

## PHYSICAL ACTIVITY IN DEMENTIA PREVENTION

### AKTYWNOŚĆ FIZYCZNA W PROFILAKTYCE DEMENCJI

**Paulina Karp**<sup>1(A,B,D,E)</sup>, **Mateusz Gabryszewski**<sup>1(C,D,E)</sup>, **Katarzyna Karp**<sup>1(B,E,F)</sup>

<sup>1</sup>Medical University of Lodz, Poland

#### Authors' contribution

##### Wkład autorów:

- A. Study design/planning zaplanowanie badań
- B. Data collection/entry zebranie danych
- C. Data analysis/statistics dane – analiza i statystyki
- D. Data interpretation interpretacja danych
- E. Preparation of manuscript przygotowanie artykułu
- F. Literature analysis/search wyszukiwanie i analiza literatury
- G. Funds collection zebranie funduszy

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#### Dear Editor,

We read with great interest the paper by Yamasaki [1], published in "Brain Sciences". In this article, the author described the cognitive effects of physical activity and exercise in healthy seniors and patients suffering from mild cognitive impairment and dementia. In our opinion, this article highlights the very important issue of physical activity in preventing dementia, which is the seventh disorder causing death and one of the main causes of seniors' disability and dependency [2,3].

Dementia is an umbrella term used to describe several disorders that lead to memory loss, thinking difficulties and trouble with performing daily activities. Vascular injury, neurodegeneration, nutritional and metabolic disorders are some major causes of dementia [4]. Approximately 55 million people suffer from dementia worldwide. Currently known risk factors for dementia are: age, hypertension, diabetes mellitus, obesity, smoking, alcohol abuse, physical inactivity, low levels of education, hearing loss, traumatic brain injury, social isolation and depression. Modifying risk factors is crucial because it may prevent up to 40% of dementia cases [1-3].

According to Yamasaki [1], possible mechanisms of the impact of physical activity on improving cognitive functions and preventing dementia are: improvement in cardiovascular factors, increased expression of neurotrophic factors (e.g. BDNF, IGF-1), increased amyloid- $\beta$  turnover, increased cerebrovascular blood flow, reduction of neuroinflammation [5].

The meta-analysis conducted by Iso-Markku et al. [5] found that as levels of physical activity increase, the incidence of general dementia and Alzheimer's disease decreases, even in studies with follow-up periods longer than 20 years. In Yamasaki's work [1], it was shown that there is some difference between two types of physical exercise: open-skill exercise (OSE) and closed-skill exercise (CSE) as a prevention of cognitive loss. OSE includes motor activities related to active decision-making in an unpredictable environment. In sports disciplines based on OSE activity, players must

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**Address for correspondence / Adres korespondencyjny:** Paulina Karp, Medical University of Lodz, Kościuszki 4, 90-419 Lodz, Poland, e-mail: paulina.karp@stud.umed.lodz.pl, phone: +48 786911969.

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change their reactions to randomly appearing external stimuli. Physical activities based on OSE include table tennis, basketball and volleyball. Conversely CSE involve motor activities in a relatively stable and predictable environment in which movements are performed according to established patterns e.g. swimming, running and cycling. It has been shown that OSE may be more effective at maintaining cognitive function than CSE. The superiority of OSE in maintaining cognitive function may be attributable to the greater cognitive engagement required to perform OSE activities. The author points to the exceptionally beneficial effect of regular table tennis playing, which can induce neuroplastic changes in the brain, leading to improved sensorimotor and executive functions and preventing age-related deterioration of cognitive functions and dementia. Moreover, it is an inexpensive, easy-to-play OSE that involves variable intensity of aerobic exercises.

Since there is currently no effective treatment for dementia, it is very important to develop optimal, non-pharmaceutical, preventive interventions. Physical activity and exercise are low-cost and easy to implement, so they can be very successful interventions for maintaining high levels of cognitive function.

**References:**

1. Yamasaki T. Preventive strategies for cognitive decline and dementia: benefits of aerobic physical activity, especially open-skill exercise. *Brain Sci.* 2023; 13(3): 521. <https://doi.org/10.3390/brainsci13030521>
2. World Health Organization. Dementia [Internet]. Geneva: WHO; 2023 March 15 [access 2024 March 25]. Available from: <https://www.who.int/en/news-room/fact-sheets/detail/dementia>
3. Livingston G, Huntley J, Sommerlad A, Ames D, Ballard C, Banerjee S, et al. Dementia prevention, intervention, and care: 2020 report of the Lancet Commission. *Lancet.* 2020; 396(10248): 413-446. [https://doi.org/10.1016/S0140-6736\(20\)30367-6](https://doi.org/10.1016/S0140-6736(20)30367-6)
4. Gale SA, Acar D, Daffner KR. Dementia. *Am J Med.* 2018; 131(10): 1161-1169. <https://doi.org/10.1016/j.amjmed.2018.01.022>
5. Iso-Markku P, Kujala UM, Knittle K, Polet J, Vuoksimaa E, Waller K. Physical activity as a protective factor for dementia and Alzheimer's disease: systematic review, meta-analysis and quality assessment of cohort and case-control studies. *Br J Sports Med.* 2022; 56(12): 701-709. <https://doi.org/10.1136/bjsports-2021-104981>