



Review

Non-pharmacological interventions for adults with mild cognitive impairment and early stage dementia: An updated scoping review



Juleen Rodakowski ^{a,b}, Ester Saghafi ^c, Meryl A. Butters ^d,
Elizabeth R. Skidmore ^{a,b,*}

^a Department of Occupational Therapy, School of Health & Rehabilitation Sciences, University of Pittsburgh (Rodakowski, Skidmore), Pittsburgh, PA, USA

^b Clinical and Translational Science Institute, University of Pittsburgh, Pittsburgh, PA, USA

^c Health Sciences Library System, University of Pittsburgh (Saghafi), Pittsburgh, PA, USA

^d Department of Psychiatry, School of Medicine, University of Pittsburgh (Butters), Pittsburgh, PA, USA

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ABSTRACT

The purpose of this scoping review was to examine the science related to non-pharmacological interventions designed to slow decline for older adults with Mild Cognitive Impairment or early-stage dementia. We reviewed 32 unique randomized controlled trials that employed cognitive training (remediation or compensation approaches), physical exercise, or psychotherapeutic interventions that were published before November 2014. Evidence suggests that cognitive training focused on remediation and physical exercise interventions may promote small improvements in selected cognitive abilities. Cognitive training focused on compensation interventions and selected psychotherapeutic interventions may influence how cognitive changes impact daily living. However, confidence in these findings is limited due to methodological limitations. To better assess the value of non-pharmacological interventions for this population, we recommend: (1) adoption of universal criteria for “early stage cognitive decline” among studies, (2) adherence to guidelines for the conceptualization, operationalization, and implementation of complex interventions, (3) consistent characterization of the impact of interventions on daily life, and (4) long-term follow-up of clinical outcomes to assess maintenance and meaningfulness of reported effects over time.

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Contents

1. Introduction	39
2. Methods	40
3. Results	40
3.1. Participant characteristics	40
3.2. Intervention characteristics	40
3.3. Primary and secondary outcomes	48
3.4. Intervention effects	48

* Corresponding author. Department of Occupational, Therapy University of Pittsburgh, 5012 Forbes Tower, Pittsburgh, PA 15260, USA. Tel.: +1 412 383 6617; fax: +1 412 383 6617.

E-mail address: skidmore@pitt.edu (E.R. Skidmore).

4. Discussion	50
Acknowledgements	52
References	52

1. Introduction

An estimated 5.2 million older adults are suspected to have dementia in the United States (Alzheimer's Association, 2014). Due to aging of one of the largest birth cohorts in United States history, up to 16 million older adults are expected to have dementia by the year 2050 (Alzheimer's Association, 2014). Costs associated with dementia are estimated to exceed \$1 trillion USD (in current market value) by 2050 (Alzheimer's Association, 2014). Mild cognitive impairment (MCI) is the state between normal cognitive aging and dementia. Approximately 16% of older adults have MCI (Mitchell and Shiri-Feshki, 2009; Petersen et al., 1999), and these older adults are at high risk of developing dementia. Thus, older adults with MCI are at high risk for disability in daily activities and costly support in the form of caregiver assistance, community resources, and long-term care. Interventions that slow or reverse the decline from MCI to dementia could have a significant impact on individual, familial, and societal burden.

The measure of efficacy of these interventions may best be detected through changes in (or at least maintenance of) cognitive function and the impact of these changes on daily living. Individuals with MCI may have subjective memory complaints and objective evidence of cognitive impairment beyond those expected for their age and education levels. These cognitive impairments may be detected through domain-specific or global measures of cognitive function. The impact of cognitive changes on daily living may be assessed through measures of daily activity performance or quality of life. Despite the common conception that individuals in the early stages of cognitive decline do not have disability in daily activities, evidence suggests that performance of complex cognitively-focused daily activities may be affected (Rodakowski et al., 2014) and this may have implications for overall quality of life.

Several pharmacological interventions (e.g., donepezil, huperzine A, vitamin E, and cholinesterase inhibitors) have been examined as potential agents for slowing or reversing cognitive decline. However, evidence suggests that these agents do not alter cognitive function outcomes or slow progression to dementia (Birks and Flicker, 2006; Farina et al., 2012; Russ, 2014; Yue et al., 2012). Thus, more recent efforts have focused on non-pharmacological interventions. Non-pharmacological interventions may be promising for a variety of reasons. First, older adults may prefer non-pharmacological strategies to maintain cognitive function and community independence rather than pharmacological strategies that may have adverse side-effects. Second, non-pharmacological strategies have less risk than pharmacological strategies (i.e., low likelihood of contraindications or problems that occur with polypharmacy); therefore, they are likely to be more broadly generalizable.

Non-pharmacological interventions that address cognitive function and the impact of cognitive function on daily living have been widely studied in a variety of clinical populations (e.g., learning disabilities, stroke, traumatic brain injury, dementia) (Chung et al., 2013; Seitz et al., 2012; Skidmore et al., 2014; Young and Amarasinghe, 2010). These non-pharmacological interventions tend to be complex, multimodal interventions, as defined by the Medical Research Council (Craig et al., 2013). Chief among these interventions are cognitive training interventions that can be grossly categorized as either remediation or compensation approaches (Cicerone et al., 2011). Cognitive remediation approaches attempt to improve cognitive function through focused training and practice (Barnes et al., 2009). Compensation interventions focus on training individuals to maintain independence, safety, or engagement in daily activities through the use of external aids or adapted methods without seeking to improve cognitive functions, per se (Parker and Thorslund, 2007). In addition to cognitive training interventions, physical exercise may also influence cognitive function. Although the data are limited, physical exercise has been associated with improvements in cognitive function healthy older adults (Kelly et al., 2014). Psychotherapeutic interventions have also been examined for their value for helping individuals with cognitive impairments cope with the changes that cognitive impairments bring about in daily life (Simon et al., 2015; Ueda et al., 2013).

While studied in other clinical populations, these interventions have only recently become the subject of interest for older adults with MCI. Recent reviews suggest that cognitive remediation interventions show promise for promoting small improvements in attention, memory, processing speed, and executive functioning (Huckans et al., 2013; Li et al., 2011; Reijnders et al., 2013; Simon et al., 2012). However, given the small magnitude of reported changes in these few reviews, and the lack of reported changes in other reviews (Cooper et al., 2013; Martin et al., 2011; Teixeira et al., 2012), the benefits of these improvements are unclear. Furthermore, the reviews could not comment on the impact of these improvements on everyday life, as the impact was infrequently addressed in the reviewed articles (Huckans et al., 2013; Kurz et al., 2011; Reijnders et al., 2013). The benefits of compensation approaches, physical exercise, and psychotherapeutic interventions also remain unclear (Cooper et al., 2013; Huckans et al., 2013; Simon et al., 2012; Teixeira et al., 2012). Furthermore, many of the reviews combined clinical populations (i.e., healthy older adults and MCI, or MCI and various stages of dementia) (Kurz et al., 2011; Martin et al., 2011; Reijnders et al., 2013; Thom and Clare, 2011), making it difficult to isolate the benefits of interventions for older adults in the early stages of cognitive decline. The lack of clarity in the findings of these reviews was strongly influenced by state of the science at the time when these reviews were

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