmental intervention
Segatore M, Adams D. Managing delirium and agitation in elderly hospitalized orthopaedic patients: part 2–interventions. *Orthopaedic Nurs* 2001;**20**:61	No participants with dementia/not separately analysed
Seidl U, Lueken U, Voelker L, Re S, Becker S, Kruse A, *et al*. Non-cognitive symptoms and psychopharmacological treatment in demented nursing home residents. *Fortschr Neurol Psychiatr* 2007;**75**:720–7	Not intervention study
Seidl UW, Re S, Voelker L, Marin R, Kruse A, Schrober J. Apathy and non-cognitive symptoms in a population of demented nursing home residents in Germany. *Neurobiol Aging* 2004;**25**:S338	Not intervention study

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Seitz D, Adunuri N, Gill S, Gruneir A, Herrmann N, Rochon P. Antidepressants for agitation and psychosis in dementia. *Cochrane Database Syst Rev* 2011;**2**	Not primary research
Seki Y, Takahashi H, Aizawa Y. [Hemostatic evaluation of a patient with haloperidol-induced neuroleptic malignant syndrome associated with disseminated intravascular coagulation.] *Rinsho ketsueki* 1998;**39**:374–8.	Not intervention study
Selbaek G, Kirkevold O, Engedal K. The course of psychiatric and behavioral symptoms and the use of psychotropic medication in patients with dementia in Norwegian nursing homes – a 12-month follow-up study. *Am J Geriatr Psychiatry* 2008;**16**:528–36	Not intervention study
Seow D, Gauthier S. Pharmacotherapy of Alzheimer disease. *Can J Psychiatry* 2007;**52**:620–9	Not primary research
Serrano C, Martelli M, Harris P, Tufro G, Ranalli C, Taragano F, *et al*. Primary progressive aphasia: its clinical variability. An analysis of 15 cases. *Rev Neurol* 2005;**41**:527–33	No participants with dementia/not separately analysed
Sevier S, Gorek B. Cognitive evaluation in care planning for people with Alzheimer disease and related dementias. *Geriatr Nurs* 2000;**21**(2):92–7	Not primary research
Shadlen MF, Larson EB, Gibbons L, McCormick WC, Teri L. Alzheimer's disease symptom severity in blacks and whites. *J Am Geriatr Soc* 1999;**47**:482–6	Not intervention study
Shaffer DR, Dooley W, Williamson GM. Endorsement of proactively aggressive caregiving strategies moderates the relation between caregiver mental health and potentially harmful caregiving behavior. *Psychol Aging* 2007;**22**:494–504	No participants with dementia/not separately analysed
Shah A, Evans H, Parkash N. Evaluation of three aggression/agitation behaviour rating scales for use on an acute admission and assessment psychogeriatric ward. *Int J Geriatr Psychiatry* 1998;**13**:415–20	No participants with dementia/not separately analysed
Shankle WR, Nielson KA, Cotman CW. Low-dose propranolol reduces aggression and agitation resembling that associated with orbitofrontal dysfunction in elderly demented patients. *Alzheimer Dis Assoc Disord* 1995;**9**:233–7	Not a psychological, behavioural, sensory or environmental intervention
Shannon KM, Moore CG. Sleep disruption in Huntington's Disease: relationship to clinical disease features. *Neurology* 2001;**56**(Suppl. 3):A214	No participants with dementia/not separately analysed
Shea TB. Effects of dietary supplementation with N-acetyl cysteine, acetyl-L-carnitine and S-adenosyl methionine on cognitive performance and aggression in normal mice and mice expressing human ApoE4. *Neuromol Med* 2007;**9**:264–9	No participants with dementia/not separately analysed
Shega JW, Ellner L, Lau DT, Maxwell TL. Cholinesterase inhibitor and *N*-methyl-D-aspartic acid receptor antagonist use in older adults with end-stage dementia: a survey of hospice medical directors. *J Palliative Med* 2009;**12**:779–83	No participants with dementia/not separately analysed
Shega JW, Hougham GW, Stocking CB, Cox-Hayley D, Sachs GA. Management of noncancer pain in community-dwelling persons with dementia. *J Am Geriatr Soc* 2006;**54**:1892–7	Not intervention study
Shega JW, Hougham GW, Stocking CB, Cox-Hayley D, Sachs GA. Pain in community-dwelling persons with dementia: frequency, intensity, and congruence between patient and caregiver report. *J Pain Symp Manag* 2004;**28**:585–92	Not intervention study
Shelton PS, Brooks VG. Estrogen for dementia-related aggression in elderly men. *Ann Pharmacother* 1999;**33**:808–12	Not primary research
Shen WK, Hayes DL, Hammill SC, Bailey KR, Ballard DJ, Gersh BJ. Survival and functional independence after implantation of a permanent pacemaker in octogenarians and nonagenarians – a population-based study. *Ann Intern Med* 1996;**125**:476–80	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Sherratt K, Thornton A, Hatton C. Music interventions for people with dementia: a review of the literature. *Aging Mental Health* 2004;**8**:3–12	Not primary research
Shevitz S. Agitated patient. *J Family Prac* 1979;**9**:305–11	Not primary research
Shiga Y, Saito H, Mochizuki H, Chida K, Tsuburaya K. [A case of adrenoleukodystrophy having progressed from the frontal lobes.] *Rinsho shinkeigaku* 1992;**32**:600–5	No participants with dementia/not separately analysed
Shinno H, Inami Y, Inagaki T, Nakamura Y, Horiguchi J. Effect of Yi-Gan San on psychiatric symptoms and sleep structure at patients with behavioral and psychological symptoms of dementia. *Prog Neuro-Psychopharmacol Biol Psychiatry* 2008;**32**:881–5	Not a psychological, behavioural, sensory or environmental intervention
Shinoda-Tagawa T, Leonard R, Pontikas J, McDonough JE, Allen D, Dreyer PI. Resident-to-resident violent incidents in nursing homes. *JAMA* 2004;**291**:591–8	Not intervention study
Shua-Haim JR, Shua-Haim V, Ross JS. Combination therapy with donepezil and sertraline in the treatment of Alzheimer's disease. *Alzheimers Rep* 1998;**1**:303–8	Not a psychological, behavioural, sensory or environmental intervention
Shub D, Ball V, Abbas AAA, Gottumukkala A, Kunik ME. The link between psychosis and aggression in persons with dementia: a systematic review. *Psychiatr Q* 2010;**81**:97–110	Not primary research
Shuster JL. Palliative care for advanced dementia. *Clin Geriatr Med* 2000;**16**:373	Not primary research
Siddique H, Hynan LS, Weiner MF. Effect of a serotonin reuptake inhibitor on irritability, apathy, and psychotic symptoms in patients with Alzheimer's disease. *J Clin Psychiatry* 2009;**70**:915–18	Not a psychological, behavioural, sensory or environmental intervention
Siders C, Nelson A, Brown LM, Joseph I, Algase D, Beattie E, *et al*. Evidence for implementing nonpharmacological interventions for wandering. *Rehabil Nurs* 2004;**29**:195–206	Not primary research
Silver BV, Collins L, Zidek KA. Risperidone treatment of motor restlessness following anoxic brain injury. *Brain Inj* 2003;**17**:237–44	No participants with dementia/not separately analysed
Simic G, Stanic G, Mladinov M, Jovanov-Milosevic N, Kostovic I, Hof P. Does Alzheimer's disease begin in the brainstem? *Neuropathol Appl Neurobiol* 2009;**35**:532–54	No participants with dementia/not separately analysed
Simuni T, Sethi K. Nonmotor manifestations of Parkinson's disease. *Ann Neurol* 2008;**64**:S65–80	No participants with dementia/not separately analysed
Sink KM, Covinsky KE, Newcomer R, Yaffe K. Ethnic differences in the prevalence and pattern of dementia-related behaviors. *J Am Geriatr Soc* 2004;**52**:1277–83	Not intervention study
Sival RC, Albronda T, Haffmans PMJ, Saltet ML, Schellekens CMAM. Is aggressive behaviour influenced by the use of a behaviour rating scale in patients in a psychogeriatric nursing home? *Int J Geriatr Psychiatry* 2000;**15**:108–11	No participants with dementia/not separately analysed
Sival RC, Duivenvoorden HJ, Jansen PAF, Haffmans PMJ, Duursma SA, Eikelenboom P. Sodium valproate in aggressive behaviour in dementia: a twelve-week open label follow-up study. *Int J Geriatr Psychiatry* 2004;**19**:305–12	Not a psychological, behavioural, sensory or environmental intervention
Sival RC, Haffmans PMJ, Jansen PAF, Duursma SA, Eikelenboom P. Sodium valproate in the treatment of aggressive behavior in patients with dementia – a randomized placebo controlled clinical trial. *Int J Geriatr Psychiatry* 2002;**17**:579–85	Not a psychological, behavioural, sensory or environmental intervention
Skjerve A, Bjorvatn B, Holsten F. Light therapy for behavioural and psychological symptoms of dementia. *Int J Geriatr Psychiatry* 2004;**19**:516–22	Not primary research

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Skocic M, Dujmovic J, Jevtovic S, Jakovljevic M. Premorbid combat related PTSD in Huntington's disease case report. *Psychiatria Danubina* 2010;**22**:286–8	No participants with dementia/not separately analysed
Skovdahl K, Sorlie V, Kihlgren M. Tactile stimulation associated with nursing care to individuals with dementia showing aggressive or restless tendencies: an intervention study in dementia care. *Int J Older People Nurs* 2007;**2**:162–70	No comparator
Skrobik Y, Ahern S, Leblanc M, Marquis F, Awissi DK, Kavanagh BP. Protocolized intensive care unit management of analgesia, sedation, and delirium improves analgesia and subsyndromal delirium rates. *Anaesthes Analges* 2010;**111**:451–63	No participants with dementia/not separately analysed
Slachevsky A, Fuentes P. An update on the treatment of psychological and behavioral symptoms associated to dementia. *Revista Medica de Chile* 2005;**133**:1242–51	Not primary research
Slimak K. *Use of Tropical Root Crops in Dietary Intervention Strategies*. Official Gazette of the United States Patent and Trademark Office Patents 2010	No participants with dementia/not separately analysed
Slimak KM. *Use of Tropical Root Crops in Effective Intervention Strategies for Treating Difficult and Complex Cases and Chronic Diseases*. Official Gazette of the United States Patent and Trademark Office Patents 2003;**1275**(2)	No participants with dementia/not separately analysed
Sloane PD, Davidson S, Knight N, Tangen C, Mitchell CM. Severe disruptive vocalizers. *J Am Geriatr Soc* 1999;**47**:439–45	Not intervention study
Sloane PD, Mitchell CM, Preisser JS, Phillips C, Commander C, Burker E. Environmental correlates of resident agitation in Alzheimer's disease special care units. *J Am Geriatr Soc* 1998;**46**:862–9	Not intervention study
Small DH, Maksel D, Kerr ML, Ng J, Hou X, Chu C, *et al*. The beta-amyloid protein of Alzheimer's disease binds to membrane lipids but does not bind to the alpha 7 nicotinic acetylcholine receptor. *J Neurochem* 2007;**101**:1527–38	No participants with dementia/not separately analysed
Small GW. Treatment of Alzheimer's disease: Current approaches and promising developments. *Am J Med* 1998;**104**:32S–8S	Not primary research
Smallwood J, Irvine E, Coulter F, Connery H. Psychometric evaluation of a short observational tool for small-scale research projects in dementia. *Int J Geriatr Psychiatry* 2001;**16**:288–92	No participants with dementia/not separately analysed
Smith DA, Perry PJ. Nonneuroleptic treatment of disruptive behavior in organic mental syndromes. *Ann Pharmacother* 1992;**26**:1400–8	Not primary research
Smith G, Vigen V, Evans J, Fleming K, Bohac D. Patterns and associates of hyperphagia in patients with dementia. *Neuropsychiatry Neuropsychol Behav Neurol* 1998;**11**:97–102	Not intervention study
Smith GC, Strain JJ, Hammer JS, Wallack JJ, Bialer PA, Schleifer SS, *et al*. Organic mental disorders in the consultation-liaison psychiatry setting – a multi-site study. *Psychosomatics* 1997;**38**:363–73	No participants with dementia/not separately analysed
Smith H, Bruckenthal P. Implications of opioid analgesia for medically complicated patients. *Drugs Aging* 2010;**27**:417–33	No participants with dementia/not separately analysed
Smith M, Buckwalter K. Behaviors associated with dementia. *Am J Nurs* 2005;**105**:40–52	Not primary research
Smith-Jones SM, Francis GM. Disruptive, institutionalized elderly: a cost-effective intervention. *J Psychosoc Nurs Mental Health Serv* 1992;**30**:17–20	No participants with dementia/not separately analysed
Snow AL, Dani R, Souchek J, Sullivan G, Ashton CM, Kunik ME. Comorbid psychosocial symptoms and quality of life in patients with dementia. *Am J Geriatr Psychiatry* 2005;**13**:393–401	Not intervention study

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Snow AL, Hovanec L, Brandt J. A controlled trial of aromatherapy for agitation in nursing home patients with dementia. *J Alt Complement Med* 2004;**10**:431–7	No comparator
Snowdon J. Reporting changes in scores on the Cohen-Mansfield Agitation Inventory subscales. *J Clin Psychiatry* 2003;**64**:732	No participants with dementia/not separately analysed
Snowdon J. The meaning of words. *Int Psychogeriatr* 2003;**15**:219–22	No participants with dementia/not separately analysed
Snyder M, Tseng Y, Brandt C, Croghan C, Hanson S, Constantine R, *et al*. A glider swing intervention for people with dementia. *Geriatr Nurs* 2001;**22**:86–90	Some participants < 50 years old
Snyder S, Strain JJ, Fulop G. Evaluation and treatment of mental disorders in patients with Aids. *Comprehens Ther* 1990;**16**:34–41	No participants with dementia/not separately analysed
Sokol DK, Chen D, Farlow MR, Dunn DW, Maloney B, Zimmer JA, *et al*. High levels of Alzheimer beta-amyloid precursor protein (APP) in children with severely autistic behavior and aggression. *J Child Neurol* 2006;**21**(6):444–9	No participants with dementia/not separately analysed
Sokol DK, Long J, Maloney B, Chen D, Lahiri DK. Potential Alzheimer's disease markers for autism? Beta-amyloid precursor protein and acetylcholinesterase correlate with aggression in autism. *Neurology* 2009;**72**:A53	No participants with dementia/not separately analysed
Sommer BR, Fenn HH, Ketter TA. Safety and efficacy of anticonvulsants in elderly patients with psychiatric disorders: oxcarbazepine, topiramate and gabapentin. *Ex Opin Drug Saf* 2007;**6**:133–45	Not primary research
Sommer OH, Aga O, Cvancarova M, Olsen IC, Selbaek G, Engedal K. Effect of oxcarbazepine in the treatment of agitation and aggression in severe dementia. *Dementia Geriatr Cogn Disord* 2009;**27**:155–63	Not a psychological, behavioural, sensory or environmental intervention
Song JA, Algase D. Premorbid characteristics and wandering behavior in persons with dementia. *Arch Psychiatr Nurs* 2008;**22**:318–27	Not intervention study
Song JA, Algase DL, Beattie ERA, Milke DL, Duffield C, Cowan B. Comparison of U.S., Canadian, and Australian participants' performance on the Algase Wandering Scale-Version 2 (AWS-V2). *Res Theory Nurs Prac* 2003;**17**:241–56	Not intervention study
Song JH. Effects of a robot pet-assisted program for elderly people with dementia. *J Korean Acad Nurs* 2009;**39**:562–73	No outcome measuring agitation
Souder E, Heithoff K, O'Sullivan PS, Lancaster AE, Beck C. Identifying patterns of disruptive behavior in long-term care residents. *J Am Geriatr Soc* 1999;**47**:830–6	Not intervention study
Sourial R, McCusker J, Cole M, Abrahamowicz M. Agitation in demented patients in an acute care hospital: Prevalence, disruptiveness, and staff burden. *Int Psychogeriatr* 2001;**13**:183–97	Not intervention study
Spagnolo C, Dallasta D, Iannuccelli M, Cucinotta D, Passeri M. A controlled double-blind trial comparing etoperidone with thioridazine in the management of severe senile dementia. *Drugs Exp Clin Res* 1983;**9**:873–80	Not a psychological, behavioural, sensory or environmental intervention
Spalletta G, Musicco M, Padovani A, Rozzini L, Perri R, Fadda L, *et al*. Neuropsychiatric symptoms and syndromes in a large cohort of newly diagnosed, untreated patients with Alzheimer disease. *Am J Geriatr Psychiatry* 2010;**18**:1026–35	Not intervention study
Sparks MB. Inpatient care for persons with Alzheimer's disease. *Crit Care Nurs Q* 2008;**31**:65–72	Not primary research
Spear J, Chawla S, O'Reilly M, Rock D. Does the HoNOS 65+ meet the criteria for a clinical outcome indicator for mental health services for older people? *Int J Geriatr Psychiatry* 2002;**17**:226–30	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Speziale J, Black E, Coatsworth-Puspoky R, Ross T, O'Regan T, Ed C. Moving forward: evaluating a curriculum for managing responsive behaviours in a geriatric psychiatry inpatient population. *Gerontologist* 2009;**49**:570–6	No participants with dementia/not separately analysed
Spira AP, Edelstein BA. Behavioral interventions for agitation in older adults with dementia: an evaluative review. *Int Psychogeriatr* 2006;**18**:195–225	Not primary research
Spira AP, Edelstein BA. Operant conditioning in older adults with Alzheimer's disease. *Psychol Record* 2007;**57**:409–27	No outcome measuring agitation
Spiridigliozzi GA, Heller JH, Crissman BG, Sullivan-Saarela JA, Eells R, Dawson D, *et al*. Preliminary study of the safety and efficacy of donepezil hydrochloride in children with Down syndrome: a clinical report series. *Am J Med Genet Part A* 2007;**143A**:1408–13	No participants with dementia/not separately analysed
Sposaro F, Danielson J, Tyson G. iWander: An Android application for dementia patients. Conference proceedings: Annual International Conference of the IEEE Engineering in Medicine and Biology Society IEEE Engineering in Medicine and Biology Society Conference 2010;2010:3875–8	Not primary research
Squitieri F, Cannella M, Porcellini A, Brusa L, Simonelli M, Ruggieri S. Short-term effects of olanzapine in Huntington disease. *Neuropsychiatry Neuropsychol Behav Neurol* 2001;**14**:69–72	No participants with dementia/not separately analysed
Srikanth S, Nagaraja A, Ratnavalli E. Neuropsychiatric symptoms in dementia-frequency, relationship to dementia severity and comparison in Alzheimer's disease, vascular dementia and frontotemporal dementia. *J Neurol Sci* 2005;**236**:43–8	Not intervention study
Staekenborg SS, Su T, van Straaten EC, Lane R, Scheltens P, Barkhof F, *et al*. Behavioural and psychological symptoms in vascular dementia; differences between small- and large-vessel disease. *J Neurol Neurosurg Psychiatry* 2010;**81**:547–51	Not intervention study
Starkstein SE, Jorge R, Mizrahi R, Robinson RG. The construct of minor and major depression in Alzheimer's disease. *Am J Psychiatry* 2005;**162**:2086–93	Not intervention study
Starkstein SE, Jorge R, Petracca G, Robinson RG. The construct of generalized anxiety disorder in Alzheimer disease. *Am J Geriatr Psychiatry* 2007;**15**:42–9	Not intervention study
Starkstein SE, Mizrahi R, Garau L. Specificity of symptoms of depression in Alzheimer disease – a longitudinal analysis. *Am J Geriatr Psychiatry* 2005;**13**:802–7	Not intervention study
Steele C, Lucas MJ, Tune L. Haloperidol versus thioridazine in the treatment of behavioral symptoms in senile dementia of the Alzheimers type – preliminary findings. *J Clin Psychiatry* 1986;**47**:310–12	Not a psychological, behavioural, sensory or environmental intervention
Steers M, Feliciano L. A Behavioral intervention to reduce agitation in individuals with Down's syndrome and dementia. *Gerontologist* 2009;**49**:395	Conference Presentation Only
Steffens DC, Maytan M, Helms MJ, Plassman BL. Prevalence and clinical correlates of neuropsychiatric symptoms in dementia. *Am J Alzheimers Dis Other Demen* 2005;**20**:367–73	Not intervention study
Steinberg M, Munro CA, Samus Q, Rabins PV, Brandt J, Lyketsos CG. Patient predictors of response to treatment of depression in Alzheimer's disease: the DIADS study. *Int J Geriatr Psychiatry* 2004;**19**:144–50	Not a psychological, behavioural, sensory or environmental intervention
Steinberg M, Sheppard JM, Tschanz JT, Norton MC, Steffens DC, Breitner JCS, *et al*. The incidence of mental and behavioral disturbances in dementia: the cache county study. *J Neuropsychiatry Clin Neurosci* 2003;**15**:340–5	Not intervention study
Steinert T, Bergk J. Aggressive and violent behaviour. Diagnosis, prevention, and treatment. *Nervenarzt* 2008;**79**:359–68	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Stelzner G, Riedel-Heller SG, Sonntag A, Matschinger H, Jakob A, Angermeyer MC. Determinants of psychotropic drug use in residential and nursing homes. *Z Gerontol Geriatr* 2001;**34**:306–12	No participants with dementia/not separately analysed
Sterniczuk R, Antle MC, LaFerla FM, Dyck RH. Characterization of the 3xTg-AD mouse model of Alzheimer's disease: part 2. Behavioral and cognitive changes. *Brain Res* 2010;**1348**:149–55	No participants with dementia/not separately analysed
Sterniczuk R, Dyck RH, LaFerla FM, Antle MC. Characterization of the 3xTg-AD mouse model of Alzheimer's disease: part 1. Circadian changes. *Brain Res* 2010;**1348**:139–48	No participants with dementia/not separately analysed
Stevenson GS, Khan MA, Perumal N. A psychiatric intensive care unit for older adults: an interval comparison of admissions. *Int Psychogeriatr* 2009;**21**:278–85	No participants with dementia/not separately analysed
Stewart R. Neuroimaging in dementia and depression. *Curr Opin Psychiatry* 2001;**14**:371–5	Not primary research
Stoessl A. Potential therapeutic targets for Parkinson's disease. *Ex Opin Ther Targets* 2008;**12**:425–36	No participants with dementia/not separately analysed
Stoppe G, Brandt CA, Staedt JH. Behavioural problems associated with dementia – the role of newer antipsychotics. *Drugs Aging* 1999;**14**:41–54.	Not primary research
Stotsky B. Multicenter Study Comparing thioridazine with diazepam and placebo in elderly, nonpsychotic patients with emotional and behavioural disorders. *Clin Ther* 1984;**6**:546–59	Not a psychological, behavioural, sensory or environmental intervention
Street JS, Clark WS, Gannon KS, Cummings JL, Bymaster FP, Tamura RN, *et al*. Olanzapine treatment of psychotic and behavioral symptoms in patients with Alzheimer disease in nursing care facilities – a double-blind, randomized, placebo-controlled trial. *Arch Gen Psychiatry* 2000;**57**:968–76	Not a psychological, behavioural, sensory or environmental intervention
Street JS, Clark WS, Kadam DL, Mitan SJ, Juliar BE, Feldman PD, *et al*. Long-term efficacy of olanzapine in the control of psychotic and behavioral symptoms in nursing home patients with Alzheimer's dementia. *Int J Geriatr Psychiatry* 2001;**16**:S62–70	Not a psychological, behavioural, sensory or environmental intervention
Streim JE, Porsteinsson AP, Breder CD, Swanink R, Marcus R, McQuade R, *et al*. A randomized, double-blind, placebo-controlled study of aripiprazole for the treatment of psychosis in nursing home patients with Alzheimer disease. *Am J Geriatr Psychiatry* 2008;**16**:537–50	No outcome measuring agitation
Strydom A, Romeo R, Perez-Achiaga N, Livingston G, King M, Knapp M, *et al*. Service use and cost of mental disorder in older adults with intellectual disability. *Br J Psychiatry* 2010;**196**:133–8	No participants with dementia/not separately analysed
Stubbs B, Yorston G, Knight C. Physical intervention to manage aggression in older adults: how often is it employed? *Int Psychogeriatr* 2008;**20**:855–7	No participants with dementia/not separately analysed
Stubbs B. Physical intervention in older adult psychiatry: an audit of physical ailments identified by physiotherapists and the implications for managing aggressive behavior. *Int Psychogeriatr* 2009;**21**:1196–7	No participants with dementia/not separately analysed
Suedfeld P, Borrie RA. Health and therapeutic applications of chamber and flotation restricted environmental stimulation therapy (REST). *Psychol Health* 1999;**14**:545–66	Not primary research
Suh GH, Greenspan AJ, Choi SK. Comparative efficacy of risperidone versus haloperidol on behavioural and psychological symptoms of dementia. *Int J Geriatr Psychiatry* 2006;**21**:654–60	Not a psychological, behavioural, sensory or environmental intervention
Suh GH, Kim JK, Cho MJ. Community study of dementia in the older Korean rural population. *Aus N Z J Psychiatry* 2003;**37**:606–12	No participants with dementia/not separately analysed
Suh GH, Son HG, Ju YS, Jcho KH, Yeon BK, Shin YM, *et al*. A randomized, double-blind, crossover comparison of risperidone and haloperidol in Korean dementia patients with behavioral disturbances. *Am J Geriatr Psychiatry* 2004;**12**:509–16	Not a psychological, behavioural, sensory or environmental intervention

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Suh GH, Yeon BK, Shah A, Lee JY. Mortality in Alzheimer's disease: a comparative prospective Korean study in the community and nursing homes. *Int J Geriatr Psychiatry* 2005;**20**:26–34	Not intervention study
Suh GH. Agitated behaviours among the institutionalized elderly with dementia: validation of the Korean version of the Cohen-Mansfield Agitation Inventory. *Int J Geriatr Psychiatry* 2004;**19**:378–85	No participants with dementia/not separately analysed
Suhr J, Anderson S, Tranel D. Progressive muscle relaxation in the management of behavioural disturbance in Alzheimer's disease. *Neuropsychol Rehabil* 1999;**9**:31–44	No outcome measuring agitation
Sultzer DL, Davis SM, Tariot PN, Dagerman KS, Lebowitz BD, Lyketsos CG, *et al*. Clinical symptom responses to atypical antipsychotic medications in Alzheimer's disease: Phase 1 outcomes from the CATIE-AD effectiveness trial. *Am J Psychiatry* 2008;**165**:844–54	Not a psychological, behavioural, sensory or environmental intervention
Sultzer DL, Gray KF, Gunay I, Berisford MA, Mahler ME. A double-blind comparison of trazodone and haloperidol for treatment of agitation in patients with dementia. *Am J Geriatr Psychiatry* 1997;**5**:60–9	Not a psychological, behavioural, sensory or environmental intervention
Sultzer DL, Gray KF, Gunay I, Wheatley MV, Mahler ME. Does behavioral improvement with haloperidol or trazodone treatment depend on psychosis or mood symptoms in patients with dementia? *J Am Geriatr Soc* 2001;**49**:1294–300	Not a psychological, behavioural, sensory or environmental intervention
Sultzer DL, Levin HS, Mahler ME, High WM, Cummings JL. Assessment of cognitive, psychiatric, and behavioral disturbances in patients with dementia – the Neurobehavioral Rating-Scale. *J Am Geriatr Soc* 1992;**40**:549–55	No participants with dementia/not separately analysed
Sultzer DL. Psychosis and antipsychotic medications in Alzheimer's disease: clinical management and research perspectives. *Dementia Geriatr Cogn Disord* 2004;**17**:78–90	Not primary research
Sultzer DL. Selective serotonin reuptake inhibitors and trazodone for treatment of depression, psychosis, and behavioral symptoms in patients with dementia. *Int Psychogeriatr* 2000;**12**:245–51	Not a psychological, behavioural, sensory or environmental intervention
Sunderland T, Silver MA. Neuroleptics in the Treatment of Dementia. *Int J Geriatr Psychiatry* 1988;**3**:79–88	Not a psychological, behavioural, sensory or environmental intervention
Sunderland T. Treatment of the elderly suffering from psychosis and dementia. *J Clin Psychiatry* 1996;**57**:53–6	Not primary research
Sung HC, Chang AM. Use of preferred music to decrease agitated behaviours in older people with dementia: a review of the literature. *J Clin Nurs* 2005;**14**:1133–40	Not primary research
Sutor B, Rummans TA, Smith GE. Assessment and management of behavioral disturbances in nursing home patients with dementia. *Mayo Clin Proc* 2001;**76**:540–50	Not primary research
Swartz JR, Miller BL, Lesser IM, Darby AL. Frontotemporal dementia: treatment response to serotonin selective reuptake inhibitors. *J Clin Psychiatry* 1997;**58**:212–16	Not a psychological, behavioural, sensory or environmental intervention
Swearer JM, Hoople NE, Kane KJ, Drachman DA. Predicting aberrant behavior in Alzheimer's disease. *Neuropsychiatry Neuropsychol Behav Neurol* 1996;**9**:162–70	Not intervention study
Sweet RA, Nimgaonkar VL, Kamboh MI, Lopez OL, Zhang F, DeKosky ST. Dopamine receptor genetic variation, psychosis, and aggression in Alzheimer disease. *Arch Neurol* 1998;**55**:1335–40	Not intervention study
Swerdlow RH, Khan SM. A "mitochondrial cascade hypthesis" for sporadic Alzheimer's disease. *Med Hypoth* 2004;**63**:8–20	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Swett C. Inpatient seclusion: description and causes. *Bull Am Acad Psychiatry Law* 1994;**22**:421–30	No participants with dementia/not separately analysed
Swift RH, Harrigan EP, Cappelleri JC, Kramer D, Chandler LP. Validation of the behavioural activity rating scale (BARS)(TM): a novel measure of activity in agitated patients. *J Psychiatr Res* 2002;**36**:87–95	No participants with dementia/not separately analysed
Szulik J. [Antipsychotics in geriatric institutions.] *Vertex* (Buenos Aires, Argentina) 2007;**18**:454–60	Not primary research
Szymczynska P, Innes A. Evaluation of a dementia training workshop for health and social care staff in rural Scotland. *Rural Remote Health* 2011;**11**:1611	No participants with dementia/not separately analysed
Tadaka E, Kanagawa K. Effects of reminiscence group in elderly people with Alzheimer disease and vascular dementia in a community setting. *Geriatr Gerontol Int* 2007;**7**:167–73	No outcome measuring agitation
Taft LB, Barkin RL. Drug abuse? Use and misuse of psychotropic drugs in Alzheimer's care. *J Gerontol Nurs* 1990;**16**:4–10	Not primary research
Taft LB, Delaney K, Seman D, Stansell J. Dementia care creating a therapeutic milieu. *J Gerontol Nurs* 1993;**19**:30–9	Not primary research
Takahashi H, Yoshida K, Sugita T, Higuchi H, Shimizu T. Quetiapine treatment of psychotic symptoms and aggressive behavior in patients with dementia with Lewy bodies: a case series. *Prog Neuro-Psychopharmacol Biol Psychiatry* 2003;**27**:549–53	Not a psychological, behavioural, sensory or environmental intervention
Talerico KA, Evans LK, Strumpf NE. Mental health correlates of aggression in nursing home residents with dementia. *Gerontologist* 2002;**42**:169–77	Not intervention study
Talerico KA, Evans LK. Responding to safety issues in frontotemporal dementias. *Neurology* 2001;**56**:S52–5	Not primary research
Talwalker S. The cardinal features of cognitive and noncognitive dysfunction and the differential efficacy of tacrine in Alzheimer's disease patients. *J Biopharm Stat* 1996;**6**:443–56	Not intervention study
Tardiff K. Unusual diagnoses among violent patients. *Psychiatr Clin North Am* 1998;**21**:567	No participants with dementia/not separately analysed
Targum SD, Abbott JL. Psychoses in the elderly: a spectrum of disorders. *J Clin Psychiatry* 1999;**60**:4–10	No participants with dementia/not separately analysed
Tariot P, Gaile SE, Castelli NA, Porsteinsson AP. Treatment of agitation in dementia. *N Direct Mental Health Serv* 1997;**76**:109–23	Not primary research
Tariot PN, Erb R, Leibovici A, Podgorski CA, Cox C, Asnis J, *et al*. Carbamazepine treatment of agitation in nursing-home patients with dementia – a preliminary study. *J Am Geriatr Soc* 1994;**42**:1160–6	Not a psychological, behavioural, sensory or environmental intervention
Tariot PN, Jakimovich LJ, Erb R, Cox C, Lanning B, Irvine C, *et al*. Withdrawal from controlled carbamazepine therapy followed by further carbamazepine treatment in patients with dementia. *J Clin Psychiatry* 1999;**60**:684–9	Not a psychological, behavioural, sensory or environmental intervention
Tariot PN, Loy R, Ryan JM, Porsteinsson A, Ismail S. Mood stabilizers in Alzheimer's disease: symptomatic and neuroprotective rationales. *Adv Drug Deliv Rev* 2002;**54**:1567–77	Not primary research
Tariot PN, Mack JL, Patterson MB, Edland SD, Weiner MF, Fillenbaum G, *et al*. The Behavior Rating-Scale for Dementia of the consortium to establish a registry for Alzheimers disease. *Am J Psychiatry* 1995;**152**:1349–57	No participants with dementia/not separately analysed
Tariot PN, Profenno LA, Ismail MS. Efficacy of atypical antipsychotics in elderly patients with dementia. *J Clin Psychiatry* 2004;**65**:11–15	Not primary research
Tariot PN, Raman R, Jakimovich L, Schneider L, Porsteinsson A, Thomas R, *et al*. Divalproex sodium in nursing home residents with possible or probable Alzheimer disease complicated by agitation – a randomized, controlled trial. *Am J Geriatr Psychiatry* 2005;**13**:942–9	Not a psychological, behavioural, sensory or environmental intervention

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Tariot PN, Ryan JM, Porsteinsson AP, Loy R, Schneider LS. Pharmacologic therapy for behavioral symptoms of Alzheimer's disease. *Clin Geriatr Med* 2001;**17**:359	Not primary research
Tariot PN, Schneider L, Katz IR, Mintzer JE, Street J, Copenhaver M, *et al*. Quetiapine treatment of psychosis associated with dementia: a double-blind, randomized, placebo-controlled clinical trial. *Am J Geriatr Psychiatry* 2006;**14**:767–76	Not a psychological, behavioural, sensory or environmental intervention
Tariot PN, Schneider LS, Katz IR. Anticonvulsant and other non-neuroleptic treatment of agitation in dementia. *J Geriatr Psychiatry Neurol* 1995;**8**:S28–39	Not primary research
Tariot PN, Schneider LS, Mintzer JE, Cutler AJ, Cunningham MR, Thomas JW, *et al*. Safety and tolerability of divalproex sodium in the treatment of signs and symptoms of mania in elderly patients with dementia: results of a double-blind, placebo-controlled trial. *Curr Ther Res* 2001;**62**:51–67	Not a psychological, behavioural, sensory or environmental intervention
Tariot PN, Sunderland T, Weingartner H, Murphy DL, Cohen MR, Cohen RM. Naloxone and Alzheimers disease. *Arch Gen Psychiatry* 1986;**43**:727–32	Not a psychological, behavioural, sensory or environmental intervention
Tariot PN, Thal L, Jakimovich L, Thomas R, Raman R. A multicenter, randomized, double-blind, placebo-controlled trial of valproate for agitation associated with dementia. *Neurobiol Aging* 2004;**25**:S189	Not a psychological, behavioural, sensory or environmental intervention
Tariot PN. Medical management of advanced dementia. *J Am Geriatr Soc* 2003;**51**:S305–13	Not primary research
Tariot PN. Treatment strategies for agitation and psychosis in dementia. *J Clin Psychiatry* 1996;**57**:21–9	Not primary research
Taylor JL, DuQueno L, Novaco RW. Piloting a ward anger rating scale for older adults with mental health problems. *Behav Cogn Psychother* 2004;**32**:467–79	No participants with dementia/not separately analysed
Terawaki K, Ikarashi Y, Sekiguchi K, Nakai Y, Kase Y. Partial agonistic effect of yokukansan on human recombinant serotonin 1A receptors expressed in the membranes of Chinese hamster ovary cells. *J Ethnopharmacol* 2010;**127**:306–12	No participants with dementia/not separately analysed
Teri L, Hughes JP, Larson EB. Cognitive deterioration in Alzheimers disease – behavioural and health factors. *J Gerontol* 1990;**45**:58–63	Not intervention study
Teri L, Larson EB, Reifler BV. Behavioral disturbance in dementia of the Alzheimers type. *J Am Geriatr Soc* 1988;**36**:1–6	Not intervention study
Teri L, Logsdon R. Assessment and management of behavioral disturbances in Alzheimer's disease. *Comprehens Ther* 1990;**16**:36–42	Not primary research
Teri L, Logsdon RG, McCurry SM. Nonpharmacologic treatment of behavioral disturbance in dementia. *Med Clin North Am* 2002;**86**:641	Not primary research
Teri L, Logsdon RG. Methodologic issues regarding outcome measures for clinical drug trials of psychiatric complications in dementia. *J Geriatr Psychiatry Neurol* 1995;**8**:S8–17	No participants with dementia/not separately analysed
Testad I, Aasland AM, Aarsland D. The effect of staff training on the use of restraint in dementia: a single-blind randomised controlled trial. *Int J Geriatr Psychiatry* 2005;**20**:587–90	Conference Presentation Only
Testad I, Auer S, Mittelman M, Ballard C, Fossey J, Donabauer Y, *et al*. Nursing home structure and association with agitation and use of psychotropic drugs in nursing home residents in three countries: Norway, Austria and England. *Int J Geriatr Psychiatry* 2010;**25**:725–31	Not intervention study
Testad I, Ballard C, Bronnick K, Aarsland D. The effect of staff training on agitation and use of restraint in nursing home residents with dementia: a single-blind, randomized controlled trial. *J Clin Psychiatry* 2010;**71**:80–6	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Testad I, Mikkelsen A, Ballard C, Aarsland D. Health and well-being in care staff and their relations to organizational and psychosocial factors, care staff and resident factors in nursing homes. *Int J Geriatr Psychiatry* 2010;**25**:789–97	No participants with dementia/not separately analysed
Thal LJ, Ferguson JM, Mintzer J, Raskin A, Targum SD. A 24-week randomized trial of controlled-release physostigmine in patients with Alzheimer's disease. *Neurology* 1999;**52**:1146–52	Not a psychological, behavioural, sensory or environmental intervention
Thaut MH, Miltner R, Lange HW, Hurt CP, Hoemberg V. Velocity modulation and rhythmic synchronization of gait in Huntington's disease. *Movement Disord* 1999;**14**:808–19	No participants with dementia/not separately analysed
Theison AK, Geisthoff UW, Foerstl H, Schroeder SG. Agitation in the morning: symptom of depression in dementia? *Int J Geriatr Psychiatry* 2009;**24**:335–40	Not intervention study
Theuring F, Thunecke M, Kosciessa U, Turner JD. Transgenic animals as models of neurodegenerative diseases in humans. *Trends Biotechnol* 1997;**15**:320–5	No participants with dementia/not separately analysed
Thomas P, Thomas C, Billon R, Peix R, Faugeron P, Clement J. Depression and frontal dysfunction: risks for the elderly? *Encephale Rev Psychiatr Clin Biol Therap* 2009;**35**:361–9	Not intervention study
Thorgrimsen L, Spector A, Wiles A, Orrell M. Aroma therapy for dementia. *Cochrane Database Syst Rev* 2003;**3**:CD003150	Not primary research
Thorpy MJ. Sleep disorders in Parkinson's disease. *Clin Cornerstone* 2004;**6**(Suppl. 1A):S7–15	No participants with dementia/not separately analysed
Thyer J, Unal A, Thomas P, Eaton B, Bhashyam R, Ortenburg J, *et al*. Prion-removal capacity of chromatographic and ethanol precipitation steps used in the production of albumin and immunoglobulins. *Vox Sanguinis* 2006;**91**:292–300	No participants with dementia/not separately analysed
Tiberti C, Sabe L, Kuzis G, Cuerva AG, Leiguarda R, Starkstein SE. Prevalence and correlates of the catastrophic reaction in Alzheimer's disease. *Neurology* 1998;**50**:546–8	Not intervention study
Tobias CR, Turns DM, Lippmann S, Pary R, Embry CK. Psychiatric-disorders in the elderly – psychopharmacologic management. *Postgrad Med* 1988;**83**:313–19	Not a psychological, behavioural, sensory or environmental intervention
Togo T, Isojima D, Akatsu H, Suzuki K, Uchikado H, Katsuse O, *et al*. Clinical features of argyrophilic grain disease – a retrospective survey of cases with neuropsychiatric symptoms. *Am J Geriatr Psychiatry* 2005;**13**:1083–91	No participants with dementia/not separately analysed
Tollefson GD, Taylor CC. Olanzapine: Preclinical and clinical profiles of a novel antipsychotic agent. *CNS Drug Rev* 2000;**6**:303–63	No participants with dementia/not separately analysed
Toro P, Schoenknecht P, Schroeder J. Type II diabetes in mild cognitive impairment and Alzheimer's disease: results from a prospective population-based study in Germany. *J Alzheimers Dis* 2009;**16**:687–91	Not intervention study
Torta R, Badino E, Scalabrino A. Therapeutic strategies for behavioral and psychological symptoms (BPSD) in demented patients. *Arch Gerontol Geriatr* 2004;443–54	Not primary research
Tractenberg RE, Gamst A, Weiner MF, Koss E, Thomas RG, Teri L, *et al*. Frequency of behavioral symptoms characterizes agitation in Alzheimer's disease. *Int J Geriatr Psychiatry* 2001;**16**:886–91	Not intervention study
Tractenberg RE, Jin S, Patterson M, Schneider LS, Gamst A, Thomas RG, *et al*. Qualifying change: a method for defining clinically meaningful outcomes of change score computation. *J Am Geriatr Soc* 2000;**48**:1478–82	No participants with dementia/not separately analysed
Tractenberg RE, Weiner MF, Patterson MB, Teri L, Thal LJ. Comorbidity of psychopathological domains in community-dwelling persons with Alzheimer's disease. *J Geriatr Psychiatry Neurol* 2003;**16**:94–9	Not intervention study

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Traissard N, Herbeaux K, Cosquer B, Jeltsch H, Ferry B, Galani R, *et al*. Combined damage to entorhinal cortex and cholinergic basal forebrain neurons, two early neurodegenerative features accompanying Alzheimer's disease: effects on locomotor activity and memory functions in rats. *Neuropsychopharmacology* 2007;**32**:851–71	No participants with dementia/not separately analysed
Treatment of special populations with the atypical antipsychotics. Collaborative working group on clinical trial evaluations. *J Clin Psychiatry* 1998;**59**(Suppl. 12):46–52	No participants with dementia/not separately analysed
Treloar AJ, MacDonald AJD. Outcome of delirium.1. Outcome of delirium diagnosed by DSM-III-R, ICD-10 and CAMDEX and derivation of the reversible cognitive dysfunction scale among acute geriatric inpatients. *Int J Geriatr Psychiatry* 1997;**12**:609–13	No participants with dementia/not separately analysed
Treloar AJ, MacDonald AJD. Outcome of delirium.2. Clinical features of reversible cognitive dysfunction – are they the same as accepted definitions of delirium? *Int J Geriatr Psychiatry* 1997;**12**:614–18	No participants with dementia/not separately analysed
Treusch Y, Jerosch D, Majic T, Heinz A, Gutzmann H, Rapp MA. How can we provide better services for demented nursing home residents suffering from apathy? *Psychiatr Prax* 2010;**37**:84–8	Not primary research
Tsai SJ, Hwang JP, Yang CH, Liu KM. [Characteristics of dementia patients with aggressive behaviors.] *Changgeng yi xue za zhi/Changgeng ji nian yi yuan* 1995;**18**:361–4	Not intervention study
Tsoi T, Baillon S, Lindesay J. Early frontal executive impairment as a predictor of subsequent behavior disturbance in dementia. *Am J Geriatr Psychiatry* 2008;**16**:102–8	Not intervention study
Tsolaki M. Evaluation of tiapride in agitated elderly outpatients: an open study. *Hum Psychopharmacol* 2001;**16**:417–22	No participants with dementia/not separately analysed
Tsuang D, Larson EB, Li G, Shofer JB, Montine KS, Thompson ML, *et al*. Association between lifetime cigarette smoking and Lewy Body accumulation. *Brain Pathol* 2010;**20**:412–18	No participants with dementia/not separately analysed
Tueth MJ. Dementia: Diagnosis and emergency behavioral complications. *J Emerg Med* 1995;**13**:519–25	Not primary research
Tulloch KJ, Zed PJ. Intramuscular olanzapine in the management of acute agitation. *Ann Pharmacother* 2004;**38**:2128–35	Not primary research
Turner J, Snowdon J. An innovative approach to behavioral assessment and intervention in residential care: a service evaluation. *Clin Gerontol* 2009;**32**:260–75	No participants with dementia/not separately analysed
Turner S. Behavioural symptoms of dementia in residential settings: a selective review of non-pharmacological interventions. *Aging Mental Health* 2005;**9**:93–104	Not primary research
Tyas SL, White LR, Petrovitch H, Ross GW, Foley DJ, Heimovitz HK, *et al*. Mid-life smoking and late-life dementia: the Honolulu-Asia Aging Study. *Neurobiol Aging* 2003;**24**:589–96	No participants with dementia/not separately analysed
Uchida N, Egashira N, Iwasaki K, Ishibashi A, Tashiro R, Nogami A, *et al*. Yokukansan inhibits social isolation-induced aggression and methamphetamine-induced hyperlocomotion in rodents. *Biol Pharm Bull* 2009;**32**:372–5	No participants with dementia/not separately analysed
Ueki A, Morita Y, Miyoshi K. Changes in symptoms after the great Hanshin earthquake in patients with dementia. *Japan J Geriatr* 1996;**33**:573–9	Not intervention study
Uttl B, Santacruz P, Litvan I, Grafman J. Caregiving in progressive supranuclear palsy. *Neurology* 1998;**51**:1303–9	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Van de Ven L, Hectors R. [The support of relatives of the demented elderly.] *Tijdschr Gerontol Geriatr* 1983;**14**:149–56	No participants with dementia/not separately analysed
Van de WA, Feys H, De Weerdt W, Dom R. Cognitive and behavioural effects of music-based exercises in patients with dementia. *Clin Rehabil* 2004;**18**:253–60	No quantitative outcome
van der Geer E, Vink A, Schols J, Slaets J. Music in the nursing home: hitting the right note! The provision of music to dementia patients with verbal and vocal agitation in Dutch nursing homes. *Int Psychogeriatr* 2009;**21**:86–93	Not intervention study
van der Linde R, Stephan BCM, Matthews FE, Brayne C, Savva GM. Behavioural and psychological symptoms in the older population without dementia – relationship with socio-demographics, health and cognition. *BMC Geriatr* 2010;**10**:87	No participants with dementia/not separately analysed
van der Ploeg ES, Eppingstall B, O'Connor DW. The study protocol of a blinded randomised-controlled cross-over trial of lavender oil as a treatment of behavioural symptoms in dementia. *BMC Geriatr* 2010;**10**:49	Protocol only
van der Ploeg ES, O'Connor DW. Evaluation of personalised, one-to-one interaction using Montessori-type activities as a treatment of challenging behaviours in people with dementia: the study protocol of a crossover trial. *BMC Geriatr* 2010;**10**:3	Protocol only
van Diepen E, Baillon SF, Redman J, Rooke N, Spencer DA, Prettyman R. A pilot study of the physiological and behavioural effects of Snoezelen in dementia. *Br J Occup Ther* 2002;**65**	No quantitative outcome
Van Dijck A, Van Dam D, De Deyn PP. Species, strain, and gender issues in the development and validation of animal models of dementia. *Animal Models Dementia* 2011;**48**:53–75	No participants with dementia/not separately analysed
van Duijn E, Kingma E, van der Mast R. Psychopathology in verified Huntington's disease gene carriers. *J Neuropsychiatry Clin Neurosci* 2007;**19**:441–8	No participants with dementia/not separately analysed
van Duijn E. Treatment of irritability in Huntington's disease. *Curr Treat Options Neurol* 2010;**12**:424–33	No participants with dementia/not separately analysed
van Hoof J, Kort H, Rutten P, Duijnstee M. Ageing-in-place with the use of ambient intelligence technology: perspectives of older users. *Int J Med Inform* 2011;**80**:310–31	No participants with dementia/not separately analysed
van Hout HP, Vernooij-Dassen MJ, Stalman WA. Diagnosing dementia with confidence by GPs. *Fam Pract* 2007;**24**:616–21	No participants with dementia/not separately analysed
Van Leuven F, Dewachter I, Terwel D, Lasrado R, Muyllaert D, Van der Auwera I, *et al*. Multiple transgenic mice, better models for AD? *Neurobiol Ageing* 2004;**25**:S10	No participants with dementia/not separately analysed
van Marum RJ. Update on the use of memantine in Alzheimer's disease. *Neuropsychiatr Dis Treat* 2009;**5**:237–47	Not primary research
van Reekum R, Clarke D, Conn D, Herrmann N, Eryavec G, Cohen T, *et al*. A randomized, placebo-controlled trial of the discontinuation of long-term antipsychotics in dementia. *Int Psychogeriatr* 2002;**14**:197–210	Not a psychological, behavioural, sensory or environmental intervention
Vance DE, Burgio LD, Roth DL, Stevens AB, Fairchild JK, Yurick A. Predictors of agitation in nursing home residents. *J Gerontol Series B* 2003;**58**:129–37	Not intervention study
Vanderzeypen F, Bier JC, Genevrois C, Mendlewicz J, Lotstra F. Frontal dementia or dementia praecox? The case report of a psychotic disorder with a severe decline. *Encephale Rev Psychiatr Clin Biol Therap* 2003;**29**:172–80	Not intervention study
Vandijk PTM, Dippel DWJ, Habbema JDF. A behavioral rating scale as a predictor for survival of demented nursing-home patients. *Arch Gerontol Geriatr* 1994;**18**:101–13	Not intervention study

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Vargas A, Rojas-Ruiz MT, Roman SS, Salin-Pascual RJ. Development of bulimia nervosa after bariatric surgery in morbid obesity patients. *Salud Mental* 2003;**26**:28–32	No participants with dementia/not separately analysed
Vasile D, Vasiliu O, Patriche D, Stanescu B, Bancescu R. Oral risperidone efficacy in Alzheimer dementia with psychotic features. *Int J Neuropsychopharmacol* 2008;**11**:176	Not a psychological, behavioural, sensory or environmental intervention
Vecchierini MF. Sleep disturbances in Alzheimer's disease and other dementias. *Psychol Neuropsychiatr Vieil* 2010;**8**:15–23	Not primary research
Vega UM, Marinho V, Engelhardt E, Laks J. Neuropsychiatric symptoms in dementias: preliminary report of a prospective outpatient evaluation in Brazil. *Arq Neuropsiquiatr* 2007;**65**:498–502	Not intervention study
Veinbergs I, Friberg M, Rodriguez M, Hubbard D, Trotter C, LaPaglia A, *et al*. The effects of AC-90222, a m1 selective agonist with weak D2 antagonist properties, in cognitive and antipsychotic behavioral assays. *Soc Neurosci Abstracts* 2001;**27**:1457	No participants with dementia/not separately analysed
Verghese J, Mahoney J, Ambrose AF, Wang C, Holtzer R. Effect of cognitive remediation on gait in sedentary seniors. *J Gerontol Series A* 2010;**65**:1338–43	No participants with dementia/not separately analysed
Verghese J, Wang C, Lipton RB, Holtzer R, Xue X. Quantitative gait dysfunction and risk of cognitive decline and dementia. *J Neurol Neurosurg Psychiatry* 2007;**78**:929–35	Not intervention study
Verhey FRJ, Verkaaik M, Lousbert R. Olanzapine versus haloperidol in the treatment of agitation in elderly patients with dementia: results of a randomized controlled double-blind trial. *Dementia Geriatr Cogn Disord* 2006;**21**:1–8	Not a psychological, behavioural, sensory or environmental intervention
Verhoeff NPLG. Radiotracer imaging of dopaminergic transmission in neuropsychiatric disorders. *Psychopharmacology* 1999;**147**:217–49	No participants with dementia/not separately analysed
Verkaik R, Francke AL, van Meijel B, Ribbe MW, Bensing JM. Comorbid depression in dementia on psychogeriatric nursing home wards: which symptoms are prominent? *Am J Geriatr Psychiatry* 2009;**17**:565–73	Not intervention study
Verkaik R, Francke AL, van Meijel B, Spreeuwenberg PM, Ribbe MW, Bensing JM. The introduction of a nursing guideline on depression at psychogeriatric nursing home wards: effects on certified nurse assistants. *Int J Nurs Stud* 2011;**48**:710–19	Not primary research
Verma SD, Davidoff DA, Kambhampati KK. Management of the agitated elderly patient in the nursing home: the role of the atypical antipsychotics. *J Clin Psychiatry* 1998;**59**:50–5	No participants with dementia/not separately analysed
Vernooij-Dassen M, Vasse E, Zuidema S, Cohen-Mansfield J, Moyle W. Psychosocial interventions for dementia patients in long-term care. *Int Psychogeriatr* 2010;**22**:1121–8	Not primary research
Vida S, Desrosiers P, Carrier L, Gauthier S. Prevalence of depression in Alzheimers disease and validity of research diagnostic-criteria. *J Geriatr Psychiatry Neurol* 1994;**7**:238–44	Not intervention study
Vidovich MR, Lautenschlager NT, Flicker L, Clare L, Almeida OP. The PACE Study: a randomised clinical trial of cognitive activity (CA) for older adults with mild cognitive impairment (MCI). *Trials* 2009;**10**	No participants with dementia/not separately analysed
Vidovich MR, Shaw J, Flicker L, Almeida OP. Cognitive activity for the treatment of older adults with mild Alzheimer's Disease (AD) – PACE AD: study protocol for a randomised controlled trial. *Trials* 2011;**12**	Protocol only
Viggo Hansen N, Jorgensen T, Ortenblad L. Massage and touch for dementia. *Cochrane Database Syst Rev* 2006;**4**:CD004989	Not primary research

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Vilalta Franch J, Lopez Pousa S, Llinas Regla J. [Non cognitive symptoms in dementias.] *Actas Esp Psiquiatr* 1999;**27**:334–40	Not primary research
Vilalta-Franch J, Garre-Olmo J, Lopez-Pousa S, Turon-Estrada A, Lozano-Gallego M, Hernandez-Ferrandiz M, *et al*. Comparison of different clinical diagnostic criteria for depression in Alzheimer disease. *Am J Geriatr Psychiatry* 2006;**14**:589–97	Not intervention study
Vilalta-Franch J, Lopez-Pousa S, Turon-Estrada A, Lozano-Gallego M, Hernandez-Ferrandiz M, Pericot-Nierga I, *et al*. Syndromic association of behavioral and psychological symptoms of dementia in Alzheimer disease and patient classification. *Am J Geriatr Psychiatry* 2010;**18**:421–32	Not intervention study
Vilalta-Franch J, Lozano-Gallego M, Hernandez-Ferrandiz M, Llinas-Regla J, Lopez-Pousa S, Lopez OL. Neuropsychiatric inventory. The psychometric properties of its adaptation to Spanish. *Rev Neurol* 1999;**29**:15–19	No participants with dementia/not separately analysed
Vitiello MV, Borson S. Sleep disturbances in patients with Alzheimer's disease – epidemiology, pathophysiology and treatment. *CNS Drugs* 2001;**15**:777–96	Not primary research
Vloeberghs E, Coen K, Van Dam D, De Deyn PP. Validation of the APP23 transgenic mouse model of Alzheimer's disease through evaluation of risperidone treatment on aggressive behaviour. *Arzneimittel-Forschung-Drug Res* 2008;**58**:265–8	No participants with dementia/not separately analysed
Vloeberghs E, Van Dam D, Coen K, Staufenbiel M, De Deyn PP. Aggressive male APP23 mice modeling behavioral alterations in dementia. *Behav Neurosci* 2006;**120**:1380–3	No participants with dementia/not separately analysed
Vloeberghs E, Van Dam D, Franck F, Staufenbiel M, De Deyn PP. Mood and male sexual behaviour in the APP23 model of Alzheimer's disease. *Behav Brain Res* 2007;**180**:146–51	No participants with dementia/not separately analysed
Volavka J. Can aggressive behavior in humans be modified by beta blockers? *Postgrad Med* 1988;Spec No:163–8	No participants with dementia/not separately analysed
Volicer L, Camberg L, Hurley AC, Ashley J, Woods P, Ooi WL, *et al*. Dimensions of decreased psychological well-being in advanced dementia. *Alzheimer Dis Assoc Disord* 1999;**13**:192–201	No participants with dementia/not separately analysed
Volicer L, Hurley AC. Management of behavioral symptoms in progressive degenerative dementias. *J Gerontol Series A* 2003;**58**:837–45	No participants with dementia/not separately analysed
Volicer L, van der Steen JT, Frijters DH. Modifiable factors related to abusive behaviors in nursing home residents with dementia. *J Am Med Direct Assoc* 2009;**10**:617–22	Not intervention study
Volicer L. Can dietary intervention help in management of problem behaviors in dementia? *J Nutr Health Aging* 2009;**13**:499–501	Not a psychological, behavioural, sensory or environmental intervention
von Bergen M, Li L, Mandelkow E. Conformation and stability of tau and Alzheimer paired helical filaments probed by tryptophan scanning mutagenesis. *Soc Neurosci Abstract Viewer Itinerary Planner* 2003	No participants with dementia/not separately analysed
von Gunten A, Alnawaqil AM, Abderhalden C, Needham I, Schupbach B. Vocally disruptive behavior in the elderly: a systematic review. *Int Psychogeriatr* 2008;**20**:653–72	No participants with dementia/not separately analysed
von Gunten A, Favre M, Gurtner C, Abderhalden C. Vocally disruptive behavior (VDB) in the institutionalized elderly: a naturalistic multiple case report. *Arch Gerontol Geriatr* 2011;**52**:E110–16	Not intervention study
Wagenaar DB, Mickus M, Luz C, Kreft M, Sawade J. An administrator's perspective on mental health in assisted living. *Psychiatr Serv* 2003;**54**:1644–6	Not intervention study
Waldemar G, Gauthier S, Jones R, Wilkinson D, Cummings J, Lopez O, *et al*. Effect of donepezil on emergence of apathy in mild to moderate Alzheimer's disease. *Int J Geriatr Psychiatry* 2011;**26**:150–7	Not a psychological, behavioural, sensory or environmental intervention

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Walker J, Fowler S, Miller D, Sun A, Weisman G, Wood W, *et al*. Spatial learning and memory impairment and increased locomotion in a transgenic amyloid precursor protein mouse model of Alzheimer's disease. *Behav Brain Res* 2011;**222**:169–75	No participants with dementia/not separately analysed
Walsh JS, Welch HG, Larson EB. Survival of outpatients with Alzheimer-type dementia. *Ann Intern Med* 1990;**113**:429–34	Not intervention study
Walsh PN. Ageing and health issues in intellectual disabilities. *Curr Opin Psychiatry* 2005;**18**:502–6	No participants with dementia/not separately analysed
Walter LC, Lui LY, Eng C, Covinsky KE. Risk of hip fracture in disabled community-living older adults. *J Am Geriatr Soc* 2003;**51**:50–5	No participants with dementia/not separately analysed
Walzer T, Chemerinski E, Sabe L, Herrmann M, Starkstein S. Anosognosia for behavioral problems in Alzheimer's disease (AD). *J Neurol Sci* 1997;**150**:S22–3	Not intervention study
Wang CC, Lu TH, Liao WC, Yuan SC, Kuo PC, Chuang HL, *et al*. Cigarette smoking and cognitive impairment: a 10-year cohort study in Taiwan. *Arch Gerontol Geriatr* 2010;**51**:143–8	No participants with dementia/not separately analysed
Wang LY, Shofer JB, Rohde K, Hart KL, Hoff DJ, McFall YH, *et al*. Prazosin for the treatment of behavioral symptoms in patients with Alzheimer disease with agitation and aggression. *Am J Geriatr Psychiatry* 2009;**17**:744–51	Not a psychological, behavioural, sensory or environmental intervention
Ward T, Murphy E, Procter A, Weinman J. An observational study of 2 long-stay psychogeriatric wards. *Int J Geriatr Psychiatry* 1992;**7**:211–17	No participants with dementia/not separately analysed
Ward-Smith P, Llanque SM, Curran D. The effect of multisensory stimulation on persons residing in an extended care facility. *Am J Alzheimers Dis Other Demen* 2009;**24**:450–5	No quantitative outcome
Watson CG, Klett WG. Prediction of Wais scores from group ability tests. *J Clin Psychol* 1973;**29**:46–9	No participants with dementia/not separately analysed
Watson PL, Shintani AK, Tyson R, Pandharipande PP, Pun BT, Ely EW. Presence of electroencephalogram burst suppression in sedated, critically ill patients is associated with increased mortality. *Crit Care Med* 2008;**36**:3171–7	No participants with dementia/not separately analysed
Wei Z, Qi J, Dai Y, Bowen WD, Mousseau DD. Haloperidol disrupts Akt signalling to reveal a phosphorylation-dependent regulation of pro-apoptotic Bcl-XS function. *Cell Signal* 2009;**21**:161–8	No participants with dementia/not separately analysed
Weiner MF, Hynan LS, Bret ME, White C. Early behavioral symptoms and course of Alzheimer's disease. *Acta Psychiatr Scand* 2005;**111**:367–71	Not intervention study
Weiner MF, Tractenberg R, Teri L, Logsdon R, Thomas RG, Gamst A, *et al*. Quantifying behavioral disturbance in Alzheimer's disease patients. *J Psychiatr Res* 2000;**34**:163–7	No participants with dementia/not separately analysed
Weiner MF, Williams B, Risser RC. Assessment of behavioral symptoms in community-dwelling dementia patients. *Am J Geriatr Psychiatry* 1997;**5**:26–30	No participants with dementia/not separately analysed
Weinrich S, Egbert C, Eleazer GP, Haddock KS. Agitation – measurement, management, and intervention research. *Arch Psychiatr Nurs* 1995;**9**:251–60	No participants with dementia/not separately analysed
Weintraub D, Katz IR. Pharmacologic interventions for psychosis and agitation in neurodegenerative diseases: evidence about efficacy and safety. *Psychiatr Clin North Am* 2005;**28**:941	Not primary research
Weisskopf MG, Grodstein F, Ascherio A. Smoking and cognitive function in Parkinson's disease. *Move Disord* 2007;**22**:660–5	No participants with dementia/not separately analysed

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Weitzel T, Robinson S, Barnes MR, Berry TA, Holmes JM, Mercer S, *et al*. The special needs of the hospitalized patient with dementia. *Medsurg Nurs* 2011;**20**:13–19	Not primary research
Wells Y, Jorm AF. Evaluation of a special nursing home unit for dementia sufferers: a randomised controlled comparison with community care. *Aus N Z J Psychiatry* 1987;**21**:524–31	No outcome measuring agitation
Werner P, Tabak N, Alpert R, Bergman R. Interventions used by nursing staff members with psychogeriatric patients resisting care. *Int J Nurs Stud* 2002;**39**:461–7	No participants with dementia/not separately analysed
Werner S. [Physical activity for patients with dementia. Respecting autonomy.] *Pflege Zeitschrift* 2011;**64**:205	Not primary research
Wersinger S, Ginns EI, O'Carroll A, Lolait S, Young W III. Vasopressin V1b receptor knockout reduces aggressive behavior in male mice. *Mol Psychiatry* 2002;**7**:975–84	No participants with dementia/not separately analysed
Wessels AM, Pollock BG, Anyama NG, Schneider LS, Lieberman JA, Marder SR, *et al*. Association of 9-hydroxy risperidone concentrations with risk of switching or discontinuation in the clinical antipsychotic trial of intervention effectiveness – Alzheimer's disease trial. *J Clin Psychopharmacol* 2010;**30**:683–7	Not a psychological, behavioural, sensory or environmental intervention
Westbury J, Jackson S, Peterson G. Psycholeptic use in aged care homes in Tasmania, Australia. *J Clin Pharm Ther* 2010;**35**:189–93	Not intervention study
Westrich L, Sprouse J. Circadian rhythm dysregulation in bipolar disorder. *Curr Opin Invest Drugs* 2010;**11**:779–87	No participants with dementia/not separately analysed
Wetzels R, Zuidema S, de Jonghe J, Verhey F, Koopmans R. Determinants of quality of life in nursing home residents with dementia. *Dementia Geriatr Cogn Disord* 2010;**29**:189–97	Not intervention study
Wetzels R, Zuidema S, Jansen I, Verhey F, Koopmans R. Course of neuropsychiatric symptoms in residents with dementia in long-term care institutions: a systematic review. *Int Psychogeriatr* 2010;**22**:1040–53	Not primary research
Wetzels RB, Zuidema SU, de Jonghe JF, Verhey FR, Koopmans RT. Course of neuropsychiatric symptoms in residents with dementia in nursing homes over 2-year period. *Am J Geriatr Psychiatry* 2010;**18**:1054–65	Not intervention study
Weyerer S, Schaeufele M, Hendlmeier I. Evaluation of special and traditional dementia care in nursing homes: results from a cross-sectional study in Germany. *Int J Geriatr Psychiatry* 2010;**25**:1159–67	Not intervention study
Whall AL, Colling KB, Kolanowski A, Kim HJ, Hong GRS, DeCicco B, *et al*. Factors associated with aggressive behavior among nursing home residents with dementia. *Gerontologist* 2008;**48**:721–31	Not intervention study
Wheeler NL, Oyebode JR. Dementia care. 2: exploring how nursing staff manage challenging behaviour. *Nurs Times* 2010;**106**:20–2	No participants with dementia/not separately analysed
White HK, McConnell ES, Bales CW, Kuchibhatla M. A 6-month observational study of the relationship between weight loss and behavioral symptoms in institutionalized Alzheimer's disease subjects. *J Am Med Direct Assoc* 2004;**5**:89–97	Not intervention study
Whyte S. Life-enhancing dance for elders with dementia. *J Dementia Care* 2010;**18**:37–9	No outcome measuring agitation
Wiegand MH. Antidepressants for the treatment of insomnia: a suitable approach? *Drugs* 2008;**68**:2411–17	No participants with dementia/not separately analysed
Wiener PK, Kiosses DN, Klimstra S, Murphy C, Alexopoulos GS. A short-term inpatient program for agitated demented nursing home residents. *Int J Geriatr Psychiatry* 2001;**16**:866–72	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Wiener PK, Kiosses DN, Klimstra S, Murphy C, Alexopoulos GS. A short-term inpatient program for agitated demented nursing home residents. *Int J Geriatr Psychiatry* 2001;**16**:866–72	Not intervention study
Wierman HR, Wadland W, Walters M, Kuhn C, Farrington S. Nonpharmacological management of agitation in hospitalized patients with late-stage dementia: a pilot study. *J Gerontol Nurs* 2011;**37**:44–8	No quantitative outcome
Wilcock GK, Ballard CG, Cooper JA, Loft H. Memantine for agitation/aggression and psychosis in moderately severe to severe Alzheimer's disease: a pooled analysis of 3 studies. *J Clin Psychiatry* 2008;**69**:341–8	Not a psychological, behavioural, sensory or environmental intervention
Wilden BM, Wright NE. Concept of pre-death. Restlessness in dementia. *J Gerontol Nurs* 2002;**28**:24	Not intervention study
Wilkinson D, Gauthier S, Rive B. Memantine decreases, and prevents the emergence of, key behavioural symptoms of Alzheimer's disease. *Eur Neuropsychopharmacol* 2008;**18**:S507	Not a psychological, behavioural, sensory or environmental intervention
Williams A. What bothers caregivers of stroke victims? *J Neurosci Nurs* 1994;**26**:155–61	No participants with dementia/not separately analysed
Williams BR, Nazarians A, Gill MA. A review of rivastigmine: a reversible cholinesterase inhibitor. *Clin Ther* 2003;**25**:1634–53	Not primary research
Williams DP. An in-service workshop for nursing personnel on the management of catastrophic reactions in dementia victims. *Clin Gerontol* 1994;**14**:47	No participants with dementia/not separately analysed
Williams GO, Gjerde CL, Haugland S, Darnold D, Simonton LJ, Woodward PJ. Patients with dementia and their caregivers 3 years after diagnosis. A longitudinal study. *Arch Fam Med* 1995;**4**:512–17	Not intervention study
Williams GO. Management of depression in the elderly. *Primary Care* 1989;**16**:451–74	No participants with dementia/not separately analysed
Williams KN, Herman RE. Linking resident behavior to dementia care communication: effects of emotional tone. *Behav Ther* 2011;**42**:42–6	Not intervention study
Williams TI. Evaluating effects of aromatherapy massage on sleep in children with autism: a pilot study. *Evidence-Based Complement Alt Med* 2006;**3**:373–7	No participants with dementia/not separately analysed
Williams-Burgess C. Agitation in older persons with dementia: a research synthesis. *Online J Knowledge Synth Nurs* 1996;**3**:U4–22	Not primary research
Williams-Grey CH, Foltynie T, Lewis SJ, Barker RA. Cognitive deficits and psychosis in Parkinson's disease – a review of pathophysiology and therapeutic options. *CNS Drugs* 2006;**20**:477–505	No participants with dementia/not separately analysed
Willson RA. The benefit of long-term interferon alfa therapy for symptomatic mixed cryoglobulinemia (cutaneous vasculitis/membranoproliferative glomerulonephritis) associated with chronic hepatitis C infection. *J Clin Gastroenterol* 2001;**33**:137–40	No participants with dementia/not separately analysed
Winblad B, Cummings J, Andreasen N, Grossberg G, Onofrj M, Sadowsky C, *et al.* A six-month double-blind, randomized, placebo-controlled study of a transdermal patch in Alzheimer's disease – rivastigmine patch versus capsule. *Int J Geriatr Psychiatry* 2007;**22**:456–67	Not a psychological, behavioural, sensory or environmental intervention
Wingenfeld K, Seidl N, Ammann A. Preventing disruptive behavior of nursing home residents. *Z Gerontol Geriatr* 2011;**44**:27–32	No participants with dementia/not separately analysed
Wisniewski HM, Silverman W. Diagnostic criteria for the neuropathological assessment of Alzheimer's disease: current status and major issues. *Neurobiol Aging* 1997;**18**:S43–50	Not primary research
Witzke J, Rhone RA, Backhaus D, Shaver NA. How sweet the sound – research evidence for the use of music in Alzheimer's dementia. *J Gerontol Nurs* 2008;**34**:45–52	Not primary research

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Woelk H, Arnoldt K, Kieser M, Hoerr R. *Ginkgo biloba* special extract EGb 761 (R) in generalized anxiety disorder and adjustment disorder with anxious mood: a randomized, double-blind, placebo-controlled trial. *J Psychiatr Res* 2007;**41**:472–80	No participants with dementia/not separately analysed
Woerner MG, Correll CU, Alvir JM, Greenwald B, Delman H, Kane JM. Incidence of tardive dyskinesia with risperidone or olanzapine in the elderly: results from a 2-year, prospective study in antipsychotic-naive patients. *Neuropsychopharmacology* 2011;**36**:1738–46	No participants with dementia/not separately analysed
Wolfklein GP. New Alzheimers drug expands your options in symptom management. *Geriatrics* 1993;**48**:26	Not primary research
Wood LD, Neumiller JJ, Setter SM, Dobbins EK. Clinical review of treatment options for select nonmotor symptoms of Parkinson's disease. *Am J Geriatr Pharmacother* 2010;**8**:294–315	Not primary research
Woodcock JH. A neuropsychiatric approach to impulse disorders. *Psychiatr Clin North Am* 1986;**9**:341–52	No participants with dementia/not separately analysed
Woodruff-Pak DS. Animal models of Alzheimer's disease: therapeutic implications. *J Alzheimers Dis* 2008;**15**:507–21	No participants with dementia/not separately analysed
Woods DL, Rapp CG, Beck C. Escalation/de-escalation patterns of behavioral symptoms of persons with dementia. *Aging Mental Health* 2004;**8**:126–32	Not primary research
Woods RT. Discovering the person with Alzheimer's disease: cognitive, emotional and behavioural aspects. *Aging Mental Health* 2001;**5**:S7–16.	Not primary research
Wooten V. Evaluation and management of sleep disorders in the elderly. *Psychiatr Ann* 1990;**20**:466–73	No participants with dementia/not separately analysed
Wooten V. Sleep disorders in geriatric patients. *Clin Geriatr Med* 1992;**8**:427–39	No participants with dementia/not separately analysed
Workman RH, Molinari V, Rezabek P, McCullough LB, Khalsa DK, Trivedi S, *et al*. An ethical framework for understanding patients with antisocial personality disorder who develop dementia: diagnosing and managing disorders of autonomy. *J Ethics Law Aging* 1997;**3**:79–90	No participants with dementia/not separately analysed
Wright MT, Cummings JL. Neuropsychiatric disturbances Alzheimer's disease and other dementias: recognition and management. *Neurologist* 1996;**2**:207–18	Not primary research
Wroblewski BA, Joseph AB, Kupfer J, Kalliel K. Effectiveness of valproic acid on destructive and aggressive behaviours in patients with acquired brain injury. *Brain Inj* 1997;**11**:37–47	No participants with dementia/not separately analysed
Wultsch T, Chourbaji S, Fritzen S, Kittel S, Grimblatt E, Gerlach M, *et al*. Behavioural and expressional phenotyping of nitric oxide synthase-I knockdown animals. *J Neural Transmis* 2007;**72**:69–85	No participants with dementia/not separately analysed
Wynn ZJ, Cummings JL. Cholinesterase inhibitor therapies and neuropsychiatric manifestations of Alzheimer's disease. *Dementia Geriatr Cogn Disord* 2004;**17**:100–8	Not primary research
Yamamoto Ki, Shinba T. [Central noradrenergic system in psychiatry.] *Seishin shinkeigaku zasshi* 2009;**111**:741–61	Not primary research
Yamashita M, Amagai M. Family caregiving in dementia in Japan. *Appl Nurs Res* 2008;**21**:227–31	No participants with dementia/not separately analysed
Yamazaki T, Blinov N, Wishart D, Kovalenko A. Hydration effects on the HET-s prion and amyloid-beta fibrillous aggregates, studied with three-dimensional molecular theory of solvation. *Biophys J* 2008;**95**:4540–8	No participants with dementia/not separately analysed
Yao L, Algase D. Emotional intervention strategies for dementia-related behavior: a theory synthesis. *J Neurosci Nurs* 2008;**40**:106–15	No participants with dementia/not separately analysed

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Yao L, Algase D. Environmental ambiance as a new window on wandering. *West J Nurs Res* 2006;**28**:89–104	Not intervention study
Young KWH, Greenwood CE, van Reekum R, Binns MA. A randomized, crossover trial of high-carbohydrate foods in nursing home residents with Alzheimer's disease: associations among intervention response, body mass index, and behavioral and cognitive function. *J Gerontol Series A* 2005;**60**:1039–45	Not intervention study
Young KWH, Greenwood CE, van Reekum R, Binns MA. Providing nutrition supplements to institutionalized seniors with probable Alzheimer's disease is least beneficial to those with low body weight status. *J Am Geriatr Soc* 2004;**52**:1305–12	Not a psychological, behavioural, sensory or environmental intervention
Young R, Batkai S, Dukat M, Glennon RA. TDIQ (5,6,7,8-tetrahydro-1,3-dioxolo [4,5-g]isoquinoline) exhibits anxiolytic-like activity in a marble-burying assay in mice. *Pharmacol Biochem Behav* 2006;**84**:62–73	No participants with dementia/not separately analysed
Yousef MI. Aluminium-induced changes in hemato-biochemical parameters, lipid peroxidation and enzyme activities of male rabbits: protective role of ascorbic acid. *Toxicology* 2004;**199**:47–57	No participants with dementia/not separately analysed
Yu F, Kolanowski AM, Litaker M. The association physical function with agitation and passivity in nursing home residents with dementia. *J Gerontol Nurs* 2006;**32**:30–6	Not intervention study
Yu X, Zheng J. Polymorphic structures of Alzheimer's beta-amyloid globulomers. *PLOS ONE* 2011;**6**	No participants with dementia/not separately analysed
Yuen HK, Benzing P. Guiding of behaviour through redirection in brain injury rehabilitation. *Brain Inj* 1996;**10**:229–38	No participants with dementia/not separately analysed
Zanetti O, Frisoni GB, Deleo D, Dellobuono M, Bianchetti A, Trabucchi M. Reality orientation therapy in Alzheimer-disease – useful or not – a controlled study. *Alzheimer Dis Assoc Disord* 1995;**9**:132–8	No outcome measuring agitation
Zannino G, Gargiulo A, Lamenza F, Marotta MG, Barzotti T, Silvestri A, *et al.* The management of psychogeriatric patient. *Arch Gerontol Geriatr* 2004;465–70	No participants with dementia/not separately analysed
Zaraa AS. Pharmacologic management of agitation and psychosis in older demented patients. *Geriatrics* 2003;**58**:48	Not a psychological, behavioural, sensory or environmental intervention
Zaremba PD, Bialek M, Blaszczyk B, Cioczek P, Czuczwar SJ. Non-epilepsy uses of antiepileptic drugs. *Pharmacol Rep* 2006;**58**:1–12	No participants with dementia/not separately analysed
Zarros AC, Kalopita KS, Tsakiris ST. Serotoninergic impairment and aggressive behavior in Alzheimer's disease. *Acta Neurobiologiae Experimentalis* 2005;**65**:277–86	Not primary research
Zaudig M. A risk-benefit assessment of risperidone for the treatment of behavioural and psychological symptoms in dementia. *Drug Safety* 2000;**23**:183–95	Not primary research
Zayas EM, Grossberg GT. Treating the agitated Alzheimer patient. *J Clin Psychiatry* 1996;**57**:46–54	Not primary research
Zebenholzer K, Oder W. Neurological and psychosocial sequelae 4 and 8 years after severe head injury: a catamnestic study. *Wiener Klinische Wochenschrift* 1998;**110**:253–61	No participants with dementia/not separately analysed
Zec RF, Burkett NR. Non-pharmacological and pharmacological treatment of the cognitive and behavioral symptoms of Alzheimer disease. *Neurorehabilitation* 2008;**23**:425–38	Not primary research
Zetteler J. Effectiveness of simulated presence therapy for individuals with dementia: a systematic review and meta-analysis. *Aging Mental Health* 2008;**12**:779–85	Not primary research

continued

TABLE 27 Excluded studies and reasons for exclusion ($n = 1756$) (*continued*)

Reference	Reason for exclusion
Zhao JH, Liu HL, Liu YF, Lin HY, Fang HW, Ho Y, *et al*. Molecular dynamics simulations to investigate the aggregation behaviors of the A beta(17–42) Oligomers. *J Biomol Struct Dynamics* 2009;**26**:481–90	No participants with dementia/not separately analysed
Zhong K, Tariot P, Minkwitz MC, Devine NA, Mintzer JE. Quetiapine for the treatment of agitation in elderly institutionalized patients with dementia: a randomized, double-blind trial. *Neuropsychopharmacology* 2004;**29**:S130	Not a psychological, behavioural, sensory or environmental intervention
Zhong KX, Tariot P, Mintzer J, Minkwitz M, Devine N. Quetiapine to treat agitation in dementia: a randomized, double-blind, placebo-controlled study. *Curr Alzheimer Res* 2007;**4**:81–93	Not a psychological, behavioural, sensory or environmental intervention
Zhou FC, Buchwald N. Connectivities of the striatal grafts in adult-rat brain – a rich afference and scand striatonigral efference. *Brain Res* 1989;**504**:15–30	No participants with dementia/not separately analysed
Ziemba C, Foster G, Neufeld R, Breuer B. Haloperidol holiday: Is it a beneficial vacation for some nursing home residents? *Clin Gerontol* 1997;**17**:15–24	No participants with dementia/not separately analysed
Zieschang T, Dutzi I, Mueller E, Hestermann U, Gruenendahl K, Braun AK, *et al*. Improving care for patients with dementia hospitalized for acute somatic illness in a specialized care unit: a feasibility study. *Int Psychogeriatr* 2010;**22**:139–46	No participants with dementia/not separately analysed
Zinetti J, Daraux J, Ploskas F. [Psychiatric emergencies in the elderly.] *Rev Prat* 2003;**53**:1197–200	No participants with dementia/not separately analysed
Zisselman MH, Rovner BW, Shmuely Y, Ferrie P. A pet therapy intervention with geriatric psychiatry inpatients. *Am J Occup Ther* 1996;**50**:47–51	No participants with dementia/not separately analysed
Zucconi M, Lanuzza B, Cosentino F, I, Iero I, Tripodi M, Marelli S, *et al*. A single question for the rapid screening of restless legs syndrome in the neurological clinical practice. *J Sleep Res* 2006;**15**:91	No participants with dementia/not separately analysed
Zuidema SU, de Jonghe JF, Verhey FR, Koopmans RT. Agitation in Dutch institutionalized patients with dementia: factor analysis of the Dutch version of the Cohen-Mansfield Agitation Inventory. *Dementia Geriatr Cogn Disord* 2007;**23**:35–41	No participants with dementia/not separately analysed
Zuidema SU, de Jonghe JF, Verhey FR, Koopmans RT. Neuropsychiatric symptoms in nursing home patients: factor structure invariance of the dutch nursing home version of the neuropsychiatric inventory in different stages of dementia. *Dementia Geriatr Cogn Disord* 2007;**24**:169–76	No participants with dementia/not separately analysed
Zuidema SU, de Jonghe JF, Verhey FR, Koopmans RT. Predictors of neuropsychiatric symptoms in nursing home patients: influence of gender and dementia severity. *Int J Geriatric Psychiatry* 2009;**24**:1079–86	Not intervention study
Zuidema SU, Derksen E, Verhey FR, Koopmans RT. Prevalence of neuropsychiatric symptoms in a large sample of Dutch nursing home patients with dementia. *Int J Geriatr Psychiatry* 2007;**22**:632–8	Not intervention study
Zuidema SU, van Iersel MB, Koopmans RTCM, Verhey FRJ, Olde Rikkert MGM. [Efficacy and adverse reactions of antipsychotics for neuropsychiatric symptoms in dementia: a systematic review.] *Ned Tijdschr Geneeskd* 2006;**150**:1565–73	Not primary research
Zwijsen SA, Smalbrugge M, Zuidema SU, Koopmans RT, Bosmans JE, van Tulder MW, *et al*. Grip on challenging behaviour: a multidisciplinary care programme for managing behavioural problems in nursing home residents with dementia. Study protocol. *BMC Health Serv Res* 2011;**11**	Protocol only

Appendix 3 Effect of removing studies where the outcome measures are invalid or unreliable or both

TABLE 28 Overall effects of removing studies where the outcome measures are invalid or unreliable or both

Category of intervention	Effect of removing invalid and/or unreliable outcome measures studies
Activities	Decrease by two in number of studies showing significant improvement at short term, no change at long term (Kovach 2003,[43] Lee and Kim 2008[45]). This slightly weakens the case for activities as an intervention with evidence of efficacy
Music therapy with a specific protocol	Decrease by one in number of studies showing no significant effects at short term, no change at long term (Groene 1993[58]). This does not affect the conclusions about this intervention
Light therapy	Decrease by one in number of studies showing significant worsening of agitation at short term, no findings at long term (Barrick 2010[89]), decrease by one in number of studies showing no significant effects at short term, no findings at long term (Satlin 1992[88]). This does not affect the conclusions about this intervention
Aromatherapy	Decrease by one in number of studies showing significant worsening of agitation at short term, no findings at long term (Akondzadeh 2003[101]). This does not affect the conclusions about this intervention
Education in behavioural management for family caregivers	Decrease by one in the number of studies showing no significant effects in short term and no findings at long term (Bourgeois 1997[106]). This does not affect the conclusions about this intervention, except to underline the lack of evidence in this area
Exercise	Decrease by two (50%) in the number of studies, one of which showed the only significant improvement at short term (Holmberg 1997[120]) and no findings in long term, the other having no significant findings at short term and no findings at long term (Eggermont 2010[121]). This does not affect the conclusions about this intervention, except to underline the lack of evidence in this area
Music therapy without a specific protocol	Decrease by one in number of studies showing significant improvement in agitation at short term and no findings at long term (Clark 1998[111]), and decrease by one in number of studies showing no significant findings at short term and no findings at long term (Garland 2007[110]). This does not affect the conclusions about this intervention, except to underline the lack of evidence in this area
Changing environment (masking exits)	Decrease by two (100%) of studies exploring changing the environment by masking exits, one of which found a short-term improvement (Darby 1990[135]) and one was not significant (Hussian and Brown 1987[136]). This does not affect the conclusions about this intervention, except to underline the lack of evidence in this area
Wayfinding	Decrease by one (100%) of studies, showing non-significant results at short term and worsening of agitation at long term (McGilton 2003[137]). This does not affect the conclusions about this intervention, except to underline the lack of evidence in this area
Simulated presence therapy	Decrease by one of studies showing no significant results at short term and no long-term findings (Camberg 1999[138]). This does not affect the conclusions about this intervention, except to underline the lack of evidence in this area

Effect of removing studies with outcome measures that are neither reliable nor valid

Two studies with quality scores of exercise, and one each of aromatherapy, light therapy and music therapy with a specific protocol, with quality ratings > 4, used outcome measures that were neither shown to be valid nor shown to be reliable.

Removing these from the overall results has the following result:

- Music therapy with a specific protocol has one fewer insignificant study.
- Light therapy has one fewer insignificant study.
- Aromatherapy has one fewer study where agitation worsened.
- Exercise loses 50% of its evidence (two out of four studies), one of which had shown improvement in the short term but no long-term findings, leaving two studies with no significant findings.

Effect of removing studies which are not valid but are reliable

Two studies of music therapy, two studies of masking exits and one each of education for family caregivers, activities, simulated presence therapy, and light therapy, with quality ratings > 4, had non-validated but reliable outcome measures.

The effect upon the category of changing the environment is that it removed studies relating to masking exits, which increases the homogeneity of the category slightly.

Music therapy without a specific protocol loses one study showing significant improvement in the short term, and one study with no significant results in the short term, and so makes little impact.

Education for family caregivers loses one study showing no significant results at short and long term, which makes little difference to the conclusions already made.

Activities loses one reasonable-quality (2b) study with good participant numbers (78), showing significant improvement in the short term but not in the long term, which slightly decreases the effectiveness of the intervention overall at short term.

Removing one simulated presence study with no significant results at short term and no long term results makes little difference to the conclusions already made.

Light therapy loses one moderate-quality (2c) study with reasonable participant numbers ($n = 66$).

Effect of removing studies which are valid but are not reliable

One study looking at wayfaring and one looking at activities, with quality ratings > 4, did not have reliable outcomes.

The effect upon activities would be that one 2c study with 23 participants, which showed improvement in the short term but did not examine long-term results, would be excluded, slightly weakening the conclusions about activities in the short term.

The effect upon wayfaring would be that there would be no studies investigating this intervention in the study.

Appendix 4 Health economics: CHEERS statements

TABLE 29 Mintzer *et al.*[203] CHEERS statement

Section/item	Recommendation	Reported on page(s)
Title and abstract		
Title	This study was not identified as an economic evaluation based on the title	1435
Abstract	A structured abstract was provided, but contained few details of the economic evaluation	1435
Introduction		
Background and objectives	The broader context for the study was discussed. The study question was presented, and the relevance for practice decisions was discussed	1435–6
Methods		
Target population and subgroups	The characteristics of the study population were discussed and justified	1437
Setting and location	The setting and location were described	1436
Study perspective	The study perspective was not stated	
Comparators	The comparators were clearly described	1436
Time horizon	The time horizon was not specifically described, and it is unclear if the time horizon was the same for the two comparators	1437–8
Discount rate	Discounting was unnecessary since costs and outcomes were measured over a period of less than 1 year	
Choice of health outcomes	The outcome measure was described and justified	1437
Measurement of effectiveness	The study design used to measure effectiveness was clearly described	1437–8
Measurement and valuation of preference based outcomes	Not applicable	
Estimating resources and costs	The approach used to measure resource use was described. Sources of unit cost data were not provided	1438
Currency, price date, and conversion	The currency was stated. The cost base year was not provided	1438
Choice of model	The choice of model structure was not justified	
Assumptions	The assumptions used to measure costs were stated	1438
Analytical methods	The analytical methods were simply described	1438

continued

TABLE 29 Mintzer *et al.*[203] CHEERS statement (*continued*)

Section/item	Recommendation	Reported on page(s)
Results		
Study parameters	Study parameters were described. Ranges and references were not reported. Probability distributions were not used	
Incremental costs and outcomes	Costs and outcomes were reported separately, and incremental cost-effectiveness ratios were reported	1438–9
Characterising uncertainty	There was no analysis of uncertainty	
Characterising heterogeneity	Cost analyses were reported for subgroups	1438
Discussion		
Study findings, limitations, generalisability, and current knowledge	There was little discussion of the economic evaluation	1439
Other		
Source of funding	Sources of funding were not stated	
Conflicts of interest	Conflicts of interest were not stated	

TABLE 30 Norman *et al.*[204] CHEERS statement

Section/item	Recommendation	Reported on page(s)
Title and abstract		
Title	This study was identified as an economic evaluation based on the title	Page numbers were not reported
Abstract	A structured abstract was provided	
Introduction		
Background and objectives	The broader context for the study was discussed. The study question was presented, and the relevance for practice decisions was discussed. The economic evaluation was linked to a clinical trial (Chenoweth *et al.*)	
Methods		
Target population and subgroups	The characteristics of the study population were discussed and justified	
Setting and location	The setting and location were described	
Study perspective	The study perspective was not stated	
Comparators	The comparators were clearly described	
Time horizon	The time horizon was stated	
Discount rate	Discounting was unnecessary since costs and outcomes were measured over a period of less than one year	
Choice of health outcomes	The outcome measure was described and justified	
Measurement of effectiveness	The study design used to measure effectiveness was clearly described	
Measurement and valuation of preference based outcomes	Not applicable	
Estimating resources and costs	The approach used to measure resource use was described. Sources of unit cost data were provided	
Currency, price date, and conversion	The currency was stated. The cost base year was not provided	
Choice of model	The choice of model structure was justified	
Assumptions	The assumptions used to measure costs were stated	
Analytical methods	The analytical methods were described	
Results		
Study parameters	Study parameters were described. Ranges and references were not always reported. Probability distributions were not used	
Incremental costs and outcomes	Costs and outcomes were reported separately, and incremental cost-effectiveness ratios were reported	
Characterising uncertainty	A univariate sensitivity analysis was reported	
Characterising heterogeneity	Results were not reported for subgroups	
Discussion		
Study findings, limitations, generalisability, and current knowledge	The study findings, limitations, generalisability and addition to knowledge were discussed	
Other		
Source of funding	Sources of funding were reported in the clinical trial paper	
Conflicts of interest	Conflicts of interest were reported in the clinical trial paper	

Appendix 5 Health economics: intervention costs

TABLE 31 Unit costs of activities

Author	Resource item	Unit cost (£)	Source	Assumptions
Kovach *et al.*[43]	Geriatric nurse practitioner (GNP) to configure activities daily	189.00	Curtis[212]	Takes 30 minutes' planning per patient
	Staff nurse to configure activities daily	189.00	Curtis[212]	Takes 30 minutes' planning per patient
	Total	**378.00**		
Lin *et al.*[44]	Montessori method (nursing staff time)	22.09	Curtis[212]	
	Rhythmic music	0.34	a	
	Clay	5.99	b	
	Paints	15.99	c	
	Nursing staff	324.00	Curtis[212]	
	Pedometer	3.99	d	
	Total	**372**		
Lee *et al.*[45]	Edible dropwort	3.09	e	
	Bean sprout	1.48	f	
	Nursing assistant	262.96	Curtis[212]	Two nursing staff a.m./p.m.
	Watering cans	1.78	f	
	Dust cloths	0.36	g	
	Sleep diary	3.99	h	
	Total	**274**		
Buettner *et al.*[46]	Specialist designed programmes	102.52	i, j	187.5 hours over 10 weeks designing programmes
	Specialist training activities department (nurse staff)	102.52	i, j	187.5 hours over 10 weeks working with departments
	Nurse staff took over from specialist for 10 weeks	153.41	i, j	Takes 30 minutes to plan and implement each plan, per patient, 187.5 hours spent approximately over 10 weeks
	Air mat	43.64	k	
	Stim box	4.99	l	
	Relaxation therapy	288.00	m	£18 for 30 minutes per relaxation therapy. Relaxation therapy given 4 days per week for 4 weeks
	Herb garden	1.18	n	
	Total	**696**		

continued

TABLE 31 Unit costs of activities (*continued*)

Author	Resource item	Unit cost (£)	Source	Assumptions
Fitzsimmons *et al.*[49]	Nursing assistant supervising	135.00	Curtis[212]	10 sessions
	Index cards	0.24	o	
	Cookbooks	8.98	p	
	Magazines	3.70	q	
	Apples	1.50	r	Items bought for 5/10 sessions
	Cream	5.00	s	Items bought for 5/10 sessions
	Potatoes	1.35	t	
	Bananas	1.30	u	Items bought for 5/10 sessions
	Eggs	0.40	v	Items bought for 5/10 sessions
	Quiche	2.20	w	
	Apple sauce	3.45	x	Items bought for 5/10 sessions
	Butter	8.00	y	Items bought for 5/10 sessions
	Custard	2.35	z	Items bought for 5/10 sessions
	Total	**173**		
Buettner *et al.*[48]	Air mat	43.64	k	
	Stim box	4.99	l	
	Relaxation therapy	288.00	m	£18 for 30 minutes per relaxation therapy. Relaxation therapy given 4 days per week for 4 weeks
	Herb garden	1.18	n	
	Nursing staff implementing programme	252.00	Curtis[212]	3 hours of activity supervised 7 days per week for 4 weeks
	Total	**590**		
Fitzsimmons *et al.*[49]	Nursing staff	202.50	Curtis[212]	Received 5 days per week
	Total	**203**		

TABLE 31 Unit costs of activities (*continued*)

Author	Resource item	Unit cost (£)	Source	Assumptions
Cohen-Mansfield *et al.*[52]	Nursing staff	33.75	Curtis[212]	
	Cookie ingredients	2.00	aa	
	Scrap book	5.99	ab	
	Portable CD player	6.25	ac	
	Camera	5.62	ad	
	Bible audio tapes	0.38	ae	
	Golf equipment	57.49	af	
	Travel magazines	1.88	ag	
	Total	**80**		

Sources (all last accessed 24 July 2013).

a http://hmv.com/hmvweb/displayProductDetails.do?ctx=280;0;-1;-1;-1&sku=787194.
b www.crafts4kids.co.uk/newclay-air-dry-clay-1kg/p232.
c www.amazon.co.uk/Scola-Artmix-Ready-Coloured-12/dp/B003LVYN80/ref=sr_1_2?ie=UTF8&qid=1349685522&sr=8-2.
d www.argos.co.uk/m/static/Product/partNumber/9003046/c_1/1%7Ccategory_root%7CHealth+and+personal+care%7C14418350/c_2/2%7C14418350%7CHealth+monitors+and+aids%7C14418375/c_3/3%7Ccat_14418375%7CPedometers%7C14418392.htm.
e www.goren.co.uk/online_store/index.php?main_page=product_info&products_id=19.
f www.diy.com/nav/garden/grow-your-own/seeds/vegetable_seeds/-specificproducttype-alfalfa/Verve-Grow-Your-Own-Sprouting-Seed-Alfalfa-9776464?skuId=10167171.
g www.sainsburys.co.uk/groceries/index.jsp.
h www.whsmith.co.uk/CatalogAndSearch/ProductDetails.aspx?productID=35605829.
i www.nhscareers.nhs.uk/explore-by-career/nursing/pay-for-nurses/.
j www.nhscareers.nhs.uk/working-in-the-nhs/pay-and-benefits/agenda-for-change-pay-rates/.
k www.amazon.co.uk/dp/B0057F08I2/ref=asc_df_B0057F08I210022548?smid=A3P5ROKL5A1OLE&tag=googlecouk06-21&linkCode=asn&creative=22206&creativeASIN=B0057F08I2.
l www.argos.co.uk/static/Product/partNumber/9284834/c_1/1%7Ccategory_root%7CHome+and+furniture%7C14417894/c_2/2%7C14417894%7CStorage+and+shelving%7C14417975/c_3/3%7Ccat_14417975%7CStorage+baskets+and+boxes%7C14417980.htm.
m www.experiencewellness.co.uk/pages/therapy-price-list.php.
n www.diy.com/nav/garden/grow-your-own/seeds/herbsspice_seeds/Verve-Grow-Your-Own-Mustard-Red-Frills-9776460.
o www.whsmith.co.uk/CatalogAndSearch/ProductDetails.aspx?productID=33302454#.
p www.amazon.co.uk/Jamies-Dinners-Essential-familyCookbook/dp/0141015756/ref=cm_lmf_tit_1.
q www.tesco.com/groceries/Product/Details/?id=275961973.
r www.tesco.com/groceries/Product/Details/?id=259531239.
s www.tesco.com/groceries/Product/Details/?id=262479533.
t www.tesco.com/groceries/Product/Details/?id=266615506.
u www.tesco.com/groceries/Product/Details/?id=268734435.
v www.tesco.com/groceries/Product/Details/?id=252114301.
w www.tesco.com/groceries/Product/Details/?id=255159410.
x www.tesco.com/groceries/Product/Details/?id=272337859.
y www.tesco.com/groceries/Product/Details/?id=254263374.
z www.tesco.com/groceries/Product/Details/?id=271246162.
aa www.tesco.com/groceries/Product/Details/?id=268956986.
ab www.whsmith.co.uk/CatalogAndSearch/ProductDetails.aspx?productID=31560511.
ac www.argos.co.uk/static/Product/partNumber/5135444/c_1/1%7Ccategory_root%7CHome+entertainment+and+sat+nav%7C14419512/c_2/2%7C14419512%7CPortable+CD+and+cassette+players%7C14419593.htm.
ad www.argos.co.uk/static/Product/partNumber/5597910/c_1/1%7Ccategory_root%7CPhotography%7C14419436/c_2/2%7C14419436%7CDigital+cameras%7C14419441/Trail/searchtext%3ECAMERA.htm.
ae www.amazon.co.uk/Bible-Audio-CD-UK-Import/dp/B000E6RVO8/ref=sr_1_2?ie=UTF8&qid=1349696875&sr=8-2.
af www.golfonline.co.uk/wilson-tour-matrix-complete-golf-set-graphite-shaft?gclid=CLLWjeis8bICFUXHtAodVE8A4w.
ag www.lonelyplanet.com/magazine.

TABLE 32 Unit costs of music therapy using a specific protocol

Author	Resource item	Unit cost (£)	Source	Assumption(s)
Sung *et al.*[54]	Nursing practitioner	12.00	Curtis[212]	
	Music CD	0.83	a	
	Total	**13**		
Lin *et al.*[57]	Music therapists time	2.64	b, c	Band 7 mid-point £35,184
	University music therapy course	24.39		£1000 per music therapy course, group sessions
	Total	**27**		
Jennings *et al.*[61]	Nursing assistant	13.50	Curtis[212]	Observed for 1 hour across all 16 participants
	Therapist	10.50	Curtis[212]	
	Total	**24**		

Sources (all last accessed 24 July 2013).
a http://hmv.com/hmvweb/displayProductDetails.do?ctx=280;0;-1;-1;-1&sku=787194.
b www.nhscareers.nhs.uk/explore-by-career/nursing/pay-for-nurses.
c www.nhscareers.nhs.uk/working-in-the-nhs/pay-and-benefits/agenda-for-change-pay-rates.

TABLE 33 Unit costs of sensory interventions

Author	Resource item	Unit cost (£)	Source	Assumption(s)
Moyle *et al.*[63]	Foot massage	128.33	a	
	Total	**128**		
Yang *et al.*[64]	Acupressure	500.00	b	£35–60, mid-point £50
	Nursing staff offering companionship and conversation	27.00	Curtis[212]	Nurse offered 30 minutes of conversation per patient
	Total	**527**		
Remington[66]	CD	0.88		
	Portable CD player	1.47		
	Nursing staff present	0.53	Curtis[212]	Nursing staff present to play calm music
	Total	**3**		
	Hand massage	7.00	a	
	Hand massage plus calm music	9.35	a	
	Nursing staff present	0.53	Curtis[212]	
	Total	**10**		Nursing staff present to play calm music
Staal *et al.*[69]	Bead mazes	12.95	c	
	Puzzles	6.60	d	
	Occupational community therapist	84.00	Curtis[212]	1 hour with occupational therapist
	Nursing staff	162.00	Curtis[212]	Six sessions of 30–180 minutes

TABLE 33 Unit costs of sensory interventions (*continued*)

Author	Resource item	Unit cost (£)	Source	Assumption(s)
	Snoezelen room per day	7.22	Curtis[212]	
	Total	**273**		
Lin *et al.*[44]	Acupressure	300.00	b	£35–60, mid-point £50
	Total	**300**		
Woods *et al.*[71]	Nursing staff	32.40	Curtis[212]	12 minutes, over 2 days for 1 week
	Total	**32**		
Gerdner *et al.*[72]	Craniosacral therapy	298.10	e	
	Nursing assistant	189.38	Curtis[212]	
	Total	**487**		
Whall *et al.*[73]	Animal CD	0.49	f	
	Picture	4.00	g	
	Pudding	1.86	h, i	
	Nursing staff giving shower	9.00	Curtis[212]	10 minutes in the bath
	Dietitian devising food plan	5.83	Curtis[212]	Devising food plan takes 10 minutes per patient
	Nursing devising food plan	9.00		Devising food plan takes 10 minutes per patient
	Total	**30**		
van Weert *et al.*[74]	Certified nursing assistant	54.00	Curtis[212]	1 hour
	Certified nursing assistant	14.40	Curtis[212]	16 hours × 4 weeks = 960 minutes
	Stimulus screening offered to patients	8.67		
	Certified nursing assistant wrote plan	27.00	Curtis[212]	Takes 30 minutes to plan each plan, per patient
	Snoezelen room	5.28	Curtis[212]	Revenue costs, land costs and capital charges related to land
	Total	**109**		

Sources (all last accessed 24 July 2013).

a www.thaisquarespa.com/prices.htm.
b www.nhs.uk/conditions/Acupuncture/Pages/Introduction.aspx.
c www.argos.co.uk/static/Search/searchTerms/MAZES.htm.
d www.argos.co.uk/static/Product/partNumber/2760142/c_1/1%7Ccategory_root%7CToys+and+games%7C14417629/c_2/2%7C14417629%7CGames+and+puzzles%7C14417785/c_3/3%7Ccat_14417785%7CPuzzles+and+jigsaws%7C14417792.htm.
e www.cranio.co.uk/craniosacral-therapy-london-treatment.shtml.
f www.amazon.co.uk/Favourite-Animal-Songs-Kids-songs/dp/1904903320.
g www.argos.co.uk/static/Product/partNumber/6239215/c_1/1%7Ccategory_root%7CHome+and+furniture%7C14417894/c_2/2%7C14417894%7CPictures+and+photo+frames%7C14418315/c_3/3%7Ccat_14418315%7CPictures%7C14418318.htm.
h www.tesco.com/groceries/Product/Details/?id=255204864.
i www.tesco.com/groceries/Product/Details/?id=260506661.

TABLE 34 Unit costs of training paid caregivers in person-centred care or communication skills, with supervision, or in DCM with supervision

Author	Resource item	Unit cost (£)	Source	Assumption(s)
Chenoweth *et al.*[75]	Researcher's time	11.05	a, b	12 hours of training in total
	(2 days') training by mapper to nurse/care staff	4.42	a, b	Band 7, mid-point £35,184, 2 days' training course consists of 12 hours of training in total
	Nurse staff develop and implement care practices	27.00	Curtis[212]	Takes 30 minutes to plan each plan, per patient
	Review of patients' histories	9.02		Takes 30 minutes to plan each plan, per patient
	Researcher visited each site (five sites) twice to help change practices	2.76		3 hours per site. Total 5 × 15
	Support over 4 months	44.78		2 hours per day over 4 months = 121.6 (days) × 2 = 243.33/98 patients
	Total	**99**		
McCallion *et al.*[76]	Nursing assistant time	75.68	a, b	35 minutes' observation per patient × 7
	Trainer observation	10.53	a, b	Band 7, mid-point £35,184
	Videotapes	1.20	c	£5.99 for pack of five
	Total	**87**		
McCallion *et al.*[77]	Two nurses' time	15.92		Offered to two nurses
	Social worker delivered programme	31.55	Curtis[212]	
	Social worker participated in training nurses 4.5 days	24.69		
	Total	**72**		
Hoeffer *et al.*[79]	Nurses	104.26	a, b	Band 7, mid-point £35,184 30 minutes for four baths over 3 weeks
	Specialist nurse observation	26.33	Curtis[212]	£316 per patient-related hour; four baths average 5 minutes per observation, four baths over three weeks
	Written plan by specialist, nurse for each resident	26.33	Curtis[212]	£316 per patient-related hour; four baths average Time spent per plan: 10 minutes
	Videotape to train nursing assistant	1.20	c	£5.99 for pack of five
	Total	**158**		

TABLE 34 Unit costs of training paid caregivers in person-centred care or communication skills, with supervision, or in DCM with supervision (*continued*)

Author	Resource item	Unit cost (£)	Source	Assumption(s)
Sloane *et al.*[80]	Three certified nursing assistants	6.75	Curtis[212]	1 hour per bath
	Two bath towels	11.99	d	
	No rinse soap	0.08	e	
	No rinse soap	0.08	e	
	Clinical psychologist	45.00	Curtis[212]	
	Total	**64**		
	Three certified nursing assistants	6.48	Curtis[212]	1 hour per bath
	Bath blankets	11.99	d	
	Two bath towels	11.99	d	
	No rinse soap	0.08	e	
	Book	1.65	f	
	Clinical psychologist	43.20	Curtis[212]	
	Total	**75**		
Deudon *et al.*[81]	Nursing staff	0.47	Curtis[212]	
	Teaching session conducted by another nurse	27.06	a, b	
	Trainer's time	2.49	a, b	
	Refreshing wipes	0.07	g	10 packs needed
	Moisturising hand cream	0.66	h	50 tubes needed
	Total	**31**		
Chenoweth *et al.*[82]	Two researchers (2 days') training, five sites	9.93	a, b	Band 7, mid-point £35,184
	Two nursing assistant (2 days'), five sites	29.72	Curtis[212]	
	Reported back to nurses	1.66		Researchers reported back to staff nurse at each site (five sites) too 2 hours at each site
	Nurse developing care plans	27.00	Curtis[212]	Takes 30 minutes to plan each plan, per patient
	Support over 4 months	40.26		2 hours per day over 4 months = 121.6 (days) × 2 = 243.33/98 patients
	Total	**108**		

continued

TABLE 34 Unit costs of training paid caregivers in person-centred care or communication skills, with supervision, or in DCM with supervision (*continued*)

Author	Resource item	Unit cost (£)	Source	Assumption(s)
Chenoweth *et al.*	Training per staff (two nurses, 3 days)	55.54	Curtis[212]	Band 7, mid-point £35,184, assumption 6 hours of training over 3 days
	DCM trainers (two trainers, 3 days)	9.28	a, b	Band 7, mid-point £35,184
	8 hours of continuous 5-minute DCM observations of each participant	4.12		
	Observations completed in 3 hours by researchers at each site, total 6 hours	3.27		
	Nurse developing care plans + researchers helping	36.02	Curtis[212]	Takes 30 minutes to plan each plan, per patient
	2 hours of researcher's time to give DCM trained/managers support	4.12		2 hours per week for 1 month. Total 8 hours
	20 minutes per chart reviewed by researcher	6.01		Per chart 20 minutes
	Researchers feeding back	9.02		Feedback 30 minutes
	Total	**127**		

Sources (all last accessed 24 July 2013).

a www.nhscareers.nhs.uk/explore-by-career/nursing/pay-for-nurses.
b www.nhscareers.nhs.uk/working-in-the-nhs/pay-and-benefits/agenda-for-change-pay-rates.
c www.argos.co.uk/static/Search/searchTerms/VIDEOTAPE.htm.
d www.argos.co.uk/static/Product/partNumber/8285250/c_1/1%7Ccategory_root%7CHome+and+furniture%7C14417894/c_2/2%7C14417894%7CBathroom+furniture%7C14418043/c_3/3%7Ccat_14418043%7CTowels%7C14418085.htm.
e www.amazon.co.uk/No-Rinse-Hair-Conditioner-Ounce/dp/B00082FF7S/ref=sr_1_1?s=drugstore&ie=UTF8&qid=1349684576&sr=1-1.
f www.amazon.co.uk/s/ref=nb_sb_noss?url=search-alias%3Daps&field-keywords=Book-+Bathing+without+a+battle.
g www.boots.com/en/Boots-Handy-Wipes-Fresh-x12_1051032.
h www.boots.com/en/Johnsons-Body-Care-24-Hour-Moisture-Hand-Cream-75ml_1235389/?CAWELAID=969295224&cm_mmc=Shopping%20Engines-_-Google%20Base-_—_-Johnsons%20Body%20Care%2024%20Hour%20Moisture%20Hand%20Cream%2075ml.

EME
HS&DR
HTA
PGfAR
PHR

Part of the NIHR Journals Library
www.journalslibrary.nihr.ac.uk

Published by the NIHR Journals Library