Critical Appraisal

Leisure activity and risk of dementia

Scrabble, anyone?

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Verghese J, Lipton RB, Katz MJ, Hall CB, Derby CA, Kuslansky G, et al. Leisure activities and the risk of dementia in the elderly. *N Engl J Med* 2003;348(25):2508-16.

Research question

Does participation in leisure activities reduce the risk of dementia in elderly patients?

Type of article and design

Prospective observational cohort study.

Relevance to family physicians

As of 1991, about 8% of the Canadian population aged 65 and older suffered from dementia; the condition accounted for 5.8% of Canada's total health care costs that year.[1] A recent Canadian study suggests there are 60 150 new cases of dementia each year in Canada.[2] The rate of dementia increases with age; its prevalence doubles every 5.1 years after age 65.[1,2] Women seem to be disproportionately affected, but this is because they live longer on average than men.

Participation in leisure activities has been associated with decreased risk of dementia, but the relationship remains unclear. Some think that such activities could provide a cognitive reserve that delays onset of dementia.[3,4] Is it participation in mental activities that lowers the risk of dementia or do elderly people simply drop out of leisure activities during the preclinical phase of dementia? This study sets out to explore this association.

Overview of study and outcomes

The study looked at 469 community-based, English-speaking subjects between 75 and 85 years old. At the start of the study, the cohort was largely middle class: 91% of participants were white, and most (64%) were female.

Exclusion criteria were severe visual or hearing impairment; previous diagnoses of Parkinson's disease, liver disease, or alcoholism; or known terminal illness. All subjects were screened to rule out dementia at baseline using the Blessed Information Memory Concentration Test (Blessed), available on the Alzheimer Society of Canada website **(www.alzheimer.ca)**.

The study ran for the 21-year period between 1980 and 2001; median follow-up time was 5.1 years. Subjects underwent detailed clinical and neuropsychologic evaluations at enrolment and at follow-up visits every 12 to 18 months.

Leisure activities received a cognitive-activity score based on six mental activities (reading, writing for pleasure, crossword puzzles, board or card games, organized group discussions, and playing musical instruments) and frequency of participation in each. A similar physical-activity score was based on frequency of participation in 11 activities, including dancing, walking, and housework.

Several neuropsychologic tests were used to flag dementia, and case conferences with neurologists and neuropsychologists not involved in the study were held to objectively diagnose people with dementia according to DSM-III-R criteria.

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Primary analysis involved any association between cognitive and physical activities and risk of dementia and its subtypes, using Cox proportional-hazards regression analysis to estimate hazard ratios (HRs) with 95% confidence intervals (CIs). Secondary analyses examined the influence of baseline cognitive status and the possibility of preclinical dementia.

Results

During 2702 person-years of follow up, 124 people developed dementia: 61 had Alzheimer's dementia (AD), 30 had vascular dementia, 25 had mixed dementia, and eight had other kinds of dementia.

When the cohort was divided into thirds according to cognitive-activity or physical-activity scores, there were no significant differences in follow-up times. Generally, subjects who developed dementia were older, had less education, and had significantly lower cognitive-activity scores, but similar physical-activity scores.

Leisure activities. Among cognitive activities, reading, board games, and playing musical instruments were all associated with decreased risk of dementia. Dancing was the only physical activity associated with lower risk of dementia.

Cognitive-activity score. This was modeled as a continuous variable; the HR for a 1-point increment in this score was 0.93 (95% CI 0.89 to 0.96). Participation in cognitive activities was associated with decreased risk of AD (HR 0.93), vascular dementia (HR 0.92), and mixed dementia (HR 0.87). Risk reduction was related to frequency of participation (eg, a person who did crossword puzzles 4 days a week had a 47% lower risk of dementia than someone who did them only once a week).

Adjustment for baseline score in the Blessed test did not affect the association, nor did adjustment for intellectual status (HR 0.92, 95% CI 0.87 to 0.97) or analyses of the 361 subjects with high school education or less (HR 0.94, 95% CI 0.91 to 0.98).

The association between cognitive activity and risk of dementia remained robust even after adjustment for potential confounders, such as age, sex, education level, chronic medical illness, and baseline cognitive status.

Analysis of methodology

This observational prospective cohort study was not controlled. The presence of potential confounders makes it impossible to establish causality between leisure activities and incidence of dementia.

It was recognized that preclinical dementia might diminish participation in leisure activities and lead to overestimation of its protective influence. Care was taken to follow patients methodically with neuropsychologic testing and thorough review at case conferences to arrive at objective diagnoses of dementia. The association between baseline cognitive activity scores and dementia was significant even after exclusion of 94 subjects in whom dementia was diagnosed in the first 7 years of enrolment (HR 0.94, 95% CI 0.88 to 0.99): the typical length of time during which the authors report an accelerated decline in memory before dementia is diagnosed. The association did not hold at the 9-year mark, however, even though only 19 additional cases of dementia were diagnosed in the interim.

The study had limitations. Subjects were all volunteers, and white people and people older than 75 were overrepresented, thus limiting generalizability of results.

Application to clinical practice

In spite of its limitations, this study remains important for many reasons. First, it confirms the widespread belief that there is a correlation between leisure activities and risk of dementia. Second,

the relationship was consistent and robust even after adjustment for covariables such as age, education, and intellectual status. Also important, the study identified particular activities, such as crossword puzzles, reading, and playing musical instruments, as potentially protective, particularly when done frequently. Last, this study shows a relationship between cognitive activities and decreased risk of all types of dementia.

Despite the magnitude and consistency of the associations, however, further controlled trials are needed to establish causality. Given the burden of dementia in today's aging society, this is an important area of investigation.

Bottom line

- Leisure activities, such as reading, doing crossword puzzles, and playing musical instruments, were associated with decreased risk of dementia.
- A 1-point increment in cognitive-activity score was significantly associated with a reduction in risk of dementia (HR 0.93, 95% CI, 0.89 to 0.96), although the same change in physical-activity score was not (HR 1.00).
- The association between cognitive-activity score and risk of dementia persisted even after exclusion of patients who could have had preclinical dementia at baseline.
- Further controlled trials are needed to establish causality.

Acknowledgment

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Points saillants

- Les activités de loisir, comme la lecture, les mots croisés et jouer d'un instrument de musique, étaient associées à une réduction du risque de démence.
- Une augmentation d'un point dans le score de l'activité cognitive était étroitement associée à une réduction du risque de démence (taux de risque 0,93, IC à 95%, 0,89 à 0,96), mais un même changement dans le score de l'activité physique ne l'était pas (taux de risque 1,00).
- L'association entre le score de l'activité cognitive et le risque de démence persistait même après l'exclusion des patients qui pourraient avoir souffert d'une démence préclinique comme point de référence.
- D'autres études contrôlées sont nécessaires pour établir la causalité.

References

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4. Wang HX, Karp A, Winblad B, Fratiglioni L. Late-life engagement in social and leisure activities is associated with a decreased risk of dementia: a longitudinal study from the Kungsholmen project. *Am J Epidemiol* 2002;155(12):1081-7.

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