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Targeted physical activity for older adults with mild cognitive impairment and subjective cognitive decline

Tailored guidelines are needed to support strategies for dementia risk reduction

There is now international consensus that physical inactivity can be considered a modifiable risk factor for dementia.[1] Research indicates that 6.5% of the attributable risk of dementia in the global population can be ascribed to low levels of physical activity alone,[2] and engaging in physical activity is regarded as one of the strongest protective factors to reduce dementia risk.[2] Extensive reviews of the evidence have led international health organisations, including the World Health Organization, the British National Institute of Health and Care Excellence and the American National Institutes of Health, to advocate for physical activity as both a primary prevention (in cognitively healthy individuals) and secondary prevention (in individuals who do not have dementia but already experience cognitive decline) strategy for reducing dementia risk.[2-4] A recent American report further supports that physical activity has many benefits, with some (eg, stroke prevention) causally linked to brain health.[3] While the evidence is still inconclusive, physical activity may delay or slow age-related cognitive decline, and people are recommended to increase physical activity to gain this brain health benefit.[3]

Current Australian guidelines for healthy older adults support the continuing engagement in physical activity for developing and maintaining overall physical and mental health and wellbeing, but they do not give any specific consideration for those with mild cognitive impairment (MCI) or subjective cognitive decline (SCD).[5] It is crucial to develop such guidelines, given that most older adults do not engage in enough physical activity to gain health benefits.[6] The Australian guidelines are consistent with most international guidelines in recommending that older adults should engage in "multicomponent physical activity", including aerobic exercise (at least 150 minutes per week of moderate to vigorous intensity, or 75 minutes per week of vigorous intensity) and muscle-strengthening activities (at least 2 days per week), along with balance training. Moreover, older adults should be as active as comorbidities and abilities allow if unable to meet the recommended physical activity level.[5-7]

However, research suggests that physical activity levels are even lower in individuals with SCD and/or MCI, compared with cognitively healthy older adults.[8] SCD refers to an individual's subjective experience of cognitive decline, which may not be associated with impaired performance measured objectively via cognitive tests.[9] MCI reflects both subjectively observed and objectively measured cognitive impairment.[10] Both SCD and MCI are associated with increased risk for dementia,[11,12] along with increased risk of adverse health conditions, including falls, poor mobility, mental health problems and increased mortality.[11,12] In addition, there is evidence that the barriers and facilitators for physical activity in this population may be both qualitatively and quantitatively different to those in the same-aged cognitively healthy population.[13] Changing physical activity in this group may be more challenging and may require syndrome-specific advice in order to overcome barriers.[13] As a result, tailored guidelines are required in order to support secondary preventive strategies for dementia risk reduction in individuals with SCD and MCI.

Overview of guideline development

We recently developed the *Physical activity guidelines for older Australians with MCI or SCD*.[13] These guidelines were created using the guideline adaptation resource toolkit (ADAPTE) and the Appraisal of Guidelines for Research and Evaluation II (AGREE II) instrument, and are an adaption of the *Canadian physical activity guidelines for older adults*.[7] The guidelines include four key recommendations, as summarised here:

- **Recommendation 1.** Participate in aerobic physical activity of moderate intensity for at least 150 minutes per week, or vigorous intensity for at least 90 minutes per week, in addition to incidental light intensity activities of daily living.
- **Recommendation 2.** Engage in progressive resistance training activities on at least 2 days per week, in addition to aerobic physical activity and continuing incidental activities helping with strength.
- **Recommendation 3.** Engage in activities that benefit balance, as older adults with MCI or SCD often have poorer balance and an increased risk of falls.
- **Recommendation 4.** Consult with the patient's health care professional and undertake individually tailored physical activity, considering factors such as health problems, physical capacity and environment.

Current evidence and evidence gaps

The past decade has seen an increase in randomised controlled trials (RCTs) examining physical activity interventions for older adults with MCI and/or SCD.[13] However, as this is a developing field, there is less evidence regarding the impact of physical activity for populations with SCD and/or MCI than for cognitively healthy older adults. As a result, our guideline recommendations are limited by the current gaps in the literature.

Our review of the literature published since 2000 revealed 24 RCTs, one quasi-experimental study and 16 observational studies in SCD and MCI populations, which informed recommendations 1, 2 and 4. There is currently a paucity of research regarding the impact of physical activity on the risk of falls in the SCD and MCI population; however, there is evidence that individuals with SCD and MCI are at increased risk of falls compared with cognitively healthy older adults.[12] As a result, recommendation 3 reflected evidence extrapolated from the Canadian guidelines, which are based on evidence that physical activity can reduce the risk of falls in older adults without SCD or MCI.[13]

One limitation affecting the evidence supporting our guidelines is related to methodological issues in many RCTs. These methodological issues include limited sample size; short duration of the physical activity intervention; short term follow-up after the intervention; participant selection bias; limitations in randomisation, concealment of allocation and blinding; high attrition rate; and not dealing with missing data. Further, some RCTs did not conduct an intention to treat analysis or perform the intention to treat analysis by excluding randomly allocated participants. For these reasons we rated some RCTs as level-2 quality. Within the level-1 quality RCTs, we observed inconsistencies in evidence for different cognitive domains. In the field of cognitive health research, it is unlikely that an intervention can improve all cognitive outcomes, particularly, as different cognitive outcomes are measured using different cognitive tests with different sensitivity to change. To this end, while a number of RCTs conducted comprehensive cognitive evaluation, others assessed outcomes on only specific cognitive domains using different cognitive tests (eg, executive function was assessed using the Stroop test, Trails B test etc), and memory was measured using delayed and immediate recall.[13] In future, developing consistent cognitive outcome measures will facilitate pooling of data in meta-analyses.[3]

In the current SCD and MCI literature, there is a major focus on cognitive health outcomes compared with other health outcomes such as physical health, mental health and quality of life. To provide strong evidence about the overall health and wellbeing benefits of physical activity for older adults with MCI or SCD, a broad range of health outcomes should be investigated in future research. Concerns associated with the reliability and validity of the measures of physical activity and health outcomes are also worth noting. First, self-reported physical activity information was

frequently used, potentially leading to some degree of measurement error. Second, some studies used objective physical activity measurement technology that did not capture all aspects of physical activity (eg, a pedometer can capture the number of steps but cannot measure the duration, intensity or frequency of physical activity), which suggests that subjective and objective measures should complement rather than replace each other. In addition, the current SCD and MCI research rarely involves low income and ethnic minority populations. It is important for future research to include these populations so this additional evidence can inform the development of more inclusive physical activity guidelines for older populations with MCI or SCD.[3]

Lastly, while there are numerous benefits for undertaking physical activity, it is only one component of a healthy lifestyle. Physical activity most likely interacts with other positive lifestyle factors or behaviour, such as a healthy diet, not smoking, moderate alcohol intake and quality of sleep. Some large lifestyle-based multimodal intervention trials that target individuals at increased risk of dementia have been or are being undertaken in several places, including Finland (Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability [FINGER]) (2009–2018), France (Multidomain Alzheimer Preventive Trial [MAPT]) (2008–2014), the Netherlands (Prevention of Dementia by Intensive Vascular Care [PreDIVA]) (2006–2013), Europe (Healthy Ageing Through Internet Counselling in the Elderly [HATICE]) (2007–2013), and Australia (Maintain Your Brain) (2018–2021).[4,14,15] Should similar large scale multimodal intervention trials involving older adults with MCI or SCD be conducted, the findings could potentially inform the development of more comprehensive guidelines that recommend a healthy lifestyle beyond physical activity for the older population with MCI or SCD.

Conclusion

Overall, existing physical activity research has provided some evidence about the benefits of physical activity for older adults with MCI or SCD, which led us to develop the world first physical activity guidelines for this specific older population. Given the limitations of the current evidence, more well conducted, large scale RCTs and observational studies are needed. Research examining the effects of balance-related physical activity compared with other types of physical activity, such as aerobic exercise and resistance training, along with studies that explore the dose–response relationship of physical activity on cognitive outcomes appear particularly warranted. Potentially, the findings of such research could provide robust evidence about the type, frequency, intensity and duration of physical activity suitable for older adults with MCI or SCD and will be crucial for updating and enriching these first physical activity guidelines for this specific group of older adults.

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