

# Effectiveness of physical rehabilitation in improving physical functioning and quality of life for long-term-care residents with dementia: a systematic review protocol

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## ABSTRACT

**Objective:** The objective of this review is to evaluate the effectiveness of physical rehabilitation versus non-rehabilitation control in improving physical functioning and quality of life in long-term care residents with dementia.

**Introduction:** Many long-term-care residents live with dementia and have impaired physical function and poor quality of life. Physical rehabilitation can improve physical function and quality of life for people living with dementia, yet many long-term-care residents with dementia do not receive this intervention, and health care providers are unsure of which rehabilitation interventions are effective. Studies synthesizing effective rehabilitation programs are needed to guide practice in the long-term-care sector where many residents live with dementia. Previous studies have focused broadly on long-term care, specific professions, interventions or outcomes, or people with dementia in the community. Our review will focus on long-term-care residents living with dementia and a broader definition of physical rehabilitation.

**Inclusion criteria:** This review will include studies that evaluate physical rehabilitation in comparison with non-rehabilitation controls among long-term-care residents with any severity of dementia. We will include studies that measure the effect on performance-based physical functioning and self- or proxy-reported quality of life.

**Methods:** Searches will be conducted in APA PsycINFO (EBSCO), CINAHL (EBSCO), MEDLINE (Ovid), Embase, Scopus, and the Cochrane CENTRAL database with no date or language limitations. Two independent reviewers will conduct a critical appraisal of eligible studies, assess methodological quality, and extract the data. Where possible, studies will be pooled in a statistical meta-analysis.

**Systematic review registration number:** PROSPERO CRD42022308444

**Keywords:** dementia; long-term care; physical functioning; quality of life; rehabilitation

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## Introduction

Dementia is an umbrella term that encompasses many disorders resulting in significant decline in cognition, including Alzheimer disease, frontotemporal dementia, dementia with Lewy bodies, or vascular dementia. Depending on the primary disorder, dementia can result in a variety of symptoms, including progressive memory impairment, behavioral disinhibition, communication deficits, falls, incontinence,

behavioral changes, and rigidity. Globally, an estimated 7% of individuals older than 65 years have dementia, with higher prevalence (8% to 10%) in developed countries due to typically longer life spans.<sup>1</sup> Dementia is highly prevalent in long-term care (LTC), which is a residential home for people who are unable to live independently, and who require access to nursing, personal care, support and/or supervision.<sup>2</sup> As many as 80% of LTC residents in Canada have a diagnosis of dementia,<sup>3</sup> and the number of newly admitted residents with dementia is increasing.<sup>4</sup>

LTC residents with dementia experience high levels of disability, including functional dependence, an increased risk of falls and fractures, and reduced quality of life.<sup>3</sup> Individuals with dementia often have a high level of functional dependence and are more likely to require assistance in activities of daily living.<sup>5</sup> Additionally, dementia affects balance, mobility, and gait performance,<sup>6,7</sup> increasing the risk of negative outcomes such as falls and fractures.<sup>8</sup> People living with dementia in LTC also have poorer quality of life than those living with dementia in the community.<sup>9</sup>

There is growing focus on the role of physical rehabilitation in helping maintain and improve physical function and quality of life for LTC residents living with dementia. Physical rehabilitation is broadly defined by the World Confederation for Physical Therapy as health- and well-being-promotion activities emphasizing the importance of physical activity; preventing movement impairments and activity limitations; providing interventions to support movement, function, and quality of life; and making modifications to enable participation in society.<sup>10</sup> There is some evidence that rehabilitation can improve physical function and quality of life in LTC: residents with dementia who participated in a multifaceted walking intervention for 4 months demonstrated improvement on several measures, including the Alzheimer disease–related quality of life, the Functional Independence Measure, the Timed Up and Go test, and the 2-Minute Walk Test.<sup>11</sup> However, LTC residents with dementia are less likely to receive rehabilitation services than those without.<sup>12</sup>

Rehabilitation providers often become frustrated when the intervention does not achieve the anticipated results when working with individuals with dementia, either because the anticipated results are unrealistic or the delivered intervention is ineffective for this population.<sup>13</sup> Yet, many rehabilitation interventions (eg, group exercise classes) are not

customized to the strengths and unique needs of individuals with dementia. Rehabilitation providers who routinely work with individuals with dementia have identified that they would benefit from further training to optimize interventions for LTC residents living with dementia.<sup>14</sup> Many studies examining rehabilitation interventions in LTC exclude residents with dementia, limiting the applicability of the results to practice.<sup>15</sup> Studies synthesizing effective rehabilitation programs are needed to guide practice in the LTC sector where many residents have dementia.

The objective of our systematic review is to synthesize the existing literature about the effectiveness of physical rehabilitation in improving physical function and quality of life for LTC residents living with dementia. A preliminary search of PROSPERO, MEDLINE, the Cochrane Database of Systematic Reviews, and *JB1 Evidence Synthesis* was conducted and no current systematic reviews on the topic were identified. The most recent Cochrane systematic review on physical rehabilitation for older people in LTC was published in 2013, but was not specific to residents with dementia.<sup>16</sup> There are several ongoing systematic reviews registered in PROSPERO related to rehabilitation in LTC; however, they are not specific to LTC residents with dementia, and focus either on specific professions (eg, physical therapists or occupational therapists), interventions (exergames, resistance training), or outcomes (short physical performance battery, balance, cognitive function).

A recent scoping review examined physical interventions for people with advanced dementia.<sup>17</sup> This review only included 4 articles, while excluding 56 articles that included residents with mild and moderate dementia, indicating there is a substantial body of literature to be synthesized pertaining to LTC residents with dementia at all stages. Further, this review was not specific to the LTC setting where the environmental context is unique for designing and delivering physical rehabilitation. Our review differs from the ongoing systematic reviews and recent scoping review as we will focus specifically on LTC residents with dementia at all stages and on a broader definition of physical rehabilitation.

## Review questions

- i) What is the effectiveness of physical rehabilitation in improving physical functioning for LTC residents with dementia?

- ii) What is the effectiveness of physical rehabilitation in improving quality of life for LTC residents with dementia?

## Inclusion criteria

### Participants

This review will include studies that included LTC residents with any severity or any form of dementia. This could include reporting of a clinical diagnosis using criteria, such as the Diagnostic and Statistical Manual of Mental Disorders, 5th edition, or results of a cognitive assessment, such as the Mini-Mental State Examination, Montreal Cognitive Assessment, Clinical Dementia Rating Scale Global Score, or other comparable alternatives. LTC will be defined as homes that provide health and personal care services for people living with medical or physical needs who require access to 24-hour nursing care, personal care, or other therapeutic and support services.<sup>18</sup> We will include any study that describes a population that meets this definition.

Our search strategy (see Appendix I) includes a variety of terms used for LTC internationally to ensure we capture literature from countries that use alternate terms for LTC. We will consider studies that include residents of any age, sex, or gender. We will use the definition of sex and gender as defined by the SAGER guidelines.<sup>19</sup> We will exclude studies that include residents who are immobile or bed-bound, as rehabilitation interventions for this group would be different than for those who are not. We will only include studies with mixed populations (eg, some participants are in LTC and others are in the community, or some residents are bed-bound while others are not) if results are reported separately for the participants in LTC.

### Interventions

This review will consider studies that evaluate physical rehabilitation as defined by the World Confederation for Physical Therapy. All dosages/intensities, modes of delivery, and frequency/duration/timing of delivery will be considered.

### Comparators

This review will consider studies that compare the intervention to any non-rehabilitation control condition. The control condition can be anything that does not include rehabilitation, for example, usual care, social engagement, or education. Multiple

comparators within the same study will be considered, but one comparator must include a control group that receives no rehabilitation treatment.

### Outcomes

This review will consider studies that include the following outcomes over any follow-up period (eg, 3, 6, 12 months). The primary outcome will be performance-based physical functioning, which we define as the observable ability to perform tasks (eg, rise from a chair, perform activity of daily living).<sup>20</sup> Outcomes will be grouped into 2 categories and include studies that report the following outcome measures: activities of daily living (Functional Independence Measure, Barthel Index, Katz Index, Rivermead Mobility Index, interRAI ADL Hierarchy Short Form or Long Form, Physical Performance Test, Physical Functioning Scale, Minimum Data Set ADL Items, Groningen Activity Restriction Scale, Tinetti Mobility Scale, Performance Test of Activities of Daily Living, Late Life Function and Disability Instrument, Physical Disability Index, Elderly Mobility Scale) and specific functional tasks (5 times sit to stand; 30-second sit to stand; Timed Up and Go; 2-, 6-, or 10-minute walk tests; 4- or 10-metre walk tests; gait speed; and timed walks).

The secondary outcome will be quality of life as defined by the World Health Organization: “an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns.”<sup>21(p.1405)</sup> We will include quality-of-life measures that are completed as self-report or by a proxy (eg, caregiver, family, friend care partner, LTC staff), including the Alzheimer's Disease Related Quality of Life questionnaire, Dementia Quality of Life Instrument, Life Satisfaction Index, SF-12 health-related quality of life, Satisfaction with Life Scale, and the General Well-Being Scale.

### Types of studies

This review will consider both experimental and quasi-experimental study designs, including randomized controlled trials, non-randomized controlled trials, before-and-after studies, and interrupted time-series studies. We will exclude analytical observational studies, including prospective and retrospective cohort studies, case-control studies, analytical

cross-sectional studies, descriptive observational study designs (including case series), individual case reports, and descriptive cross-sectional studies.

## Methods

The proposed systematic review will be conducted in accordance with the JBI methodology for systematic reviews of effectiveness.<sup>22</sup> The review title has been registered in PROSPERO (CRD42022308444).

### Search strategy

The search strategy will aim to locate both published and unpublished studies. A 3-step search strategy will be utilized in this review. First an initial limited search of MEDLINE (PubMed) and CINAHL (EBSCO) was undertaken to identify articles on the topic. The text words contained in the titles and abstracts of relevant articles, and the index terms used to describe the articles, were used to develop a full search strategy for CINAHL via EBSCO (see Appendix I). We will search the following databases: APA PsycINFO (EBSCO), CINAHL (EBSCO), MEDLINE (Ovid), Embase (Elsevier), Scopus, and Cochrane CENTRAL with no date or language limitations.

The search strategy, including all identified keywords and index terms, will be adapted for each included database and/or information source. The reference lists of all included sources of evidence will be screened for additional studies. Studies published since database inception will be included. We will include articles in any language by using Google Translate to determine title and abstract eligibility and translation services for included full texts. We will also perform a search of gray literature guided by the Canadian Agency for Drugs and Technologies in Health Grey Matters Tool,<sup>23</sup> which is a checklist intended to support researchers conducting systematic reviews.

We will include the following websites in our search: Biomed Central ISRCTN Registry, National Institute of Medical Statistics – Indian Council of Medical Research Clinical Trials Registry, Thomson CentreWatch Clinical Trials Listing Service, ClinicalTrials.gov, UK Department of Health UK Clinical Research Network Study Portfolio, World Health Organization International Clinical Trials Registry Platform Search Portal, Bandolier Knowledge, Latin-American and Caribbean Center on Health Sciences Information, McMaster University Health Systems

Evidence, National Institute for Health and Care Excellence Evidence Search: Health and Social Care, TRIP Database, University of York Centre for Reviews and Dissemination, PROSPERO, US National Library of Medicine, US National Library of Medicine and National Institutes of Health, Google, Google Scholar, and Directory of Open Access Journals.

### Study selection

Following the search, all identified citations will be collated and uploaded into Covidence (Veritas Health Innovation, Melbourne, Australia) and duplicates removed. Following a pilot test to determine agreement between reviewers, titles and abstracts will then be screened by 2 or more independent reviewers for assessment against the inclusion criteria for the review. The full text of selected citations will be assessed in detail against the inclusion criteria by 2 or more independent reviewers. Reasons for exclusion of papers at full text that do not meet the inclusion criteria will be recorded and reported in the systematic review report. Any disagreements that arise between the reviewers at each stage of the selection process will be resolved through discussion or with an additional reviewer. Title and abstract and full-text screening will be conducted in Covidence. Full texts will then be uploaded into the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI; JBI, Adelaide, Australia).<sup>24</sup> The results of the search and the study inclusion process will be reported in full in the final systematic review and presented in a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram.<sup>25</sup>

### Assessment of methodological quality

Eligible studies will be critically appraised by 2 independent reviewers at the study level for methodological quality in the review using standardized critical appraisal instruments from JBI for experimental and quasi-experimental studies.<sup>22</sup> Authors of papers will be contacted to request missing or additional data for clarification, where required. Any disagreements that arise will be resolved through discussion or with a third reviewer. The results of critical appraisal will be reported in narrative format and in a table. All studies, regardless of the results of their methodological quality, will undergo data extraction and synthesis.

### Data extraction

Data will be extracted from studies included in the review by 2 independent reviewers using the standardized JBI data extraction tool. The data extracted will include general study characteristics (eg, authors, year, country), study design, population characteristics (eg, age, gender, sample size), intervention and comparator details, and reported outcomes. To provide a comprehensive description, we will report the intervention and comparator details according to the Template for Intervention Description and Replication Checklist.<sup>26</sup> Any disagreements that arise between the reviewers will be resolved through discussion or with a third reviewer. Authors of papers will be contacted to request missing or additional data, where required.

### Data synthesis

Studies will, where possible (ie, same outcome measures used, same length of follow-up, minimal concerns about bias, methodological and clinical diversity, and statistical heterogeneity),<sup>27</sup> be pooled in statistical meta-analysis using JBI SUMARI. Depending on the outcome measures, effect sizes will be expressed as weighted or standardized mean differences and their 95% CI will be calculated for analysis. Statistical analyses will be performed using a random effects model.<sup>28</sup> Subgroup analyses will be conducted where there is sufficient data (ie, 10 studies or more)<sup>27</sup> to investigate the effectiveness of rehabilitation by stage of dementia (ie, mild, moderate, or severe). Heterogeneity will be assessed statistically using the standard  $\chi^2$  and  $I^2$  tests.

A funnel plot will be generated to assess publication bias if there are 10 or more studies included in a meta-analysis. Statistical tests for funnel plot asymmetry (Egger test, Begg test, Harbord test) will be performed where appropriate. Where meta-analysis is not possible, the findings will be presented in narrative format and in tables and figures to aid in data presentation.

### Assessing certainty in the findings

The Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach for grading the certainty of evidence will be followed and a Summary of Findings will be created using GRADEpro GDT 2021 (McMaster University, ON, Canada). This will be undertaken by 2 independent reviewers at the outcome level. Any disagreements

that arise between the reviewers will be resolved through discussion or with a third reviewer. The Summary of Findings will present the following information where appropriate: effect of treatment and a ranking of the quality of the evidence based on the risk of bias, directness, heterogeneity, and precision, and risk of publication bias of the review results. The outcomes reported in the Summary of Findings will be physical performance and quality of life.

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### Declarations

This work has been created and will be carried out in collaboration with a study advisory team with expertise in rehabilitation, LTC, and systematic review methodology. Our advisory team includes patient partners and stakeholders in the LTC sector who support the work through lived experience.

### Author contributions

CM conceptualized the study in collaboration with NA, RA, KC, ND, ME, TF, PG, SH, LM, EM, SS, CS, LW. CM drafted the manuscript and all authors provided critical feedback.

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## Appendix I: Search strategy

CINAHL (EBSCO)

Date searched: June 14, 2022

#	Query	Results retrieved
S1	physiotherapy OR "physical therapy" OR "occupational therapy" OR exercise OR "functional training" OR "resistance training" OR "weight training" OR "balance training" OR "mobility training" OR "physical activity" OR activation OR "restorative therapy"	441,385
S2	"major neurocognitive disorder" OR "pick disease" OR "picks disease" OR "pick's disease" OR "supranuclear palsy" OR "corticobasal* degeneration" OR "corticobasal* syndrome" OR "logopenic aphasia" OR "Posterior Cortical Atrophy" OR dementia* OR alzheimer* OR "creutzfeldt Jakob" OR creutzfeldt OR crueltzfeldt OR "progressive aphasia" OR cadasil OR "nonfluent aphasia" OR huntington* OR huntingdon* OR "kluver bucy" OR "lewy body" OR "lobar degeneration" OR "neurofibrillary tangles"	112,209
S3	"nursing home*" OR "care home*" OR "long term care" OR ltc	76,319
S4	(MH "Rehabilitation+") OR (MH "Exercise+") OR (MH "Therapeutic Exercise+")	386,848
S5	(MH "Dementia+")	81,569
S6	(MH "Long Term Care") OR (MH "Nursing Home Patients") OR (MH "Nursing Homes+") OR (MH "Residential Facilities+") OR (MH "Residential Facilities+")	52,887
S7	S1 OR S4	641,276
S8	S2 OR S5	112,210
S9	S3 OR S6	82,912
S10	S7 AND S8 AND S9	1901

No date limits; no language limits.