Physical leisure activities and their role in preventing dementia: a systematic review
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CRD summary
The authors concluded that there was equivocal evidence that participation in physical leisure activities, during middle or later adult life, could prevent dementia. Due to the reliance on studies with weak designs, and uncertainties in the review process, the reliability of this conclusion is unclear.

Authors' objectives
To evaluate the role of physical leisure activities in preventing dementia in older adults.

Searching
Sixteen databases (listed in the paper) were searched up to October 2008 for all published and unpublished studies, written in English. The search terms were reported and the reference lists of retrieved papers were scanned to locate additional studies.

Study selection
All published studies of physical leisure activities that required active movement of the body were eligible for inclusion if they were for adults aged 60 years or older, who were living in the community or in residential care, and who did or did not have a clinical diagnosis of dementia. The eligible outcome was the presence or absence of dementia that was measured by cognitive function tests, mental examination scores, Diagnostic and Statistical Manual of mental disorders (DSM) classification, or other valid diagnostic tools for dementia.

The included studies were conducted in the USA, Sweden, Japan, Finland, France, China, Australia, and Canada. Most of them were of people living in the community, and some of them only included specific populations. The participant ages varied and the presence or absence of the preclinical stages of dementia was unclear. Most of the studies investigated physical leisure activities carried out in later life. A variety of methods were used to measure the participation in activity and the physical activity was not clearly defined, with various types of individual or group activity listed.

It appears that two reviewers screened studies for inclusion, with referral to a third reviewer where consensus could not be reached.

Assessment of study quality
The study quality was assessed using the Joanna Briggs Institute critical appraisal instrument, which assessed sample characteristics, selection bias, confounding factors, outcome measurement, follow-up, withdrawals, and statistical analysis. The maximum achievable score was nine.

Two independent reviewers carried out the quality assessment and disagreements were resolved by discussion, or by referral to a third reviewer.

Data extraction
The data were extracted to enable the presentation of odds ratios, relative risks, and hazard ratios, along with 95% confidence intervals. The study authors were contacted for further information, where necessary.

The number of reviewers who extracted the data was not reported.

Methods of synthesis
Studies were combined in a narrative synthesis and they were grouped into those of physical leisure activity participation in early and middle adulthood and those of participation in later adulthood.
Results of the review
Seventeen studies were included, with sample sizes ranging from 180 to 4,615. There were 15 cohort studies and two case-control studies. The quality of these studies was reported to be variable, with the majority scoring at least five out of nine. The average follow-up appeared to range from three to 36 years.

Early and middle adulthood: There was conflicting evidence to suggest that there was a protective effect of physical leisure activities in early and middle adulthood (five studies). Significant associations were found between: a diverse range of activities in early adulthood and Alzheimer's Disease (OR 2.67, 95% CI 1.85 to 3.85; one study; this result was unaltered in the adjustment for confounders); dementia and middle adulthood participation in light (OR 0.34, 95% CI 0.16 to 0.72) exercise (one study); and physical activity and dementia (OR 0.47, 95% CI 0.25 to 0.90) or Alzheimer's Disease (OR 0.35, 95% CI 0.16 to 0.80; one study). A further study suggested that walking (OR 0.4, 95% CI 0.2 to 0.8), gardening (OR 0.5, 95% CI 0.3 to 1.0), dancing (OR 0.1, 95% CI 0.2 to 0.9), and cycling (OR 0.1, 95% CI 0.0 to 1.0) were associated with a reduced risk of developing Alzheimer's Disease.

Late adulthood: Equivocal evidence was also revealed in the 12 studies of physical leisure activity participation in later life. Five of nine studies investigating group activities reported significant benefits, and six studies reported that individual activities, such as gardening, walking, travelling, and dancing might be beneficial in reducing the risk of dementia, Alzheimer's Disease, or both.

Authors’ conclusions
There was no conclusive evidence that participation in physical leisure activities, during middle or later adult life, could delay the onset of dementia. Some physical activities, such as gardening and walking, appeared to be more beneficial than others.

CRD commentary
This review addressed a clear research question and reported potentially reproducible inclusion criteria. A number of relevant databases were searched, and attempts were made to minimise publication bias. Language bias was a possibility, and the restriction of the analysis to published studies means that publication bias was also possible. An appropriate quality assessment tool was used to assess the included studies, and their variable quality was highlighted in the findings. Study selection and validity assessment were conducted with sufficient attempts to minimise error and bias, but similar attempts were not reported for the data extraction. The study characteristics were presented and their results were given in the full report.

Few studies provided the exercise frequency and intensity details and, where reported, various methods were used to diagnose and measure dementia. The number of patients and the extent of their dementia were unclear, and some participants might have been at the preclinical stage. These issues could reduce the generalisability and reliability of the findings. The authors acknowledged that there was limited information on withdrawals and losses to follow-up, which are important in long-term cohort studies. The method of synthesis was appropriate, given the wide variation between the included studies.

The authors’ conclusion reflected the limited evidence presented, but due to the reliance on studies with weaker designs and uncertainties in the review process, the reliability of this conclusion is unclear.

Implications of the review for practice and research
Practice: The authors stated that participation in physical leisure activities, during middle or later adult life, could neither be refuted nor recommended to prevent the onset of dementia.

Research: The authors stated that clinical studies (with appropriate sample sizes and follow-up) were needed to evaluate the causal association between participation in physical leisure activity and the risk of dementia. The classification of physical leisure activity should be standardised and specific research into the effects of different modes, frequencies, and intensities of activity should be conducted.
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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.