UNIVERSITY of MARYLAND
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The Impact of Aerobic Exercise on Cognition among Older Adults with Dementia

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Background & Significance

Dementia is a major neurocognitive disorder, according to the DSM-5, that entails substantial impairment in an individual's cognitive domain due to physical changes in the brain.[1] Cognitive functioning is a process in the brain that allows learning, memory, and making judgements. Cognitive decline involves a disruption in this process where the person becomes confused and has memory loss.[2] This is not a normal sign of aging, although approximately one third of adults over ages 85 years have some form of dementia.[3] There are over 55 million people worldwide who are diagnosed with dementia and the number is increasing by approximately ten million cases each year.[4] This a major public policy issue as the baby boomer population is aging with a 75% increase of the number of people over the age 65 years from 2010 to 2030.[5] Currently, the 2018 Dementia Care Practice Recommendations include building a nurturing relationship, creating a supportive environment, and developing a routine.[6]

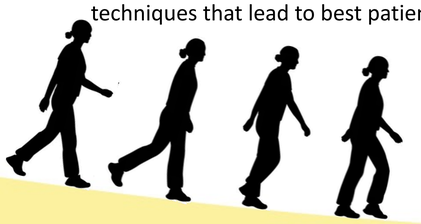
According to the World Health Organization, healthy aging is when the person can live a long and healthy life.[4] Genetic and environmental factors such as family history, smoking, food, and pollution affect one's healthy life and cognition as they age. It can be supported through nutrition, physical and social activity, and brain stimulation.[3] Physical activity is beneficial to manage weight, strengthen bone and muscles, and lower the risk of diseases that can affect cognitive decline. Specifically, aerobic exercise increases oxygen levels to vital tissues including the heart and brain.

Objectives

The purpose of this project was to systematically analyze prevailing literature on the effectiveness of aerobic exercise on decreasing the progression of cognitive decline in older adults who have a history of dementia.

Clinical Nurse Leader Role

- **Advocate**: serve as an advocate to policymakers to protect and provide benefits for those with dementia and their caretakers.
- **Clinician**: integrate interdisciplinary team members to create optimal care plans that are best for the patients by incorporating everyone's expertise.
- **Educator**: facilitate continuous learning on current practice and policies.
- **Researcher**: implement evidence-based practice to ensure patients receive updated care that renders the most benefits. They promote research, monitor trends, and create innovative techniques that lead to best patient outcomes.



Methods

PICO Question: In older patients with a history of dementia, does the promotion of aerobic exercise decrease the progression of cognitive decline?

Database: PubMed
Keywords: "cognitive decline" AND "adults" AND "dementia" AND "aerobic exercise"
Volume: 121
Limitations: published within 2016 to 2023, randomized control trials**,** peer reviewed, and English language
Inclusion Criteria: older adults diagnosed with dementia who are physically capable to perform simple exercises independently
Rejections: reviews, protocols, non-experimental studies, and guidelines

Evidence Review

Authors, Year	Level of Evidence & Quality Rating	Sample Size (n)	Intervention	Results
Karssemeijer et al., 2019	1B	100	Cycling with and without a digital environment	Statistical significance in improving psychomotor speed with cycling after 12 months. No significant findings in executive functioning and memory.[7]
Lamb et al., 2018	1A	418	Combination of walking, cycling, sit to stand, and bicep curls	Statistical significance in cognitive functioning with combined aerobic exercise after 12 months.[8]
Morris et al., 2017	1A	68	Individualized aerobic exercise with personalized trainers	No significant findings between aerobic exercise and flexibility exercises/strength training for improving cognitive functioning after 26 weeks.[9]
Sanders et al., 2020	1A	69	Combination of walking and lower body strength training	No significant findings between aerobic exercise and flexibility training/recreational activities for improving cognitive functioning after 24 weeks.[10]
Yu et al., 2021	1A	71	Cycling	No significant findings between aerobic exercise and range of motion activities for improving cognitive functioning after 12 months.[11]

Summary & Conclusions

- All the studies used different combinations of aerobic activities: walking, cycling, and personalized training.
- To measure the improvement of cognitive functioning , the researchers utilized a series of instruments and scales that represented different domains of cognition.
- Only one article supported that aerobic exercise had a positive impact of cognitive functioning among older adults living with dementia.
- Four articles did not demonstrate a statistically significant improvement in cognition for individuals living with dementia following engagement in aerobic activity.
- Further research is recommended to determine the need for practice change.

Implications for Nursing Practice

No implication for change in current practice as further research required to determine the benefits of aerobic exercise on cognitive functioning.

Considerations for Further Research:

- Incorporate a large sample size
- Plan for full supervision of interventions to increase fidelity
- Include a variety of aerobic exercises for adults limited to disability
- Conduct the experiment prior to the onset of dementia to evaluate mild cognitive impairment
- Utilize sensitive scales that can account for minor changes in cognitive functioning
- Include follow ups after the intervention period has ended to measure the long-term effects

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