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Literature Review of Dementia

Final Report

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INVESTORS IN PEOPLE

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Executive Summary

1.   OBJECTIVES

- To undertake a rapid literature review focused on summarising the best available evidence on AHP-led interventions for people with dementia; in order to identify evidence that meets the following six themes adopted by the Joint Improvement Team (JIT) and the Scottish Government's Community Care Outcomes:
  o   User satisfaction;
  o   Access to services and support;
  o   Support for carers;
  o   Quality of assessment, care planning and review;
  o   Identifying and supporting those at risk of admission to hospital;
  o   Shifting the balance of care to support more people at home for longer, promoting self-care rather than reliance on professionals, and providing services and support closer to people's own homes.

2.   METHODS

- A range of secondary research resources, including systematic reviews, health technology assessments, guidelines, were searched to identify evidence to support the research question.
- Supplementary searches were undertaken for pivotal primary literature, for example randomised controlled trials (RCTs) and economic evaluations.
- In addition to the main search, an accompanying search was conducted based primarily on published evidence by L N Gitlin.
- The selected records were reviewed and relevant information was extracted and summarised in evidence tables according to the following outcomes:
  o   Reduced hospital admissions;
  o   Reduced length of stay for people with dementia admitted;
  o   Reduced number of falls in people with dementia;
  o   Increase in daily activity;
  o   Improvement in quality of life for patient and carer.

3.   RESULTS

- A total of 1,126 records were identified from the searches, seven studies were identified through other searches of grey literature or internet and an additional 65 studies following the separate search undertaken on the author L N Gitlin.
- From the searches, 22 final studies were assessed in full.
- The selected records were reviewed and relevant data was extracted. This data informed the summaries of the AHP-led interventions.

Reduced Hospital Admissions, Reduced Length of Stay in Hospital and Reduced Number of Falls for People with Dementia

- The review assessed evidence on the following AHP-led interventions: multifactorial assessment and interventions (e.g. physiotherapy and occupational therapy); massage and touch therapy; music and music therapy and physical activity and exercise.

- Although the review found a number of studies of AHP interventions studying the impact on hospital admissions, length of stay and number of falls for people with dementia results were inconclusive and strong evidence in support of these outcomes lacking.

Increase in Daily Activity

- Those interventions considered in the review included: art therapy; sensory stimulation-oriented therapy; occupational therapy; Tailored Activity Program (TAP) and multifactorial assessment and intervention.

- There was only limited evidence showing that single interventions were effective.

- Occupational therapy at day care centres and in residential care home was found to help modulate the decline of cognition, function and improve the daily functioning of people with dementia in managing self-care.

- Other functions, for example nursing assistants working with residents on developing their activities of daily living to maximise autonomy also yielded improved capability.

- Results found limited evidence of the duration of benefit with interventions such as massage and touch therapy and multi-sensory stimulation (MSS).

- The majority of interventions fell into the *'might work for a very short period'* category due to inconclusive results and poor quality of the study methods (e.g. sensory stimulation-oriented approaches and art therapy).

- Strongest evidence of interventions which were effective involved multi-component interventions and where the caregiver was an active participant (e.g. TAP that helped improve general health and training families in home safety, simplifying tasks and stress reduction).

Improve Quality of Life for Patient and Carer

- Those interventions considered included: art therapy; sensory stimulation-oriented therapy; occupational therapy; Tailored Activity Program (TAP); cognitive stimulation therapy or training; multifactorial assessment and intervention; activity and recreation; music and music therapy and Advanced Caregiver Training (ACT).

- Some evidence showed that single interventions were effective. Those with the greatest effect were physical activity and active recreational activities which were beneficial in reducing wandering behaviour and improving cognitive functionality in people with dementia.

- Interventions such as music therapy and multi-sensory stimulation showed short-term benefits (e.g. reduced problematic behaviours such as agitation) and an improvement in immediate quality of life symptoms (e.g. reduced sense of apathy in people with dementia. However, no longer-term benefits were measured.

- Sensory stimulation-oriented approaches and art therapy showed some short term effects for people with dementia but were inconclusive.
- Therapies involving music and group music sessions might work in alleviating some behavioural and psychological symptoms of dementia, but evidence of effectiveness in respect of reducing wandering, depression, aggression, apathy and neuropsychiatric symptoms was inconclusive, particularly in the longer-term.
- Some suggestion that interventions could be delivered by the informal carer rather than the trained AHP; however there was no evidence on the efficacy or safety of delivery by this group or of the cost of training and level of supervision required.

4.   DISCUSSION

- The review found a good literature base, including four systematic reviews and nine RCTs, on people with dementia managed with a range of AHP-led interventions in relevant settings (residential care, nursing homes, the community and home).
- The strongest evidence of effective AHP-led interventions in increasing daily activity and improving quality of life involved multi-component interventions.
- In most studies the intervention was delivered to the person with dementia but in others the caregiver was also an active participant, particularly in terms of receiving education and training to reinforce strategies and this seems to be a strength of these programmes.
- Inconclusive results and poor quality of the study methods limited the evidence base.
- Six studies were described as cost or economic evaluations but none provided robust cost effectiveness analysis of the intervention compared to current practice.
- National Institute of Health and Clinical Excellence (NICE) Guideline on 'Supporting People with Dementia and their Carers' [18] recommendations on non-pharmacological interventions in people with dementia, as well as for caregivers, do not correspond with the findings in this review. This review of interventions showed empirical evidence of benefits to people with dementia but clinical effect sizes were small and inconclusive.
- The review revealed that for most interventions the outcomes are not directly related to the themes set out by the JIT/SGHD. Benefits have had to be inferred from intermediate endpoints such as improved daily activity, better quality of life and improved mobility.

5.   RECOMMENDATIONS

- The review adds to the growing evidentiary base supporting active non-pharmacological interventions with results providing important insights for developing and testing future interventions for people and caregivers.
- Many interventions are multi-dimensional. There does not appear to be a single, easily implemented and consistently effective method for managing the progression of dementia.
- Some of the more successful interventions included the caregiver in the intervention and this aspect seems to deliver added value.

- The overall impact of interventions on resource use and costs should be evaluated more robustly. Generalising from the clinical studies is not enough.

Section 1:   Introduction and Objectives

1.1   BACKGROUND

The Scottish Government Health Department (SGHD) outlined in a national framework document 'Reshaping Care for Older People in Scotland'[1], the intention to provide funding from 2011/12 for partnerships which aim to move care from institutions and the acute health sector back into the home and community. Multi-agency/disciplinary teams (MDTs) and Allied Health Professionals (AHPs) will play a key role in redesigning and structuring the services provided for older people and in particular those with long term conditions such as dementia. One key area of interest is the provision of re-ablement and anticipatory care at home for people with dementia. Not only is the aim to shift to more home-based care but also to enable greater support for the carers of dementia people with dementia.

Six themes have been adopted by the Joint Improvement Team (JIT) and the Scottish Government's Community Care Outcomes to apply when commissioning projects[2]:

- User satisfaction;
- Access to services and support;
- Support for carers;
- Quality of assessment, care planning and review;
- Identifying and supporting those at risk of admission to hospital;
- Shifting the balance of care to support more people at home for longer, promoting self-care rather than reliance on professionals, and providing services and support closer to people's own homes.

The SGHD requested a literature review to look at AHP interventions for people with dementia and how these can meet the six themes particularly the ability to contribute to shifting the balance of care.

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[1]   Reshaping Care for Older People A Programme for Change 2011 – 2021 COSLA, Scottish Government and NHS Scotland.
[2]   Developing Commissioning Strategies JIT Support to Local Partnerships
http://www.jitscotland.org.uk/publications-1/commissioning/.

1.2   OBJECTIVES

The SGHD has commissioned a literature review to provide evidence on AHP interventions for people with dementia which shift the balance of care. Subsequently it is anticipated that this evidence will inform bids for Change funding from local partnerships that embed core AHP skills.

The two research questions are:

'What effective interventions can AHPs offer to reduce hospital admissions, reduce length of stay for those admitted, increase day to day activity and improve quality of life for patients and carers living with dementia in the community, including care homes?'

'What effective interventions can AHPs offer to reduce falls and thence hospital admissions, reduce length of stay for those admitted, increase day to day activity and improve quality of life for patients and carers living with dementia in the community, including care homes?'

1.3   REPORT STRUCTURE

This report of the literature review consists of three further sections covering:

- Literature search, study selection and data retrieval;
- Results from the literature reviewed;
- Limitations, discussion and conclusions.

Section 2: Methods

The rapid literature review focused on summarising the best available evidence on AHP-led interventions for people with dementia; these comprised systematic reviews and evidence-based guidelines, supplemented with searches for pivotal primary literature, for example randomised controlled trials (RCTs) and economic evaluations.

Literature searches were undertaken to identify secondary research studies (systematic reviews, health technology assessments, guidelines) and cost/economic studies about AHPs and people with dementia in the community.

The search strategy included search terms for 'falls', as this literature was of particular interest to the review team. Databases and resources focusing on systematic reviews, guidelines and cost/economic studies were searched, alongside larger bibliographic databases such as MEDLINE and EMBASE. When searching the larger bibliographic databases methodological search filters were included designed to retrieve systematic reviews and guidelines, and also limited the searches by date range to 2005 to 2011. All searches were limited to English language studies only.

The following databases and resources were searched:

- Cochrane Database of Systematic Reviews (CDSR);
- Database of Abstracts of Reviews of Effects (DARE);
- Health Technology Assessment (HTA);
- NHS Economic Evaluation Database (NHS EED);
- Health Economic Evaluations Database (HEED);
- MEDLINE and MEDLINE In-Process;
- EMBASE;
- AMED (Allied and Complimentary Medicine);
- PsycINFO;
- PEDro;
- EPPI-Centre databases (DoPHER and TRoPHI);
- National Institute for Health and Clinical Excellence (NICE);
- Scottish Intercollegiate Guidelines Network (SIGN);
- National Guidelines Clearinghouse;
- Health Care Needs Assessment;
- Alzheimer's Society.

An author search for Gitlin LN was also undertaken using ISI Web of Science.

The full search strategies are listed in detail in Appendix A.

As a number of searches were undertaken, across a number of different databases, some degree of duplication resulted. In order to manage this issue, the titles and abstracts of bibliographic records were downloaded and imported into EndNote software and duplicate records removed.

One hundred and thirty-nine records were retrieved from the initial searches. These were rapidly assessed for relevance using the 'PICO' method (an evidence-based approach to literature searching). PICO stands for:

- Patient/population (the who, and in this case also where);
- Intervention (the what, by whom and how intensively?);
- Comparison (the main alternative in the study which ideally will be current practice);
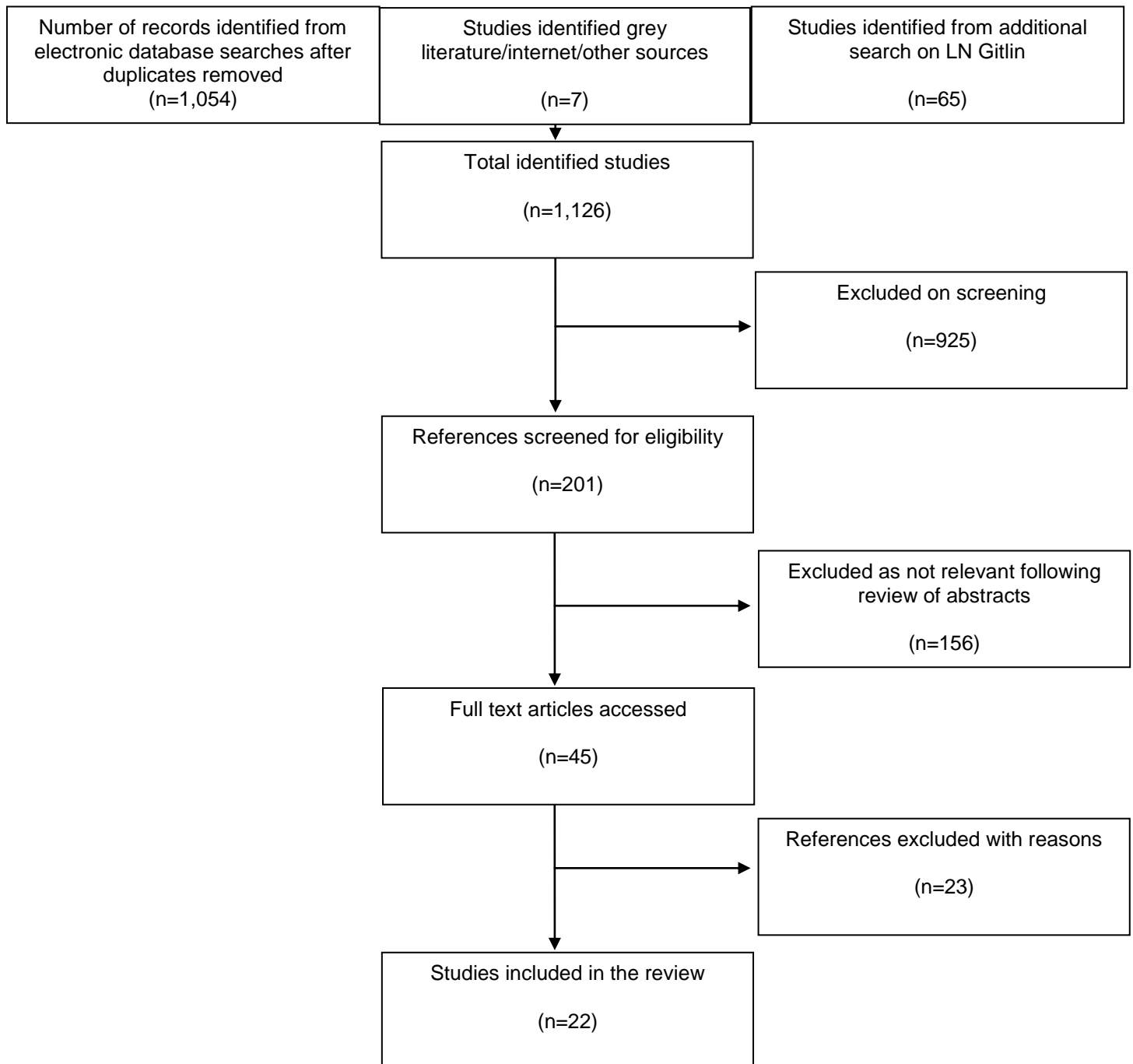- Outcome (what study was measuring and what the effect size was).

The initial search retrieved several thousand records, many including many studies of the elderly in general (so not necessarily people with dementia), falls in the elderly and clinical disease specific areas such as stroke, Parkinson's disease, osteoarthritis, joint replacement and rehabilitation – all such studies were excluded immediately. The remaining 139 titles and abstracts of the records retrieved from the initial searches were assessed for relevance using the following inclusion/exclusion criteria:

- Patient/population:
  - o People with dementia, people with dementia who have fallen with dementia.
- Setting or environment:
  - o Community, care home, own home.
- Intervention:
  - o Delivered by AHPs, multi-disciplinary groups/teams (MDTs) or community nurses.
- Outcomes:
  - o Activity, quality of life, admissions, length of stay and surrogate measures such as improved clinical performance.
- Restrict to English language only;
- Date range restricted to 2005-2011.

In addition to the main search, a supplementary search was conducted based primarily on published evidence by L N Gitlin. From the main search results it was clear this author has published extensively in this area hence it was important to capture her main studies. Sixty-five additional records were found, of which 10 were also included in the results of the main literature search.

A total of 1,126 records were identified from electronic database searches, 7 studies were identified through other searches (grey literature, internet) and an additional 65 studies following the separate search undertaken on the author L N Gitlin. Abstracts of 201 references were reviewed for applicability and suitability using the inclusion/exclusion criteria. From both these searches, the full text of reviews, guidelines and primary studies assessed as being of potential relevance were obtained, where available, for final assessment, with 22 final studies assessed as being potentially informative. Figure 2.1 provides an overview of the study selection process.

Figure 2.1:   Study selection process

Number of records identified from electronic database searches after duplicates removed (n=1,054)	Studies identified grey literature/internet/other sources (n=7)	Studies identified from additional search on LN Gitlin (n=65)

Total identified studies

(n=1,126)

Excluded on screening

(n=925)

References screened for eligibility

(n=201)

Excluded as not relevant following review of abstracts

(n=156)

Full text articles accessed

(n=45)

References excluded with reasons

(n=23)

Studies included in the review

(n=22)

A data extraction table was designed to record effective and non-effective interventions with particular attention to extract data on the following parameters:

- Patient/population:
  - Age, sex and setting (*e.g.* community, care home, own home).
- Intervention:
  - What is the intervention?
  - Method of delivery (*e.g.* AHP, nurse, MDT);
  - Frequency of delivery (*e.g.* daily, weekly, fortnightly);
  - Duration of intervention (*e.g.* one-off, six monthly, yearly);
  - Period of follow-up.
- Comparison:
  - What is the alternative intervention/management?
- Outcome:
  - Intended benefits/outcomes from the intervention (e.g. reduced hospital admissions, reduced length of stay for people admitted, increase in daily activity, improvement in quality of life for patient and carer, reduced number of falls in people with dementia).

The benefits reported in the final 22 records were mapped to overall outcomes using the six JIT themes as a framework.

The data extraction tables are presented in Appendix B.

Section 3:   Results

3.1   SEARCH RESULTS FOR AHPS AND DEMENTIA

As a result of the searches a total of 22 records were assessed in more detail and provided the basis for this review. Table 3.1 includes the number of records assessed broken down by study type.

Table 3.1:   Type of studies included in the final review

Type of study	Records reviewed
Clinical Guidelines (NICE)	1
RCTs	9
Systematic literature reviews [a]	4
Cost/economic evaluations	6
Case studies/surveys	2
Total	**22**

[a]   Includes qualitative reviews

3.2   REVIEW RESULTS

Information was extracted and summarised from the 22 records according to the following outcomes:

- Reduced hospital admissions;
- Reduced length of stay for people with dementia admitted;
- Reduced number of falls in people with dementia;
- Increase in daily activity;
- Improvement in quality of life for patient and carer.

Results from the literature review are outlined in more detail in the remainder of this section by dividing discussion according to each outcome described above. In the final section of the report key findings are summarised in terms of interventions that could be adopted to achieve the outcomes outlined, with a particular focus on the JIT theme – shifting the balance of care to support more people in their homes for longer.

3.2.1 Reduced Hospital Admissions, Reduced Length of Stay in Hospital and Reduced Number of Falls for People with Dementia

The review found a number of studies of AHP interventions which reduced hospital admissions for people with dementia. The review also found that such interventions can also reduce the length of stay of people with dementia and the number of falls. The elderly and those with cognitive impairment are at increased risk of suffering falls with a reported rate twice that of cognitively normal older people [1]. As such, these individuals are more likely to be admitted into hospital as a result of a fall and subsequent fracture or other injury.

3.2.1.1 Multifactorial assessment and interventions (including physiotherapy and occupational therapy)

Several studies assessed the effectiveness of multifactorial assessment and interventions in reducing admissions to hospital for people with dementia. Some looked at the outcome directly, whereas others reported on cognitive functioning and effects on behavioural symptoms such as wandering, which can arguably lead to problems such as increase risk of falls and hospital admissions and longer lengths of stay.

One study by Shaw *et al.* (2003) [1] assessed older people (aged ≥65 years) with cognitive impairment and dementia (mini-mental state examination score >24) presenting to the accident and emergency department (A&E) after a fall. Individuals were randomised to either an intervention group or control group. Multifactorial assessment and intervention included medical, cardiovascular, physiotherapy and occupational therapy assessment.

Physiotherapy interventions included a supervised home-based exercise programmes for 3 months (e.g. structured gait retraining, balance, transfer and mobility interventions, functional limb strengthening and flexibility exercises) which was to be continued by the patient for the duration of study (1 year); the provision of appropriate walking aids and footwear and chiropody referrals as required. Alongside this, occupational therapy interventions were utilised which involved home hazard modification. The data collected on falls, injuries, attendance at A&E, hospital admission and mortality were collected prospectively for the study duration and interventions repeated at 3 month follow-up. Those in the control arm of the study were provided with conventional assessment and care. Despite physiotherapy and occupational therapy interventions, the results from this study indicated that there was no significant difference between either groups in terms of the proportion of people with dementia who fell during 1 year follow-up (RRR = 0.92 (95% CI 0.81 to 1.05)) and fall-related hospital admissions (RRR = 1.11 95% CI 0.61 to 2.00)) [1].

Similarly, another trial lasting over 2 years [2] considered people with dementia living in their own homes and their caregivers (aged ≥65 years). Participants received either occupational therapy interventions or social worker-led assessment. Occupational therapy was achieved by home assessment and provision of equipment or adaptation of the environment to optimise independence in completing an activity (e.g. installation of a level access shower or stair lift, rather than providing extra care services). In contrast, social workers recommended personal care assistance to meet the needs of their clients in relation to care in the community policies and this was often undertaken by telephone (39%). Admission to acute beds was similar between the groups. In the social worker arm (n=30), people with dementia spent a total of 960 days admitted to hospital and in the occupational therapy arm (n=39) a total of 726 days was reported. Interestingly, there was higher reported use of rehabilitation beds in the occupational therapy arm (a total of 369 days versus 16 days). The study concluded that occupational therapy and social work-led interventions were equally effective in maintaining older people in the community.

An evaluation of 26 people [3] with moderately severe dementia attending a day care centre for occupational therapy sessions (including educational activities such as cooking, gardening and colouring) and physical activity, reported that Tinetti scores (used to assess motor performance e.g. gait and balance) declined by 2 points over 12 months. The Mini-Mental State Examination (MMSE) also declined by 2 points. Arguments to understand this negative trend in cognitive, functional and motor performances, suggested the multidimensional assessment may have been instrumental in slowing psychophysical decline (as indicated by the non-significant decrease in performance indices). Despite a negative trend, people remained relatively stable over time as opposed to the expected natural progression of the disease.

In contrast to the studies by Shaw [1] and Stewart [2] who reported minimal effectiveness in reducing hospital admissions amongst people with dementia through multifactorial interventions such as physiotherapy and occupational therapy, a home-based intervention for functionally vulnerable older adults (aged 70+ years), ABLE (Advancing Better Living for Elders) reported that an intervention based on occupational therapy and physiotherapy principles versus traditional home care could improve functional ability and mortality in people admitted to hospital within 1 year of study entry [4]. The ABLE intervention provided a two-phase mixture of education and problem-solving; environmental modifications and balance, muscle strengthening and fall recovery techniques. These phases involved occupational and physiotherapy sessions at home, over 6 months as well as follow-up calls. Results found statistical significant reductions in functional difficulties and the fear of falling. Evidence from the trial suggests the intervention reduced mortality by 9% at 12 months with those people admitted to hospital within 1 year of study entry having greater survival rates (0% mortality rate for ABLE versus 21% control group). In this study survival was statistically significant for up to 2 years, with mortality rates remaining lower up to 3.5 years from study entry for the intervention group. Although the benefits derived are shown clearly in this study, the authors discussed the challenges of moving the ABLE intervention from an RCT setting into the community/home-based care setting. Occupational therapists require

training (at least 2 days training days), time and costs are required to tailor written strategies to individuals and there is often a lack of funding for home modifications.

3.2.1.2 Massage and touch therapy

One behavioural symptom that people with dementia present with, is wandering which could increase the risk of a fall and thus a stay in hospital. A non-pharmacological intervention to reduce such agitated behaviour is massages or touch therapy. A systematic review [5] identified three studies that reviewed the use of massage or touch therapies for their effect on behavioural and psychological symptoms including agitation and wandering. Results reported an immediate effect on the short-term reduction in agitated behaviour, but no evidence that such intervention could significantly reduce wandering.

3.2.1.3 Music and music therapy

In the same systematic review [5] 10 studies considered the effects of the use of music and music therapy on symptoms of dementia including decreasing behavioural problems such as wandering, as well as improving cognitive skills of people with dementia. As outlined previously, individuals with cognitive impairments are at greater risk of falls and thus admissions to hospital for related injuries, so improving such skills could lead to a reduced number of falls and admissions. Evidence from the 10 studies suggested that music and group music therapy, in particular the playing of preferred music, can reduce agitation and wandering behaviour.

A group music therapy intervention for 45 nursing home residents with Alzheimer's disease (AD) did not show significant clinical benefit in reducing the range and frequency of agitated behaviours such as wanderings. However, empirical evidence gathered from the therapists delivering the therapy did suggest a positive trend in a reduction of wandering [6]. Participants (age range 71 to 96 years) in the yearlong study received either weekly music therapy or standard home nursing. The weekly sessions lasted between 30 and 45 minutes for 42 weeks and therapists noted that prior to sessions most participants (amongst other symptoms) wandered and fidgeted. However, these behaviours were seen considerably less frequently within the music therapy sessions and in many cases, participants remained less agitated immediately after sessions.

3.2.1.4 Physical activity and exercise

Five studies from a systematic review [5] suggested that sessions encouraging physical exercise and activity could reduce wandering behaviour and cognitive function. The evidence suggested physical activity reduced such symptoms which is consistent with a study by Eggermont and Scherder (2006) [5] who reported that moderate intensive exercise may reduce wandering in people with dementia.

3.2.2 Increase in Daily Activity

A contributing factor to the challenging and distressing nature of dementia for both the people with dementia and their caregivers is the ability for the individual to show signs of depression, apathy or withdrawal and neglect of themselves. Caregivers are relied upon increasingly to manage the daily activities of the patient. As part of the review, the evidence base was reviewed to identify interventions to shift the balance of care by promoting more independence in daily activities rather than a reliance on health professionals and carers. This is one of the key themes to come out of the JIT and SGHD framework. The studies suggest a strong link between improvements in daily activity and quality of life for a patient and the caregiver.

3.2.2.1 Art therapy

An RCT followed 45 people with mild to severe dementia [7] who were living in a cross-section of local facilities from a day resource unit within a local hospital, private and public rest homes and resource centres. Art therapy or activity groups met for 1 hour each week for a total of 40 weeks and were measured on cognition, depression, behaviour, sociability, well-being and mood. Data on 'within session changes' reported that over a 40 week period of art therapy, people showed a session to session cumulative change in measures of responsiveness. Mental acuity, sociability, calmness and physical engagement within the art sessions increased on a slow, upward, linear trajectory. Significant engagement of people within the group was reported. However, the positive changes seen over the first 10 to 20 weeks of the programme were not maintained. It was followed by a steep decline in engagement in the second half of the programme which suggested art therapy could be in the short-term beneficial for engaging people with dementia in increased daily activity, but perhaps not in the longer-term. The responses were also reported by observers; this may have confounded results particularly if they expected to see initial improvement.

3.2.2.2 Sensory stimulation-oriented therapy

One of the non-pharmacological interventions included in a systematic review by Kverno *et al.* (2009) [8] was sensory-stimulation-oriented therapies. These can include bright light therapy, interventions involving physical movement and interactive activities such as passing a ball and clapping, music therapy or multi-sensory stimulation (MSS) which stimulates a patient's senses through the provision of visual, auditory and tactile stimuli. In terms of increasing daily activity there was limited but good quality evidence from the systematic review supporting the use of music therapy for the short-term reduction of agitation and apathy in people. Garland *et al.* (2007) reported 50% of the total participants (n=30) demonstrated a reduction in agitated behaviours of 50% or more during preferred music sessions. Holmes *et al.* (2006) reported 69% of total participants (n=32) showed positive engagement with live music as opposed to pre-recorded music (25%) or silence (12.5%).

As well as music therapy showing positive signs of increased engagement in daily activity, two studies by Baker *et al.* (2001, 2003) reported in the same systematic review, [8] examined the effects of multi-sensory stimulation (MSS) sessions. These were 30 minute sessions twice per week over a 4 week period. The study (Baker 2001) found significant reductions in dysphoric mood and behaviour following MSS compared to activity therapy. Baker *et al.* (2003) found no differences between the groups but did report a difference when comparing individuals with moderately severe dementia and severe dementia. Those with severe dementia showed a reduction in apathy following MSS and an increase following activity therapy. In contrast, those with moderately severe dementia showed the opposite pattern. However, neither study reported the number of people in the subgroups so the interpretation of the results is limited.

3.2.2.3 Occupational therapy

There is evidence that community occupational therapy interventions can be an effective strategy in improving the daily functioning of people with dementia, as well as providing a sense of competence in their caregivers. A cost-effectiveness study by Graff *et al.* (2006) [9] in which, 135 people aged ≥65 years with mild to moderate dementia, living in the community and their caregivers, were provided with a series of 10 1-hour occupational therapy sessions over a 5 week time period. The sessions included cognitive and behavioural interventions to teach the person with dementia in the use of aids to compensate for cognitive decline and caregivers in coping behaviours and supervision. The first 4 sessions were focused on diagnostics; goal defining and activities that the patient and caregiver wanted to improve, whilst the remaining 6 sessions worked on optimising these compensatory and environmental strategies to improve daily activity performance. Over 3 months these outcomes were combined in one measure for successful treatment outcome for the evaluation (clinically relevant improvement in people with dementia and caregivers for all primary outcome measures). The treatment was judged successful if the process, performance and competence scale scores showed improvements of ≥0.5 points, ≥20% and ≥5 points respectively. The effect of treatment at 3 months follow up was greatest for the occupational therapy group (difference = 36% (95% CI: 23-47%)) with the number needed to treat for successful treatment outcome at 2.8 (95% CI: 2.7 to 2.9).

A case study [10] assessing system-based occupational therapy at home, reported quantitative results showing an improvement in daily performance (e.g. initiative, motor and process skills, need for assistance) and quality of life of the person and an improved sense of competence, quality of life and mastery of the situation of the caregiver after the intervention. People reported a greater sense of autonomy and pleasure in performing daily activities. So, the combination of education, setting feasible goals, using adaptations in physical environment, training compensatory skills, training supervision skills, and changing dysfunctional cognitions on patient behaviour and caregiver role seemed to be successful in some cases.

Another evaluation by Baldelli *et al.* (2007) [11] also suggested that a daily occupational therapy program requiring people to follow a programme for washing, personal hygiene (combing hair, shaving), dressing, sanitary services and eating can lead to an increase in self-sufficiency and have practical implications in daily activities in respect of the workload of the caregiver. In this study of 34 patients with dementia and moderate to severe cognitive impairment (including individuals with vascular dementia (n=14) and Alzheimer's (n=20)), a programme of occupational therapy was followed for 40 days. All people with dementia improved in mean scores in all of their reactivated functional areas.

3.2.2.4 Tailored Activity Program (TAP)

The Tailored Activity Program (TAP) is a good example of an intervention that could help support people with dementia and their carers, as well as promote self-care and a shift in the balance of care from professionals and services to the home. The main aim of intervention is to identify people with dementia preserved capabilities, previous roles, habits and interests, and develop customised activities, and train caregivers in their use. In a study by Gitlin [12], over 60 people with dementia/caregivers were assigned to either the TAP intervention program or a control group who did not receive any study contact. TAP involved 8 sessions (6 home and 2 telephone contacts) of occupational therapy over 4 months, and was delivered in 3 phases.

Phase 1:
Standardised neuropsychological and occupational therapy-based observational tools were used to evaluate people's abilities, deficits, previous roles, habits and interests. Also evaluated were caregiver's communication and the home environment.

Phase 2:
Based on assessment results, 3 activities were developed tailored to the patient capabilities. 'Activity prescriptions' were developed that detailed persons' capabilities, target activity (e.g. sorting beads) and activity goal (e.g use bead sorting when preparing meals) and set up and supervision needs. Caregivers were instructed in 5 specific techniques including cueing, relaxing the rules, not rushing, and environmental set-up and simplifying communication and also provided with education on the role of environment, how to integrate activities in daily care routines and stress reduction techniques.

Phase 3:
Interventionists finally helped generalise the techniques to other care challenges.

Outcome measures used for time spent care giving were 2 items from the 4-item Caregiver Vigilance Scale (NIH REACH I study):

- Hours *'doing things'* refers to task performance such as managing self-care;
- Hours '*on duty'* refers to perceived oversight demands including providing cueing, guidance and assuring safety and well-being.

The reported intervention effect on time spent care giving was favourable to caregivers on the TAP programme who reported at baseline an average 6.3 hours *'doing things'* compared to an average 6.2 hours in the control group arm. At 4 month follow-up TAP caregivers reported an average 5.4 hours *'doing things'* (a difference of -1 hour) whereas carers in the control group reported 8.6 hours (a difference of +3 hours). This evidence suggested that people with dementia whose caregivers were enlisted in the TAP programme for 4 months, had increased their daily activities and thus lowered the number of hours their caregiver spent *'doing things'* for them. Similarly, at baseline TAP caregivers reported an average of 18.2 hours 'on duty' and the control group caregivers reported an average 15.5 hours. However, at 4 month follow-up, TAP caregivers reported –5 hours difference (mean = 13.4 hours) compared to the control group who reported +3 hours difference. Again, this suggested an increase in the independence of the people with dementia in their daily activities and the lower need for supervision and care provided by another.

3.2.2.5 Multifactorial assessment and interventions (including physiotherapy and occupational therapy)

The home-based intervention ABLE (Advancing Better Living for Elders) [4] suggested an intervention based on occupational therapy and physiotherapy principles versus traditional home care can also significantly improve functional ability and enhanced performance in activities of daily living (ADLs).

The COPE trial [13] also reported randomised people living with dementia in the community and who needed help with daily activities. The multifaceted intervention included up to 12 home or telephone calls over a 4 month study period by AHPs who assessed the patient's capabilities as well as providing caregivers with training in home safety and simplifying tasks for the patient. The control group received 3 telephone calls and educational materials. Outcomes at 4 months were favourable to the COPE intervention group, and they included functional dependence, quality of life, frequency of agitated behaviour and engagement for people and well-being, confidence using activities and perceived benefits for the caregivers. The intervention group had less functional dependence compared with the control group (adjusted mean difference = 0.24, 95%CI: 0.09-0.44) and less dependence in instrumental ADLs (adjusted mean difference = 0.32, 95%CI: 0.09-0.55) at 4 month follow-up. They also showed evidence of improved engagement with activities (adjusted mean difference = 0.0.12, 95%CI: 0.07-0.22). However, despite a reported increase in daily activity at 4 month follow-up, at 9 months no difference was observed for the people with dementia. This is in line with other evidence to suggest interventions can have short-term benefits in outcomes but longer-term benefits are harder to identify.

3.2.3 Improvement in Quality Of Life for both Patient and Carer

Dementia brings about considerable challenges for people with dementia in their daily performance and which contributes to a significant decline in quality of life and mental health, not only for the people with dementia but also for their caregivers who often provide informal, unpaid, long-term primary support to these individuals. This review explored AHP interventions that could be effective in facilitating the personal capacities of the dementia patient, helping to change cognition and behaviour as well as enhancing the skills of the caregiver to improve quality of life for all. Most studies explored the issue of quality of life of patient and caregiver.

3.2.3.1 Art therapy

Art therapy is an intervention increasingly used by psychotherapists to work with people with dementia in an attempt to improve quality of life. In a study by Rusted (2006) [7] individuals were randomised to an art therapy group or an activity group. The art group's baseline score was 6.33 (mean) and corresponding activity groups' mean score was 4.75. However, at week 40 the score for art therapy participants had increased to a mean score of 12.22 whereas the score for the activity group had lowered from baseline to 4.58 (mean). The study also assessed scores in anxiety and depressed mood and reported an increase in depression scores for the art therapy group. This was interpreted as being a response to the end of the group sessions, contra-indication for art therapy for example the individuals becoming more depressed through involvement in the group or a growing negative perception of therapy on the part of the key therapy workers who were asked to measure and rate their clients behaviour.

3.2.3.2 Sensory stimulation-oriented therapy

Non-pharmacologic treatment strategies such as sensory-stimulation have become increasingly focused on, as interventions to improve the quality of life of individuals presenting neuropsychiatric symptoms with dementia. The systematic review by Kverno (2009) [8] compiled summaries of 215 non-pharmacological intervention studies published between 1998 and 2008. Sensory stimulation-oriented approaches such as bright light therapy, physical activity and music therapy were considered as contributing to a better quality of life for people with dementia.

Bright light therapy was examined in Skjerve *et al.* (2004) [8] in which people with severe dementia were exposed to bright light every morning for 45 minutes for 4 weeks. Results showed a decrease in agitation and behavioural symptoms, however due to the small sample size (n=10), caution should be taken when interpreting the effect of the intervention in increasing the quality of life of people with dementia.

Another study included in the systematic review by Heyn *et al.* (2003) examined the effects of structured movement therapy, combining movement with multi-sensory activities such as storytelling and music. Participants met for 30 minute sessions 3 times per week for 2

weeks and 61.5% (n=13) of participants showed improvement ratings of facial expression and mood. However, the recurring limitation of a small sample size limits the interpretation of this evidence.

Baker *et al.* (2001) examined the effects of multi-sensory stimulation (MSS) by provision of visual, auditory and tactile stimuli to people with dementia and found significant reductions in dysphoric mood and behaviour compared with activity therapy. Baker *et al.* (2003) found no differences between the groups but did see a difference when comparing individuals with moderately severe dementia and severe dementia. Those with severe dementia showed a reduction in apathy following MSS and an increase following activity therapy. In contrast, those with moderately severe dementia showed the opposite pattern.

3.2.3.3 Occupational therapy

Not only has occupational therapy been considered a valuable intervention to aid people with dementia in improving their quality of life, through increasing cognitive and physical functioning, but there is evidence that it can also help improve the quality of life for caregivers by providing coping behaviours and supervision. The study by Graff *et al.* (2006) [9] assessed outcomes for the caregivers of 135 people with mild to moderate dementia living in the community. A sense of competence questionnaire was completed by carers, with scores ranging from 27 to 135 (the higher the score, the greater the sense of competence).

Also reporting positive changes in quality of life after system-based occupational therapy at home was Graff (2006) [10]. In this study people with dementia and caregivers illustrated an improvement in daily performance, communication, sense of competence and quality of life of an older patient with dementia and their primary caregiver.

Following a daily occupational therapy program lasting 40 days, results from the Baldelli trial (2007) [11] showed an increase in self-sufficiency levels and functional areas such as dressing, sanitary services and washing for both groups (vascular dementia and people with Alzheimer). This can be seen to increase quality of life for both patient and caregiver in terms of autonomy and implications in daily living.

A study by Stewart *et al.* (2005) [2] which assessed two groups of older people living at home and their carers given either occupational therapy interventions or social work-led assessment showed no statistically significant differences between the groups in terms of quality of life measures. The EQ-5D (a weighted health index) and a self-rated 'thermometer' to assess health status were used for people with dementia, as well as the Perceived Stress Scale (PSS) measuring well-being and stress levels. Carers completed the Carers Assessment of Difficulties Index (CADI) as well as the Subjective Burden Scale (SBS) alongside the EQ-5D and PSS. Follow-up results at 4 months showed both groups (occupational therapy and social work-led) made similar gains across CADI, EQ-5D and PSS with no significant differences found. However, when adjusted for baseline values significant differences were found for caregivers in favour of the occupational therapy arm on

EQ-5D, suggesting that the intervention could go some way in improving quality of life and health status of those providing support with daily living activities.

3.2.3.4 Tailored Activity Program (TAP)

The positive outcomes found following the TAP intervention [12] shows that an intervention of this nature, using a mixture of standardised neuropsychological and occupational therapy-based observational tools, can not only improve the daily functioning of both people with dementia and their caregivers but contribute to an improvement in their quality of life. Four month follow-up results compared to baseline scores showed individuals following the TAP programme had a reduction in hours spent *'doing things'* (e.g. task performance) and *'on duty'* (e.g. overseeing dementia patient demands including safety and well-being) compared to the control group. This study showed that caregivers devoting time and energy to providing hands-on assistance to people with dementia can be offered respite or time off from duties, thus helping to alleviate some of the burden they have as primary carers and improving their quality of life.

3.2.3.5 Cognitive stimulation therapy or training

There is some evidence that cognitive stimulation therapy and training to help improve memory, functioning, behaviour, depression and quality of life could work, although evidence is inconclusive given small sample sizes. For example, in a systematic review by Hulme (2010) [5] the meta-analysis by Sitzer *et al.* (2006) produced positive results reporting medium effect sizes for learning memory, executive functioning, ADLs, depression and self-rated general functioning. However, because the interventions were diverse and not pointing to the effectiveness of any one type of cognitive training the evidence should be interpreted with caution.

3.2.3.6 Multifactorial assessment and interventions (including physiotherapy and occupational therapy)

The ABLE intervention (see Section 3.2.2.5) reported by Gitlin (2009) [4] provided evidence that interventions by AHPs, that instruct people in strategies to improve their quality of life can be effective. Mortality rates remained lower for the ABLE group of people with dementia up to 3.5 years from study entry and maintained statistical significance for up to 2 years showing that such a tool could help delay functional decline and mortality in this group of people.

3.2.3.7 Activity and recreation

Kolanowski *et al.* (2005), reported in the systematic review by O'Connor [14], measured the affect and behaviour of 30 behaviourally symptomatic nursing home residents who participated in repeated 20 minute recreational activities suited to their former interests; current skill levels and combination of interests and skills. Positive effects such as pleasure, interest and contentment were seen significantly more often in the intervention group than control group (moderate effect size of 0.54). Similarly, Beck *et al.* (2002) [5] randomised 143

nursing home residents with dementia and current behavioural disturbance to 1 of 5 conditions. In one group nursing assistants worked with residents for 45 to 60 minutes per day for 12 weeks focusing on ADL that maximised residents' autonomy. Another group applied standard psychosocial activities to promote self-esteem and expression and another group received both for 90 minutes daily. Control conditions included either one-to-one interactions chosen by residents or usual care. Outcomes of this study showed greater contentment and interest in all intervention groups compared with controls, although no one group appeared superior.

3.2.3.8 Music and music therapy

Evidence suggests music and music therapy can positively affect quality of life for people with dementia and their caregivers. Ragneskog *et al.* (1996) reported in the systematic review by O'Connor [14] trialled a music intervention consisting of 3 types of music played for 2 weeks each, while 20 residents of a psychogeriatric nursing home ward ate dinner. Using a psychiatric scale (GBS) to assess behaviour immediately after the musical intervention reported a reduction in irritability levels compared to a final no music session (range 11-44% between 3 groups). Depression rates also fell (range 27-73%) and in addition staff reportedly served more meals and residents ate a little more. In particular the mean effect size for soothing music was substantial (0.75 (range 0.67-0.86)) but short term, with no long-term benefits reported.

Another study by Van de Winckel *et al.* (2004) summarised in Ziv and Lidor (2011) [15] examined cognitive function using the MMSE scale in 2 groups of psychiatric hospital persons with dementia. One group participated in sitting exercise with music while the control group had one-to-one talks with a therapist. They found statistically and clinically significant improvements in MMSE scores in the intervention group (effect size = 0.5) with no improvements in the control group. However, it cannot be concluded that music per se contributed to the improvement – the control group did not exercise so it is possible that exercise and activity alone could have led to MMSE score improvements. Nonetheless, it seems to suggest that physical activity with music or without can help improve quality of life (in terms of mental state scores) in populations of individuals with dementia.

Group music therapy has also proven to be effective in improving quality of life in terms of less agitated and aggressive behaviour in a study by Ledger (2007) [6]. Forty-five nursing home residents presenting with Alzheimer's disease attended weekly group music therapy session for 42 weeks within 1 year. Participants listened to favourite music, sang, and moved to music and discussed feelings and memories. Although no significant differences were seen between the experimental and control groups in the range and frequency of agitated behaviours manifested over time, empirical observations by the therapists suggested behaviours seen prior to the sessions (e.g. wandering, fidgeting, yelling, anxiety, repetitive questioning) were less frequently observed within the intervention sessions and people remained less agitated immediately after the therapy.

One study revealed that participation in music and reading group activities can offer opportunities to improve quality of life by improving the patient's sense of belonging, self-esteem and depressive symptoms. Cooke (2010) [16] studied 47 older people either with dementia or probable dementia who were randomised to a music intervention program or reading control group. Participants in the music intervention group were encouraged to participate actively through singing, playing instruments and movement. Two primary outcomes were measured using the DQoL (dementia quality of life) and GDS (geriatric depression scale). Participants who experienced the reading control first reported higher feelings of belonging than those who experienced the music first. When the first reading group crossed-over into the music group their mean scores decreased, whereas when the first music group crossed-over into the reading group, their scores increased. The study by Cooke (2010) concluded that participation in a music therapy intervention, did not significantly affect levels of depression and quality of life in older people with dementia. There was also no evidence to indicate that the therapeutic use of music was more effective than a group reading activity. However, results did suggest that both the music and reading group activities offered opportunities to improve quality of life symptoms in some people with dementia.

These results suggest that treatment with music worked best in specific, time-limited situations which were tailored to individual requirements (e.g. based on a patient's musical preferences). Multiple measures of treatment efficacy were recommended to better understand the long-term effects music therapy programs have on the population of people with dementia.

3.2.3.9 Advanced caregiver training

A non-pharmacological home-based intervention provided by AHPs to caregivers providing in-home care to persons with moderate stage dementia can help improve quality of life for patient and carer. The ACT study reported by Gitlin (2010) [17] is detailed above in Section 3.2.2.4 and examined the two phase intervention.

At 16 weeks, 68% of intervention caregivers reported improvement in targeted problem behaviour, compared with 46% of caregivers in the control group. Additionally, intervention caregivers reported less upset with all problem behaviours, less negative communication, less burden, and better well-being than controls. Fewer intervention caregivers had depressive symptoms (53%) than control group caregivers (68%). Similar reported caregiver outcomes occurred at 24 weeks with intervention caregivers perceiving more study benefits, including ability to keep family members home, than controls. As a standalone study this showed that a home-based intervention for people with dementia and caregivers can have immediate positive effects on the problematic behaviour and improve caregiver quality of life and confidence in managing such behaviours.

Section 4: Discussion

4.1 OVERVIEW

This review has found a good literature base, including four systematic reviews and nine RCTs, on people with dementia managed with a range of AHP-led interventions in relevant settings (residential care, nursing homes, the community and home). The outcome from these studies can inform the evidence base on which interventions are likely to be successful in shifting the balance of care in Scotland.

4.2 REVIEW RESULTS AND DISCUSSION

4.2.1 Review of Evidence

The strongest evidence, from well conducted RCTs or case studies, of AHP-led interventions which were effective in increasing daily activity and improving quality of life involved multi-component interventions. These interventions included the elements listed, together with the studies that trialled the element:

- Occupational and physical therapy sessions to instruct people in compensatory strategies, home and environmental modifications to improve home safety, fall recovery techniques and balance and muscle strengthening exercises (ABLE);
- A combination of education, setting feasible goals, using adaptations in physical environment, training compensatory skills, training supervision skills, and changing dysfunctional cognitions on patient behaviour and caregiver role (GRAFF);
- Home/telephone contact by AHPs assessing patient capability and customising interventions using the findings, monitoring general health and training families in home safety, simplifying tasks and stress reduction (ACT,COPE and TAP);
- A daily therapeutic program of occupational therapy for functional daily living such as washing, personal hygiene, dressing and eating (Baldelli).

In most studies the intervention was delivered to the person with dementia but in others the caregiver was also an active participant, particularly in terms of receiving education and training to reinforce strategies (TAP, ACT and GRAFF) and this seems to be a strength of these programmes.

The review also found that a mixture of contact by AHPs via home visits or telephone contact to assess patient capability monitoring follow-up was successful.

Some evidence showed that single interventions were effective. Those with the greatest effect were physical exercise and active recreational activities which were beneficial in reducing wandering behaviour and improving cognitive functionality in people with dementia. Moreover, occupational therapy at day care centres and in residential care home may modulate the decline of cognition, function and improve the daily functioning of people with dementia in managing self-care. Other functions, for example nursing assistants working with residents on developing their activities of daily living to maximise autonomy also yielded improved capability.

Results suggested social work and occupational therapy assessments were equally effective in maintaining older people in the community. No study compared directly the effectiveness of such interventions to behavioural, sensory or emotional therapies. The effect sizes were higher for the occupational and physiotherapy interventions and hence, by implication, social work interventions than the remaining therapies.

Some authors suggested that interventions could be delivered by the informal carer rather than the trained AHP; however there was no evidence on the efficacy or safety of delivery by this group or of the cost of training and level of supervision required.

Results found limited evidence of the duration of benefit with interventions such as music therapy, hand massage and touch therapy and multi-sensory stimulation (MSS) provided to people with severe stages of dementia. These have shown benefits in the short-term from reduced problematic behaviours such as agitation and an improvement in immediate quality of life symptoms such as a reduced sense of apathy in people with dementia. No longer-term benefits were measured.

The majority of non-pharmacological interventions, which were not physical or occupational therapy fell into the *'might work for a very short period'* category due to inconclusive results and poor quality of the study methods. For example, sensory stimulation-oriented approaches, art therapy, light therapy, reality orientation and reminiscence therapy showed some short term effects for people with dementia but were inconclusive due to methodological limitations and the very limited benefit observed. Behavioural management interventions and therapies involving music and group music sessions, might work in alleviating some behavioural and psychological symptoms of dementia, but the evidence of effectiveness in respect of reducing wandering, depression, aggression, apathy and neuropsychiatric symptoms was inconclusive, particularly in the longer-term due to a lack of long-term follow-up results in most studies.

Six studies were describes as cost or economic evaluations but none provided robust cost effectiveness analysis of the intervention compared to current practice.

4.2.2 Comparison of Findings with NICE Guideline

National Institute of Health and Clinical Excellence (NICE) Guideline on '*Supporting People with Dementia and their Carers'* [18] recommended non-pharmacological interventions for cognitive and non-cognitive symptoms in people with dementia, as well as for their caregivers. The Guideline recommends to provide the opportunity for all people with dementia to participate:

- In structured group cognitive stimulation programmes;
- In other approaches such as multi-sensory stimulation, therapeutic use of music, dancing and massage.

NICE recommended that AHPs should deliver these interventions after appropriate training and supervision.

The Guideline recommendations do not correspond with the findings in this review. Rather the studies reviewed of such interventions showed empirical evidence of benefits to people with dementia but clinical effect sizes were small and inconclusive.

One explanation for this different evidence base may be that this review only considered studies published after 2005 but the NICE Guideline was published in 2006. No end date for the literature review was disclosed but a review of the references revealed that no studies of non pharmaceutical interventions published after 2004 were included. Thus no studies were included in both reviews. The weight of evidence on the benefit of physiotherapy and occupational therapy for this group of people may have been absent, with the pivotal RCTs reported within the last few years.

NICE recommended a range of tailored interventions for the primary caregivers of people with dementia. Individual or group education, peer-support groups, tailored coaching to meet the needs of the individual the person is caring for, support and information by telephone, the internet and training courses, communication and problem solving in the care of people with dementia are interventions showing evidence of improving the quality of life for the caregiver. Examples of benefit include releasing time and burden of care. These recommendations are more consistent with the evidence base in this review.

These interventions are anticipated to assist in shifting the balance of care, reducing reliance on professionals and enabling the person with dementia to be managed for a longer period at home.

4.3   LIMITATIONS

This rapid review of secondary research studies (systematic reviews, health technology assessments, guidelines) and cost/economic studies about AHPs and people with dementia in the community has revealed that for most interventions the outcomes are not directly related to the themes set out by the JIT/SGHD. Rather benefit in terms of maintained time at home has had to be inferred from intermediate endpoints such as improved daily activity, better quality of life and improved mobility. This does not undermine the value of the work; if a patient's ability to cope with daily living deteriorates then the likelihood of a move into a care home increases.

Whilst there were four synthesised studies the studies underpinning the synthesis were often small underpowered case or cohort studies, with diverse outcomes, heterogeneous patient groups and settings. Thus quantitative synthesis was often not possible with only a qualitative review possible. Few such studies had end points that reached statistical significance.

Many of the case studies considering emotion-oriented approaches and the sensory stimulation-oriented approaches have material methodological limitations including small sample sizes, non-clinical endpoints, observation by onlookers to score results and a lack of evidence of duration of effect sizes. As such, the evidence they provide is not sufficiently robust to inform practice in Scotland.

A problem with some of the multi-interventions is one cannot discern the intervention which contributes the greatest benefit; disaggregation to find what works is not possible. There may also be issues of generalisability; the care providers in the clinical trials may be better skilled and motivated than staff delivering such care in Scotland. Access to aids and improvements may also have been much easier.

The patient groups may also have excluded people judged to be at risk of failing to remaining in the community setting for the duration of the study in order to reduce drop-outs and lost to follows-ups. However, this may not be reflecting of the Scottish population with dementia and hence again limit generalisability

It has not been possible to separate out any *'Hawthorne effect'* in the studies, although one suspects this occurred. The Hawthorne effect is a form of reactivity whereby subjects in the study improve or modify their behaviour simply in response to the fact that they know they are being observed. For example, following an art therapy intervention programme, depressive mood scores declined but this could be because the key therapy workers who were measuring and rating their client's behaviour expected the therapy to work. Moreover, if the participants knew they are being observed and measured they may be more inclined to participate and be involved in the sessions in the short-term, but then the longer term effects are either not recorded or show a decline in trend.

The recording of patient outcomes, often by carer observation is a weakness but one which may be difficult to overcome for people with severe dementia. However there is always the risk that the observed view does not accord with the patient view.

The absence of robust economic evaluation was also a major limitation; thus even for the interventions which have demonstrated longer term clinical benefit there has been no formal evaluation of their cost effectiveness.

Finally, this was a rapid and low-cost review and therefore with more time and wider searches the effects of interventions and delivery methods for people with dementia from a healthcare setting to the home/community could be investigated in more depth.

4.4   FURTHER RESEARCH

The existing evidence base is sufficient to identify the interventions that deliver benefit, when led by occupational therapists and physiotherapists or indeed other trained staff. The further research should focus on two aspects. For each of the multi-interventions or single activities of interest some threshold analyses should be conducted to judge the likelihood that these would be cost-effective in Scotland. This could be approached by using the clinical evidence from the relevant study/ies and information on the likely local resources required to deliver the intervention to determine what outcomes would be needed, (for example, admissions to hospital and care home avoided) in order to make the intervention cost neutral and then cost saving. The likelihood of realising these could be informed by using the effect size for the reported outcomes.

Secondly implementation of any intervention could be accompanied by a pilot with local evaluation to test whether the benefits measured in the trial setting are replicated in practice. Long-term follow-up would be essential, being absent from many studies. The evaluation should also include a measure of cost effectiveness. Such robust evaluation of the interventions as they are introduced could be shared with the national groups to encourage take-up and shared learning.

4.5   CONCLUSIONS AND RECOMMENDATIONS

The growing epidemiological and cost burden presented by people with dementia has increased the need to identify effective interventions. These would offer the opportunity to delay or prevent the deterioration in a patient's functioning capability, itself associated with disease progression, with disease progression often accompanied by a placement in more intensive, and costly, support care homes.

A wide range of interventions have been studied by researchers using a several methodologies, including some robust RCTs and cohort studies. This review has been able to identify good evidence to suggest interventions by occupational and physiotherapists are effective in reducing psychological and behavioural symptoms, either as part of multifactorial assessments or as standalone therapies. The evidence for these interventions proved effective across a wide range of endpoints such as reduced mortality, improved behaviours, carer satisfaction and improvement in quality of life. All could be delivered by a range of AHPs. The duration of benefit was seldom demonstrated beyond a few months, in part because of the trial design. Robust long-term evaluation of the costs and benefits of implementing such interventions should be included within implementation plans from the outset.

This study adds to the growing evidentiary base supporting active non-pharmacological interventions. Currently in Scotland, there is not a standard approach to delivering consistent interventions to individuals with dementia. The results of this review provide important insights for developing and testing future interventions for people and caregivers. Particularly relevant is the list of interventions which show little clinical benefit in the short term; in all likelihood these will not be cost effective. Many of the active interventions are multi-dimensional confirming earlier research that there no single, easily implemented and consistently effective method for managing the progression of the disease.

Some of the more successful interventions also included the caregiver in the intervention and this aspect seems to deliver added value. Interventions that focus on supporting the caregiver have also been shown to be effective in increasing the capability of the carer to manage the person with dementia, including reducing the caring time required.

Other characteristics of successful interventions include the emphasis on tailoring the interventions to the person with dementia. The studies have demonstrated that people with mild to moderate dementia respond better to some interventions than those with severe dementia and vice versa. Thus tailored care plans, agreed with the patient and the carer seem an essential aspect of effective delivery of interventions. Importantly, the studies have shown people may respond better to one therapy than another. There is little understanding of why this is the case but it suggests the need to monitor the responses to therapy for each patient over time, with adjustments made accordingly.

In conclusion, physical therapies can be successful in managing people with dementia, supported by individual patient monitoring; for successful implementation across Scotland the overall impact on resource use and costs should also be evaluated. Generalising from the clinical studies is particularly difficult for these interventions, relying as they do on the delivery of the intervention.

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APPENDIX A

Search Strategies and Results

Search Strategies and results

CDSR (Cochrane Library/Wiley interscience). 2011/10. Searched 14 October 2011

63 reviews were retrieved

#1	MeSH descriptor Allied Health Occupations explode all trees	692
#2	MeSH descriptor Allied Health Personnel explode all trees	519
#3	MeSH descriptor Physical Therapy (Specialty) explode all trees	107
#4	MeSH descriptor Occupational Therapy explode all trees	435
#5	MeSH descriptor Language Therapy explode all trees	96
#6	MeSH descriptor Speech Therapy explode all trees	149
#7	MeSH descriptor Dietetics explode all trees	66
#8	MeSH descriptor Podiatry explode all trees	24
#9	MeSH descriptor Orthoptics explode all trees	30
#10	MeSH descriptor Sensory Art Therapies explode all trees	1294
#11	(allied NEXT health NEXT profession*) or (allied NEXT health NEXT care NEXT profession*) or (health NEXT profession* NEXT allied) or AHP*	651
#12	(physiotherap* or (physical NEXT therap*)):ti,ab,kw	5101
#13	(occupational NEXT therap*):ti,ab,kw	830
#14	((speech or language) NEAR/2 therap*):ti,ab,kw	510
#15	(dietician* or dietetic*):ti,ab,kw	330
#16	(chiropod* or podiatr*):ti,ab,kw	88
#17	(orthoptic* or pleoptic*):ti,ab,kw	64
#18	((music or drama or dance or art or sensory) NEAR/2 therap*):ti,ab,kw	1062
#19	(#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18)	9739
#20	MeSH descriptor Dementia explode all trees	3088
#21	MeSH descriptor Delirium explode all trees	152
#22	MeSH descriptor Confusion explode all trees	254
#23	(dementia* or alzheimer* or deliri* or confus*)	11395
#24	(#20 OR #21 OR #22 OR #23)	11491
#25	MeSH descriptor Accidental Falls explode all trees	700
#26	(fall or falls or falling or faller):ti,ab,kw	12070
#27	(slip or slips or slipped or trip or trips or tripped or stumble*):ti,ab,kw	252
#28	(#25 OR #26 OR #27)	12281
#29	(#19 AND (#24 OR #28))	521*

* NB includes all databases on the Cochrane Library (CDSR, DARE, CENTRAL, HTA and NHS EED)

DARE, HTA and NHS EED (CRD interface). 2011/12th October. Searched 14 October 2011

77 records were retrieved in DARE, 18 in HTA, and 56 in NHS EED.

1	MeSH DESCRIPTOR Allied Health Occupations EXPLODE ALL TREES	141
2	MeSH DESCRIPTOR Allied Health Personnel EXPLODE ALL TREES	63
3	MeSH DESCRIPTOR Physical Therapy (Specialty) EXPLODE ALL TREES	22
4	MeSH DESCRIPTOR undefined EXPLODE ALL TREES	0
5	MeSH DESCRIPTOR Occupational Therapy EXPLODE ALL TREES	60
6	MeSH DESCRIPTOR Language Therapy EXPLODE ALL TREES	15
7	MeSH DESCRIPTOR Speech Therapy EXPLODE ALL TREES	22
8	MeSH DESCRIPTOR Dietetics EXPLODE ALL TREES	6
9	MeSH DESCRIPTOR Podiatry EXPLODE ALL TREES	5
10	MeSH DESCRIPTOR Podiatry EXPLODE ALL TREES	5
11	MeSH DESCRIPTOR Orthoptics EXPLODE ALL TREES	1
12	MeSH DESCRIPTOR Sensory Art Therapies EXPLODE ALL TREES	63
13	("allied health")	94
14	("profession* allied")	6
15	physiotherap* or "physical therap*"	1158
16	"occupational therap*"	235
17	((speech or language) near therap*)	103
18	dietician* or dietetic*	139
19	chiropod* or podiatr*	43
20	orthoptic* or pleoptic*	9
21	((music or drama or dance or art or sensory) near therap*)	129
22	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21	1805
23	MeSH DESCRIPTOR Dementia EXPLODE ALL TREES	333
24	MeSH DESCRIPTOR Delirium EXPLODE ALL TREES	30
25	MeSH DESCRIPTOR Confusion EXPLODE ALL TREES	34
26	dementia* or alzheimer* or deliri* or confus*	972
27	#23 OR #24 OR #25 OR #26	987
28	MeSH DESCRIPTOR Accidental Falls EXPLODE ALL TREES	110

29	fall or falls or falling or faller	707
30	slip or slips or slipped or trip or trips or tripped or stumble*	142
31	#28 OR #29 OR #30	841
32	#27 OR #31	1785
33	#22 AND #32	151
34	* IN NHSEED	11885
35	* IN HTA	10888
36	* IN DARE	23180
37	#33 AND #34	56
38	#33 AND #35	18
39	#33 AND #36	77

HEED (Wiley). 2011/Sep. Searched 14 October 2011

32 records were retrieved.

AX='allied health' (44)
AX='profession allied' within 2 (0)
AX=physiotherapy or physiotherapist or physiotherapists or 'physical therapy' or 'physical therapist' or 'physical therapists' (292)
AX='occupational therapy' or 'occupational therapist' or 'occupational therapists' (105)
AX='speech therapy' within 2 or 'speech therapist' within 2 or 'speech therapists' within 2 or 'language therapy' within 2 or 'language therapist' within 2 or 'language therapists' within 2 (21)
AX=dietician or dieticians or dietetic or dietetics (88)
AX=chiropody or chiropodist or chiropodists or podiatry or podiatrist or podiatrists (21)
AX=orthoptic or orthoptics or pleoptic or pleoptics (11)
AX='music therapy' or 'drama therapy' or 'dance therapy' or 'art therapy' or 'sensory therapy' (56)
CS=1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 (559)
AX=dementia or alzheimer or alzheimers or delirium or confusion (547)
AX=fall or falls or falling or faller (728)
CS=10 or 11 (1253)
CS=9 and 12 (32)

MEDLINE and MEDLINE In-Process & Other Non-Indexed Citations (OvidSP). 1948-2011/Oct wk 1. Searched 14 October 2011

260 records were retrieved in MEDLINE, and 20 in MEDLINE In-Process & Other Non-Indexed Citations.

1.   Allied Health Occupations/ or Allied Health Personnel/ (9868)
2.   "Physical Therapy (Specialty)"/ (1823)
3.   Occupational Therapy/ (9256)
4.   Language Therapy/ or Speech Therapy/ (5418)
5.   Dietetics/ (4737)
6.   Podiatry/ (1855)
7.   Orthoptics/ (1630)
8.   exp Sensory Art Therapies/ (35067)
9.   (allied health profession$ or allied health care profession$ or health profession$ allied or AHP$).ti,ab. (3283)
10.   (physiotherap$ or physical therap$).ti,ab. (21795)
11.   occupational therap$.ti,ab. (6953)
12.   ((speech or language) adj2 therap$).ti,ab. (2812)
13.   (dietician$ or dietetic$).ti,ab. (5834)
14.   (chiropod$ or podiatr$).ti,ab. (2175)
15.   (orthoptic$ or pleoptic$).ti,ab. (1072)
16.   ((music or drama or dance or art or sensory) adj2 therap$).ti,ab. (4380)
17.   or/1-16 (102747)
18.   exp Dementia/ (104225)
19.   exp Delirium/ (4674)
20.   exp Confusion/ (7803)
21.   (dementia$ or alzheimer$ or deliri$ or confus$).ti,ab. (143323)
22.   or/18-21 (174872)
23.   Accidental Falls/ (12502)
24.   (fall or falls or falling or faller).ti,ab. (103063)
25.   (slip or slips or slipped or trip or trips or tripped).ti,ab. (10591)
26.   stumble$.ti,ab. (179)
27.   or/23-26 (117584)
28.   review.ab. (533582)
29.   review.pt. (1691639)
30.   meta-analysis as topic/ (11904)
31.   meta-analysis.ab. (24919)
32.   meta-analysis.pt. (31210)
33.   meta-analysis.ti. (16455)
34.   or/28-33 (1904902)
35.   Practice Guideline/ (16053)
36.   Guidelines as Topic/ (27186)
37.   (guideline$ or criteria).ti,ab. (405115)
38.   (standard care or standard of care or standard clinical practice).ti,ab. (12548)
39.   consensus.ti,ab. (78873)
40.   or/35-39 (505287)
41.   Critical Pathways/ (3863)
42.   ((patient$ or critical or care or clinical or treatment) adj3 (pathway$ or path or paths)).ti,ab. (12061)
43.   or/41-42 (14077)
44.   17 and (22 or 27) and (34 or 40 or 43) (583)
45.   (letter or editorial or comment).pt. (1094632)
46.   animals/ not (animals/ and humans/) (3609243)
47.   44 not (45 or 46) (580)
48.   limit 47 to (english language and yr="2005 -Current") (260)

EMBASE (OvidSP). 1996-2011/wk 40. Searched 14 October 2011

348 records were retrieved.

1. exp physiotherapy/ or physiotherapist/ (33261)
2. occupational therapy/ or occupational therapist/ (9837)
3. speech therapy/ (5236)
4. dietitian/ or dietics/ (2205)
5. podiatrist/ or podiatry/ (1037)
6. orthoptics/ (388)
7. music therapy/ or art therapy/ (3499)
8. (allied health profession$ or allied health care profession$ or health profession$ allied or AHP$).ti,ab. (2830)
9. (physiotherap$ or physical therap$).ti,ab. (21226)
10. occupational therap$.ti,ab. (6720)
11. ((speech or language) adj2 therap$).ti,ab. (2752)
12. (dietician$ or dietetic$).ti,ab. (5199)
13. (chiropod$ or podiatr$).ti,ab. (1075)
14. (orthoptic$ or pleoptic$).ti,ab. (476)
15. ((music or drama or dance or art or sensory) adj2 therap$).ti,ab. (5071)
16. or/1-15 (70220)
17. exp dementia/ (137011)
18. exp delirium/ (9223)
19. exp confusion/ (13660)
20. (dementia$ or alzheimer$ or deliri$ or confus$).ti,ab. (135456)
21. or/17-20 (195091)
22. fall risk/ or fall risk assessment/ or falling/ (17589)
23. (fall or falls or falling or faller).ti,ab. (69067)
24. (slip or slips or slipped or trip or trips or tripped).ti,ab. (8968)
25. stumble$.ti,ab. (160)
26. or/22-25 (83974)
27. Meta-Analysis/ (52469)
28. (meta analy$ or metaanaly$ or meta-analy$).ti,ab. (45439)
29. (systematic adj4 (review$ or overview$)).ti,ab. (38955)
30. (data adj synthesis).ti,ab. (6909)
31. (published adj studies).ti,ab. (10611)
32. (data adj extract$).ti,ab. (9559)
33. or/27-32 (113006)
34. practice guideline/ (179509)
35. (guideline$ or criteria).ti,ab. (416563)
36. (standard care or standard of care or standard clinical practice).ti,ab. (16299)
37. or/34-36 (530738)
38. clinical pathway/ (4323)
39. ((patient$ or critical or care or clinical or treatment) adj3 (pathway$ or path or paths)).ti,ab. (13713)
40. 38 or 39 (16017)
41. 16 and (21 or 26) and (33 or 37 or 40) (494)
42. (letter or note or editorial).pt. (1092693)
43. exp Animal/ (560274)
44. nonhuman/ (2335469)
45. (rat or rats or mouse or mice or hamster or hamsters or animal or animals or dogs or dog or cats or bovine or sheep).ti,ab,sh. (1962123)
46. or/43-45 (3096733)
47. exp Human/ (7155379)
48. 46 not (46 and 47) (2241615)
49. 41 not (42 or 48) (470)
50. limit 49 to yr="2005 -Current" (348)

AMED (OvidSP). 1985-2011/Oct. Searched 14 October 2011

30 records were retrieved.

1. allied health/ or occupational therapy speciality/ or physical therapy speciality/ (2088)
2. allied health personnel/ or occupational therapists/ or physiotherapists/ (1465)
3. Language therapy/ or Speech therapy/ (743)
4. Diet therapy/ (1529)
5. Podiatry/ or Podiatrists/ (542)
6. exp sensory art therapies/ (2265)
7. (allied health profession$ or allied health care profession$ or health profession$ allied or AHP$).ti,ab. (196)
8. (physiotherap$ or physical therap$).ti,ab. (9110)
9. occupational therap$.ti,ab. (5881)
10. ((speech or language) adj2 therap$).ti,ab. (460)
11. (dietician$ or dietetic$).ti,ab. (117)
12. (chiropod$ or podiatr$).ti,ab. (615)
13. (orthoptic$ or pleoptic$).ti,ab. (2)
14. ((music or drama or dance or art or sensory) adj2 therap$).ti,ab. (1263)
15. or/1-14 (21753)
16. exp dementia/ (1798)
17. Delirium/ (73)
18. Confusion/ (29)
19. (dementia$ or alzheimer$ or deliri$ or confus$).ti,ab. (3028)
20. or/16-19 (3237)
21. accidental falls/ (1159)
22. (fall or falls or falling or faller).ti,ab. (2530)
23. (slip or slips or slipped or trip or trips or tripped).ti,ab. (256)
24. stumble$.ti,ab. (16)
25. or/21-24 (2858)
26. Meta analysis/ (106)
27. (meta analysis or "review literature").pt. (355)
28. (review or meta analy$).ti,ab. (12395)
29. or/26-28 (12488)
30. 15 and (20 or 25) and 29 (68)
31. limit 30 to yr="2005 -Current" (30)

PsycINFO (OvidSP). 2002-2011/Oct week 2. Searched 14 October 2011

266 records were retrieved.

1. exp allied health personnel/ (1462)
2. exp creative arts therapy/ (3141)
3. (allied health profession$ or allied health care profession$ or health profession$ allied or AHP$).ti,ab. (550)
4. (physiotherap$ or physical therap$).ti,ab. (1887)
5. occupational therap$.ti,ab. (2719)
6. ((speech or language) adj2 therap$).ti,ab. (1135)
7. (dietician$ or dietetic$).ti,ab. (309)
8. (chiropod$ or podiatr$).ti,ab. (26)
9. (orthoptic$ or pleoptic$).ti,ab. (14)
10. ((music or drama or dance or art or sensory) adj2 therap$).ti,ab. (3191)
11. or/1-10 (10357)

12.	exp dementia/ (24132)
13.	exp delirium/ (989)
14.	mental confusion/ (244)
15.	(dementia$ or alzheimer$ or deliri$ or confus$).ti,ab. (38357)
16.	or/12-15 (39246)
17.	falls/ (860)
18.	(fall or falls or falling or faller).ti,ab. (11830)
19.	(slip or slips or slipped or trip or trips or tripped).ti,ab. (1799)
20.	stumble$.ti,ab. (103)
21.	or/17-20 (13609)
22.	risk.tw. (110871)
23.	search.tw. (20789)
24.	exp treatment/ (220065)
25.	or/22-24 (326474)
26.	exp Treatment Guidelines/ (2973)
27.	(guideline$ or criteria).ti,ab. (54916)
28.	(standard care or standard of care or standard clinical practice).ti,ab. (1375)
29.	or/26-28 (57003)
30.	((patient$ or critical or care or clinical or treatment) adj3 (pathway$ or path or paths)).ti,ab. (1113)
31.	11 and (16 or 21) and (25 or 29 or 30) (432)
32.	limit 31 to (human and english language and yr="2005 -Current") (292)
33.	"review book".dt. (45075)
34.	32 not 33 (266)

PEDro (http://www.pedro.org.au/). Searched 17 October 2011

52 records were retrieved.

Each line searched separately

Abstract & Title:

"allied health" dementia
"allied health" alzheimer
"allied health" fall
physiotherap dementia
physiotherap alzheimer
physiotherap fall
"physical therapy" dementia
"physical therapy" alzheimer
"physical therapist" dementia
"physical therapist" Alzheimer
"physical therapist" fall
occupational dementia
occupational alzheimer
occupational fall

When Searching: Match all search terms (AND)

EPPI-Centre (http://eppi.ioe.ac.uk/cms/). Searched 17 October 2011

Database of promoting health effectiveness reviews (DoPHER)

8 reviews identified

Freetext: "allied health"
Freetext: "physiotherap*"
Freetext: "physical therap*"
Freetext: "occupational therap*"
Freetext: "speech therap*"
Freetext: "language therap*"
Freetext: "chiropod*"
Freetext: "podiat*"
1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8
Freetext: dementia
Freetext: "alzheimer*"
Freetext: "fall*"
10 OR 11 OR 12
9 AND 13

Trials Register of Promoting Health Interventions (TRoPHI)

17 records identified

Freetext: "allied health"
Freetext: "physiotherap*"
Freetext: "physical therap*"
Freetext: "occupational therap*"
Freetext: "speech therap*"
Freetext: "language therap*"
Freetext: "chiropod*"
Freetext: "podiat*"
1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8
Freetext: dementia
Freetext: "alzheimer*"
Freetext: "fall*"
10 OR 11 OR 12
9 AND 13

National Institute for Health and Clinical Excellence (NICE). (http://www.nice.org.uk/) Searched 17 October 2011

3 guidelines and 3 NICE pathways were retrieved

NICE guidance by topic: Mental health and behavioural conditions

Scottish Intercollegiate Guidelines Network (SIGN) (www.sign.ac.uk/). Searched 17 October 2011

1 guideline was retrieved

Guidelines by topic: Mental health

National Guidelines Clearinghouse (http://www.guideline.gov/). Searched 17 October 2011

11 guidelines were retrieved

Each line searched separately

"allied health" AND (dementia OR alzheimer*)

(physiotherap* or "physical therap*" or "occupational therap*") AND (dementia OR alzheimer*)

("speech therap*" or "language therap*" or chiropod* or podiat*) AND (dementia OR alzheimer*)

Health Care Needs Assessment (http://www.hcna.bham.ac.uk/) Searched 17 October 2011

1 chapter retrieved: Aleimer's Disease and other Dementias (1st series)

Alzheimer's Society (alzheimers.org.uk/). Searched 17 October 2011.

Browsed website

Author search: Gitlin LN. (ISI Web of Science). Searched 20 October 2011.

75 records were retrieved

Gitlin ln

APPENDIX B

Data Extraction Tables

Data Extraction Tables

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
Shaw *et al.* (2003) RCT	Older people (≥65y) with cognitive impairment and dementia (mini-mental state examination score >24) presenting to A&E after a fall. Intervention group n=130 Control group n=144 Median age = 84y % female (intervention group) = 78% (n=101) % female (control group) = 82% (n=118) % resident in community at study entry (intervention group) = 26% (n=34) % resident in community at study entry (control group) =18% (n=26)	Multifactorial assessment and intervention after a fall.	Multifactorial assessment and intervention included medical, cardiovascular, physiotherapy and occupational therapy assessment. Physiotherapy assessment included: • Modified version of performance orientated mobility assessment; • Assessment of walking aids, feet and footwear. Physiotherapy interventions included: • Supervised home-based exercise programmes for 3 months (structured gait retraining, balance, transfer and mobility interventions, functional limb strengthening and flexibility exercises) to be continued by patient for duration of study; • Provision of appropriate walking aids and footwear; • Chiropody referrals as required. Occupational therapy assessment included:	Compliance with intervention was assessed at 3m by direct questioning of informant, inspection of drugs, review of physiotherapy documentation and observation of the environment and patient.	Assessment followed by conventional care.	Intention to treat analysis showed no significant difference between intervention and control groups in proportion of patients who fell during 1y follow-up: Intervention group = 74% (96/130) Control group = 80% (115/144) RRR = 0.92 (95% CI 0.81 to 1.05) Fall-related hospital admission was no different between groups: Intervention group = 15% (19/130) Control group = 13% (19/144) RRR = 1.11 95% CI 0.61 to 2.00)

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
			• Assessment of environmental fall hazards using a standard checklist. Occupational therapy interventions included: • Home hazard modification using standard protocol. Data on falls, injuries, attendance at A&E, hospital admission and mortality collected prospectively for 1y. Repeated physiotherapy and occupational therapy assessments at 3m. Data on falls recorded prospectively by informants completing a weekly diary.			
Rusted *et al.* (2006) RCT	x45 patients with mild to severe dementia: • Alzheimer type (n=18) • Multi-infarct dementia (n=19) • Unspecified dementia (n=8) Average age of women = 84.05y (range 74 to 92)	Art therapy	Art therapy or activity groups (maximum of 6 participants per group) met for 1h each week for 40 weeks. Standardised measures of cognition, depression, behaviour, sociability, well-being and mood were taken at 6 assessment points (baseline, 10, 20, 40 weeks) into group work.	1m and 3m follow-up assessment	Activity groups	*Outside session changes:* Comparison of means indicated the art therapy group showed significantly increased depression scores (Cornell Scale for Depression in Dementia) at week 40 relative to baseline and week 20 assessments. The activity group showed no change over time: • Art group baseline score = 6.33 (mean);

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
	Average age of men = 80.33y (range 67 to 92) Centres hosting the sessions represented a cross-section of types of local facilities for people with dementia: • Day resource unit within a local hospital; • Privately owned rest home; • Rest home run by a company contracted under social services; • Resource centre funded by social services. Clients were either day users or in long-term care.		At the end of every session the immediate impact on mental acuity, physical involvement, calmness, sociability, cooperative and anti-social behaviour were systematically recorded. Art therapy and activity groups took place in parallel in each centre, on the same day and at the same time each week. Each group included an art therapist or occupational therapist and an assistant.			• Activity group baseline = 4.75 (mean); • Art group week 40 score = 12.22 (mean); • Activity group week 40 = 4.58 (mean). Increase in anxious/depressed mood (measured by the Multi-factorial Observational Scale for Elderly Subjects) for art therapy group between baseline and week 40 assessment mirrored change in CSDD scores over same time period. No group differences over time reported for any measures of cognition, memory or attention. *Within session changes:* Scores for mental acuity, physical involvement, calmness and sociability were explored at baseline and week 40 assessment: • Art therapy group scores increased over time, with all 4 factors showing significant positive changes between the first 5 and last 5 weeks of group work. • Activity group scores also showed significant changes on these comparisons but scores

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
						decreased.
						• Cooperative behaviour increased over time for both groups with no group differences.
						Data shows that over 40 weeks of therapy, art therapy patients showed session to session cumulative changes in measures of responsiveness. Mental acuity, sociability, calmness and physical engagement within art sessions increase on a slow, upward, linear trajectory.
						Group work concluded with a significant engagement of patients within the group. However, positive change over first 10 to 20 weeks of the programme is not maintained. It is followed by a steep decline in engagement in the second half of the programme.
						Anecdotal evidence of observed changes in social and communication behaviour for both groups were not picked up by study measures. Evidence included changes in recognition of members outside of sessions and better person-to-person communication between client and carer.
						High depression scores for art

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
						therapy group could be interpreted as follows: • Response to the end of the group sessions; • Contra-indication for art therapy. Clients becoming more depressed through involvement in the group; • Growing negative perception of art therapy on the part of the key workers who were asked to rate their clients behaviour.
Kverno *et al.* (2009) Systematic literature review	Patients presenting neuropsychiatric symptoms (NPS) with diagnosed advanced dementia (moderately severe to severe stages). x215 non-pharmacological intervention studies published between 1998 and 2008. Settings were nursing homes or long-term care facilities (including geriatric wards and day hospitals).	Non-pharmacological interventions including: • Emotion-oriented approaches; • Behaviour or environment-oriented approaches; • Sensory stimulation-oriented approaches.	*Emotion-oriented approaches:* RCT examined the effects of verbal and non-verbal emotion-focused care. In both studies, nursing assistants in nursing homes were trained to provide emotion-focused care compared to usual care, for example recognising and validating non-verbal expressions of emotion over 2 weeks (Magai *et al.* 2002). *Sensory stimulation-oriented approaches:* Bright light therapy was examined in Skjerve *et al.* (2004) which exposed 10 patients with severe dementia to morning bright	*n/a*	Placebo Usual care	*Emotion-oriented approaches:* Magai *et al.* (2002) showed no difference in behaviour between the groups in the longer-term (12 weeks), but showed a positive affect increase sharply during the first 6 weeks following non-verbal sensitivity training. *Sensory stimulation-oriented approaches:* Skjerve *et al.* (2004) showed a decrease in agitation and behavioural symptoms from pre to post treatment but it was a small sample size and data from 1 participant was not included. Holliman *et al.* (2001) showed that participants in interactive physical activity had less disruptive behaviour, but no long-term

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
			lights for 45m each morning for 4 weeks. Two studies examined the effects of structured movement therapies, both combining movement with interactive activities such as balloon volleyball, clapping hands passing a ball (Holliman *et al.* 2001) and imagined bread baking, swimming, flying with birds and incorporating exercise into a multi-sensory activity that also included storytelling and music (Heyn *et al.* 2003). Participants in the Holliman study received the exercise program x3 per week for 8 weeks (duration of exercise was increased over time from 15m to 70m). Participants in the Heyn study met for 30m x3 per week for 2 weeks. Three studies examined the effects of music on NPS in moderately to severe dementia patients. Garland *et al.* (2007) presented 15m audiotape recordings x3 per week of preferred music, simulated presence (conversations by family			benefits. Small sample size limits the interpretation of this evidence. Heyn *et al.* (2003) reported 61.5% (n=13) of participants showed improvement ratings of facial expression and mood. Small sample size limits the interpretation of this evidence. Garland *et al.* (2007) 50% of total participants (n=30) demonstrated a reduction in agitated behaviours of 50% or more during preferred music. Holmes et al. (2006) 69% of total participants (n=32) showed positive engagement with live music than pre-recorded (25%) or silence (12.5%). Svansdottir and Snaedal (2006) study of 23 participants showed a reduction in combined symptom scores for activity disturbances, aggressiveness and anxiety. However, benefits disappeared at 4 week follow-up. Limited but good quality evidence supporting use of music therapy for the short-term reduction of agitation and apathy in patients. Baker *et al.* (2001) found

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
			members, placebo recording and usual care). Svansdottir and Snaedal (2006) compared 30m of live familiar music with usual care x3 per week for 6 weeks. Holmes et al. (2006) compared 30m random music session with silence. Two studies by Baker *et al.* (2001, 2003) examined the effects of multi-sensory stimulation (MSS) which stimulates senses through the provision of visual, auditory and tactile stimuli. MSS sessions were 2 30m sessions per week over a 4 week period.			significant reductions in dysphoric mood and behaviour following MSS compared to activity therapy. Baker *et al.* (2003) found no differences between the groups but did see a difference when comparing individuals with moderately severe dementia and severe dementia. Those with severe dementia showed a reduction in apathy following MSS and increase following activity therapy. In contrast, those with moderately severe dementia showed the opposite pattern. Studies don't report the number of patients in subgroups so the interpretation of the results is limited. However, the evidence suggests non-verbal MSS is more effective than intellectual interventions for reducing apathy in patients. NPS treatment is aimed at improving comfort and enhancing quality of life for the sufferer. The review found moderate to high quality, although limited, evidence of efficacy for the following interventions: • MSS, especially patients with severe dementia; • Listening to music.

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
Graff *et al.* (2006) Cost-effectiveness study	x135 patients aged ≥65y with mild to moderate dementia living in the community and their caregivers. Occupational therapy group mean age = 79.1y Usual care group mean age = 77.1y Occupational therapy group sex (M/F) for patient = 29/39 Usual care group sex (M/F) for patient = 31/36 Occupational therapy group sex (M/F) for primary caregiver = 22/46 Usual care group sex (M/F) for primary caregiver = 18/49 Primary caregiver cared for the patient at least once per week.	Occupational therapy sessions including cognitive and behavioural interventions to train patients in the use of aids to compensate for cognitive decline and caregivers in coping behaviours and supervision.	Intervention was implemented by experienced occupational therapists, trained and experienced in delivering treatment. Treatment consisted of x10 1h sessions held over x5 weeks and focussed on both the patient and primary caregivers. Total time spent for the intervention was ~18h per patient and caregiver together. First x4 sessions of diagnostics and goal defining, with patients and caregivers learning to define their problems and choose/prioritise meaningful activities they wanted to improve. This was using x3 interview instruments to assess possibilities for modifying the home/environment and observing the patient's ability to perform daily activities and use compensatory and environmental strategies. Remaining x6 sessions patients optimised these compensatory/environmental strategies to improve	Baseline before intervention, 6 weeks and 3m.	Usual care (the care dementia patients and caregivers usually receive, without the new occupational therapy intervention).	Primary outcome measure for patients was daily functioning assessed with the process scale of assessment of motor and process skills, with scores ranging from -3 to 4 (higher scores indicating better process skills). The performance scale of the interview of deterioration in daily activities in dementia, with scores ranging from 0 to 44 (lower scores indicating less need for assistance). Primary outcomes for caregivers was assessed with a sense of competence questionnaire, with scores ranging from 27 to 135 (higher scores denoting a greater sense of competence). Over 3m these outcomes were combined in one measure for successful treatment outcome for the evaluation (clinically relevant improvement in patients and caregivers for all primary outcome measures). So, the treatment was judged successful if the process, performance and competence scale scores showed improvements of ≥0.5 points, ≥20% and ≥5 points. Effect of treatment at 3m follow up:

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
			performance of daily activities.			Occupational therapy group (n=67) = 25 (37%) Usual care group (n=65) = 1 (1.5%) Difference = 36% (95% CI: 23-47%) NNT for successful treatment outcome = 2.8 (95% CI: 2.7 to 2.9). From a societal viewpoint community occupational therapy is an effective strategy as it yielded significant and clinically relevant improvements in daily functioning in patients and sense of competence in caregivers.
Gitlin *et al.* (2010) Cost-effectiveness study	x60 dementia patients/caregivers recruited between 2005 and 2006 and randomly assigned to treatment or control groups. Treatment groups received a tailored activity programme (TAP) and control group received no study-related contact. x4 patients were lost to follow-up.	Tailored Activity Program (TAP).	x8 sessions (x6 home and x2 telephone contacts) of occupational therapy over 4m, delivered in x3 phases. Aim of intervention is to identify patients preserved capabilities, previous roles, habits and interests, and develop customised activities, and train families in their use. **Phase 1:** Interventionists used standardised neuropsychological and occupational therapy-based	4m follow-up from baseline. Re-assessed on study outcomes.	Control group did not receive any study-related contact.	Outcome measures used for time spent care giving were 2 items from the 4-item Caregiver Vigilance Scale (NIH REACH I study): • Hours 'doing things'- refers to task performance such as managing self-care; • Hours 'on duty' – refers to perceived oversight demands including providing cueing, guidance and assuring safety and well-being. Intervention effect on time spent care giving:

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
	Dementia patients were primarily male (57%) and white (77%). Mean age = 79y. Caregivers were primarily female (88%) and white (77%), graduates (56%) and spouses (62%). Mean age = 65y. Dementia patients has a MMSE score <24, able to self-feed and participate in at least x2 self-care activities (bathing, dressing, grooming, toileting or transferring from bed-to-chair). They also had ≥1 behavioural symptoms as reported by caregivers.		observational tools to evaluate patients' abilities, deficits, previous roles, habits and interests. Also evaluated caregivers communication and home environment. **Phase 2:** Based on assessment results, interventionists developed x3 activities tailored to patient capabilities. 'Activity prescriptions' were developed that detailed persons' capabilities, target activity (e.g. sorting beads) and activity goal (e.g use bead sorting when preparing meals) and set up and supervision needs. Caregivers were instructed in x5 specific techniques: cueing, relaxing the rules, not rushing, environmental set-up and simplifying communication. Caregivers were also provided with education on the role of environment, how to integrate activities in daily care routines and stress reduction techniques.			Baseline TAP caregivers reported average 6.3h (SD = 4.3) 'doing things'. Caregivers spent average 6.2h (Sd =3 .3). 4m follow-up TAP caregivers reported average 5.4h (SD = 2.5) 'doing things' (difference = -1h). Control group caregivers reported 8.6h (SD=5.7) 'doing things' (difference = +3h). Baseline TAP caregivers reported average 18.2h (SD = 7.3) 'on duty' and control group caregivers reported average 15.5h (SD = 7.7). 4m follow-up TAP caregivers reported –5h (mean = 13.4h, SD = 7.6) compared to control group who reported +3h (mean = 17.6h, SD = 7.1). By 4m there was large and statistically significant difference between intervention and control group caregivers in their perceptions of time spent in direct care 'doing things' and being 'on duty' for their patients. Average total cost of TAP = $941.

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
			Phase 3: Interventionists help generalise techniques to other care challenges, as caregiver masters activity use. Also provide instructions on how to simplify prescribed activities to prepare for future declines.			
Stewart *et al.* (from Flood *et al.* (2005)) (2005) RCT	x321 older people living in their own homes and x113 carers. Age = ≥65y Subjects with dementia were eligible providing they had an informal carer able to give consent. Carers defined as relatives/friends who regularly provided unpaid help with daily living activities to the participant.	Participants received occupational therapy-led assessment.	Occupational therapy interventions aim to minimise either an individual's dependence on others, in relation to self-care, or the ongoing physical impact on the carer. Achieved by provision of equipment or adaptation of the environment to optimise independence in completing an activity e.g. installation of level access shower or stair lift, rather than providing extra care services. Participants in the occupational therapy arm received assessment in their home. In contrast, social workers recommend personal care assistance to meet the needs of their clients in relation to care in the community policies.	Trial lasted 2y 4m. Follow-up at 4m and 8m from baseline. Collected on each participant in their own home, repeating the measures administered at baseline.	Social worker-led assessment.	Primary outcome measure assessed using the Community Dependency Index (CDI) – range 0-100 with higher scores denoting greater independence. CDI measures the individual's ability within their environment to carry out a range of daily living tasks relating to self-care. EQ-5D provided weighted health index (range 1 to -0.59) and self-rated 'thermometer' to assess health status (range 0 to 100). In both instances higher scores denote greater well-being. Perceived Stress Scale (PSS) measures well-being (range 0 to 56) with higher scores indicating higher levels of perceived stress. Informal carers completed the following: • Carers Assessment of Difficulties Index (CADI) with higher scores denoting more

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
			Participants in the social worker-led arm received assessment, often undertaken by telephone (39%). Measurements were completed within 5 days of receipt of referral and included standard in-house assessment forms to complete and record the assessment, after which appropriate interventions were initiated.			tasks and increased stress (range 0 to 90); • Subjective Burden Scale (SBS) with higher scores denoting more strain (range 0 to 7); • EQ-5D; • PSS. Follow-up scores at 4m and 8m showed both groups made similar gains across CDI, EQ-5D (health state and thermometer) and PSS. No statistically significant differences between groups. Admission to acute beds was similar between groups (SW arm n=30, total 960 days and OT arm n=39, total 726 days) but higher use was made of rehabilitation beds in the OT arm (SW arm n=2, total 16 days and OT arm n=8, total 369 days). When adjusted for baseline values significant differences were found between both arms on carer scores in favour of SW arm in both elements of CADI at 8m follow-up and in favour of OT arm on EQ-5D thermometer. No differences between social work and occupational therapy

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
						allocated to subjects on any key outcome measure. At 8m follow-up neither arm had maintained improvement in CDI scores recorded at 4m. Results suggest social work and occupational therapy assessments were equally effective in maintaining older people in the community.
Hulme *et al.* (2010) Systematic literature review	Dementia patients, typically older people.	Range of non-pharmacological interventions grouped into 3 headings: cognitive ability, ability to perform activities of daily living (ADLs) and psychological symptoms. Interventions included: • Acupuncture; • Animal assisted therapy (AAT); • Aromatherapy; • Behaviour management; • Cognitive stimulation therapy/cognitive training;	Majority of studies included were based in community residential settings and characterised by small sample numbers. *Behaviour management:* x3 studies included behaviour management studies reporting the effect on wandering, depression, aggression, apathy and neuropsychiatric symptoms. Interventions included social skills training, problem solving and behavioural reinforcement. *Cognitive stimulation therapy/cognitive training:* x5 reviews included cognitive training for improving memory, cognitive functioning, neuropsychiatric	*n/a*	*n/a*	*Behaviour management:* Robinson *et al.* (2006, 2007) identified x1 study but didn't provide evidence that the intervention was effective in preventing/reducing wandering. Verkaik *et al.* (2005) found limited evidence that people with probable AD living at home with depression are less depressed when caregivers are trained in using behaviour therapy rather than standard information from a therapist or no information/training. Livingston *et al.* (2005) reported x25 papers but of low quality. Reported that findings from larger RCTs were consistent and positive and effects lasted months, but table of evidence in review does not reflect this.

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
		• Counselling; • Environmental manipulation; • Light therapy; • Massage/touch therapies; • Music/music therapy; • Physical activity/exercise; • Reality orientation; • Reminiscence therapy; • Snoezelen/multi-sensory stimulation; • Transcutaneous electrical nerve stimulation (TENS); • Validation therapy.	symptoms, behaviour, depression, quality of life, learning and ADLs. *Counselling:* Studies included counselling interventions in reviewing psychosocial interventions for people with milder dementia illness. *Environmental manipulation:* Studies included environment manipulation to effect changes in neuropsychiatric symptoms and inappropriate behaviours including agitation. Interventions were diverse but included use of mirrors, sign-posting and access to outdoor areas. *Light therapy:* x4 studies reviewed the use of light therapy to manage sleep, behaviour, mood, cognition, agitation and psychological symptoms. *Massage/touch therapies:* x3 studies reviewed use of massage or touch therapies for its effect on behavioural and psychological symptoms (nutrition, agitation,			Conclusion: Behavioural management interventions might work in alleviating some behavioural/psychological symptoms of dementia but evidence of effectiveness in respect of reducing wandering, depression, aggression, apathy and neuropsychiatric symptoms is inconclusive. *Cognitive stimulation therapy/cognitive training:* Reviews reported that it might work for improving memory, cognitive functioning, neuropsychiatric symptoms, behaviour, depression, quality of life, learning and ADL, but evidence is inconclusive given small sample sizes. Sitzer *et al.* (2006) meta analysis produced positive results reporting medium size effects for learning memory, executive functioning, ADLs, depression and self-rated general functioning but interventions were diverse not pointing to the effectiveness of any one type of cognitive training. *Counselling:* Bates *et al.* (2004) found no evidence that counselling works for improving cognitive function

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
			wandering, anxiety and aggression). *Music/music therapy:* x10 reviews considered effects of music/music therapy on symptoms of dementia including social, emotional and cognitive skills and for decreasing behavioural problems. *Physical activity/exercise:* x5 reviews evaluated the effect of physical activity/exercise on mood, sleep, functional ability (ADLs), wandering, agitation and cognitive function for those with dementia. *Reality orientation:* x3 reviews looked at therapy aimed at decreasing confusion and dysfunctional behaviour patterns in people with dementia by orientating patients to time, place and person. *Reminiscence therapy:* x4 reviews assessed therapy in respect of cognitive symptoms, mood, behavioural and psychological symptoms,			(recall, logic memory or learning) from one RCT identified. *Environmental manipulation:* Results were conflicting and only possible to conclude that environmental manipulation might work for improving behavioural and psychological symptoms. Studies included were based in residential or institutional settings and may not be transferable to home settings. *Light therapy:* All evidence was inconclusive – therapy might work when used to improve behavioural and psychological symptoms (sleep, behaviour, mood, agitation) and cognition. However studies were of poor quality. *Massage/touch therapies:* Results from number of studies suggest massage or touch therapies work in a number of areas for example hand massage, music followed by hand massage or both simultaneously for 10m can have an immediate effect on ST reduction in agitated behaviour. However no conclusive evidence that it reduces wandering, anxiety or aggressiveness.

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
			management of neuropsychiatric symptoms and depressed, aggressive and apathetic behaviours in people with dementia. *Snoezelen/multi-sensory stimulation:* A visual, auditory, tactile and olfactory stimulation in a specially designed room or environment. x6 reviews explored its use and effects on disruptive behaviour, mood, depression, aggression, apathy, cognition, social/emotional behaviours, wandering and neuropsychiatric symptoms.			*Music/music therapy:* Evidence from studies suggests therapy does work in reducing behavioural and psychological symptoms including agitation, aggression, wandering, restlessness, irritability, social and emotional difficulties and improving nutritional intake. Playing preferred music can reduce agitation and group music activities can reduce wandering behaviour. *Physical activity/exercise:* Study quality varied but evidence suggested physical activity does work for behavioural and psychological symptoms and functional ability. Findings consistent with Eggermont and Scherder (2006) who reported sustained walking may benefit mood, moderate intensive exercise may reduce wandering and physical activity appears to have beneficial impact on sleep quality. *Reality orientation:* Evidence inconclusive although results suggested improvements in cognitive ability, depression and apathy.

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
						Reminiscence therapy: Therapy might work and has potential benefits for cognition, mood and general behaviour. However results were of low quality and small sample sizes. *Snoezelen/multi-sensory stimulation:* Evidence reported suggests MSS might work as positive results reported across a range of behaviours including a reduction in apathy. However many results were not statistically significant and overall benefits not sustained. *Conclusions:* Evidence presented suggests x3 interventions are effective for dementia sufferers: • Music therapy; • Hand massage/touch; • Physical activity/exercise. But still highlighted methodological limitations including weak study designs and small sample sizes. Informal carers can apply some of the interventions in the home setting at little or no cost to themselves or health/social care services some require training or instruction.

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
						Majority of interventions fell into 'might work' category due to inconclusive evidence and differing quality of evidence. No evidence to suggest beneficial effects of acupuncture and counselling. Service providers and commissioners should explore current and future provision of more structured group activities for people with dementia, in particular the provision of group music therapy and group exercise activities.
Gitlin *et al.* 2010 Review of ABLE intervention from RCT to standard care (RCT results below)	Functionally vulnerable older adults.	Advancing Better Living for Elders (ABLE). For each identified problem area, ABLE provides: • Education and problem-solving; • Environmental modifications and adaptive equipment; • Instruction in energy conservation; • Balance, muscle strengthening	Home-based intervention for functionally vulnerable older adults based on the Lifespan Theory of Control. Active phase of the intervention involves x5 occupational therapy sessions and x1 physical therapy home session (90m) over 6m. Occupational therapists (OTs) meet participants and conduct semi-structured clinical interview to identify and prioritise functional concerns.	Maintenance phase consisting of x3 check-in calls over 6m.	Traditional/ usual homecare.	RCT using ABLE (n=319) in participants 70y+ showed that there were statistically significant reductions in functional difficulties and fear of falling, as well as enhanced performance in ADL. Also use of strategies enhancing personal control was increased and fewer home hazards observed. Intervention reduced mortality by 9% at 12m and patient admitted to hospital within 1y of study entry had greater survival; 0% mortality rate for ABLE vs. 21% control group. Survival was statistically significant for up to 2y, with mortality rates remaining lower up

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
		and fall recovery techniques. Based on occupational therapy/physical therapy principles but differs from traditional homecare.	In subsequent session the OTs engage participants in problem-solving as a tool to identify specific modifiable contributors to performance and possible solutions. Then, specific strategies are derived and equipment options explored. In the 4th session physical therapists (PTs) provide balance, muscle strengthening and fall recovery techniques. In the 5th session, (telephone or in the home) OTs reinforce strategy use, make any adjustments and train in use of provided equipment. In the final session OTs review progress, strategy use and provide additional educational resources.			to 3.5y from study entry for ABLE group. Greatest benefit derived to adults 80y+, showing individuals of any age can learn new strategies to engage in valued activities. Average total cost for ABLE (including equipment, therapist time and training = $941.88 per participant. Moving ABLE from RCT setting to practice is challenging: • Requires delivery by trained OTs (x2 training days to learn assessments, client-centred approach and integration); • US lacks adequate infrastructures to support referrals and payment for preventive services such as ABLE, but it may be reimbursable under Medicare Part B; • Time required to tailor written strategies which is labour intensive and potentially costly; • Lack of funding for home modifications.

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
						Conclusions: Despite methodological challenges, ABLE is low-cost, offsets functional difficulties and reduces mortality. Should be considered as standard care in homecare, independent living and aging LT services.
Gitlin *et al.* 2009 ABLE RCT	x319 adults aged 70y+ with difficulties performing daily activities. Setting: Homes of urban community-living elderly people.	Occupational and physical therapy sessions(ABLE) to instruct patients in compensatory strategies, home modifications, home safety, fall recovery techniques, balance and muscle strength exercises.	*See above*	*See above*	*See above*	Outcomes were survival time in days between baseline interview and date of death. *Results at 2y:* Intervention group (n=160) 5.6% mortality rate (n=9 deaths) Control group (n=159) 13.2% mortality rate (n=21 deaths) Intervention group with moderate mortality risk 16.7% mortality rate (n=16/96 deaths) Control group with moderate mortality risk 28.2% mortality rate (n=24/85 deaths) Mortality rates remained lower for ABLE group up to 3.5y from study entry. At 3y mortality rates were not statistically significantly different between groups. *Conclusions:* ABLE extended survival up to 3.5y and maintained statistically significant differences for up to 2y.

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
						Participants with moderate mortality risk derived greatest benefit from ABLE. Low cost tool to delay functional decline and mortality.
Gitlin *et al.* 2010 Care of Persons with Dementia in their Environments (COPE) RCT	x237 randomised patients in the community living with dementia and family caregivers. Patients aged ≥21y. Needing help with daily activities or behavioural symptoms and living with/within 5 miles of family caregivers. Caregivers provided oversight or care for 8h+ weekly, planned to live in the area for 9m, not seeking nursing home placement and reported difficulties managing patient functional decline/behaviours.	Home/telephone contact by AHPs assessing patient capability and deficits. Taking blood and urine samples and training families in home safety, simplifying tasks and stress reduction.	Up to x12 home/telephone contacts over 4m.	Reassessed at 4m and 9m by telephone.	Control group who received x3 telephone calls and educational materials.	Patient and caregiver outcomes were functional dependence, quality of life, frequency of agitated behaviour and engagement for patients and well-being, confidence using activities and perceived benefits for caregivers at 4m. Data collected from dyads at 4m (n=209) and at 9m (n=173). At 4m intervention group had less functional dependence compared with control group (adjusted mean difference = 0.24, 95%CI: 0.09-0.44) and less dependence in instrumental ADLs (adjusted mean difference = 0.32, 95%CI: 0.09-0.55). Intervention group patients had improved engagement with activities (adjusted mean difference = 0.0.12, 95%CI: 0.07-0.22). Intervention group caregivers improved their well-being (adjusted mean difference = 0.22, 95%CI: 0.08-0.36) and confidence

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
						using activities (adjusted mean difference = 0.81, 95%CI: 0.30-1.32). At 4m 62.7% (n=64) intervention group patients vs. 44.9% (n=48) eliminated 1+ caregiver-identified problem(s). *Conclusions:* Among community-living dyads COPE intervention vs. control group resulted in better outcomes at 4m. No differences were observed at 9m for patients, caregivers perceived greater benefits.
O'Connor *et al.* 2009 Systematic literature review	Dementia patients suffering psychosocial symptoms such as anxiety, depression, irritability and social withdrawal.	Psychosocial interventions. Primary interventions included: • Music; • Person-centred care; • Physical activity; • Simulated family presence; • Recreation; • Relaxation; • Reminiscence therapy; • Sensory enrichment; • Validation therapy.	*Activity and recreation:* Kolanowski *et al.* (2005) measured affect and behaviour o x30 behaviourally symptomatic nursing home residents who participated in repeated 20m recreational activities suited to their former interests; current skill levels and combination of interests and skills. Beck *et al.* (2002) randomised x143 nursing home residents with dementia and current behavioural disturbance to 1 of 5 conditions. In one group nursing assistants worked	*n/a*	Studies only included if a treatment was compared with another treatment and/or 'attention control' condition (providing equivalent attention and diversion to confirm that an intervention confers some special benefit).	*Activity and recreation:* Kolanowski *et al.* (2005) observers watched session recordings and estimate proportion of session evinced x3 positive effects (e.g. pleasure, interest, contentment) and x3 negative effects (e.g. anger, anxiety and depression). Positive effects were evident significantly more often than the skills only condition (moderate effect size = 0.54). Beck *et al.* (2002) results showed greater contentment and interest in all intervention groups compared with attention control group, but no one group proved superior.

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
			with residents for 45-60m per day for 12 weeks approaching ADL that maximised residents' autonomy. Another group applied standard psychosocial activities to promote self-esteem and expression and another group received both for 90m daily. Control conditions included either one-to-one interactions chosen by residents or usual care. *Carer education:* Teri *et al.* (1997) caregivers of x72 community resident dementia sufferers were randomly assigned to x2 training groups, each meeting for x1h per week for x9 times. One group was coached in behavioural approach to challenge behaviours focusing on identifying and avoiding triggers. The other group received additional training in planning and implementing pleasant events and positive interactions. *Exercise, movement and relaxation:* Williams and Tappen (2007)			*Carer education:* Teri *et al.* (1997) both intervention groups performed significantly better than the usual care group, but neither had a better outcome than the other. *Exercise, movement and relaxation:* Williams and Tappen (2007) reported results at 10 weeks using the AMS and OAS scales. Positive effect measured by OAS was 15% higher in exercise group than walking group and 9% higher than conversation group. Negative effect measured by AMS were 12% lower in exercise group than walking group and 21% lower than conversation group. Suhr *et al.* (1999) caregivers completed BPRS scale rating anxiety, depression, hostility at the start and end of the program. 2m follow-up scores fell in both groups, no significant difference between them. *Music and sensory enrichment:* Ragneskog *et al.* (1996) using GBS scale to assess behaviour immediately after reported a reduction in irritability levels was seen compared to a final no music session (range 11-44% between

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
			compared a program of strength, balance and flexibility exercises (e.g. knee bends, toe rises, side-stepping and walking) with a supervised walking group and social conversation group. x90 nursing home residents with AD randomly allocated to groups that met for 15m per day, increasing to 30m later. Suhr *et al.* (1999) tested a program of progressive muscle relaxation training to treat x34 community-resident dementia sufferers with carers reported problem behaviour. Weekly muscle relaxation training sessions were compared to individualised imaginal relaxation technique relaying more on verbal skills and number of sessions was tailored to individual need. *Music and sensory enrichment:* Ragneskog *et al.* (1996) played x3 types of music for x2 weeks each while x20 residents of psychogeriatric nursing home ward ate dinner.			x3 groups). Depression rates fell (range 27-73%) and in addition staff served more meals and residents ate a little more. Mean effect size for soothing music was substantial = 0.75 (range 0.67-0.86). *Conclusions:* Intervention treatments proved more effective in reducing psychological symptoms than an attention control condition or other treatment in only 6 of 12 studies selected studies (n=48). Interventions with moderate effect sizes included music and recreation therapy. Limited efficacy suggests treatments work best in specific, time-limited situations, tailored to individual requirements.

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
Ziv and Lidor 2011 Qualitative literature review	Clinical populations (e.g. individuals suffering from neurological diseases such as AD and PD) and the elderly.	Adding music to exercise programs to enhance adherence and functionality.	Mathews *et al.* (2001) studied x21 patients with dementia living in a special-care residential facility who participated in exercise sessions with music. Van de Winckel *et al.* (2004) examined cognitive function using MMSE scale in x2 groups of psychiatric hospital patients with dementia. Intervention group participated in sitting exercises with music while the control group had one-to-one talks with a therapist. Cevasco and Grant (2003) examined different methods of using music with AD patients. Movement to music was incorporated into a general music therapy session. Sessions were 3m near beginning and 3m near end of each session.	*n/a*	*n/a*	Mathews *et al.* (2001) found participation in session increased from 50 to 70% when music was added. Increase in participation was only found in the group who voluntarily took part in social activities (not the nonsocially active). Van de Winckel *et al.* (2004) found statistically and clinically significant improvements in MMSE scores in the intervention group (effect size = 0.5) with no improvements found in the control group. However, it cannot be concluded that music per se contributed to the improvement – the control group didn't exercise so possible this alone would have led to MMSE score improvements. Cevasco and Grant (2003) found continuous verbal cueing throughout each movement resulted in greater participation than single verbal cueing at the beginning of each movement. Listening to instrumental music resulted in greater participation when compared to listening to vocal music. However, sample sizes were small (range n= 12-14) and no control groups that completed the same sessions without music were available.

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
						Conclusions: Some methodological concerns presented based on the choice of music style. Type of music should be individualised based on each patient's musical preferences.
NICE 2011 Clinical Guideline 42	People with dementia and carers in health and social care	Non-pharmacological interventions for cognitive and non-cognitive symptoms.	*See Outcomes*	*n/a*	*n/a*	*Non-pharmacological interventions for cognitive symptoms and maintenance of function:* Patients with mild/moderate dementia of all types should be given the opportunity to participate in structured group cognitive stimulation programmes. Commissioned and provided by range of health and social care staff and offered irrespective of any drug prescribed for treatment of cognitive symptoms. *Non-pharmacological interventions for non-cognitive symptoms and behaviour that challenges:* Symptoms include hallucinations, delusions, anxiety, marked agitation and associated aggressive behaviour. These behaviours might have effects on care providers. Behaviour that challenges includes aggression, agitation, wandering, hoarding, sexual disinhibition, apathy and disruptive vocal activity such as

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						shouting. Patients developing such symptoms should be offered an assessment to establish factors that might generate aggravate or improve such behaviour. Assessment should include behavioural and functional analysis conducted by AHPs with skills, in conjunction with carers/care workers. Individually tailored care plans that help carers/staff address behaviour that challenges should be developed, recorded and reviewed regularly. Other approaches such as multisensory stimulation, therapeutic use of music/dancing, massage may be delivered by a range of AHPs with appropriate training and supervision since there is evidence of their clinical effectiveness. *Interventions for the carers:* Care plans for carers should involve a range of tailored interventions: • Individual or group psycho education; • Peer-support groups with other carers tailored to the

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
						needs of individuals depending on the stage of dementia of the person being cared for; • Support and information by telephone and through the internet • Training courses about dementia, services and benefits, and communication and problem solving in the care of people with dementia; • Involvement of other family members as well as the primary carer in family meetings.
Graff *et al.* 2006 Case study	Older people with mild dementia and their primary caregiver.	System-based occupational therapy at home using a guideline focusing on both patient's performance in daily activities and caregiver's cognition on patient behaviour and caregiver role and focusing on adaptation of the physical environment.	System-based and client-centred, so individual treatment goals are set with both the patient and with primary caregiver(s).	*Not reported*	*n/a*	Global categories derived from content analysis were: daily performance and communication. *Patients changes reported after OT:* • More initiative, autonomy and pleasure in performing daily activities; • Increase of quality of life. *Caregiver's changes reported after OT:* • Improved communication and supervision skills changed cognition on patient behaviour and caregiver role; • Improved sense of

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						competence. Quantitative results showed an improved daily performance (e.g. initiative, motor and process skills, need for assistance) and quality of life of the patient and improved sense of competence, quality of life and mastery of the situation of the caregiver after OT intervention. *Conclusions:* Results of the qualitative content analysis were supported by the quantitative results. Study provides information on how OT can improve the daily performance, communication, sense of competence and quality of life of an older patient with dementia and his or her primary caregiver. A combination of education, setting feasible goals, using adaptations in physical environment, training compensatory skills, training supervision skills, and changing dysfunctional cognitions on patient behaviour and caregiver role seemed to be successful.
Baldelli *et al.* 2007 Evaluation /	x26 patients with moderately severe dementia attending a day care centre.	Occupational therapy program at a day care centre.	Patient enrolled in therapeutic program for 12m. Sessions were held for 2h per day, x5 days per week.	Patients evaluated at the start of the program and followed up at	*n/a*	Mean MMSE score declined by nearly 2 points and Tinetti scale for motor performance (gait and balance) scores by 2 points, from start to end of trial at 12m.

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trial	Mean age = 85.7y.		Activities included: • Educational procedures (e.g. cooking, gardening, colouring, drawing); • Physical activities.	6m and 12m.		Negative trend in cognitive, functional and motor performances, taking into account the severity of disease and extended follow-up (12m) management of OT and multidimensional assessment may have been instrumental in showing psychophysical decline (as indicated by the non-significant decrease in performance indices). Patients remained relatively stable over time as opposed to the expected natural progression of the disease. NPI scores for behavioural disorders showed an improvement between treatment start and end, supporting the subjective impressions reported by staff and caregivers who found patients had more adequate behaviour in performing ADLs. The decrease in behavioural disorders of patients attending the program permitted better delivery of care and fewer prescriptions of psychoactive medications and physical constraints. *Conclusions:* Positive effect of intervention in modulating the decline of cognition, function and improving care suggests OT may

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						be valid addition to therapy for treating advanced dementia.
Baldelli *et al.* 2007 Evaluation / trial	x34 patients with dementia and a moderate to severe cognitive impairment. Vascular dementia (n=14) AD (n=20) Required therapy for washing, personal hygiene, dressing, sanitary services and eating. Mean age = 81y	Daily occupational therapy program for 40 days.	Program required patients to follow a daily therapeutic program of OT for washing, personal hygiene (combing hair, shaving), dressing, sanitary services and eating.	Assessed before and after therapy.	*n/a*	Patients following daily therapeutic program of OT resulted in an increase of self-sufficiency level and practical implications in daily activities in respect of the workload of the caregiver. All patients improved in mean RBEB scores in all of their reactivated functional areas and in washing, use of sanitary services and dressing they improved significantly. Patients with VD observed consistent improvement in functional areas regarding dressing, sanitary services and washing. Observed same improvements in AD group. *Conclusions:* Even if dementia is moderate to severe it is possible and important to try to recuperate residual functional capacities using OT programs to guarantee highest level of autonomy possible and improve patient and caregivers quality of life.
Ledger *et al.* 2007 Evaluation	x45 nursing home residents with AD. Age range = 71y to 96y.	Group music therapy for agitation.	Intervention group received weekly music therapy (n=26) and control group received standard nursing home care (n=19).	Study employed for 1y. Agitation levels assessed prior to the	Control group received standard nursing home care (e.g. usual nursing	*Range and frequency of behaviours:* Measured by mean total CMAI (agitation level) scores. Total CMAI means for both groups

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	Intervention group participants attended a mean number of 44.65 music therapy group sessions.		Agitation levels measured x5 times over 1y.\n\nWeekly sessions lasted 30-45m for at least 42 weeks within 1y.\n\nParticipants joined in sessions through listening to music played by the therapist, choosing or requesting favourite songs, guessing song-titles from melodic/lyric clues, singing, playing instruments, moving to music, and discussing feelings and memories.	commencement of study period, then at 3m, 6m, 9m and 12m.	and therapy).	fluctuated from one data collection point to the next. The control group showed a large decrease between the baseline and first reassessment of CMAI, and then a large increase at the next reassessment before a decline in agitation at the end of the study. Intervention group showed an increase between the baseline and first reassessment of CMAI, followed by a small decrease at the next CMAI reassessment then an increase in agitation, before returning to an agitation level similar to time points 2 and 3. Control group participants showed their highest degree of agitation at time point 3, but the experimental group showed their highest degree of agitation later, at time point 4.\n\nThe repeated measures multivariate analysis of variance revealed significant effects within participants over time but not within participants over time by group.\n\nThis indicated that there were no significant differences between the experimental and control groups in the range and frequency of agitated behaviours manifested over time.

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						Severity of behaviours: CMAI subtype scores included verbal aggressive, verbal non-aggressive, physical aggressive, and physical non-aggressive. In the experimental group, the course of agitation appeared to remain more stable for verbal aggressive behaviour than for the other subtypes and are therefore focused on in this paper. However, the repeated measures multivariate analysis of variance revealed no significant differences between the groups in the manifestation of any of the four different types of agitation over time. Univariate test results revealed a significant effect of the variables time and group for verbal aggressive behaviour. It is therefore possible that the experimental group manifested less verbal aggressive behaviour over time, only the effect size was too small to be detected through multivariate analysis. *Therapists observations:* Prior to sessions, the therapists noted that most participants wandered, fidgeted, grabbed or insulted others, yelled,

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						complained, made anxious statements (e.g., about others stealing), or asked repetitive questions (e.g., asking to ''go home''). These behaviours were seen considerably less frequently within music therapy sessions and in many cases, participants remained less agitated immediately after sessions. *Conclusions:* Although music therapy participants showed short-term reductions in agitation, there were no significant differences between the groups in the range, frequency, and severity of agitated behaviours manifested over time. Multiple measures of treatment efficacy are necessary to better understand the long-term effects music therapy programs have on this population.
Cooke *et al.* 2010 RCT	x47 older people with either a confirmed diagnoses of dementia, probable dementia (MMSE level 12-24) or features consistent with dementia of AD. Patients also had a documented	Music intervention program.	Group music sessions ran for 40m, x3 mornings per week for x8 weeks. Participants then 'crossed over' into the opposite arm and program repeated for another x8 weeks (with x5 week 'washout' period included between cross-over to reduce potential carryover	Study employed for 6m.	Reading control group. Led by trained assistant. Interactive in nature to mirror music intervention. Range of	Two primary outcomes measures used: • DQoL (dementia quality of life); • GDS (geriatric depression scale). A significant difference in the mid-point QoL belonging scores between the music and reading

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	behavioural history of agitation/aggression on record within the last month.		effects as reported in other studies). Live music was delivered by two musicians with each session involving 30m of musician-led familiar song singing and x19m pre-recorded instrumental music for active listening. Participants were encouraged to participate actively through singing, playing instruments and movement. Repertoire selection was partly based on participant's musical preferences.		reading/social activities were selected for the session including reading local news stories, short stories, telling jokes and undertaking quiz activities.	groups. Specifically, participants who experienced the reading control first reported higher feelings of belonging than those who experienced the music first. Means showed that when the first reading group crossed-over into the music group their scores decreased, whereas when the first music group crossed-over into the reading group, their scores increased. In the two sub-analyses undertaken, two significant findings emerged: • Participants attending ≥ 50% of music sessions in either arm one or two of the study (n=24), there was a significant improvement in QoL self-esteem scores over time, regardless of group. Specifically, there was a significant improvement in scores from mid-point to post-intervention; • Participants who had scores of > 5 on the GDS (n=12), had a significant difference in depression scores over time. Specifically, depression scores decreased respectively, being more noticeable for those experiencing the music

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						sessions compared to the reading group.
						Conclusions: Participation in 40m live music intervention, x3 week for x8, did not significantly affect levels of depression and QoL in older people with dementia. There was also no evidence to indicate that the therapeutic use of live music was more effective than a group reading activity. However, results did suggest that both the music and reading group activities offered opportunities to improve sense of belonging, self-esteem and depressive symptoms in some older people with dementia.
Hopper *et al.* 2007 Survey	Survey of x304 speech-language pathologists (S-LPs) providing services to older adults or adults with neurological communication and swallowing disorders.	Speech-language therapy.	x16 question survey where S-LPs reported on their caseload and work habits in the area of dementia and gave their perspectives including the role of S-LPs and perceived barriers to service delivery.	*n/a*	*n/a*	For the question related to interventions, fewer respondents provided a rating of type and frequency of interventions used with their clients with dementia (n=101). More than 80% of respondents reported that they often or always used caregiver training with patients who have dementia. ~55% of sample disagreed with the statement that the progressive nature of dementia prevents individuals from improving in direct one-to-one speech, language, communication and

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						cognitive interventions. However, a large proportion indicated a neutral stance on these items (23.8 to 26.2%) and ~20% agreed that dementia prevents individuals from improving in direct intervention programs. The large majority of respondents (88.8%) agreed that individuals with dementia retain strengths that can be capitalised on in therapy. In addition, 94.7% agreed that consistent routines may facilitate higher levels of functioning in people with dementia, 78.2% agreed that individuals with dementia benefit from consistent cognitive stimulation and 95.6% agreed that structured activities may be beneficial. With respect to learning by individuals with dementia, the majority of respondents disagreed with the statement that individuals with dementia could not learn functional information because of memory impairments (78.6%). Fewer, however, agreed that individuals with dementia could learn new information (51.9%) and in fact, a large proportion of the sample indicated a neutral position regarding new learning

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						(30.6%).
						Most respondents indicated support for caregiver communication training programs. ~96% of respondents agreed that personal and professional caregivers can learn to use effective communication strategies with individuals who have dementia. However, some respondents noted that caregiver training alone is insufficient for long-term effects on the functioning of individuals with dementia.
						Conclusions: Respondents indicated positive opinions on the role of S-LPs with individuals who have dementia and the potential of affected individuals to benefit from certain interventions; they also reported barriers to providing assessment and intervention services.
Gitlin *et al.* 2010 RCT	x272 caregivers providing in-home care to persons with moderate stage dementia with 1+ behavioural disturbances.	Non-pharmacological home-based intervention.	*ACT phase (advanced caregiver phase):* Up to x11 home and telephone contacts over x16 weeks by AHPs who identified potential triggers of patient behaviours, including communication and environmental factors and patient undiagnosed medical	24 week program (two phases).	Control group participants did not receive any intervention contact. After completion of all study	Primary outcomes were frequency of targeted problem behaviour and caregiver upset with and confidence managing it at 16 weeks. Secondary outcomes were caregiver well-being and management skills at 16 and 24 weeks and caregiver perceived

Study	Patient/Population (age, sex, setting)	Type of intervention	Delivery of intervention (method, by whom, frequency)	Duration and follow up	Comparator	Outcomes
			conditions (by obtaining blood and urine samples) and trained caregivers in strategies to modify triggers and reduce their upset. Included up to x9 OT sessions and x2 nursing sessions (home/telephone). *Maintenance phase:* Between 16 and 24 weeks, x3 telephone contacts reinforced strategy use.		assessments for the trial at 24 weeks, control group participants were offered a 2h in-home workshop involving education and tips for managing problem behaviours.	benefits. Prevalence of medical conditions for intervention patients was also examined. At 16 weeks, 67.5% of intervention caregivers reported improvement in targeted problem behaviour, compared with 45.8% of caregivers in control group and reduced upset with and enhanced confidence managing the behaviour. Additionally, intervention caregivers reported less upset with all problem behaviours, less negative communication, less burden, and better well-being than controls. Fewer intervention caregivers had depressive symptoms (53.0%) than control group caregivers (67.8%). Similar caregiver outcomes occurred at 24 weeks. Intervention caregivers perceived more study benefits, including ability to keep family members home, than controls. *Conclusions:* The study showed that an intervention that identifies and modifies x3 sources of potential triggers of problem behaviours has immediate positive effects on the most-problematic behaviour identified

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						by caregivers and on caregiver upset with and confidence managing that behaviour.
Gitlin *et al.* 2009 Evaluation of TAP	Individuals with behavioural symptoms and dementia and their caregivers.	Tailored Activity Program (TAP).	TAP is a home-based occupational therapy intervention to reduce behavioural symptoms and caregiver burden in dementia. TAP involves x8 sessions (x6 home visits and x2 telephone calls) for 4m. OTs identifies preserved capabilities, previous roles, habits, and interests of individuals with dementia; develop activities customised to individual profiles; and train families in activity use. Interventionists documented time spent and ease conducting assessments, and observed receptivity of TAP. For each implemented prescribed activity, caregivers reported the amount of time their relative spent in activity and perceived benefits.	4m	*n/a*	Assessments include a combination of standardised and validated neuropsychological tests, occupational therapy – based cognitive functioning observational tools, an interest questionnaire, and an investigator developed semi-structured clinical interview. The clinical interview asked caregivers to describe a typical day and their care challenges. The TAP assessment yielded information on capabilities from which to identify and tailor activities. Assessments were easy to administer, taking an average of x2 1h sessions. Of x170 prescribed activities, 81.5% were used, for an average of x4 times for 23m by families between treatment sessions for a period of months. Caregivers reported high confidence in using activities, being less upset with behavioural symptoms (86%), and enhanced skills (93%) and personal control (95%).

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						OTs observed enhanced engagement (100%) and pleasure (98%) in individuals with dementia during sessions.
Gitlin *et al.* 2008 Randomised pilot study	At-home dementia patients and caregivers.	Tailored Activity Program (TAP).	TAP is an activity-based intervention seeking to reduce behavioural disturbances by identifying patients preserved capabilities and devising activities that build on them. TAP involved x8 sessions (x6 home visits (90m each) and x2 (15m) telephone contacts by occupational therapists (OTs) over 4m. In the first x2 home sessions, interventionists met with caregivers, introduced intervention goals, used a semi-structured interview to discern daily routines, and the Pleasant Event Schedule to identify previous and current activity interests. Interventionists observed dyadic communication and home environmental features and assessed dementia patients using the DRS and Allen's observational craft-based assessments (leather lacing, placemat task,	4m	*n/a*	*4m Patient Outcomes:* Treatment effect for frequency of behavioural occurrences with reductions in shadowing (adjusted mean difference =-1.00, 95% CI: −1.36, −.64;) and repetitive questioning (adjusted mean difference =−.49, 95% CI: −.90, −.07) reaching statistical significance. Also, there was a slight decrease in the number of reported behaviours for TAP participants compared to controls, for whom the number of behaviours increased, but the difference did not reach statistical significance. We did find statistically significant reductions in the number of experimental caregivers that reported agitation and argumentative behaviours compared to controls. Furthermore, experimental caregivers reported greater activity engagement, ability to keep busy and a trend toward overall improved life quality. We did not find an effect for depressed mood.

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			sensory-based tests). In subsequent sessions, interventionists identified x3 activities and developed 2–3 page written plans (Activity Prescriptions) for each. Each prescription specified patient capabilities, an activity (completing a puzzle form board) and goal (engage in activity for 20m each morning after breakfast) and specific implementation techniques Activities ranged in complexity from multi-step (making salad, simple woodworking) to one-to-two step (sorting beads, playing catch with grandchild), to sensory-based (viewing videos, listening to music). Caregivers, and when appropriate dementia patients, chose one activity prescription to focus on first. The prescription was reviewed and the activity introduced through role-play or direct demonstration with patients. Caregivers were also instructed in stress reducing			*4m Caregiver Outcomes:* Caregivers in the experimental group reported fewer hours doing things for patients, approximately 1h less, whereas control group caregivers reported 2h more by 4m. Experimental caregivers also reported fewer hours on duty, approximately 5h less, whereas control participants reported about 2h more. Also, experimental caregivers reported greater mastery, enhanced self-efficacy using activities, and greater use of simplification techniques compared to controls. We did not find a statistically significant treatment effect for subjective burden. Finally, study found that caregiver baseline depressive symptom scores did not moderate treatment outcomes. Depressed (CES-D ≥16) caregivers representing 36.7% of the sample, and non-depressed (CES-D <16) caregivers benefited similarly from TAP on all major outcomes.

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			techniques (deep breathing) to help establish a calm emotional tone. Caregivers practiced using the activity between visits. Once an activity was mastered, another was introduced. In each session, prescriptions were reviewed and modified if necessary. As caregivers mastered activity use, interventionists generalized simplification strategies to care problems and instructed how to downgrade activity complexity to prepare for future declines in capability.			