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Non-pharmacological interventions for people with dementia: A review of reviews

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Abstract

Objective: Aged care services increasingly respond to the needs of people with dementia. Non-pharmacological approaches are preferable to reduce responsive behaviours, improve/maintain functional capacity and reduce emotional disorders. This rapid review of systematic reviews aimed to consolidate the evidence for non-pharmacological interventions and determine outcome effectiveness.

Methods: Systematic review literature was comprehensively searched for non-pharmacological interventions for dementia in residential care. Quality ratings used adapted GRADE methodology, and ease of implementation assessed.

Results: Of 629 abstracts screened, 81 full-text articles were retrieved, 38 articles included. The strongest evidence for reducing responsive behaviours was music, sensory stimulation, simulated presence and validation therapies. Exercise and light therapy improved/maintained activities of daily living, while cognitive stimulation and reminiscence improved cognition. Strongest evidence for reducing emotional disorders was music, psychological interventions and reminiscence.

Conclusion: Much evidence of varying quality exists, with resource-constrained residential care providers now able to make evidence-based decisions about non-pharmacological interventions.

Keywords

long-term care, dementia, psychosocial interventions

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Introduction

Dementia is increasingly prevalent in Australia and across the globe, bringing forth health and social care challenges. Currently, over 425,000 people live with dementia in Australia (Dementia Australia, 2018a), with 50 million people affected worldwide (Alzheimer's Disease International, 2014). In Australia, dementia is the most common cause of disability in those over 65 years and third leading cause of overall disability burden (AIHW, 2012).

Dementia is an umbrella term for numerous conditions affecting brain function, including memory, perception and language (AIHW, 2012). People in the earlier stages may experience challenges with everyday tasks such as shopping or driving. Dementia progression results in greater limitations with core activities of daily living (ADLs) such as eating, bathing, dressing, mobility and self-care (AIHW, 2012). When residing in the community is no longer an option, residential aged care facilities provide 24 hour nursing or other supervised care (Standing Committee on Health and Ageing, 2013). Currently, over half of all residents in Australian facilities have dementia, with a substantial proportion having concurrent mental illness or recorded behavioural conditions such as agitation or aggression (Productivity Commission, 2017).

In Australia, quality care of people with dementia is mandated through the accreditation standards outlined by the Australian Aged Care Quality Agency (2018). These standards ensure that aged care providers comply with the Aged Care Act 1997, including promoting optimal physical and mental well-being. This mandate provides the overarching standards which must be met by residential care services. In practice, to help managers and direct care staff address the needs of this population, Australian National Clinical Practice guidelines (2016) for people living with dementia were developed. The central tenet of this resource is that care should be person centred and aim to improve the quality of life, maintain function and maximise comfort across the course of the disease (Guideline Adaptation Committee, 2016). Further, it details that non-pharmacological interventions (NPIs) should be considered as a priority within dementia care (Guideline Adaptation Committee, 2016).

Enacting these standards and guidelines in practice, however, is more challenging given that there is little direction in *how* to identify and deliver NPI interventions with a person-centred approach. Further complicating the practice environment for aged care providers is the plethora of dementia care research and the proliferation of commercialised models and programmes that claim to improve quality of life and maintain function. According to a recent literature review, outcomes of these models and programmes were 'at best, comparable with traditional care' (Petriwskyj, Parker, Wilson, & Gibson, 2016, p. e12). This makes for a fraught environment from which aged care providers must choose interventions to suit their residents. The National Institute for Health and Care Excellence (NICE) has developed guidelines for categorising dementia care interventions, including for people in the latter stages of dementia. The NICE guidelines categorise interventions according to their therapeutic goal, of use for aged care providers when attempting to link clinical, accreditation and individual requirements. The three categories of intervention are maintenance of function (includes interventions that promote cognitive and/or physical well-being and quality of life); reduction of responsive behaviours (the preferred term, rather than challenging behaviours or behaviours of concern, for actions, words and gestures that are a response to their personal, social or physical environment (Alzheimer Society Ontario, 2017); and reduction of co-morbid emotional disorders (including interventions primarily associated with anxiety and/or depression) (National Institute for Health and Care Excellence, 2016).

This rapid review was undertaken to support aged care providers to make decisions related to NPIs by identifying which 'care' models, interventions or programmes have high-quality evidence and are relatively straightforward to implement for people with dementia living in residential aged care. The aim was to identify the level of evidence and ease of implementation for NPIs by reviewing the plethora of systematic reviews already conducted that have the abovementioned therapeutic goals within residential aged care.

Methods

Systematic review of systematic reviews methodology was utilised (Smith, Devane, Begley, & Clarke, 2011), as a rapid review in response to organisational requirements for a timely, cost-effective synthesis of current evidence (Tricco, Langlois, & Straus, 2017). Reporting adhered to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement (Moher, Liberati, Tetzlaff, & Altman, 2009).

Data sources and search strategy

The search strategy was limited to databases specific to systematic reviews: Cochrane Database of Systematic Reviews and the Database of Abstracts of Review of Effects. Postulated to be comprehensive, only the search term of 'dementia' was used to search titles, keywords and abstracts, restricted to English language and published between 2007 and 2017. Searching of study type was refined to 'review articles only (no protocol)' and 'other reviews'. As per rapid review protocol, one author (CM) reviewed the titles and abstracts. Relevant full text articles were retrieved.

Inclusion criteria

Studies were deemed relevant for inclusion if they met the following criteria: (1) people with dementia residing in residential care; (2) NPIs for dementia; and (3) outcome of interest of reduction of responsive behaviours, maintenance/improvement in functional capacity (physical or cognitive) and/or reduction of co-morbid emotional disorders (see Box 1 for definitions of outcome measures). Quantitative, qualitative and mixed-method reviews were

Box 1. Definitions of outcome measures.

These three interlinking outcome measures were adapted from the National Institute for Health and Care Excellence guidelines (2016) and the Alzheimer Society Ontario (2017).

Outcome 1: Reducing responsive behaviours

Responsive behaviour is the preferred terminology of people with dementia, rather than terminology such as challenging behaviours which diminishes their experience. Responsive behaviours express something of importance to the person with dementia through actions, words or gestures in response to a stimulus in the environment.

Outcome 2: Maintaining or improving functional capacity

Functional capacity refers to the required cognitive and/or physical capacity necessary to maintain/improve function within daily activities.

Outcome 3: Reducing co-morbid emotional disorders

Reducing co-morbid emotional disorders refers to the treatment of psychiatric disorders that exist alongside dementia, most commonly being anxiety and/or depression.

included. Studies which included broad analysis of NPIs were included only if a sub-analysis reported interventions and outcomes of interest.

Data extraction

Data from included studies were extracted using a standardised template: author/s, date, aim of study, intervention/s of interest, outcome/s of interest, number of included studies, total number of participants, quality assessment and major conclusions.

Quality assessment

A two-phased quality assessment was undertaken by one reviewer. First, the AMSTAR (**A** **M**eaSurement **T**ool to **A**ssess systematic **R**eviews) tool (Shea et al., 2017) was used to rate the quality of each individual systematic review addressing key domains of: extent of searching undertaken, including establishment of the research question (yes/partially/no), data extraction (yes/no), comprehensive literature review (yes/partially/no); detailed description of included studies (yes/partially/no); risk of bias assessment and interpretation (yes/partially/no); explanation of heterogeneity (yes/no); assessment of publication bias (yes/no); and statement of conflict of interest (yes/no).

Second, each individual review was rated for quality using adapted GRADE criteria, accounting for quality of the review (risk of bias), consistency (assessment of heterogeneity), directness (ability to be generalisable) and effect size (BMJ Clinical Evidence, 2012). Quality was rated as high (++++) if there were no concerns found related to quality, consistency, directness and effect size; moderate (+++) if downgraded by one point; low (++) if downgraded by two points; and very low (+) if downgraded by three points for above concerns.

The final categorisation of evidence relates to the quality of evidence for a specific outcome, according to interventions of interest, rather than individual study quality (BMJ Clinical Evidence, 2012). Discordant reviews were explored, accounting for the validity of the review, whether the differences between reviews were important, and whether the reviews were asking the same question (Jadad, Cook, & Browman, 1997).

Assessment for ease of implementation of the interventions into practice

The National Health and Medical Research Council (2009) grades of recommendations for guideline development were used to guide the rating of ease of implementation of interventions into practice. In addition, clinical judgement of the authors was used based upon perceived: direct costs (e.g. equipment required), indirect costs (e.g. staff involvement), training requirements (e.g. whole of facility training in Montessori methods) and need for specialist service provision (e.g. accredited psychologist for psychological treatments). This decision was then merged with the quality rating to give a score from * (recommended based on expert opinion and best practice, but limited evidence to support intervention and potential implementation challenges) to **** (recommended based on strong evidence to support intervention and ease of implementation).

Results

The initial search strategy yielded 10,013 abstracts, with 629 records remaining after refining to review articles only. Five hundred and fifty-three records were excluded on review of title

and abstract as they did not meet inclusion criteria or were duplicates. Eighty-one full text articles were retrieved, with 38 included in the synthesis (Figure 1).

Study characteristics

Characteristics of the studies are summarised in Table 1. Included interventions related to NPIs for dementia included: cognitive stimulation (n = 4), environment (n = 4), exercise (n = 7), mealtimes (n = 2), Montessori (n = 1), music (n = 5), psychological treatment (n = 1), sensory stimulation (n = 9), simulated presence therapy (n = 2), transcutaneous electrical nerve stimulation (TENS) (n = 1), reminiscence therapy (n = 1) and validation therapy (n = 1) (see Box 2 for definitions of interventions). These interventions are inclusive of therapies (e.g. cognitive stimulation), approaches/philosophies (e.g. Montessori) and surroundings/settings with therapeutic intent (e.g. mealtimes with a focus on routine and experience). Most studies reported on single interventions, but three studies reported on more

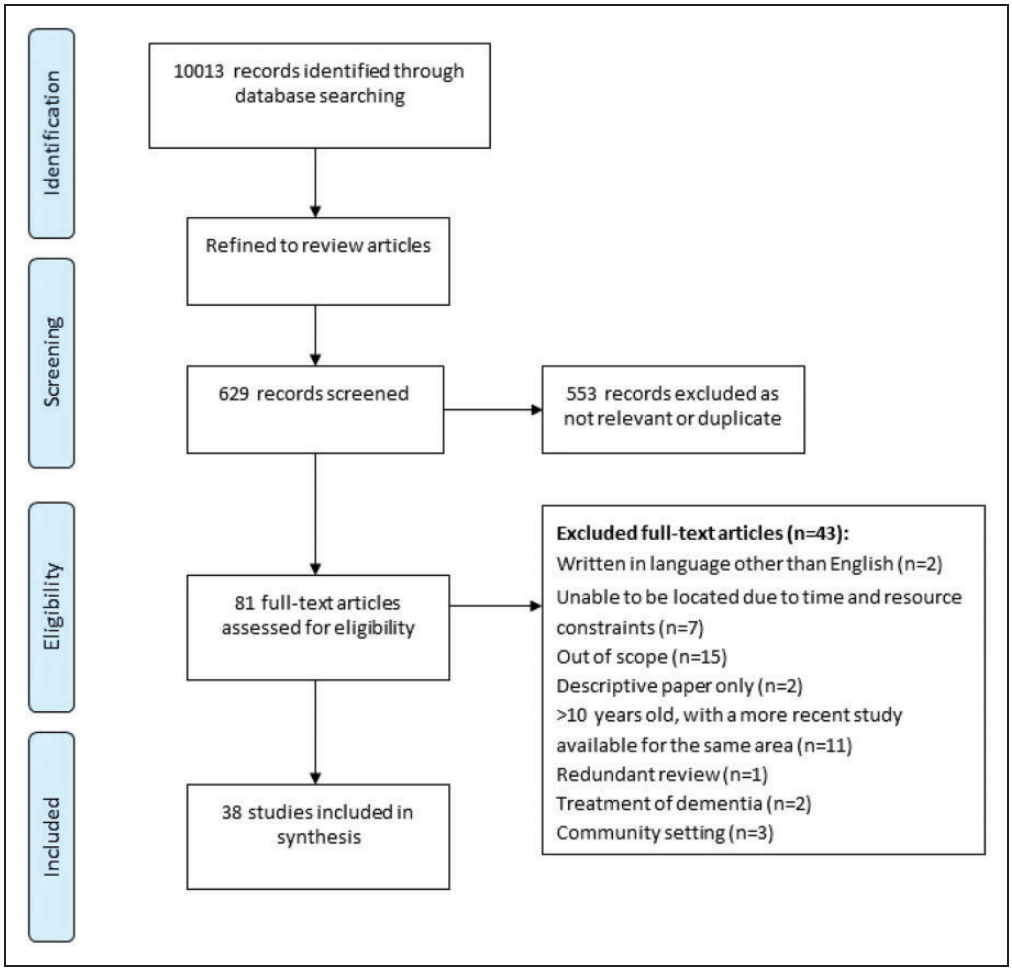

Figure 1. Identification, screening and inclusion of studies according to PRISMA.

Table 1. Summary table of scope of reviews.

Author, year	Aim	Intervention	Outcomes			Major conclusions
			Reduction or maintenance of responsive behaviours	Maintenance or improvement in functional capacity	Reduction of co-morbid emotional disorders	
Abraha et al. (2017)	To assess the effects of simulated presence therapy on behavioural and psychological symptoms and quality of life in people with dementia	Audio or videotape recording that family members or caregivers have personalised for the person with dementia	✓			The overall quality of the evidence was very low and authors were unable to draw conclusions about the effectiveness of simulated presence therapy for behavioural problems or other outcomes.
Anderiesen Scherder, Goossens, and Sonneveld (2014)	To measure the effects of environmental stimuli on the physical activity of residents living with dementia	Three dimensions of environment of considered: ambient features, interior design features and architectural features		✓		Positive results were found for the residents' levels of physical activity for music, a homelike environment and functional modifications. Predominantly positive results were also found for the small-scale group living concepts and mixed results for bright or timed light, the multisensory environment and differences in the building footprint.
Blankevoort et al. (2010)	To investigate the effect of physical activity on physical functioning and basic activities of daily living (BADL) in older people living with dementia	The effects of physical activity on mobility, endurance, lower extremity strength, balance or activities of daily living (ADL) performance		✓		Multicomponent interventions improved physical functioning and BADL in older people regardless of the stage of dementia. The study concluded that exercise should be offered at all stages of dementia, using multi-component interventions of >12 weeks, at least x3/week of 45–60 minute duration.
			✓	✓		

(continued)

Table 1. Continued

Author, year	Aim	Intervention	Outcomes			Major conclusions
			Reduction or maintenance of responsive behaviours	Maintenance or improvement in functional capacity	Reduction of co-morbid emotional disorders	
Cameron, Lonergan, and Lee (2003)	To determine the effectiveness and safety of transcutaneous electrical nerve stimulation (TENS) in the treatment of dementia	TENS application including peripherally applied and/or to the head (cranial electrical stimulation)				No effect of TENS was found on any of the neuropsychological and behavioural measures evaluated either directly after TENS treatment or six weeks after treatment was completed.
Cooper et al. (2012)	To report the effectiveness of non-pharmacological interventions in improving quality of life or well-being of people with dementia	Any non-pharmacological interventions with an outcome of quality of life or well-being		✓		There was a lack of definitive evidence for any intervention that increases quality of life or well-being of people with dementia. The strongest evidence was for group cognitive stimulation therapy.
Cowl and Gaugler (2014)	To identify existing evidence regarding the effectiveness of creative arts therapies among persons with memory loss and their care providers	Creative arts therapy was used, including painting, sculpture, colouring, drawing, collage, music playing, music listening, poetry, song-writing or drama/movement	✓	✓	✓	Findings suggest that creative arts therapy was effective for treatment of behavioural and emotional challenges of dementia, but not for treatment of cognitive decline.
Forbes, Forbes, Blake, Thiessen, and Forbes (2015)	To identify whether exercise programmes for older people with dementia improve their cognition, ADLs, neuropsychiatric symptoms, depression and mortality	Exercise programmes versus usual care or social contact/activities with the aim of improving cognition	✓	✓	✓	There was no clear evidence that exercise programmes improved cognitive functioning. Benefit was found for improving ADLs, but needs to be viewed with caution and there was no clear evidence for improving responsive behaviours or depression.

(continued)

Table 1. Continued

Author, year	Aim	Intervention	Outcomes			Major conclusions
			Reduction or maintenance of responsive behaviours	Maintenance or improvement in functional capacity	Reduction of co-morbid emotional disorders	
Forbes, Blake, Thiessen, Peacock, and Hawranik (2014)	To examine the effectiveness of light therapy in improving cognition, ADLs, sleep, challenging behaviour and psychiatric symptoms associated with dementia	Light therapy of any intensity and duration was compared with a control group	✓	✓		Insufficient evidence was found for the use of bright light therapy in people with dementia.
Forrester et al. (2014)	To assess the efficacy of aromatherapy as an intervention for people with dementia	Use of fragrance from plants defined as aromatherapy	✓			The benefits of aromatherapy for people with dementia were equivocal, with several methodological concerns.
Fox, Hodgkinson, and Parker (2014)	To identify whether physical exercise affects functional performance, quality of life, cognitive impairment and physical activity levels of older adults (>65 years) with a diagnosis of dementia	Exercise interventions on a one-on-one basis or group setting		✓		Exercise appeared to be beneficial for improving ADL function and mobility, with potential to improve balance and cardiovascular fitness. There was inconclusive evidence for improving cognitive function, strength or flexibility.
Fung, Tsang, and Chung (2012)	To identify the clinical benefits of aromatherapy in older adults with dementia, and its efficacy in reducing behavioural and psychological symptoms of dementia (BPSD)	Clinical application of aromatherapy (or essential oils)	✓			Aromatherapy showed potential to be applied as a therapeutic and safe complementary and alternative therapy for the management of BPSD.

(continued)

Table 1. Continued

Author, year	Aim	Intervention	Outcomes			Major conclusions
			Reduction or maintenance of responsive behaviours	Maintenance or improvement in functional capacity	Reduction of co-morbid emotional disorders	
Kim, Yoo, Jung, Park, and Park (2012)	To identify whether occupational therapy (OT) interventions were effective approaches in improving the behavioural problems and depression for individual with dementia	OT interventions that included sensory stimulation, Snoezelen, environmental modification and education for caregivers, as well as usual OT practice for ADLs	✓	✓	✓	Sensory stimulation was an effective intervention to improve behavioural problems while OT interventions based on environmental modification and functional task activity were not effective to improve depression and behavioural problems.
Littbrand, Stenvall, and Rosendahl (2011)	To systematically review the applicability (attendance, achieved intensity, adverse events) and effects of physical exercise on physical functions, cognitive functions and ADLs among people with dementia	Use of physical exercise with session frequency, duration, intensity level, and the use of progression and individual adjustments in physical exercise		✓		Combined functional weight-bearing exercise at an intended moderate intensity improved walking performance and reduced ADL decline, while individual walking exercise prevented decline in walking performance. Exercise should be task specific, challenging and of several months duration.
Liu, Cheon, and Thomas (2014)	To evaluate the effects of interventions on mealtime difficulties in older adults with dementia	Any intervention for mealtime difficulties, such as feeding assistance, environmental modification, training/education for caregivers and nutritional supplements	✓	✓		Moderate evidence was found for nutritional supplements to increase intake, weight and body mass index, while training/education programmes increased eating time and decreased feeding difficulty. There was insufficient evidence to suggest music decreased agitation.
			✓			

(continued)

Table 1. Continued

Author, year	Aim	Intervention	Outcomes			Major conclusions
			Reduction or maintenance of responsive behaviours	Maintenance or improvement in functional capacity	Reduction of co-morbid emotional disorders	
Livingston et al. (2014)	To systematically review randomised controlled trial evidence regarding non-pharmacological interventions to reduce agitation	Interventions included: activities, music therapy, sensory interventions, light therapy, person-centred care or communication training, dementia care mapping, cognitive behavioural therapy, simulated presence therapy, exercise and cognitive stimulation therapy				Working through care staff seemed to have the most convincing evidence (e.g. communication) as well as sensory interventions, activities and music therapy. Light therapy appeared to not be effective and may be harmful. Training in behavioural management techniques or cognitive behavioural therapy was not effective.
McDermott, Crellin, Ridder, and Orrell (2012)	To conduct a narrative synthesis systematic review on music therapy in dementia	Music therapy with people with dementia, both active and receptive music therapies either in individual or group format	✓	✓	✓	Evidence for short-term improvement in mood and reduction in behavioural disturbance was consistent, but no demonstration of the long-term benefits of music therapy.
Moyle, Murfield, O'Dwyer, and Van Wyk (2012)	To review the literature on massage used to manage agitated behaviours in older people with dementia	Techniques that involved a therapist touching the participant with their hands and applying some pressure in a moving way on parts of the body	✓			There is a severe paucity of research that considers the effects of massage on managing agitated behaviours in older people with dementia and, while there is some evidence to support its use, conclusions cannot be drawn
Neal and Barton Wright (2003)	To evaluate the effectiveness of validation therapy for people	Validation therapy as a specific form of psychosocial intervention	✓	✓	✓	There is insufficient evidence regarding the efficacy of validation

(continued)

Table 1. Continued

Author, year	Aim	Intervention	Outcomes			Major conclusions
			Reduction or maintenance of responsive behaviours	Maintenance or improvement in functional capacity	Reduction of co-morbid emotional disorders	
	diagnosed as having dementia of any type or cognitive impairment	for people with dementia				therapy for people with dementia or cognitive impairment.
Nguyen and Paton (2008)	To review the evidence supporting the use of aromatherapy in BPSD	Aromatherapy and its application (adherence to principles of aromatherapy, types of oils used, and method of administration)	✓			Little data were available, with the included studies reporting both positive and negative consequences. Side effects are virtually unexplored.
Orgeta, Qazi, Spector, and Orrell (2014)	To assess the effectiveness of psychological interventions in reducing anxiety and depression in people with dementia or mild cognitive impairment	Therapies included are cognitive behavioural therapies, relaxation training therapies, psychodynamic therapies, interpersonal therapies, and supportive or counselling therapies			✓	Psychological interventions added to usual care reduced symptoms of depression and clinician-rated anxiety for people with dementia, with the potential to improve well-being.
Pitkälä, Savikko, Poysti,Strandberg, and Laakkonen (2013)	To examine the efficacy of physical activity or exercise as a major component of intervention on the physical functioning, mobility and functional limitations of people with dementia	Exercise (individual or group) was the main component of intervention, including any type of physical activity that was planned, structured and repetitive for the purpose of conditioning any part of the body		✓		Intensive physical rehabilitation enhanced mobility and, when administered over a long period, also improved the physical functioning of people with dementia.
			✓	✓	✓	

(continued)

Table 1. Continued

Author, year	Aim	Intervention	Outcomes			Major conclusions
			Reduction or maintenance of responsive behaviours	Maintenance or improvement in functional capacity	Reduction of co-morbid emotional disorders	
Potter, Ellard, Rees, andThorogood (2011)	To synthesise the evidence related to physical functioning, quality of life and depression in people with dementia, and to provide information on physical activity programmes as they relate to the OPERA trial	Some form of physical activity intervention lasting at least 12 weeks in which participants were older and had a diagnosis of dementia				There is some evidence that physical activity interventions improved physical function in older people with dementia. Evidence for an effect on depression and quality of life was limited.
Sanchez, Millan-Calenti, Lorenzo-Lopez, and Maseda (2012)	To analyse the therapeutic effectiveness of multisensory stimulation in people with dementia	Multi-sensory stimulation behaviour therapy or stimulation room, in one-to-one or group sessions	✓		✓	Evidence present of immediate positive effects on the behaviour and mood of people with dementia, but no conclusive data about their long-term effectiveness.
Sheppard, Mcarthur, and Hitzig (2015)	To examine the benefits of Montessori-based activities for persons with dementia			✓	✓	Overall, there was a strong level of evidence for the benefits of Montessori-based activities on eating behaviours and weak evidence for the benefits on cognition. Evidence for the benefits of Montessori-based activities on engagement and affect was mixed.
Soril et al. (2014)	To determine the effectiveness of built environment interventions in managing behavioural and psychological symptoms of dementia	Interventions were specific to the physical or built structure of the living environment	✓			There was inconclusive evidence to suggest a built environment intervention which is clinically superior in long-term care settings.

(continued)

Table 1. Continued

Author, year	Aim	Intervention	Outcomes			Major conclusions
			Reduction or maintenance of responsive behaviours	Maintenance or improvement in functional capacity	Reduction of co-morbid emotional disorders	
	(BPSD) among residents in long-term care settings					
Ueda, Suzukamo, Sato, and Izumi (2013)	To investigate the effects of music therapy on BPSD, cognitive function and ADLs in people with dementia	The music types that were used for intervention had to be a single music-related experience or a combination of music-related experiences such as singing, listening, performing, rhythmic exercising, and/or improvising	✓	✓	✓	The conclusions drawn from this study were that music therapy appeared effective for the management of BPSD.
Van der Steen et al. (2017)	To assess the effects of music-based therapeutic interventions for people with dementia on emotional well-being including quality of life, mood disturbance or negative affect, behavioural problems, social behaviour and cognition at the end of therapy and four or more weeks after the end of treatment	Music-based therapeutic interventions, either receptive (passive) or active	✓	✓	✓	Music-based therapeutic intervention, of at least five sessions, reduced depressive symptoms but had little or no effect on agitation or aggression. There is little evidence for effect on emotional well-being or quality of life, overall behavioural problems and cognition. There was uncertainty regarding effects on anxiety or social behaviour.

(continued)

Table 1. Continued

Author, year	Aim	Intervention	Outcomes			Major conclusions
			Reduction or maintenance of responsive behaviours	Maintenance or improvement in functional capacity	Reduction of co-morbid emotional disorders	
Vasionyt and Madison (2013)	To provide a meta-analysis of the effects of music interventions on patients with dementia, distinguishing between different types of interventions and different outcome measures	Interventions included active music therapy, receptive music therapy or music listening	✓	✓	✓	Music interventions appeared effective and had the potential of increasing the quality of life for people with dementia, but there were limitations due to methodological concerns.
Whear et al. (2014b)	To examine the impact of gardens and outdoor spaces on the mental and physical well-being of people with dementia	Use of an outside space or garden in a care home for people with dementia	✓	✓	✓	There were promising impacts on levels of agitation in care home residents with dementia who spent time in a garden.
Whear et al. (2014a)	To examine the effectiveness of mealtime interventions aimed at improving behavioural symptoms in elderly people living with dementia in residential care	Interventions aimed to improve the mealtime routine, experience or environment (e.g. provision of assistance and encouragement, a more stimulating environment, and increased access and choice for food)	✓			Some evidence to suggest that mealtime interventions improved behavioural symptoms although numerous methodological flaws in the studies were evident.
Woods, Spector, Orrell, and Davies (2005)	To assess the effects of reminiscence therapy for older people with	Regular individual sessions or small groups involving the process of reminiscing, possibly		✓	✓	Limited conclusions were drawn due to the limited number and quality of studies and variation in study design.

(continued)

Table 1. Continued

Author, year	Aim	Intervention	Outcomes			Major conclusions
			Reduction or maintenance of responsive behaviours	Maintenance or improvement in functional capacity	Reduction of co-morbid emotional disorders	
	dementia and their caregivers	using photographs, music and videos of the past				
Woods, Aguirre, Spector, and Orrell (2012)	To evaluate the effectiveness and impact of cognitive stimulation interventions aimed at improving cognition for people with dementia	Interventions needed to offer exposure to generalised cognitive activities rather than training in a specific modality	✓	✓	✓	Consistent evidence for improved cognition in people with mild to moderate dementia.
Zetteler (2008)	To assess the efficacy of simulated presence therapy for challenging behaviours in dementia	Use of an audio or videotape, personalised by a carer for positive experiences and shared memories from the person's life	✓			Limited support was found for the use of simulated presence therapy, with assessment of suitability and monitoring for such an approach strongly recommended.

Box 2. Definitions of intervention.

Cognitive stimulation: Interventions which offer a range of enjoyable activities providing general stimulation for thinking, concentration and memory usually in a social setting (Woods et al., 2012)
Environment: The constructed, physical surroundings (interior and exterior) where activities of daily living such as eating, bathing and sleeping are conducted, and social interaction occurs (Soril et al., 2014)
Exercise: Planned, structured and repetitive movement to improve or maintain one or more components of physical fitness (Forbes et al., 2015)
Mealtimes: Improvements to the mealtime routine, experience or environment (Whear et al., 2014a)
Music therapy: Defined by the World Federation of Music Therapy as
the professional use of music and its elements as an intervention in medical, educational, and everyday environments with individuals, groups, families, or communities who seek to optimize their quality of life and improve their physical, social, communicative, emotional, intellectual, and spiritual health and well-being. (Van der Steen et al., 2017)
Montessori: A method to create structured, stimulating environments that facilitate self-paced learning and independence (Boyle et al., 2006)
Psychological intervention: Interventions based on psychological theory, structured discussion between a facilitator and another person for the purposes of reducing anxiety and/or depression, to improve functioning (Orgeta et al., 2014)
Reminiscence therapy: Involves discussion of past activities, events and experiences with another person or group of people, usually with the aid of tangible prompts such as photographs, household and other familiar items from the past, music and archive sound recordings (Woods et al., 2005)
Sensory stimulation: Refers to different techniques used to stimulate the sense to increase alertness and reduce agitation, as well as enhance quality of life (Lykkeslet, Gjengedal, Skrondal, &Storjord, 2014).
Simulated presence therapy: Video or audiotape recordings of family members are played to the person with dementia (Abraha et al., 2017).
Transcutaneous electrical nerve stimulation (TENS): The application of an electrical current through electrodes attached to the skin (Cameron et al., 2003).
Validation therapy: Based on the general principle of validation, the acceptance of the reality and personal truth of another's experience, and incorporates a range of specific techniques (Neal and Barton Wright, 2003).

than one outcome and were included for analysis: cognitive stimulation and sensory stimulation (n = 1); sensory stimulation, music and exercise (n = 1) and sensory stimulation and environment (n = 1). Most studies reported on the outcome of reducing or maintaining responsive behaviours (n = 28) with a further 20 studies reporting on maintenance/improvement in functional capacity and 15 studies reporting on reducing co-morbid conditions. Most studies reported on more than one outcome (see Table 1 for major conclusions).

Study quality

All included systematic reviews were categorised according to the outcomes of interest. Several reviews reported in more than one outcome category and were assessed for quality accordingly.

Online Table provides detail of the quality assessment of each systematic review, according to the three outcomes, with a summary provided below.

Outcome 1: reduction of responsive behaviours. Overall, review quality was highly variable ranging from very low to high. The moderate and high-quality studies can provide some guidance for therapeutic interventions, while there can be no confidence in the low-quality studies. Cognitive stimulation was found to have a non-significant effect on responsive behaviours, as did exercise, music therapy and light therapy. Some evidence of effect was found for generalised sensory stimulation and validation therapy. There were no high-quality studies related to the environment, mealtimes, simulated presence therapy or therapeutic touch.

Outcome 2: maintenance/improvement in functional capacity. Again, the overall review quality was highly variable for this outcome, with the moderate and high-quality studies driving potential interventions. Cognitive stimulation was found to have a positive effect on functional capacity, through improved quality of life and cognitive function, as was reminiscence therapy and TENS. Exercise was shown to be beneficial for ADLs, as was light therapy. Music therapy was non-significant for quality of life, cognitive function and ADLs. There were no high-quality studies related to environment, mealtimes, aromatherapy and Montessori.

Outcome 3: reduction of co-morbid emotional disorders. The third outcome also had studies of highly variable quality. Interventions for reducing co-morbid emotional disorders can be guided by the moderate and high-quality studies. Cognitive stimulation was non-significant for mood, while environment and exercise were non-significant for depression. Montessori was shown to positively increase affect. Music-related therapy and psychological treatments were significant for both depression and anxiety, while reminiscence and validation therapies were beneficial only for depression.

Assessment of ease of implementation into practice

Direct costs were estimated as high for environment, psychological treatment and generalised sensory stimulation due to specialised equipment/staffing. Indirect costs were variable for exercise and mealtime interventions and medium for therapeutic touch and light therapy. Training requirements were high for Montessori methods, generalised sensory stimulation, aromatherapy, light therapy, therapeutic touch and TENS. Specialist service provision was necessary for environmental and psychological interventions, aromatherapy and TENS (Table 2).

Recommendations for implementation of interventions into practice

Recommendations for implementation of the specified NPIs for dementia into practice are drawn from a merge of the level of research evidence and the ease of implementation into practice. Recommendations are as follows (Table 3):

- Interventions to ***reduce responsive behaviours*** should include music therapy, generalised sensory stimulation, light therapy (with caution applied as some people may experience increased agitation), simulated presence and validation therapy. Cognitive stimulation, environmental interventions, exercise, mealtime interventions, aromatherapy and therapeutic touch are less supported by evidence and have potential implementation challenges.
- Interventions for ***maintenance/improvement in functional capacity*** should include cognitive stimulation, reminiscence therapy and TENS for cognitive function; and exercise and

Table 2. Authors' evaluation of the suitability of non-pharmacological interventions for people with dementia living in residential aged care.

	Interventions																	
	Cognitive stimulation		Environment	Exercise	Mealtimes	Montessori	Music	Psychological treatment		Reminiscence therapy		Sensory stimulation (general)		Aromatherapy		Light therapy		Therapeutic touch		Simulated presence therapy		TENS		Validation therapy	
Direct costs	Low	High	Varies	Low	Low	Varies	High	Low	High	Low	High	Low	Medium	Low	Medium	Low	Medium	Low	Medium					
Indirect costs	Low	Low	Varies	Varies	Low	Low	Low	Low	Low	Low	Low	Low	Medium	Low	Medium	Medium	High	Low	Low					
Training Requirements	Low	Low	Low	Low	High	Medium	Low	Low	High	Low	High	High	High	High	High	High	Medium	Low	Low					
Need for specialist service	No	Yes	Varies	Varies	No	Varies	Yes	No	No	No	No	Yes	No	No	No	No	No	Yes	High					

TENS: transcutaneous electrical nerve stimulation.

Table 3. Recommendations for implementation of interventions into practice.

Outcomes of interest	Interventions														
	Cognitive stimulation	Environment	Exercise	Mealtimes	Montessori	Music	Psychological treatment	Reminiscence therapy	Sensory stimulation (general)	Aromatherapy	Light therapy	Therapeutic touch	Simulated presence therapy	TENS	Validation therapy
Reduction or maintenance of responsive behaviours	n=3 reviews *	n=3 reviews *	n=2 reviews **	n=2 reviews **	N/A	n=5 reviews ***	N/A	N/A	n=2 reviews ***	n=4 reviews *	n=2 reviews ***	n=2 reviews **	n=2 reviews ***	N/A	n=1 review ***
Maintenance or improvement in functional capacity	n=3 reviews *** cognition **QoL	n=2 reviews * ADLs	n=6 reviews ***ADLs **cognition	n=1 review ** ADLs	n=1 review *cognition	n=3 reviews ** cognition, ADLs and QoL	N/A	n=1 review **** cognition	N/A	n=1 review ** cognition	# see below n=1 review *** ADLs	N/A	N/A	n=1 review *** cognition	N/A
Reduction of co-morbid emotional disorders	n=2 reviews **	n=2 reviews **	n=2 reviews **	N/A	n=1 review **	n=3 reviews ***	n=1 review ***	n=1 review ***	n=2 reviews **	N/A	N/A	N/A	N/A	N/A	n=1 review **

ADL: activities of daily living; QoL: quality of life; TENS: transcutaneous electrical nerve stimulation.

Recommendation for intervention.

****Recommended based on strong evidence to support intervention and ease of implementation.

***Recommended based on moderate evidence to support intervention, with potential implementation challenges.

**Recommended based on low evidence to support intervention, with potential implementation challenges.

*Recommended based on expert opinion and best practice, but limited evidence to support intervention and potential implementation challenges.

#Caution to be applied with light therapy as it can worsen agitation in some people.

light therapy for ADLs. There is no evidence to support the use of any of the interventions to maintain or improve quality of life. Environmental and mealtime interventions, Montessori, music therapy and aromatherapy are not supported by strong evidence and/or have potential implementation challenges.

- Interventions for ***reduction of co-morbid emotional disorders*** should include exercise, music therapy, psychological treatments, reminiscence and validation therapy. However, cognitive stimulation, environmental interventions, Montessori and generalised sensory stimulation do not have strong evidence and/or have potential implementation challenges.

Discussion

There is a plethora of NPI interventions designed to improve quality of life and independence for people with dementia. There are also numerous studies of varying quality that infer effectiveness of these interventions. To our knowledge, this is the first review of systematic reviews to integrate this evidence, to assist aged care providers to implement a complex and confusing array of evidence-based strategies. Dementia is currently an incurable condition, and best practice dementia care is critical to ensure symptoms are manageable for the individual, their family and their formal caregivers (Livingston et al., 2017). Of the many interventions that exist, some have been tested, with varying levels of evidence. Importantly, evidence-based strategies should be at the core of any approach (Livingston et al., 2017).

This rapid review of systematic reviews was a novel approach to understanding the level of evidence that exists for NPIs and the ease of implementation, specifically to address the maintenance of physical and cognitive function, management of responsive behaviours and co-morbid emotional disorders for the person with dementia living in a residential aged care facility. Overall, this review found that the strongest evidence for reducing responsive behaviours was music, generalised sensory stimulation, simulated presence and validation therapies. Exercise and light therapy showed some evidence for effectiveness in improving/maintaining ADLs, while cognitive stimulation, reminiscence therapy and TENS showed promise for improving cognition. The strongest evidence for improving co-morbid emotional disorders was for exercise, music therapy, psychological interventions, reminiscence and validation therapies.

Management of responsive behaviours

Responsive behaviours in dementia include psychosis, affective conditions, hyperactivity and apathy (Aalten et al., 2007). These symptoms are common and may be deemed challenging for family and staff of residential care facilities, yet are most likely in response to an unmet need (Cohen-Mansfield, Thein, Marx, Dakheel-Ali, & Freedman, 2012). Pharmacological treatments may be required, but NPIs should be the first-line strategy (Guideline Adaptation Committee, 2016), building on a person-centred care philosophy of valuing the individual and attending to their social environment to support personhood (Brooker, 2007).

This review showed music and simulated presence therapies to have overall positive results for reducing responsive behaviours, being relatively easy to implement in practice. The principal feature is an establishment of connection to others, through reminiscence and

ability to express emotions, which make these therapies beneficial (Lawrence, Fossey, Ballard, Moniz-Cook, & Murray, 2012). High-quality studies related to cognitive stimulation or exercise did not show any significant results. In addition, poor quality reviews for environmental and mealtime interventions can only be interpreted as inconclusive. Generalised sensory stimulation showed overall positive results, particularly from one high-quality review of an occupational therapy-led intervention. From the perspective of ease of implementation, occupational therapy is more specialised and, when incorporating Snoezelen rooms or environmental modification, can become expensive. Sensory stimulation, viewed separately as aromatherapy and touch therapy showed inconclusive, but non-harmful results. Light therapy, however, showed non-significant findings from a high-quality study, with another study suggesting light therapy be viewed with caution as it may increase agitation.

Maintaining functional capacity

Maintaining/improving functional capacity involves both cognitive and physical well-being through the promotion of quality of life (National Institute for Health and Care Excellence, 2016). Ballard et al. (2017) demonstrated through a randomised controlled trial, that quality of life was enhanced with social interaction and exercise. In this study, cognitive well-being was enhanced by cognitive stimulation, reminiscence therapy and TENS, through different mechanisms. Cognitive stimulation is one form of mental exercise that enhanced the person with dementia's communication and interactions (Woods et al., 2012), thus improving quality of life. Communication is the cornerstone of relationships and, when impaired, can often be frustrating for the person with dementia and their caregivers (Dementia Australia, 2018b). Discussion of past events and life experiences in reminiscence therapy is known to be enjoyable, but it can also enhance communication and cognitive function (Woods et al., 2005). Although conclusions were not particularly definitive, the use of TENS to enhance brain activity shows some promise through activation of neurons and slowing down or reversal of cell degeneration (Cameron et al., 2003).

In this review, physical well-being was measured predominantly through ADLs, with exercise and light therapy showing the strongest evidence and ease of implementation. Dependency in ADLs is linked with mobility concerns in the older person which, in turn, relates to impairments in balance, gait and lower limb strength (Littbrand et al., 2006). Several of the included studies addressed these aspects, with non-significant findings noted for strength and balance (Blankevoort et al., 2010), and endurance (Potter et al., 2011) and positive results for walking speed (Potter et al., 2011). Balance, particularly in relation to preventing falls, has been shown in other studies to be positively affected by exercise (Christofoletti et al., 2008; Suttanon, Hill, Said, & Dodd, 2010). The mixed outcomes for balance and strength noted across these studies may result from the oft-cited criticism of exercise programmes within residential aged care being of insufficient intensity and frequency to effect change (Sherrington, Tiedemann, Fairhall, Close, & Lord, 2011). People with dementia have similar strength and endurance training ability compared to other older adults (Heyn, Johnson, & Kramer, 2008), so there is imperative that exercise programmes are of sufficient calibre to address physical well-being of people with dementia.

Light therapy was shown to improve ADLs in a single study and thus caution is suggested for interpretation. It is unclear at present how light therapy can improve ADLs, with further research required.

Reduction of co-morbid emotional disorders

People with dementia often experience anxiety, most likely related to changes from the disease process, environment, grief and illness (Kraus et al., 2008). Depression prevalence rates are estimated to be very high in people with dementia (Muliyala and Varghese, 2010). Both conditions have been associated with a negative impact on quality of life and ADLs, with an increased risk of placement into residential care (Kraus et al., 2008; Lyketsos et al., 1997).

Exercise, music therapy, psychological interventions and reminiscence therapy all showed promise within this review to alleviate these co-morbid conditions. Exercise is well known to have positive effects on the brain due to the release of hormones such as dopamine. Music therapy has potential to reduce stress hormones such as cortisol, evoke memories and, in a group setting, enhance social interactions (Van der Steen et al., 2017), impacting depressive symptoms. Psychological interventions, as for the broader population, are designed as one-to-one counselling or other known psychological techniques. A trained psychologist is required for these sessions, but the opportunity for people with dementia to access such services with good results for depression and anxiety is an important consideration for residential care facilities (Orgeta et al., 2014). Reminiscence therapy, as mentioned above, is an enjoyable activity, provoking discussion from eliciting positive memories.

Strengths and limitations

Meeting the needs of people with dementia in residential aged care facilities is complex and challenging. A systematic review by Cadieux, Garcia, and Patrick (2013) identified 19 different needs ranging from management of responsive behaviours and emotional needs through to the need for a homelike comforting environment. The strength of this study was that it integrated Cochrane-level evidence with an assessment of ease of implementation in practice, providing a user-friendly account of this complex area. A limitation of this review was the focus on only three categories; however, this was designed for ease of staff to allocate resources in a more practical and timely manner. Ultimately, each person with dementia should have their individual needs assessed and addressed accordingly.

Recommendations

This review has drawn together the evidence for three intertwined outcomes: reducing responsive behaviours, maintaining/improving functional capacity and reducing co-morbid emotional disorders. The interventions that have been shown to be most effective often traverse these three outcomes. Music, sensory stimulation, light, simulated presence and validation therapies are recommended to reduce responsive behaviours. Interestingly, most of these therapies seem to be related to drawing on previously laid down memories. Cognitive stimulation, exercise, TENS, and reminiscence and light therapies are recommended for maintaining/improving functional capacity, widely variable in their mechanisms; while music, psychological treatment and reminiscence therapy are recommended to reduce co-morbid emotional disorders, again appearing to draw on former memories.

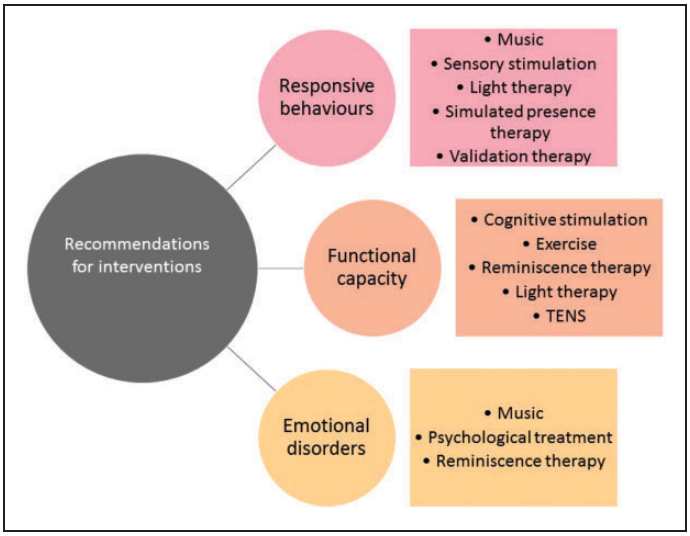

Figure 2. Summary of recommended interventions. TENS: transcutaneous electrical nerve stimulation.

It would seem prudent, in light of limited fiscal resources, for interventions to be evidence based and to be implemented with ease. A wellness and reablement approach, however, must also be considered given that it will be mandated through residential facilities from July 2019. This approach promotes independence and quality of life, acknowledging the resident's expressed needs and desires. As was found in the Ballard et al.'s (2017) study, health-related quality of life can be enhanced with person-centred principles, a critical factor in engaging residents in activities of their choice designed to improve responsive behaviours, functional capacity and co-morbid emotional disorders. Activities must move beyond a one-size-fits-all approach.

This review will also assist resource-constrained residential aged care providers to make evidence-based decisions regarding NPIs, ultimately to benefit the person with dementia. Recommendations from this review are that facilities delivering dementia care should:

1. Implement interventions, such as described in this paper, that have been critically evaluated (see Figure 2 for a summary);
2. Ensure sufficient and appropriate resources, processes and policies to support implementation of interventions;
3. Investigate the suitability of interventions for their environment and context;
4. Have sufficiently qualified staff through adequate education and consider accessibility to further expertise (e.g. consultant nurse); and
5. Carefully assess and plan care to ensure appropriate use of an intervention for the person with dementia.

Conclusion

This review of systematic reviews has integrated evidence and assessment of ease of implementation to reduce the complexity of interventions used in dementia care in the residential

care environment. The findings highlight that no single programme or intervention will meet the needs of all residents. It is important to note that these interventions cannot be viewed in isolation from the individual needs and preferences of a person with dementia identified through a person-centred approach. The evidence of clinical interventions must be matched with the priorities of the person with dementia, through working with the resident. Such collaboration will allow aged care providers to truly understand the needs and preferences of their residents, to form a foundation of care that is both person centred and best practice.

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Supplemental Material

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