Received: 8 January 2021 | Revised: 15 March 2021 | Accepted: 30 March 2021

DOI: 10.1002/gps.5554

REVIEW ARTICLE

International Journal of Geriatric Psychiatry WILEY

Systematic review of the current psychosocial interventions for people with moderate to severe dementia

Esther K. Hui[1] | Victoria Tischler[2] | Gloria H. Y. Wong[3] | W. Y. Tiffany Lau[1] | Aimee Spector[1]

[1]Department of Clinical, Educational and Health Psychology, University College London, London, UK

[2]European Center for Environment and Human Health, The University of Exeter, Truro, UK

[3]Department of Social Work and Social Administration, The University of Hong Kong, Hong Kong

Correspondence
Esther Hui, Department of Clinical, Educational and Health Psychology, University College London, 4th Floor, 1–19 Torrington Place, London, UK WC1E 7HB.
Email: esther.hui.19@ucl.ac.uk

Abstract

Objective: Dementia, a global epidemic, currently affects 50 million individuals worldwide. There are currently limited effective treatments for moderate to severe dementia, and most treatments focus on reducing symptoms rather than improving positive factors. It is unclear if improvements are not possible due to disease severity. This review examines the efficacy of the current psychosocial interventions for people with moderate to severe dementia, focusing on improving cognition and quality of life (QoL) to evaluate what treatments are working and whether improvements are possible.

Methods: A systematic search was conducted using six key databases to identify psychosocial interventions for people with moderate to severe dementia, measuring cognition or QoL in randomized controlled trials (RCTs), published between 2000 and 2020.

Results: The search identified 4193 studies, and 74 articles were assessed for full-text review. Fourteen RCTs were included and appraised with the Physiotherapy Evidence Database Scale. The included RCTs were moderate in quality.

Conclusions: Aromatherapy and reminiscence therapy showed the strongest evidence in improving QoL. There was some evidence that aerobic exercise enhanced cognition, and a multicomponent study improved QoL. However, a quality assessment, using pre-specified criteria, indicated many methodological weaknesses. While we found improvements in cognition and QoL for moderate to severe dementia, results must be interpreted with caution. Future interventions with rigorous study designs are a pressing need and required before we can recommend specific interventions.

KEYWORDS
cognition, moderate to severe dementia, psychosocial intervention, quality of life, systematic review

Key Points

- While cognition and quality of life (QoL) are largely considered as key outcomes for dementia interventions, little is known about their scope of improvement for moderate to

severe dementia. Intervention outcomes tend to focus on managing problem behaviors rather than improving positive aspects.
- Aromatherapy and reminiscence therapy showed the strongest evidence in improving QoL, and both studies are high-quality randomized controlled trials with sufficient power. A multicomponent and an aerobic exercise intervention also enhanced QoL and cognition, respectively.
- Improving cognition and QoL might be possible, even in moderate to severe dementia. However, due to the limited number and quality of studies, our results must be interpreted with caution.

1 | INTRODUCTION

Dementia, a global epidemic, currently affects 50 million individuals worldwide.[1] While 12.5% of people with Alzheimer's disease have severe dementia, there is currently no cure and limited effective treatments for moderate to severe dementia.[2] Only five drugs are approved by the Food and Drug Administration to reduce its symptoms.[3] Therefore, psychosocial interventions are frequently used to promote cognition and quality of life (QoL), because of the various adverse effects and contraindication of pharmacological treatments for dementia.[4–6]

Despite the increase in psychosocial interventions in recent years, there is little guidance and understanding of how to treat moderate to severe dementia. The National Institute for Health and Care Excellence (NICE) recommends cognitive stimulation therapy (CST), one of the most established psychosocial interventions, for improving cognitive function for people with mild to moderate dementia because its effects are comparable to antidementia drugs.[7,8] While NICE does ask professionals to consider using multisensory stimulation (MSS) for people with moderate to severe dementia, there is insufficient evidence for an official recommendation. It is unclear if and how MSS and other current psychosocial interventions are effective for people with moderate to severe dementia. Past systematic reviews of dementia have largely been intervention focused rather than stage-specific.[9] For example, Cochrane reviews of exercise, aromatherapy, reminiscence therapy (RT), music therapy, and MSS interventions.[10–14] Even when systematic reviews were stage-specific, the emphasis was mostly on mild cognitive impairment and mild to moderate dementia.[15–18]

A recent review assessed nonpharmacological interventions (NPIs) for moderate to severe dementia; yet, they did not breakdown the different types of NPIs, so we do not know what kind was effective.[19] While psychosocial interventions and NPI are often used synonymously, NPI do not explain what an intervention is, just what it is not, and has a strong sense of symptom management. Psychosocial interventions focus on improvement and can go beyond basic problem-management. Boote et al.[20] conducted a review on psychosocial interventions—almost 20 years ago. Both reviews included various study designs, publication types, which were low to moderate in quality with inconsistent evidence. An up-to-date systematic review on psychosocial treatments with a robust methodology is warranted to indicate what interventions are effective for the target population.

Previous literature on moderate to severe dementia focuses on reducing problem behaviors rather than examining if positive factors, cognitive function and QoL, can be maintained or improved,[21] leading to an implicit assumption that improvements might not be possible for people with moderate to severe dementia. Cognitive function and QoL are, however, the main outcomes of CST, meaning that these improvements are possible for earlier stages of dementia. For later stages, some argue that the focus should be on a dignified life instead of enhancing cognitive function or QoL. However, improved cognition, for example, can honor people with dementia (PwD) by enhancing their functional abilities, communication, interpersonal relationships, which allows for better QoL. Past studies have shown that changes in cognition mediate the effects of QoL.[22] Theories on brain plasticity and the biopsychosocial model have also suggested disease outcomes to be modifiable intrinsically (biological factors) and extrinsically (social factors).[23]

Cognition is a defining attribute of dementia, for it is a major neurocognitive disorder characterized by a decline in one or more of the six cognitive domains in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition.[24] Interventions have aimed to improve cognition and prolong disease progression. Commonly used interventions include computerized cognitive training, music therapy, CST.[8,25,26] However, most of these interventions, like CST—recommended by NICE[7] for improving cognition—target people with mild to moderate dementia.

QoL is also a critical outcome as it is an essential aspect of health. It is defined as "an individual's perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns."[27] According to the WHO's constitution, health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."[28] Improving well-being is just as important as enhancing cognition, and QoL is a core outcome in dementia research.[29] As a result, a number of past interventions for mild to moderate dementia, such as cognitive stimulation, cognitive training, and cognitive rehabilitation,[17,30] have measured QoL.

This review aimed to evaluate whether the current psychosocial interventions can improve or maintain cognition and QoL for people with moderate to severe dementia, specifically considering (1) the

types of effective interventions for the affected population; (2) and their significant outcomes with their respective effect sizes. We also aimed to evaluate other significant outcomes in the selected psychosocial interventions, so we could provide a comprehensive view of what is effective for the affected population.

2 | METHODS

2.1 | Search strategies

The systematic review was performed in a prespecified protocol, in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) transport reporting of systematic reviews recommendations.[31] The International Prospective Register of Systematic Reviews (PROSPERO) was searched for complete systematic reviews on this topic. This review was prospectively registered with PROSPERO on 9 March 2020 (Registration number: CRD42020167483).

A systematic literature search was conducted using PsychINFO, EMBASE, MEDLINE, CENTRAL, CINAHL, and Web of Science. A combination of search terms was used to identify studies: dementia, cognitive function, QoL, psychosocial interventions, randomized controlled trials (RCTs) (see Appendix A in Supporting Information for search terms).

We used keywords and database-specific subject headings in the title and abstract to perform the search. The MeSH terms varied between databases. In some databases, such as Web of Science, MeSH terms were not available. The search terms were developed in conjunction with a university research subject librarian. The keywords were reviewed by three authors. The first search was conducted on 4 January 2020 and replicated on 1 April 2020, with no relevant additional or relevant publications found.

2.2 | Inclusion criteria

- Study design: RCTs published in an English peer-reviewed journal within the period of 2000–2020.
- Participants: people with a diagnosis of moderate to severe dementia, aged 18 years of older. If a study did not specify the stage of dementia, then the participant's mean Mini-Mental State Examination (MMSE) score plus two standard deviations ≤ 20 was used. This cut-off score was selected, because according to the NICE guidelines, people with moderate and severe dementia have an MMSE score of 10–20 and <10, respectively. The Clinical Dementia Rating (CDR) score of two or more, and Global Deterioration Scale of five or more were also accepted.
- Interventions: psychosocial interventions were defined as physical, cognitive, or social activities that may maintain or improve "functioning, interpersonal relationships and well-being in people with dementia."[32]
- Comparisons: any control group; for example, treatment as usual.[33]
- Outcome(s): a cognitive or/and QoL outcome, with corresponding between-group *p* values, included as a minimum (Table 1).

2.3 | Other outcomes and missing information

Significant effects of other outcome measures, such as depressive symptoms, agitation, activities of daily living (ADL), and other behavioral and psychiatric symptoms, were also included. We included these outcomes in order to evaluate all positive effects of current psychosocial interventions. Authors were contacted for missing data, such as details of randomization, means, and standard deviation.

2.4 | Data extraction

E. Hui examined the titles and abstracts against the inclusion criteria. Subsequently, the full-text reports were screened to confirm if the articles met the inclusion requirements, especially in terms of outcome measures. To resolve questions on eligibility where necessary, an additional study author, A. Spector, was sought. The reasons for excluding studies were recorded.

2.5 | Quality assessment

The methodological quality of the studies was independently assessed by two reviewers (E. Hui and T. Lau) using the Physiotherapy Evidence

TABLE 1 Inclusion criteria

Criteria	Determinants
Population	People with moderate to severe dementia; aged > 18; MMSE + 2*SD* ≤ 20, CDR ≥ 2 or GDS ≥ 5
Intervention	Psychosocial
Comparison	Any group
Outcome(s)	Cognitive or/and QoL with corresponding between group *p*-values

Abbreviations: CDR, Clinical Dementia Rating Scale; GDS, Global Deterioration Scale; MMSE, Mini-Mental State Examination Scale; QoL, quality of life; *SD*, standard deviation.

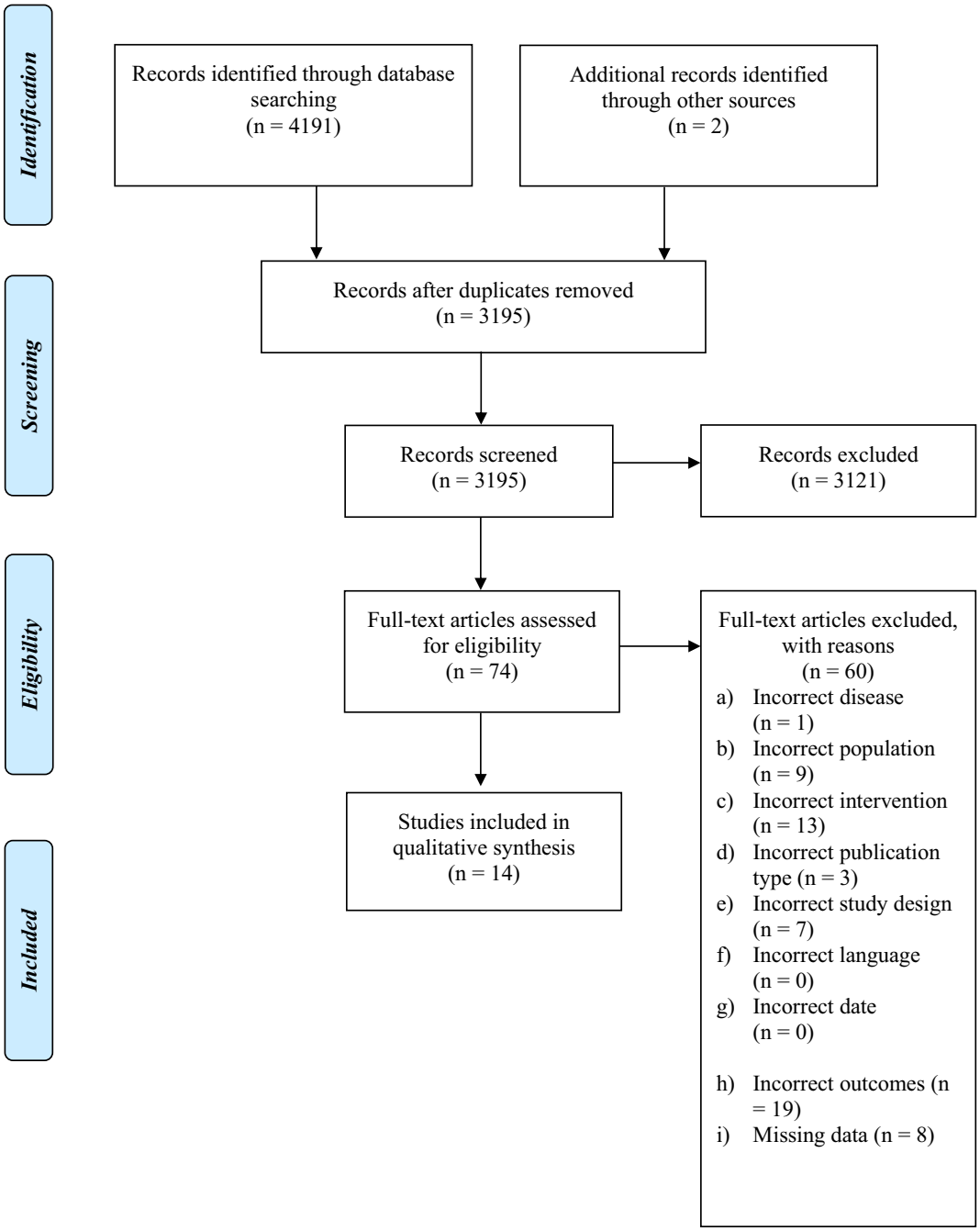

FIGURE 1 PRISMA flow diagram. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analysis

Database (PEDro) Scale. The Consolidated Standards of Reporting Trials (CONSORT) guidelines were also consulted.[34,35] Any discrepancies were resolved by a third reviewer, A. Spector. The PEDro is an 11-item scale designed to evaluate RCTs and controlled clinical trials, which includes assessments of internal validity—blinding, attrition, study design, allocation concealment, baseline differences—and evaluation of statistical information sufficiency—intention-to-treat analysis (ITT), between-group and point measures. Each criterion was rated as "1" for yes, "0" for no, and "unclear" where there was insufficient detail reported in the study, and the corresponding authors were contacted. If the authors did not respond within seven working days, then a "0" was given. The scale has a maximum score of 10, where five is the cut-off point. High-quality papers had a score greater or equal to 5.

We referenced the CONSORT guidelines for further information, such as power analysis, effect size, method of statistical analysis, randomization sequence generation, and allocation concealment mechanism.[35]

TABLE 2 Characteristics of included studies

Author	Year	Study design	Study setting	Sample characteristics	Interventions (*as defined in paper*)	Cognitive or quality of life outcome(s)	Results	Other significant outcomes	Quality rating and comments
Multisensory stimulation									
Ballard et al.	2002	RCT	United Kingdom, nursing homes	Diagnosis of dementia No baseline cognitive data $N = 72$; age (M (SD)) = 78.5 (8.1)	Intervention: MSS with Melissa essential oil	Quality of life: DCM	% social withdrawal: $p = 0.01$[a]	Agitation: CMAI—physical aggression ($p = 0.01$[a]); CMAI—physical nonaggression ($p < 0.0001$[a]); CMAI verbal nonaggression ($p = 0.001$[a])	PEDro: 7/10 Pros: effect size, double blinding, sufficient power
					Control: sunflower oil		% engaged in constructive activities: $p = 0.001$[a]	Behavior: NPI—irritability score ($p < 0.0001$[a])	Cons: no power analysis
					Dosage: twice daily, 4 weeks				
				Intervention: $n = 36$; age (M (SD)) = 77.2 (7.6) Baseline % social withdrawal (median) = 5.6 (IQR: 1.4–24.6) Baseline % engaged in constructive activities = 28.2 (IQR: 15.0–0.46.7)	Delivery: care assistant				
				Control: $n = 36$; age (M (SD)) = 79.6 (8.5) Baseline % social withdrawal (median) = 3.7 (IQR: 0–15.5) Baseline % engaged in constructive activities (median) = 32.2 (IQR: 17.0–44.6)					

(Continues)

TABLE 2 (Continued)

Author	Year	Study design	Study setting	Sample characteristics	Interventions (*as defined in paper*)	Cognitive or quality of life outcome(s)	Results	Other significant outcomes	Quality rating and comments
Jøranson et al.	2016	RCT	Norway, nursing home	Diagnosis of dementia *N* = 53 Intervention: *n* = 27; age = 83.9 (7.2) CDR 1 (mild): 7.4%CDR 2 (moderate): 48.1% CDR 3 (severe): 44.4% Control: *n* = 26; age = 84.1 (6.7)CDR 1 (mild): 7.6%CDR 2 (moderate): 46.2% CDR 3 (severe): 46.2%	Intervention: PARO, an adaptive robot with artificial intelligent software developed for PwD in a form of a baby seal Control: treatment as usualDosage: 30 min, twice a week for 12 weeks Delivery: trained nurses	Quality of life: QUALID	PARO versus control (T2 to T0, adjusted): $p = 0.085$ PARO versus control (T2 to T0, adjusted, CDR3 only): $p = 0.011$[a]		PEDro: 6/10 Pros: power analysis, effect size, follow-ups Cons: no blinding, allocation concealment
Raglio et al.	2015	RCT	Italy, geriatric departments	Diagnosis of dementia *N* = 120 Intervention (MT): *n* = 40; age: 81.0 (7.6); CDR = 3 (range: 1–4); MMSE = 11.1 (5.4); MMSE corrected for education = 11.3 (5.6) Intervention (LM): *n* = 40; age = 81.7 (7.8); CDR = 3 (range: 1–4); MMSE = 11.0 (6.2); MMSE corrected for education = 11.4 (6.3) Control (SC): *n* = 40; age = 82.4 (6.8); CDR = 3 (range: 1–4); MMSE = 11.0 (5.3); MMSE corrected for education = 11.8 (5.6)	Intervention(s): MT, LMControl: standard careDosage: 30-min sessions, twice a week, 10 weeksDelivery: trains musical therapist (MT), formal caregiver (MT and standard care)	Quality of life: CBS-QoL	$p = 0.43$	Behavior: NPI ($p < 0.01$) Depressive symptoms: CSDD ($p = 0.001$)	PEDro: 6/10 Pros: intention-to-treat analysis, some blinding, effect size Cons: no power analysis, insufficient power

TABLE 2 (Continued)

Author	Year	Study design	Study setting	Sample characteristics	Interventions (*as defined in paper*)	Cognitive or quality of life outcome(s)	Results	Other significant outcomes	Quality rating and comments
Ridder et al.	2013	RCT	Norway, nursing home	Diagnosis of dementia*N* = 42, age (*M* (range)) = 81 (66–96)Intervention: *n* = 21; age = 82.17 (8.84)MMSE = 9.84 (5.97); GDS = 5.54 (0.69); QoL = 334.14 (57.36)Control: *n* = 21; age = 80.20 (8.67); MMSE = 5.25 (4.83); GDS = 5.80 (0.62); QoL = 314.09 (85.46)	Intervention: MTControl: standard careDosage: 12 sessions, 6 weeksDelivery: clinicians certified in music therapy	Quality of life: ADRQL	$p = 0.439$	Agitation: CMAI-disruptiveness ($p = 0.027$)	PEDro: 6/10 Pros: sufficient power, effect size, follow-ups Cons: no blinding, concealed allocation
Baker et al.	2003	RCT	United Kingdom, Netherlands, and Sweden; home/ward/day hospital	Diagnosis of Alzheimer's, vascular or mixed dementiaMMSE (range): 0–17 *N* = 136 Intervention (UK and Netherlands): *n* = 54Baseline MMSE: 9.4 (6.3) Control (UK and Netherlands): *n* = 57Baseline MMSE = 6.7 (5.3)	Intervention: standardized MSS programsControl: Eight standardized activity programs Dosage: 30-min sessions, twice a week for 8 weeks Delivery: one-to-one basis by an occupational therapist or a psychology assistant	Cognition: MMSE	$p = 0.56$		PEDro: 5/10 Pros: reported effect size, sufficient power Cons: lack of allocation concealment, no power analysis, no follow-up
Koh et al.	2018	RCT	Korea, nursing home	Diagnosis of dementiaAge ≥ 65 years; *N* = 33 Intervention: *n* = 17; age = 86.8 (8.42) Baseline MMSE = 14.29 (2.82) Control: *n* = 16; age = 86.2 (5.73) Baseline MMSE = 15.06 (2.91)	Intervention: PAROControl: Unspecified Dosage: 12 sessions, 30 min per session, every week for 6 weeks Delivery: facilitator, unspecified	Cognition: MMSE-K (Korean version)	MMSE-K, $p = 0.117$	Positive emotions: AER ($p = 0.044$)Problem behaviors: K-CMAI ($p < 0.001$)	PEDro: 4/10 Pros: effect size, power analysis Cons: no concealed allocation, blinding, intention-to-treat analysis

(Continues)

TABLE 2 (Continued)

Author	Year	Study design	Study setting	Sample characteristics	Interventions (*as defined in paper*)	Cognitive or quality of life outcome(s)	Results	Other significant outcomes	Quality rating and comments
Exercise									
Cancela et al.	2016	RCT	Spain, nursing home	Diagnosis of dementiaAge > 65 years; *N* = 189Intervention: *n* = 73Baseline MEC = 15.16 (2.54) Control: *n* = 116Baseline MEC = 14.95 (2.44)	Intervention: aerobic physical activity programControl: nonphysical distractive recreational activities as usual and of their choice Dosage: 15-min sessions, daily, 15 months Delivery: physiotherapist	Cognition: MMSE (Spanish version)	$p = 0.04$[a]	Mobility: TUG ($p = 0.04$) Behavior: NPI ($p = 0.01$)ADL: Katz Index ($p = 0.05$) Depressive symptoms: CSDD ($p = 0.03$), wrong directionMemory: FOME ($p = 0.03$)	PEDro: 6/10 Pro: effect size, allocation concealment, sufficient power Cons: no power analysis, no blinding
Venturelli et al.	2011	RCT	Italy, residential homecare	Diagnosis of later stage dementiaAge ≥ 65, age (*M* (*SD*)) = 84 (5); *N* = 21 Intervention (walking group): *n* = 11; age = 83 (6); MMSE = 13 (2) Control group: *n* = 10; age = 85 (5); MMSE = 12 (2)	Intervention(s): exercise, walkingControl: Daily organized activities, such as bingo, patchwork, sewing, and music therapy Dosage: 30-min, four times a week, 6 months Delivery: caregiver, instructed by research staff	Cognition: MMSE	$p < 0.001$[a]	Mobility: 6MWT ($p < 0.05$)Activities of daily living: Barthel Index ($p < 0.05$)	PEDro: 6/10 Pros: concealed allocation, effect size Cons: no intention-to-treat analysis, blinding, insufficient power, no power analysis
Multicomponent									
Hensken et al.	2018	RCT	Netherlands, nursing homes	Diagnosis of dementiaAge ≥ 65, *N* = 87Intervention (ADL training): *n* = 21, age = 86.05 (5.86), GDS = 5.19 (0.84) Intervention (multicomponent exercise training): *n* = 22, age = 85.14 (4.64), GDS = 5.40 (0.82) Intervention (combined	Intervention: ADL, ADL and exerciseADL: Self-care activities with individualized healthcare planExercise: Group session (4–6 participants) focused on strength and aerobic activities Control: drank tea Dosage: 30–45 min sessions, with progressive increase	Cognition: MMSE, SIB-S	ADL versus control, $p = 0.85$Exercise versus control, $p = 0.45$Exercise and ADL versus control, $p = 0.50$	Mobility: exercise and ADL versus control, 6MWT ($p = 0.04$); exercise-AD versus ADL, TUG ($p = 0.04$); Depressive symptoms: ex-ADL versus exercise ($p = 0.04$)	PEDro: 7/10 Pros: effect size, blinding, concealed allocation, follow-ups, sufficient power, intention-to-treat Cons: low attrition

TABLE 2 (Continued)

Author	Year	Study design	Study setting	Sample characteristics	Interventions (*as defined in paper*)	Cognitive or quality of life outcome(s)	Results	Other significant outcomes	Quality rating and comments
				multicomponent exercise and ADL training): $n = 22$, age = 86.95 (7.21), GDS = 5.05 (0.80)	in intensity, three times a week				
				Control: $n = 22$, age = 84.73 (4.55), GDS = 5.55 (0.83)	for 6 monthsDelivery: nursing staff, qualified movement teachers			Apathy: ex-ADL versus exercise ($p = 0.03$)	
Cheung et al.	2018	RCT	Hong Kong; nursing home	Diagnosis of any type of dementiaAge > 65 years; $N = 165$ Interventions (MM): $n = 58$; age = 85.71 (6.68); baseline MMSE = 10.99 (4.16) Intervention (ML): $n = 54$; age = 84.50 (6.82); baseline MMSE = 12.12 (4.13) Control (social activity) SA): $n = 53$; age = 85.58 (7.46); baseline MMSE = 11.97 (4.43)	Intervention: MM, LMMM: listening to preferred music and moved their limbs and trunkLM: listening to music Control: social activity Dosage: 30-min sessions, twice a week for 6 weeks Delivery: leader researcher (MM) trained research assistants (ML and control)	Cognition: MMSE	$p = 0.055$	Memory: FOME, total storage ($p = 0.021$) and delayed memory ($p = 0.013$) Depressive symptoms: GDS ($p = 0.042$)	PEDro: 6/10 Pros: power analysis, allocation concealment, blinding, effect size, sufficient power Cons: no precision data (i.e., standard deviation, no follow-up)
Hutson et al.	2014	RCT	UK, care home	Diagnosis of dementiaMMSE = 0–17; $N = 39$; age ≥ 65 Intervention: $n = 21$ Control: $n = 18$	Intervention: Sonas, involves MSS, reminiscence activities, and physical activities Control: treatment as usualDosage: 45 min to 1 h, twice a week, 7 weeks Delivery: care home staff, at least one Sonas trained	Quality of life: QoL-AD	$p < 0.48$		PEDro: 6/10 Pros: follow-up, effect size Cons: no intention-to-treat analysis, blinding, insufficient power

(Continues)

TABLE 2 (Continued)

Author	Year	Study design	Study setting	Sample characteristics	Interventions (*as defined in paper*)	Cognitive or quality of life outcome(s)	Results	Other significant outcomes	Quality rating and comments
Kampragkou et al.	2017	RCT	Greece, chronic diseases center	Diagnosis of Alzheimer's disease*N* = 36; age > 65 years Intervention: *n* = 18; baseline MMSE = 14.66 (3.13); ADAS-Cog = 44.06 (9.03) Control: *n* = 18; MMSE = 16.00 (2.95); ADAS-Cog = 42.20 (6.98)	Intervention(s): aerobic exercise, memory games, and music therapy Control: only memory program Dosage: 40-min sessions, three times a week, 12 weeks Delivery: therapists	Cognition: ADAS-Cog	MMSE, $p < 0.05$[a]ADAS-Cog, $p < 0.05$[a]	Mobility: Get up and go test ($p < 0.05$)	PEDro: 5/10 Pros: effect size, allocation concealed Cons: no power analysis, follow-up, blinding
Kim et al.	2016	RCT	Korea, nursing home	Diagnosis of Alzheimer's diseaseAge = 81.5 (6.6); *N* = 33Baseline MMSE = 14.8 (4.4) Intervention (KEP and MCP): *n* = 19; age = 81.9 ± 7.0; baseline MMSE = 13.4 (4.2) Control (MCP only): *n* = 14; age = 80.9 ± 6.1; baseline MMSE = 16.6 (4.0)	Intervention: KEP and MCPKEP: warm-up, strength, and lower limb aerobic exercisesMCP: multicomponent intervention that consisted of music therapy, art therapy, horticulture therapy, handicraft, recreational therapy, stretching, laughing therapy, and activity therapyControl: MCP only Dosage: (KEP) 60 min sessions, five times a week for 6 months, (MCP) 60 min per session twice a day, 5 days a week for 6 months. Delivery: physiotherapist or professional therapists	Cognition: MMSE, ADAS-Cog, CDT	MMSE, $p = 0.80$ADAS-Cog, $p = 0.08$CDT, $p = 0.09$		PEDro: 5/10 Pros: blinding, allocation concealment, effect size, intention-to-treat analysis Cons: no power analysis, follow-up, low power

TABLE 2 (Continued)

Author	Year	Study design	Study setting	Sample characteristics	Interventions (*as defined in paper*)	Cognitive or quality of life outcome(s)	Results	Other significant outcomes	Quality rating and comments
Other									
Serrani Azcurra	2012	RCT	Argentina, nursing home	Diagnosis of Alzheimer's disease, DSM-IV *N* = 135 Intervention: *n* = 45; baseline MMSE = 13.2 (1.2); age = 85.3 (5.6) Active control: *n* = 45; baseline MMSE: 14.1 (1.4); age = 86.4 (4.9) Passive control: *n* = 45; baseline MMSE: 14.6 (1.4); age = 85.8 (5.1)	Intervention(s): RTControl(s): unstructured social contact (active control); causal discussions, counseling, and informal social contacts (passive control) Dosage: 1-h sessions, twice a week, 12 weeks Delivery: psychologists	Quality of life: SRQoL	$p < 0.01$[a]	Engagement: SES ($p < 0.01$)	PEDro: 7/10 Pros: intention-to-treat analysis, effect size, follow-up Cons: no concealed allocation, insufficient power

Abbreviations: ADAS-Cog, Alzheimer's Disease Assessment Scale–Cognitive Subscale; ADL, activities of daily living; ADRQL, Alzheimer's Disease Related Quality of Life; AER, Apparent Emotion Rating Instrument; CBS-QoL, Cornell-Brown Scale of Quality of Life in Dementia; CDR, Clinical Dementia Rating; CMAI, Cohen-Mansfield Agitation Inventory; CSDD, Cornell Scale for Depression for Dementia; DCM, Dementia care mapping; DSM-IV, Diagnostic and Statistical Manual of Mental Disorders (fourth edition); FOME, Fuld's Object Memory Evaluation; GDS, Global Deterioration Scale; IQR, interquartile range; K-CMAI, Korean version of the Cohen Mansfield Agitation Inventory; KEP, Kohzuki Exercise Program; LM, listening to music; MCP, multicomponent cognitive program; *M*, mean; MM, music with movement; MMSE, Mini-Mental State Examination; MMSE-K, Mini-Mental State Examination Korean; MSS, multisensory stimulation; MT, music therapy; *N*, total sample size; *n*, sample size of a group; NPI, Neuropsychiatric Inventory; PARO, robotic seal; PEDro, Physiotherapy Evidence-Based Database Scale; PwD, people with dementia; QUALID, Quality of Life in Late-stage Dementia; RT, reminiscence therapy; *SD*, standard deviation; SES, Social Engagement Scale; SIB, Severe Impairment Battery; SRQoL, Self-Reported Quality of Life; T, time point; TUG, Timed Up and Go test; 6MWT, 6-min walk test.

[a]Statistical significance ($p < 0.05$).

3 | RESULTS

3.1 | Description of selected studies

The systematic search produced 4191 articles, with two identified additionally through bibliography reviews. Only peer-reviewed articles, written in English between 2000 and 2020 were included. Duplicates, 997 studies, were removed among the databases. After the title and abstract screening of 3195 articles, 74 full-text articles were reviewed. Sixty studies were excluded for including the incorrect disease (n = 1), incorrect population (n = 9), incorrect intervention (n = 13), incorrect publication type (n = 3), incorrect study design (n = 7), incorrect outcomes (n = 19), and missing data (n = 8). Fourteen RCTs were included in this review. Please see Figure 1 for the PRISMA flow diagram.

3.2 | Participants and settings

The included studies contained a total of 1161 participants, ranging from 21 to 189 participants per study (Table 2). All studies included participants who were 62 years old or over.[36] The studies took place in the United Kingdom, Italy, Argentina, Norway, Korea, Greece, Netherlands, Hong Kong, and Spain. Settings included long-term care facilities, outpatient facilities, geriatric departments, and residential homes.

3.3 | Methodological quality of the included studies

The overall quality of the studies was moderate (see Table 2). The scores ranged from four to seven on the PEDro scale, with 5.86 as the average score. The cut-off score of the 10-point scale was 5, where a score below five denoted low quality.[37] Ten studies had a low risk of bias, scoring above 5; three had moderate risk, scoring 5; and one was high risk. The most frequent methodological shortcomings were lack of blinding and high attrition rate.

All studies met the standard criteria of PEDro, as they specified the eligibility criteria and use of randomization. However, only eight studies had concealed allocation. Four studies' control and intervention groups were significantly different at baseline.

None of the studies were double-blinded, except one on aromatherapy.[38] However, the lack of double blinding is not indicative of the studies' quality. Due to the nature of most psychosocial interventions, the therapists could not be blinded because they were delivering the treatment. As a result, only single-blind was possible. Eight RCTs blinded the participant or assessor.

Over half of the included studies had an 85% attrition rate in at least one key outcome.[33,38–42] All but six studies included an ITT analysis.[33,38,40,43–45] All included between-group statistical measures with their respective point measures except for two studies.[38,46]

To assess other potential biases, additional information on power-analysis, effect size, and follow-up were obtained (see Table 2). Out of the 14 included studies, 5 included a power analysis, and 8 were sufficiently powered. While all studies reported effect sizes, only 11 studies indicated a specific p value, where five were accompanied by a confidence interval.

Five studies included follow-up assessments indicating that cognitive and QoL effects were maintained for 3–6 months, meaning that once improvements are present, the positive effects can endure for some time.[33,41,42,45,47] However, since most of the studies did not have follow-ups longer than 6 months, it is unclear if and for how long those studies' intervention effects were maintained.

3.4 | Outcome measures

Four tests were used for cognitive assessments: Mini-Mental State Examination (MMSE) (n = 7), the Alzheimer's Disease Assessment Scale–Cognitive Subscale (n = 2), Severe Impairment Battery–Short Form (n = 1), Clock Drawing Test (n = 1). Each of the included studies used a different assessment tool for QoL: Quality of Life for Late-Stage Dementia Scale, Dementia Care Mapping, Cornell-Brown Scale for Quality of Life in Dementia, Self-reported Quality of Life Scale, Alzheimer's Disease-Related Quality of Life, and Quality of Life in Alzheimer's Disease.

3.5 | Intervention and their effects and cognition and QoL

Out of the 14 included studies, there were 6 MSS interventions, 5 multicomponent programs, 2 exercise programs, and 1 RT.[33,36,38–49] The duration of the interventions ranged from 4 to 65 weeks, and the median treatment duration was 12 weeks. Table 2 illustrates the quality rating, description of the interventions, and amount of statistical significance for studies with significant outcomes.

3.5.1 | Multisensory stimulation

Many types of MSS interventions were included in this review, such as Snoezelen rooms, aromatherapy, robotic pets, and music therapy (see Table 2 for intervention details). Only aromatherapy, however, reported significant improvements in QoL (p = 0.01) post-intervention.[38] This study was sufficiently powered and is of high quality (PEDro = 7). The dosage was 15 min, twice a day for 4 weeks. Robotic pets also had significant effects for QoL in its subgroup analysis of people with moderate to severe dementia (p = 0.01). While this study was of high quality, the sample size of the subgroup was too small for results to be conclusive (n = 24).

3.5.2 | Exercise

Two exercise interventions were included in this review.[36,44] Other studies with exercise had multiple components, involving other types of activities, so they were included as multicomponent programs. Both studies found significant improvements in cognition. The statistical significance can be attributed to the slight improvement in cognition postintervention in the experimental group and the decline in the control group.[36,44] Both interventions were of moderate quality (PEDro = 6) and included aerobic exercises, but they differed in terms of dosages and sample sizes (see Table 2). Unlike the cycling intervention,[36] the walking program was insufficiently powered.[44] The cycling program was 15 min daily for 15 months, and the walking program was 30 min daily for 6 months.

3.5.3 | Multicomponent

Multicomponent programs refer to interventions with more than one type of program in this review. Henskens et al.[47] for example, had exercise as well as ADL in the experimental group. Out of the five selected studies, one reported improvement in cognitive function that was statistically significant.[40] This study included a variety of programs in its intervention: aerobic exercise, memory games, and music therapy. Its quality was the lowest among the ones with significant results (PEDro = 5), and its sample size was small ($N = 36$). The music and movement intervention were moderate in quality (PEDro = 6) and was sufficiently powered; however, only a positive trend in cognitive improvement was reported ($p = 0.055$).[46]

3.5.4 | Reminiscence

The only RT study included in this review enhanced the QoL ($p < 0.01$).[42] This paper was sufficiently powered ($N = 135$) and had high quality ratings.

3.6 | Other outcomes

Apart from cognitive and QoL outcomes, we also presented other outcomes in Table 2. Many other outcomes were investigated, but the five main ones with statistically significant improvements were: neuropsychiatric symptoms, agitation, depressive symptoms, mobility, and ADL. Several studies reported significant positive effects on neuropsychiatric symptoms and used the same measure—Neuropsychiatric Inventory.[36,38,41] In terms of agitation, two MSS interventions had a significant impact.[38,41] Another MSS study, Raglio et al.[49] and an exercise program, Cancela et al.[36] found significant differences in the pretest and posttest scores, where the intervention group had fewer depressive symptoms than the control. Two studies with aerobic exercise components were effective in improving mobility.[36,40] Exercise was also associated with significant improvements in ADL, meaning that people with moderate to severe dementia became better at performing routine activities after the intervention.[36,44]

Other outcomes, such as emotions and social engagement, were also explored. The use of RT was associated with enhanced social engagement.[42] Robotic animals reduced and increased people with moderate to severe dementia's negative and positive emotions, respectively.[43] Details of the results are in Table 2.

3.7 | Impact on outcomes

Aside from the design and content of an intervention, the power sufficiency and quality of RCTs also impacted study outcomes. Results from the five studies with moderately high quality and sufficient power were less prone to type I error.[36,38,41,42,49] It was unclear if dosage influenced the intervention outcomes as the studies were too heterogenous for comparisons to be meaningful.

4 | DISCUSSION

This systematic review was designed to evaluate the efficacy of the current psychosocial treatments for moderate to severe dementia, focusing on cognition and QoL to see whether improvements in these areas are possible. We believe this is the most comprehensive review to date that emphasizes these positive aspects for this population while also taking other significant outcomes into account. Comparing to the most recent review, which included three studies on cognition and one on QoL, we provided a more comprehensive and updated evaluation with 10 RCTs on cognition and 4 on QoL.[19] In this review, aromatherapy and RT showed the strongest evidence in improving QoL. There was some evidence a multicomponent study also advanced QoL, and aerobic exercise enhanced cognition.[36,40,42,44] However, the aerobic exercise study was insufficiently powered, and the multicomponent program was poor in quality.[40,42,44] Overall, the included RCTs varied greatly in factors such as intervention duration, methodological quality, study settings, and outcomes, making it difficult to draw firm conclusions.

4.1 | Effectiveness of intervention based on intervention types

Results suggest that stimulating multiple senses simultaneously exerts positive effects on cognition and QoL for people with moderate to severe dementia, because of the statistically significant improvements in one aromatherapy, and one multicomponent intervention.[38,40] The multicomponent intervention included many types of programs in its experimental group—music therapy, memory games, and aerobic exercises. As a result, it was unclear what activity was effective. This study also had a small sample size and was of low quality. Out of all the MSS studies, aromatherapy had the most solid

evidence in improving QoL; it had sufficient power and the highest quality rating in this review. Our findings align with the previous Cochrane systematic reviews on aromatherapy, aerobic exercises, and music therapy, indicating positive trends in the use of MSS for QoL and cognition.[10–13]

Results from other Snoezelen, robotic animals, and multicomponent intervention studies, however, did not have statistical significances—only positive trends were observed.[33,39,43,46] Our findings support past studies, where Snoezelen provided some evidence of the immediate improvements in cognition in small studies. However, the promising effects were not observed between groups and in systematic reviews with methodologically weak studies.[50] There was insufficient evidence to suggest that these interventions—Snoezelen, robotic animals, music with movement—were beneficial for moderate to severe dementia.

We found RT to be advantageous for people with moderate to severe dementia, not just dementia in general. While previous studies on the effects of RT varied, there was some evidence that it could improve QoL, cognition, communication, and mood.[12] Most past studies were not stage-specific, and if they were, they focused on the mild to moderate population; for example, the majority of the studies in the most recent Cochrane review of RT were on mild to moderate dementia.[12] Knowing that RT is applicable to moderate to severe dementia is imperative for the development of future interventions.

Two exercise interventions had positive findings for cognitive outcomes.[36,44] However, the statistical significance was mainly due to the major decline in the control group's cognitive abilities for one study,[36] and the other RCT was insufficiently powered.[44] Other interventions with exercise components did not exhibit the same positive effect.[45] Whether exercise enhanced cognition is unclear.

There is conflicting evidence on exercise's role in cognition in our findings and previous studies. Walking or cycling for 30 min a day might not be physically possible for some with severe dementia due to disease progression.[51] Previous studies have suggested exercise to enhance physical and cognitive abilities.[10,52] Dementia and Physical Activity, a recent multicentered RCT, however, claimed exercise to be damaging for PwD. Twenty-five adverse events (AE) were reported during this trial. Not only did exercise not improve the QoL, but it could potentially damage cognition.[53]

Many other outcomes were investigated in the 14 RCTs (see Table 2). As mentioned previously, the five main areas with significant outcomes were neuropsychiatric symptoms, agitation, depressive symptoms, mobility, and ADL. The positive effects of MSS on agitation support previous reviews.[11,38,41,54] Current practice supports the use of antipsychotic medications for agitation and neuropsychiatric symptoms.[7] Due to the emergence of AE and the high risk of contraindications of pharmacological treatments, effective NPIs would be impactful.[4,5] This provides the rationale for the current study.

While we found significant improvements in depressive symptoms, mobility, and ADL from various interventions in this review, there is conflicting evidence in the existing literature.[36,40,44,46,47,49] Depressive and dementia symptoms can overlap and be hard to distinguish, making positive effects in mood difficult to evaluate.[55] While some exercise interventions appear to increase mobility and improve ADL, others suggest it can be potentially harmful or ineffective.[53] Publications to date have also not provided the mechanism of how exercise influences cognitive function in dementia.

4.2 | Limitations

This review was limited by including RCTs with outcome measures that may not be sensitive to people with moderate to severe dementia. While the MMSE is the gold standard for assessing cognitive impairment, whether it is effective in measuring cognitive changes in moderate to severe dementia is unclear.[56] MMSE is not a staging tool, so for studies that did not use an additional staging tool, it is unclear if people with moderate to severe dementia were accurately selected for participation.[36,43]

Results of this systematic review were limited by the fact that there is no standard assessment of QoL. Each study used a different instrument, making it hard to compare the effects across studies as they have various rating systems (Table 2). The validity and reliability of some are questionable. For example, one study used a self-reported test, Self-reported Quality of Life.[42] Since people with moderate to severe dementia often have limited communication and language abilities, self-rating would be challenging; whether responses are accurate is questionable. Only one study used a QoL instrument specifically for moderate to severe dementia.[33]

Our systematic review also could not present the most comprehensive data for people with moderate dementia. We excluded one of the most established psychosocial interventions for mild to moderate dementia, CST, because we could not separate the moderate dementia results from the mild. CST studies also did not meet our inclusion criteria, designed to ensure most of the sample have moderate to severe dementia.

Publication bias and including studies with insufficient power, and/or lack of statistical information may also threaten the validity of this review. We did not include any gray literature, and trials with positive findings are more likely to be published.[57] Several studies were insufficiently powered to detect changes in effect sizes. For studies with sufficient power, there was a lack of statistical information.[40,41,43,44,48] While all studies reported between-group *p*-values and effect sizes, most *p* values did not include a confidence interval, and it was hard to compare the effect sizes due to the heterogeneity in study design and outcome measures.

4.3 | Future work

Current pharmacological treatments can reduce symptoms of dementia, but for people with moderate to severe dementia, diminished cognitive function and QoL can be enhanced. Using findings from this review, future studies can investigate how MSS, aerobic exercise, multicomponent programs, and RT affects QoL and cognition in moderate to severe dementia. The clinical trials should consider using

outcome measures that are valid and sensitive to people with moderate to severe dementia. High-quality RCTs with larger sample sizes, robust methods of randomization, blinding of assessors, and ITT is essential.

4.4 | Conclusion

Results from the present systematic review show aromatherapy and RT to improve QoL, and positive trends in the use of multicomponent programs for QoL and aerobic exercise for cognition. Due to the limited studies per intervention type, methodological weaknesses, and heterogeneity, results must be interpreted with caution.

Since dementia is currently a global epidemic, and the world's aging population is increasing, developing effective treatment is a public health priority. Various types of current psychosocial interventions can enhance the health of people with moderate to severe dementia. However, future research with well-defined and quality outcome measures with a rigorous study design is required before recommendations can be made regarding the use and prescription of MSS, RT, exercise, or multicomponent interventions for people with moderate to severe dementia.

ACKNOWLEDGMENTS

None.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest that could be perceived as prejudging the impartiality of the research reported.

AUTHOR CONTRIBUTIONS

Esther K. Hui has made substantial contributions to conception and design, acquisition of data, analysis, interpretation of data, drafting and revising the manuscript. Victoria Tischler and Gloria H.Y. Wong have made substantial contributions to the interpretation of data and revision of the manuscript for important intellectual content. Tiffany Lau has made substantial contributions to the acquisition of data and analysis. Aimee Spector has made substantial contributions to the conception, design, interpretation of data, revision of the manuscript. All authors read and gave final approval of the version to be published. All authors agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy and integrity of any part of the work are appropriately investigated and resolved.

ORCID

Esther K. Hui https://orcid.org/0000-0001-7815-5473
Victoria Tischler https://orcid.org/0000-0002-0086-1906
Gloria H. Y. Wong https://orcid.org/0000-0002-1331-942X
Aimee Spector https://orcid.org/0000-0003-4448-8143

REFERENCES

1. GBD 2016 Dementia Collaborators. Global, regional, and national burden of Alzheimer's disease and other dementias, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet Neurol*. 2019;18(1):88-106. https://doi.org/10.1016/S1474-4422(18)30403-4
2. World Health Orgnization. World Report on Aging and Health; 2015. https://www.who.int/ageing/events/world-report-2015-launch/en/. Accessed December 16, 2020.
3. Alzheimer's Association. FDA-approved Treatments for Alzheimer; 2019. https://www.alz.org/media/documents/fda-approved-treatments-alzheimers-ts.pdf. Accessed December 22, 2020.
4. Kavirajan H, Schneider LS. Efficacy and adverse effects of cholinesterase inhibitors and memantine in vascular dementia: a meta-analysis of randomised controlled trials. *Lancet Neurol*. 2007;6(9):782-792. https://doi.org/10.1016/s1474-4422(07)70195-3
5. Whalley LJ, Sharma S, Fox HC, et al. Anticholinergic drugs in late life: adverse effects on cognition but not on progress to dementia. *J Alzheimers Dis*. 2012;30(2):253-261. https://doi.org/10.3233/jad-2012-110935
6. Patel V, Saxena S, Lund C, et al. The Lancet Commission on global mental health and sustainable development. *Lancet*. 2018;392(10157):1553-1598. https://doi.org/10.1016/S0140-6736(18)31612-X
7. National Institute for Health and Care Excellence. Dementia: Assessment, Management and Support for People Living with Dementia and Their Carers. London: National Institute for Health and Care Excellence; 2018. https://www.nice.org.uk/guidance/ng97. Accessed May 10, 2020.
8. Spector A, Thorgrimsen L, Woods B, et al. Efficacy of an evidence-based cognitive stimulation therapy programme for people with dementia. *Br J Psychiatry*. 2003;183:248-254. https://doi.org/10.1017/S1041610210000840
9. McDermott O, Charlesworth G, Hogervorst E, et al. Psychosocial interventions for people with dementia: a synthesis of systematic reviews. *Aging Ment Health*. 2019;23(4):393-403. https://doi.org/10.1080/13607863.2017.1423031
10. Forbes D, Forbes SC, Blake CM, Thiessen EJ, Forbes S. Exercise programs for people with dementia. *Cochrane Database Syst Rev*. 2015;(4):CD006489. https://doi.org/10.1002/14651858.CD006489.pub4
11. Forrester LT, Maayan N, Orrell M, Spector AE, Buchan LD, Soares-Weiser K. Aromatherapy for dementia. *Cochrane Database Syst Rev*. 2014:(2):CD003150. https://doi.org/10.1002/14651858.CD003150.pub2
12. Woods B, O'Philbin L, Farrell EM, Spector AE, Orrell M. Reminiscence therapy for dementia. *Cochrane Database Syst Rev*. 2018;3(3):CD001120. https://doi.org/10.1002/14651858.CD001120.pub
13. van der Steen JT, Smaling HJ, van der Wouden JC, Bruinsma MS, Scholten RJ, Vink AC. Music-based therapeutic interventions for people with dementia. *Cochrane Database Syst Rev*. 2018;7(7):CD003477. https://doi.org/10.1002/14651858.CD003477.pub4
14. Chung JC, Lai CK, Chung PM, French HP. Snoezelen for dementia. *Cochrane Database Syst Rev*. 2002;(4):CD003152. https://doi.org/10.1002/14651858.CD003152
15. Woods B, Aguirre E, Spector AE, Orrell M. Cognitive stimulation to improve cognitive functioning in people with dementia. *Cochrane Database Syst Rev*. 2012;(2):CD005562. https://doi.org/10.1002/14651858.CD005562.pub2
16. Bahar-Fuchs A, Clare L, Woods B. Cognitive training and cognitive rehabilitation for mild to moderate Alzheimer's disease and vascular dementia. *Cochrane Database Syst Rev*. 2013;2013(6):CD003260. https://doi.org/10.1176/appi.books.9780890425596
17. Bahar-Fuchs A, Martyr A, Goh AM, Sabates J, Clare L. Cognitive training for people with mild to moderate dementia. *Cochrane Database Syst Rev*. 2019;3(3):CD013069. https://doi.org/10.1002/14651858.CD013069.pub2

18. Lobbia A, Carbone E, Faggian S, et al. The efficacy of cognitive stimulation therapy (CST) for people with mild-to-moderate dementia. *Eur Psychol*. 2019;24(3):257-277.
19. Na R, Yang J-h, Yeom Y, et al. A systematic review and meta-analysis of nonpharmacological interventions for moderate to severe dementia. *Psychiatry Investig*. 2019;16(5):325-335. https://doi.org/10.30773/pi.2019.02.11.2
20. Boote J, Lewin V, Beverley C, Bates J. Psychosocial interventions for people with moderate to severe dementia: a systematic review. *Clin Eff Nurs*. 2006;9:e1-e15. https://doi.org/10.1016/j.cein.2006.06.002
21. Abraha I, Rimland JM, Trotta FM, et al. Systematic review of systematic reviews of non-pharmacological interventions to treat behavioural disturbances in older patients with dementia. The SENATOR-OnTop series. *BMJ Open*. 2017;7(3):e012759. https://doi.org/10.1136/bmjopen-2016-012759
22. Woods B, Thorgrimsen L, Spector A, Royan L, Orrell M. Improved quality of life and cognitive stimulation therapy in dementia. *Aging Ment Health*. 2006;10(3):219-226. https://doi.org/10.1080/13607860500431652
23. Spector A, Orrell M. Using a biopsychosocial model of dementia as a tool to guide clinical practice. *Int Psychogeriatr*. 2010;22(6):957-965. https://doi.org/10.1017/S1041610210000840
24. American Psychiatric Association. *The Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Washington, DC: American Psychiatric Association; 2013.
25. Chu H, Yang C-Y, Lin Y, et al. The impact of group music therapy on depression and cognition in elderly persons with dementia. *Biol Res Nurs*. 2014;16(2):209-217. https://doi.org/10.1177/1099800413485410
26. Hill NTM, Mowszowski L, Naismith SL, Chadwick VL, Valenzuela M, Lampit A. Computerized cognitive training in older adults with mild cognitive impairment or dementia: a systematic review and meta-analysis. *Am J Psychiatry*. 2017;174(4):329-340. https://doi.org/10.1176/appi.ajp.2016.16030360
27. World Health Organization. Division of Mental Health and Prevention of Substance Abuse. Program on Mental Health—WHOQOL; 2012. https://apps.who.int/iris/handle/10665/77932. Accessed December 16, 2020.
28. World Health Organization. Basic Documents: Forty Ninth Edition; 2020. https://apps.who.int/gb/bd/pdf_files/BD_49th-en.pdf. Accessed December 16, 2020.
29. Reilly ST, Harding AJE, Morbey H, et al. What is important to people with dementia living at home? A set of core outcome items for use in the evaluation of non-pharmacological community-based health and social care interventions. *Age Ageing*. 2020;49(4):664-671
30. Kudlicka A, Martyr A, Bahar-Fuchs A, Woods B, Clare L. Cognitive rehabilitation for people with mild to moderate dementia. *Cochrane Database Syst Rev*. 2019;2019(8):CD013388. https://doi.org/10.1002/14651858.CD013388
31. Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med*. 2009;6(7):e1000097. https://doi.org/10.1080/13607863.2010.543665
32. Moniz-Cook E, Vernooij-Dassen M, Woods B, Orrell M, Interdem Network fnm. Psychosocial interventions in dementia care research: the INTERDEM manifesto. *Aging Ment Health*. 2011;15(3):283-290. https://doi.org/10.1080/13607863.2010.543665
33. Jøranson N, Pedersen I, Rokstad AM, Ihlebaek C. Change in quality of life in older people with dementia participating in Paro-activity: a cluster-randomized controlled trial. *J Adv Nurs*. 2016;72(12):3020-3033.doi:https://doi.org/10.1111/jan.13076
34. Blobaum P. Physiotherapy Evidence Database (PEDro). *J Med Libr Assoc*. 2006;94(4):477-478.
35. Schulz KF, Altman DG, Moher D, CONSORT Group. CONSORT 2010 statement: updated guidelines for reporting parallel group randomised trials. *BMJ*. 2010;340:c332. https://doi.org/10.1136/bmj.c332
36. Cancela JM, Ayán C, Varela S, Seijo M. Effects of a long-term aerobic exercise intervention on institutionalized patients with dementia. *J Sci Med Sport*. 2016;19(4):293-298. https://doi.org/10.1016/j.jsams.2015.05.007
37. Cashin AG, McAuley JH. Clinimetrics: Physiotherapy Evidence Database (PEDro) Scale. *J Physiother*. 2020;66(1):59. https://doi.org/10.1016/j.jphys.2019.08.005
38. Ballard CG, O'Brien JT, Reichelt K, Perry EK. Aromatherapy as a safe and effective treatment for the management of agitation in severe dementia. *J Clin Psychiatry*. 2002;63(7):553-558. https://doi.org/10.4088/jcp.v63n0703
39. Baker R, Holloway J, Holtkamp CCM, et al. Effects of multi-sensory stimulation for people with dementia. *J Adv Nurs*. 2003;43(5):465-477. https://doi.org/10.1046/j.1365-2648.2003.02744.x
40. Kampragkou C, Iakovidis P, Kampragkou E, Kellis E. Effects of a 12-weeks aerobic exercise program combined with music therapy and memory exercises on cognitive and functional ability in people with middle type of Alzheimer's disease. *Int J Physiother*. 2017;4(5):262-268. https://doi.org/10.15621/ijphy/2017/v4i5/159420
41. Ridder HMO, Stige B, Qvale LG, Gold C. Individual music therapy for agitation in dementia: an exploratory randomized controlled trial. *Aging Ment Health*. 2013;17(6):667-678. https://doi.org/10.1080/13607863.2013.790926
42. Azcurra DJLS. A reminiscence program intervention to improve the quality of life of long-term care residents with Alzheimer's disease. A randomized controlled trial. *Braz J Psychiatry*. 2012;34(4):422-433. https://doi.org/10.1016/j.rbp.2012.05.008
43. Koh IS, Kang HS. Effects of intervention using PARO on the cognition, emotion, problem behavior, and social interaction of elderly people with dementia. *J Korean Acad Community Health Nurs*. 2018;29(3):300-309. https://doi.org/10.12799/jkachn.2018.29.3.300
44. Venturelli M, Scarsini R, Schena F. Six-month walking program changes cognitive and ADL performance in patients with Alzheimer. *Am J Alzheimers Dis Other Demen*. 2011;26(5):381-388.doi:https://doi.org/10.1177/1533317511418956
45. Hutson C, Orrell M, Dugmore O, Spector A. Sonas: a pilot study investigating the effectiveness of an intervention for people with moderate to severe dementia. *Am J Alzheimers Dis Other Demen*. 2014;29(8):696-703. https://doi.org/10.1177/1533317514534756
46. Cheung DSK, Lai CKY, Wong FKY, Leung MCP. The effects of the music-with-movement intervention on the cognitive functions of people with moderate dementia: a randomized controlled trial. *Aging Ment Health*. 2018;22(3):306-315. https://doi.org/10.1080/13607863.2016.1251571
47. Henskens M, Nauta IM, van Eekeren MCA, Scherder EJA. Effects of physical activity in nursing home residents with dementia: a randomized controlled trial. *Dement Geriatr Cogn Disord*. 2018;46(1-2):60-80. https://doi.org/10.1186/s12877-017-0504-6
48. Kim M-J, Han C-W, Min K-Y, et al. Physical exercise with multicomponent cognitive intervention for older adults with Alzheimer's disease: a 6-month randomized controlled trial. *Dement Geriatr Cogn Disord Extra*. 2016;6(2):222-232. https://doi.org/10.1159/000446508
49. Raglio A, Bellandi D, Baiardi P, et al. Effect of active music therapy and individualized listening to music on dementia: a multicenter randomized controlled trial. *J Am Geriatr Soc*. 2015;63(8):1534-1539. https://doi.org/10.1111/jgs.13558
50. Sánchez A, Millán-Calenti JC, Lorenzo-López L, Maseda A. Multisensory stimulation for people with dementia. *Am J Alzheimers Dis Other Demen*. 2013;28(1):7-14. https://doi.org/10.1177/1533317512466693

51. Sclan SG, Reisberg B. Functional assessment staging (FAST) in Alzheimer's disease: reliability, validity, and ordinality. *Int Psychogeriatr*. 1992;4(suppl 1):55-69. https://doi.org/10.1017/s1041610292001157
52. Groot C, Hooghiemstra AM, Raijmakers PGHM, et al. The effect of physical activity on cognitive function in patients with dementia: a meta-analysis of randomized control trials. *Ageing Res Rev*. 2016;25:13-23. https://doi.org/10.1016/j.arr.2015.11.005
53. Lamb SE, Sheehan B, Atherton N, et al. Dementia and Physical Activity (DAPA) trial of moderate to high intensity exercise training for people with dementia: randomised controlled trial. *BMJ*. 2018;361:k1675. https://doi.org/10.1136/bmj.k1675
54. Livingston G, Kelly L, Lewis-Holmes E, et al. Non-pharmacological interventions for agitation in dementia: systematic review of randomised controlled trials. *Br J Psychiatry*. 2014;205(6):436-442. https://doi.org/10.1192/bjp.bp.113.141119
55. Bulbena A, Berrios GE. Pseudodementia: facts and figures. *Br J Psychiatry*. 1986;148:87-94. https://doi.org/10.1192/bjp.148.1.87
56. Creavin ST, Wisniewski S, Noel-Storr AH, et al. Mini-Mental State Examination (MMSE) for the detection of dementia in clinically unevaluated people aged 65 and over in community and primary care populations. *Cochrane Database Syst Rev*. 2016;(1):CD011145. https://doi.org/10.1002/14651858.CD011145.pub2
57. Hopewell S, Loudon K, Clarke MJ, Oxman AD, Dickersin K. Publication bias in clinical trials due to statistical significance or direction of trial results. *Cochrane Database Syst Rev*. 2009:(1):MR000006. https://doi.org/10.1002/14651858.MR000006.pub3

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

How to cite this article: Hui EK, Tischler V, Wong GHY, Lau WYT, Spector A. Systematic review of the current psychosocial interventions for people with moderate to severe dementia. *Int J Geriatr Psychiatry*. 2021;1–17. https://doi.org/10.1002/gps.5554