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Impact of physical activity on mental health in elderly population

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ABSTRACT

Introduction

Physical activity is an inseparable element of people's lives. It reduces risk of cardiovascular diseases, hypertension, helps maintain physical well-being as well as mental health. Exercise is especially crucial in adults aged over 65 as this population leads a more sedentary lifestyle.

Objective

This article aims to evaluate the impact of exercise on mental health in elderly population.

Methods

A Literature review of articles published in Pubmed between 2000 and 2024 using the following words "physical activity", "exercise", "mental health", "elderly population".

Results

Physical activity has an impact on physical as well as mental health. In elderly population it especially influences the latter. Recent studies have shown that it can reduce a risk of dementia, enhance cognitive performance and improve social life by creating a stronger community and social network.

Conclusion

Physical activity is one of the crucial elements of overall well-being. It is particularly important in elderly population in maintaining mental health. It enhances cognition, reduces risk of dementia and improves social life.

Keywords: physical activity, exercise, mental health, elderly population

Introduction

Physical activity (PA) plays a crucial role in people's lives. It reduces the risk of cardiovascular disease mortality, incidence of hypertension, type-2 diabetes, falls as well as improves mental, cognitive health and sleep (Strain et al. 2024). Lack of exercise has recently been regarded as a global pandemic, leading as a fourth cause of death worldwide and having far-reaching health, economic, environmental and social consequences (Kohl et al. 2012). Physical inactivity can pose a greater risk of developing hypertension, type 2 diabetes and coronary artery disease. Also, it can add to feelings of anxiety, depression and increase risk of falls especially among elderly population (Booth, Roberts, and Laye 2012; Cunningham et al. 2020a).

Given that many of the diseases mentioned above are seen in adults over 65 years of age, physical activity can play a strong part in their overall wellness (Mattiuzzi and Lippi 2020). Moreover, it can slow down decline in quality of life among older population in the long run (Groessl et al. 2019).

WHO guidelines recommend adults aged over 65 at lest 150-300 -minutes of moderate-intensity aerobic training or 75-150 minutes of vigorous-intensity exercises per week ('WHO Guidelines on Physical Activity and Sedentary Behaviour', n.d.). Recent systematic review shows that 2,4% to 83% of older adults meet this criteria, with most studies reporting a prevalence of 20-60% (Sun et al2013).

Another important aspect, are aging societies- a trend observed globally ('World Social Report 2023: Leaving No One Behind In An Ageing World | DESA Publications' 2023). Recent report from Central Statistical Office has shown a rise in number of adults aged over 60 in Poland ('Sytuacja_osob_starszych_w_polsce_w_2022_r.Pdf', n.d.).

Taking all those factors into consideration, one can pose a question what role does physical activity play in elderly population's lives? Apart from physical health benefits, exercise also impacts mental health (Booth, Roberts, and Laye 2012; Cunningham et al. 2020a). This review aims to investigate the impact of physical activity on mental health in elderly population.

WHO guidelines on physical activity for adults aged over 65

Recently, World Health Organisation has introduced recommendations on physical activity for adults ('WHO Guidelines on Physical Activity and Sedentary Behaviour', n.d.). It has especially included guidelines for adults over 65, which is considered an elderly population (Singh and Bajorek. 2014). The main message from the recommendations is that any activity is better than none. Moreover, everyday activities, transportaion and leaisure are considered an exercise in this population.

It is recommended that elderly should engage in physical activities regularly and perform at least 150–300 minutes of moderate-intensity aerobic physical activity, 75–150 minutes of vigorous-intensity aerobic physical activity or a mix of the mentioned above. Additional health benefits could be gained by muscle strenghtening excercises that focus on major muscle group.

Another association between physical activity and health related outcomes is a risk of falls and falls related injuries among elderly population ('WHO Guidelines on Physical Activity and Sedentary Behaviour', n.d.). According to WHO report around 28-35% of people aged of 65 and over fall each year increasing to 32-42% for those over 70 years of age ('WHO Global Report on Falls Prevention in Older Age', n.d.). To prevent and reduce risk of these injuries, particularly multicomponent physical activity programs, which include combinations of balance, strength, endurance, gait, and physical function training play role in reducing the rate of falls and fall-related risks of injurie in older adults (Sherrington et al. 2019; 'Physical Activity Guidelines Advisory Committee. 2018 Physical Activity Guidelines Advisory Committee Scientific Report. Washington, DC: US Department of Health and Human Services; 2018.', n.d.).

Guidelines also mention recommendations for sedentary behavior. The amount of time spent being sedentary should be limited and replaced with exercise of any intensity. Moreover, if one wants to reduce the negative consequences of sedentary lifestyle, adults should aim to do more than recommended levels of exercise ('WHO Guidelines on Physical Activity and Sedentary Behaviour', n.d.).

State of physical activity among elderly population

The World Health Organization (WHO) states that physical inactivity is the 4th leading cause of death worldwide. A 2019 study by Poland's Central Statistical Office (GUS) revealed

that roughly 45% of people aged 65-74 engage in regular physical activity, but this figure declines to about 20% for those aged 75 and older.

Eurostat's 2020 report indicated that around 50% of people aged 65-74 in the European Union regularly engage in some form of physical exercise, such as walking. Over the age of 75, this number significantly decreases, with only about 30% of older adults maintaining regular physical activity.

Older women tend to be less physically active than men. WHO data shows that about 32% of women over 60 are inactive, compared to 29% of men. In the European Union, men aged 65-74 are more active (54%) than women in the same age group (47%).

Current recommendations for physical activity in people over 65 according to WHO state that all older adults should engage in regular physical activity. They should aim for at least 150–300 minutes of moderate-intensity aerobic activity, 75–150 minutes of vigorous-intensity aerobic activity, or a combination of both throughout the week to achieve significant health benefits (‘WHO Guidelines on Physical Activity and Sedentary Behaviour’, n.d.).

The WHO's 2020 report highlights that around 31% of people aged 60 and older worldwide do not meet these physical activity guidelines.

Customized physical activity is essential for the elderly to prevent diseases, as limited movement and disabilities can impede the recovery process (Rottermund, Knapik, and Szyszka 2015).

Walking and brisk walking are some of the easiest and most advantageous exercises, particularly for the elderly. Nordic walking is gaining popularity in Poland. This sport requires no special training facilities or expensive gear. It is a safe and simple form of exercise, especially recommended for seniors (‘M. Saulicz, E. Saulicz, A. Knapik, M. Mędrek, J. Rottermund, Wpływ 4-Tygodniowego Programu Treningowego Nordic Walking Na Sprawność Fizyczną Osób w Wieku Średnim, w: M. Kosińska, L. Niebrój (Red.), Fizjoterapia: Nowe Potrzeby – Nowe Możliwości, Katowice 2010, s. 163–168’, n.d.).

Strong evidence indicates that engaging in physical activity in older age is linked to improved mental health. Physical activity is associated with increased optimism, life satisfaction, positive emotions, and mental well-being in older adults who live alone.

Additionally multiple studies have demonstrated that physical activity lowers the risk of depression in seniors (Foong et al. 2021).

Examples of physical activities for elderly

Physical activity levels should always be tailored to each patient, considering their age, comorbidities, disabilities, or baseline functional level. Reviewing the practical evaluation of physical inactivity in a clinical setting can help improve provider awareness and enhance our ability to prescribe appropriate interventions.

What are the most popular appropriate types of physical activity for elderly?

Riding a bike is an excellent form of exercise for seniors, offering numerous health benefits. It provides a low-impact cardiovascular workout that is gentle on the joints, making it particularly suitable for older adults with arthritis or other joint issues. Regular cycling improves cardiovascular fitness, increases muscle strength, and enhances flexibility and balance, which can help prevent falls. This activity can be easily adapted to individual fitness levels and health conditions. Additionally, cycling positively impacts mental health by reducing stress, anxiety, and depression, while also promoting a sense of independence and well-being (Albrecht et al. 2023).

Pilates, developed a century ago, is a widely favored low-impact exercise. It focuses on breathing, alignment, concentration, and core strength, usually incorporating mats, Pilates balls, and other inflatable accessories to build strength without the strain of high-impact exercises. Pilates has proven effective in enhancing balance, core strength, and flexibility in older adults.

Strength training offers many benefits for seniors, such as maintaining muscle mass, improving bone density, and enhancing overall physical fitness. As people age, they naturally lose muscle mass, which can lead to weakness and an increased risk of falls and fractures. Strength training helps prevent this by stimulating muscle growth and strengthening bones, thereby reducing the risk of osteoporosis. Additionally, it improves joint health, flexibility, and balance, leading to better mobility and greater independence (Farinha et al. 2021).

Water-based workouts offer several benefits for seniors. Swimming delivers a full-body workout, enhances cardiovascular health, and is gentle on the joints. The warm water in pools

can relax muscles and joints. Water aerobics is another popular exercise among seniors. The natural resistance of water removes the need for weights in strength training. Water aerobics exercises boost strength, flexibility, and balance with minimal strain on the body.

Walking is one of the most accessible and low-stress forms of exercise. Since walking can be more challenging for some seniors than others, individual goals for distance and steps vary. While 10,000 steps per day are generally recommended for a healthy lifestyle, those with walking difficulties or joint pain might aim for a lower step count. Walking supports a healthy lifestyle and helps strengthen muscles (Pereira et al. 2022).

Instruments for measuring physical activity among elderly

Physical activity measures can be broadly classified as either subjective or objective measures. An example of a subjective instrument is a Physical Activity Scale for the Elderly (PASE), which is an easily scored, reliable and valid instrument measuring the amount of physical activity in elderly population (Washburn et al. 1993). It is a 12-item self-administered document intended for individuals over the age of 65. The PASE assesses the types of activities typically chosen by older adults e.g. walking, recreational activities, exercise, housework, yard work, and caring for others. It uses frequency, duration, and intensity level of activity over the previous week to assign a score, ranging from 0 to 793, with higher scores indicating greater physical activity (Logan et al. 2013). This kind of measurement methods provides important information about the context in which physical activity occurs however it is open to significant biases including social-desirability bias, recall bias and often presents issues with reliability, evidence of validity and sensitivity to change (Falck et al. 2023).

Objective methods are often considered a more accurate and reliable measure of physical activity however they are more costly and require skillful administration and data interpretation. That kind of methods can also lead to inaccurate estimates due to mobility impairments such as slowed gait or non-wear time because the participant forgets to wear the device or because certain activities cannot be measured with some objective measures (Falck et al. 2023). Examples of objective instruments are: pedometers, accelerometers, heart rate monitors, multimodal sensors, calorimetry and doubly labeled water.

State of mental health in elderly population

Mental health among the elderly is a crucial concern affecting their overall well-being and quality of life. With aging, individuals encounter a range of physical, emotional, and social changes that can impact their mental health.

Data from the National Health Fund (NFZ) in Poland for 2018 reveals that people aged 65 and older represented about 15-20% of all patients seeking psychiatric consultations.

What are the biggest challenges facing modern geriatric psychiatry?

First and foremost, depression, anxiety disorders, dementia, and other cognitive disorders, as well as substance abuse, should be highlighted. A particular concern is the issue of medication misuse, which often originates from polypharmacy among the elderly population.

The decline in mental quality of life among seniors is influenced by many factors.

Several factors contribute to the deterioration of mental quality of life among seniors. Chronic illnesses can cause pain and limitations, leading to an increased risk of depression and anxiety. A key factor affecting the mental health of older adults is loneliness. This can result from the loss of loved ones due to the death of a spouse, diminished contact with children, and social isolation caused by reduced musculoskeletal function. Therefore, social support is crucial for maintaining mental health.

By 2030, it is projected that the number of people with mental disorders will double. Data indicates that approximately 15% of individuals aged 60 and older face mental health issues such as depression, anxiety, social isolation, or dementia. Among these, depression is one of the most prevalent mental health conditions in the elderly (Foong et al. 2021; ‘Mental Health of Older Adults’, n.d.).

Research indicates that older adults are especially at risk for mental health issues like depression, anxiety, and dementia. Highlighting again elements such as social isolation, loneliness, and physical health play a crucial role in affecting their mental well-being. Early intervention, social support, and effective treatment strategies can substantially enhance the quality of life for elderly individuals.

What is cognition?

Cognition involves the mental processes related to acquiring knowledge and understanding through thinking, experience, and the senses. It encompasses all aspects of intellectual functions and processes, such as perception, attention, thinking, imagination, intelligence, knowledge creation, memory and working memory, evaluation and judgment, reasoning and calculations, problem-solving and decision-making, as well as language comprehension and production (Dominguez et al. 2021).

What is dementia?

Dementia is a condition associated with many neurodegenerative diseases, characterized by a general decline in cognitive abilities, which affects a person's ability to perform everyday tasks. It typically involves problems with memory, thinking, behavior, and motor control. Besides memory and thinking impairments, the most common symptoms of dementia include emotional issues, language difficulties, and decreased motivation.

Dementia is a commonly encountered condition in older adults for which there are no definitive treatments. Increasing research emphasizes the importance of physical activity and exercise in preventing or slowing the progression of pathology and dementia-related issues. It is well known that older individuals who are more physically active can maintain cognitive functions for a longer period compared to those who lead a sedentary lifestyle (Dominguez et al. 2021; Cunningham et al. 2020b).

How does exercise improve cognition?

Exercise can improve cardiovascular function, increase blood flow and oxygen delivery to the brain, and enrich brain cells with nutrients. As a result, it helps maintain brain function and may delay or halt the progression of neurodegenerative processes and diseases.

It is emphasized that aerobic exercise is crucial for protecting the brain's cardiovascular system and has a direct impact on cognitive functions in older adults. Additionally, some studies suggest that specific aerobic exercise programs can improve cognitive abilities in older individuals to varying degrees.

It is suggested that resistance training may be beneficial for improving cognitive functions in older adults. Resistance exercises can stimulate muscle pumps by compressing

peripheral blood vessels, which leads to increased cardiac output and enhanced blood flow to the brain. Studies that included both aerobic and resistance training in traditional exercise programs have shown similar effects.

Common diagnostic criteria include the Modified Mini Mental State Examination (3MS), MMSE, the Diagnostic and Statistical Manual of Mental Disorders (DSM), and the International Classification of Diseases (ICD). Research indicates that regular physical activity may reduce the risk of developing dementia in healthy older adults.

Higher levels of physical activity are associated with a 14% to 21% reduction in the risk of dementia. Increased exercise intensity lowers the risk of all-cause dementia by 28%. Meanwhile, moderate-intensity physical activity reduces dementia risk by 24%.

In conclusion, physical activity and exercise are effective methods not only for improving cognitive functions but also for achieving better outcomes in other health aspects for individuals with mild cognitive impairment (MCI) and dementia. However, available research is still limited, and there is often a lack of integration with other non-pharmacological interventions, such as dietary changes. Therefore, we strongly recommend future intervention studies that better incorporate healthy lifestyle factors into the treatment and prevention of MCI and dementia (Xu et al. 2023).

How can physical activity improve the social life of elderly people?

Social communication is essential for human survival. Active participation in social life and interactions with others can significantly enhance an individual's quality of life. Although the primary goal of physical exercise is to improve health, physical activity also creates objective opportunities for social interactions. Individuals engaging in such activities often develop deep and meaningful relationships. Studies also indicate a connection between physical activity and social skills. Research on residents aged ≥50 years has shown that those who regularly engage in physical exercise are more likely to experience happiness. Participation in sports can expand an individual's social network, which supports the accumulation of social capital and the development of social skills. Research has demonstrated that community physical activity contributes to strengthening neighborhood bonds and improving social skills (Xu et al. 2023).

Impact of physical activity on other factors

Physical activity can also impact other areas of life such as quality of life (QoL). QoL can be assessed by various tools of which World Health Organization Quality of Life instrument, Short Form (WHOQOL-BREF) is one of the best-known (Băjenaru et al. 2022). WHOQOL-BREF covers four domains: Physical health, Psychological health, Social relationships and Environmental health ('WHOQOL Group . WHOQOL-BREF. Introduction, Administration, Scoring and Generic Version of the Assessment, Field Trial Version. Geneva: World Health Organisation; 1996', n.d.; 'Development of the World Health Organization WHOQOL-BREF Quality of Life Assessment. The WHOQOL Group' 1998). Recent study indicate that PA is consistently associated with the following QoL domains: functional capacity, autonomy, past, present, and future activities, intimacy, vitality, psychological and mental health. These associations suggest that PA helps promoting overall independence in elderly population and boosting essential aspects of QoL regarding mental health. Although, the review showed moderate associations between PA and the physical, emotional, overall health, social relations, pain, and environment domains of QoL, further investigations are required (Vagetti et al. 2014). Another study focused on finding association between change in PA and health related QoL in older English adults. It concluded that increasing baseline for moderate to vigorous PA and lower total sedentary life were linked to higher QoL around six years later. Moreover, even smaller declines in PA and smaller increases in total sedentary bout time were associated with better QoL (Yerrakalva et al. 2023).

Another factor influenced by PA in elderly population is risk of mobility disability. Mobility is the ability to walk freely, easily and without assistance. It is a crucial factor for preserving independence and proper functioning (Guralnik et al. 1993; 'Lonergan ET, Krevans JR. A National Agenda for Research on Aging. N Engl J Med. 1991; 324:1825–1828. [PubMed: 2038376', n.d.). Loss of mobility can be linked to higher rates of disability, mortality and disability (Hirvensalo, Rantanen, and Heikkinen 2000; Lampinen and Heikkinen 2003). Preserving it can have a positive impact on creating tight-knit communities, maintaining high QoL and independence in the society. One of the randomized controlled trials shows that PA involving total of 150 min walking sessions per week, strength, flexibility, and balance training significantly reduce major mobility disability, compared to health education group, which focused on gaining knowledge concerning nutrition, reliable health information sources, preventive services and screenings excluding PA (Pahor et al. 2014). It is not to say that health education is not a reliable and advantageous intervention however, putting the knowledge into

practice has many health benefits. The results indicate that structured PA is potentially a feasible and effective intervention to reduce the burden of disability among vulnerable older persons, in spite of functional decline in late life (Pahor et al. 2014). Moreover, elderly population is at risk of many chronic diseases such as hypertension, coronary artery disease, diabetes or chronic kidney disease (CKD) (Maresova et al. 2019). In light of that, some of these diseases especially chronic kidney disease may lead to disability in this age group (Smyth et al. 2013). Thus medical treatment and behavioral interventions are crucial to improving patients' lives. A recent study focusing on influence of PA on disability in older community of patients with and without CKD concluded that all participants, both with CKD and without it have lower disability incidence after engaging in moderate-to-vigorous PA (Chiba et al. 2022). These findings indicate the need to promote physical activity to prevent disability in older adults independently of chronic disease burden.

Factors limiting physical activity among elderly

Physical activity is affected by diverse factors which is why many behavioural theories and models are used to guide the selection of variables for studies (Bauman et al. 2012). The ecological model of determinants of physical activity proposed by Bauman et al is a comprehensive multilevel framework, which includes contributors to an active behavior at all levels: individual, social, environmental and policy (Franco et al. 2015).

In elderly population participation in physical activity can be associated with pain, discomfort and risk of falling. Moreover older people often feel they lack the capacity to engage in physical activity because of their perceived frailty and deem age-related deterioration as being unavoidable and unpreventable (Franco et al. 2015). Beliefs that comorbidities necessitate sedentary behavior, physical activity is unnecessary, previous sedentary habits in life, competing priorities, fatigue and apathy are following causes that elderly population might not partake in physical activity.

Regarding older people with dementia it is conceivable that the barriers and limitations of physical activity are different compared with dementia-free old adults due to dementia patients' low functional and cognitive capacity (van Alphen, Hortobágyi, and van Heuvelen 2016). Difficulties with guidance and organization of physical activity by caregivers are the most prominent additional barriers in this population.

At the social level key barriers are reported to be: lack of company, lack of support by healthcare professional or family, lack of confidence in social settings, the perceived pressure to keep pace when exercising in groups (Kilgour et al. 2024).

The physical environment might be especially relevant for older adults as an increase in functional limitations and associated fear of moving outdoors might cause more difficulties in overcoming physical barriers towards physical activity (Van Cauwenberg et al. 2011). Poor access to transport, lack of adequate venues to safely exercise, unsuitable weather, neighbourhood safety, lack of resting places, unavailability of exercise programmes and equipment were reported as access difficulties to sustain an active lifestyle. Costs associated with physical activity programmes and classes were also considered a major barrier to participation in physical activity.

Worth noting is that the importance of barriers varies across gender, age, geographical location and functional ability of elderly population. Lack of company, lack of transport, social support from friends and family and the social element of physical activity were more important to women, and that lack of interest or motivation was more important in men. The importance of poor health as a barrier increased with age, and the importance of weather varied by country. Those with functional impairment rated environmental and psychological barriers more commonly (Kilgour et al. 2024).

Conclusion

Physical activity plays a crucial role in maintaining good physical as well as mental health. It reduces risks of cardiovascular diseases and improves cognitive abilities and sleep (Strain et al. 2024). Recent who report states that around 30% of elderly do not meet recommended time of exercise (‘WHO Guidelines on Physical Activity and Sedentary Behaviour’, n.d.). Moreover, modern geriatric psychiatry faces huge challenges such as dementia, anxiety, social isolation and depression (van Alphen, Hortobágyi, and van Heuvelen 2016; Kilgour et al. 2024). Recent studies show that physical activity can reduce risk of dementia even by 20% (Kilgour et al. 2024). Moreover engaging in exercise can enlarge social network strengthen neighborhood bonds and improve social skills in elderly (van Alphen, Hortobágyi, and van Heuvelen 2016). Furthermore future actions should focus on promoting physical activity among elderly, encouraging policy makers to provide sport facilities and and engaging elderly in active lifestyle.

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