

Effects of Physical Activity on Cognitive Abilities of Dementia Person



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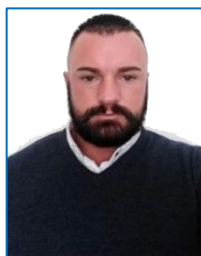
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Abstract: The concept of dementia is associated with cognitive changes, behavioral changes, as well as daily motor actions and life functions. The association of physical activity with dementia is a controversial topic in science and is always an interesting basis for discussion among researchers. Moderate PA can be an effective means of reducing the rate of dementia as well as behavioral problems, however caution should be approached when working with this group of people, especially when setting end goals. Given the division of dementia, each person needs to be approached individually and appropriate selection made. The contribution of PA is irreplaceable compared to any type of therapeutic treatment, it improves basic life functions, reduces the mortality rate and improves the quality of life.

Keywords: Alzheimer's, Exercise, Older people, Brain health, Prevalence, QOL



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1. Introduction

Physical activity (PA) provides great opportunities for improving and preserving health, including reducing the risk of various diseases and improving functional abilities [1] associated with poorer mental, physical and social health [2-6]. Physical activity (PA) is a very important segment in health care and development [7]. Research shows that increasing

PA provides comprehensive health benefits and reduces mortality associated with any cause, regardless of body mass index [8]. Physical inactivity was considered a global health problem of one nation. PA has positive relationships with health and life expectancy [9, 10]. More than half of respondents who start any of the exercise programs to increase physical activity stop within a few months [11]. In this case, it is necessary to pay much more attention when motivating. PA has a positive effect on perception, concentration [12] and self-esteem [13-15], while simultaneously reducing anxiety and stress [16, 17]. It has a preventive and therapeutic effect on several diseases and conditions and contributes to the quality of life in many ways [18-20]. Epidemiological studies are increasingly proving that PA and exercise can prolong the onset of dementia, and reduce the progression of this condition when it comes to people over the age of 60. There is growing evidence from epidemiological studies that a history of exercise or physical activity may delay the onset and progression of dementia in older adults [21, 22]. Most of the research conducted to examine the effects of PA on people with dementia includes a sample taken from nursing homes [23, 24], but this population lacks room for PA, which greatly exacerbates the decline in physical fitness [25]. The aforementioned physical readiness is a very important factor in many activities such as walking, climbing stairs and simpler activities such as getting up, performing basic hygiene and the like [26]. Longitudinal studies of surveyed men and women, the results indicate that the mortality rate of people with dementia is significantly lower compared to the sedentary population [27]. Also, some of the studies with a large sample of respondents point out that PA can reduce the degree of dementia by 28% [28]. The aim of the study was to highlight the positive effects of PA on the cognitive abilities of people with dementia.

2. Classification and Diagnosis of Dementia

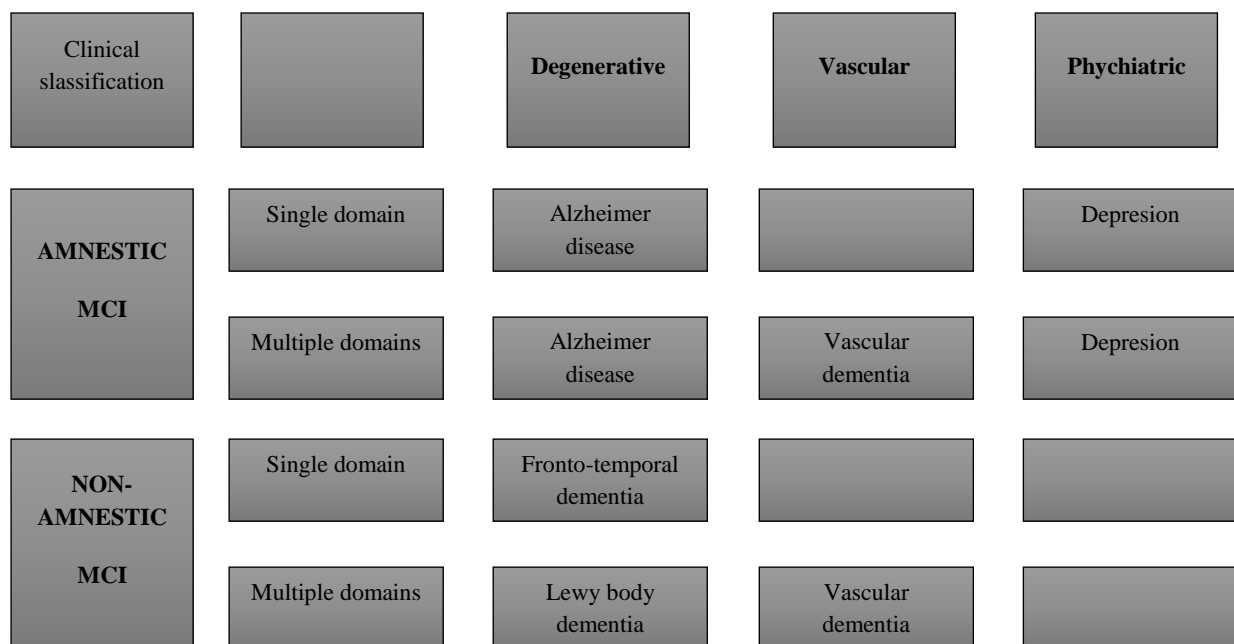
Alzheimer's (AD) accounts for the highest percentage of this disease, up to 80% [29]. Aging is the highest risk factor for dementia, the percentage is as much as 90-98% of people over 65 with some type of dementia or certain cognitive impairment [30, 31]. The primary term "dementia" is divided into four output types of dementia: Alzheimer's, Vascular dementia, Levi's, and Frontotemporal dementia [32]. AD is the most common form of dementia. It is formed

by the deposition of beta-amyloid plaques, with the center in the entorial cortex and hypothalamus, and this causes neuronal damage, followed by total neuronal destruction. By spreading to other parts of the brain, other neural units are destroyed and the disease itself worsens [33]. The types of this disease can be cognitive (loss of memory, loss of objects, etc.) and non-cognitive (depression, aggression, hallucinations, etc.). This type of dementia in the final stages leads to the impossibility of movement, tracking objects, deep delirium, etc. [34, 35]. Vascular dementia is becoming more common, especially due to a sedentary lifestyle, and is caused by a reduced supply of oxygen to the brain. In addition to the most common symptom, stroke, very common disorders are: confusion, depression, poor speech power and the like. Detailed view on *Figures 1.* - mild cognitive impairment. Similar to AD, Levi's dementia is caused by the formation of alpha-synuclein protein deposits. Patients have a problem with attention, alertness, frequent "staring" at certain objects [36]. Frontotemporal dementia most often occurs at a younger age (starting at the age of 40). The most common symptoms of this type of dementia are personality changes and behavioral disorders. This type of dementia affects the frontal and temporal lobes of the brain [37]. Patients with dementia, they have a significant reduction in the ability to remember, but also a significantly reduced insight into this issue. Due to the characteristics of the disease itself and the previous allegation, patients very rarely come for an

examination on their own initiative. Patient in the initial stages it quickly forgets some of the information, such as names, dates, days and the like. With the development of the disease itself, especially if it is a type of AD, the patient can forget certain events, situations, even information and actions that are of vital importance. By visiting a doctor, it is characteristic that the doctor asks for a certain amount of information from the patient and confirmation from a close family member, so that he can diagnose the severity of the condition and determine further treatment.

3. FA and Dementia

The clinical syndrome, which is characterized by cognitive changes, major changes in behavior, problems in motor activities and everyday life functions, is related to the concept of dementia, ie. dementia [38]. Some of the authors estimate that by 2030 the number of people with dementia will be around 65.7 million [39], however, according to the WHO [19], that number is significantly higher and amounts to around 82 million people with dementia. Since there are still no drugs available for this type of disease, physical activity (PA) is the best means of controlling and rehabilitating people with dementia [40, 41] because other alternatives such therapies often lead to side effects and changes in the behavior of patients [42].



Figures 1. Mild cognitive impairment

Exercising PA can have a positive effect on pathogenic by-products that negatively affect a person's behavior [43, 44], also, PA affects the improvement of basic motor functions such as walking, balance, which are otherwise significantly impaired. this disease [45]. Various studies suggest that PA and exercise may to some extent improve cognitive performance in patients with dementia, but it is still unclear which exercise frequency, intensity, time, and type of exercise may better influence cognition improvement in the elderly and adults diagnosed with dementia [46]. Some research points out that exercise plays a significant role in the treatment of people with dementia, however, great caution is emphasized due to the heterogeneity of groups, small number of subjects and other disturbing factors influencing the significance of findings [47, 48]. Taking into account previous findings, PA has a positive effect on reducing risk factors and in addition slows the development of dementia [49, 50]. People who engage in some form of physical activity almost twice reduce their risk of developing AD, from people who belong to an inactive group [28, 51]. PA should be started in a timely manner in middle age and thus prevent cognitive difficulties and further impairment that would lead to mental and physical changes in the elderly [52]. A large number of authors advise to practice PA type aerobic exercise, walking, running, nordic walking, swimming, cycling, dancing and thus maintain a high degree of cognition [53- 56]. It is concluded that PA has many benefits for people with dementia, however, PA must be individually tailored to the person's mental state and physical abilities [57]. Also a very important factor is achieving good communication due to speech difficulties associated with the disease, understanding of certain requirements, impaired memory, and other difficulties [58].

4. Research and Exercise Recommendations

The aim of one study was to examine whether any physical or cognitive recreational activity affects mental activity. The study lasted 21 years and included 469 respondents older than 75 years. According to this study [59], the percentages in which certain mental and physical activities reduce the risk of developing dementia are: Cycling and swimming - 0% reduced risk; Playing golf - 0% reduced risk; Reading books - reduces risk by 35% Solving memory games (crossword puzzles, sudoku) at least 4 times a week -

by 47%; Frequent dancing - by 76%. In the study [60], an intensive program of strength and balance exercises was conducted, while the subjects of the control group performed light activities of light intensity in a sitting position. The results of the study indicate that the intervention group improved the score on the balance test by an average of 2, 9 points after the intervention, while the control group deteriorated. In the study [61], a customized yoga program was conducted in small groups 3 times a week for 12 weeks, the control group did not have any kind of activity. In the experimental group, observation was increased, depression decreased. This group had better physical and mental status than the control, including, lowered blood pressure, reduced respiratory rate, improved cardiopulmonary fitness, improved body flexibility, improved muscle strength and endurance, improved balance and increased range of motion in the joints. The study [62] included two experimental groups. First, a program of exercises for strength, balance and flexibility, and walking. Second, a supervised walking program. Symptoms of depression were alleviated in both groups.

Exercise recommendations: Exercise should be primarily aerobic in nature; It is desirable that the intensity of exercise be moderate (example: walking, stretching 15-20 minutes per mile); Exercise should last at least 30 minutes and be continuous (preferably every day); Gradually increase the amount of exercise, in order to improve the benefits and health benefits to the maximum; Apply light resistance exercises with additional load at least twice a week to encourage muscle strength and endurance.

5. Conclusion

Interventions for PA should have an individual approach in people with dementia. Moderate PA can be an effective means of reducing the rate of dementia as well as improving the cognitive abilities of people already suffering from this type of disease. The contribution of PA is irreplaceable compared to any type of therapeutic treatment, it improves basic life functions, reduces the mortality rate and improves the quality of life. PAs must fit into the daily lives of people with dementia, and with adequate training carefully set the ultimate goal so that people enjoy the activities and reap the best benefits. This study is expected to be an important step in highlighting the importance of PA to public health as well as patients in order to

reduce the prevalence of this type of disease in the future.

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Authors Contribution

Bojan Bjelica and Nikola Aksović, were included in the study design, literature research and manuscript writing; Laishram Santosh Singh were included in conceptualization, study findings interpretation and manuscript writing; Ljubica Milanović and Milan Zelenović were included in the study methodology design and formal analysis. All authors read and approved the final version of the manuscript.

Conflict of interest

The Authors have no conflicts of interest to declare that they are relevant to the content of this article.

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Yes

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