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PHYSICAL ACTIVITY AND COGNITIVE FUNCTION IN AMONG OLDER ADULTS AT ANGGREK HEALTH CENTER, MOJOKERTO

Yossa Mayang Pitaloka[1], Amin Zakaria[2], Musthika Wida Mashitah[3]
[1]Bachelor of Nursing Study Program, Faculty of Health Sciences, Institute of Technology, Science, and Health dr. Soepraoen Hospital, Malang, East Java, Indonesia
[2, 3]Department of Nursing, Institute of Technology, Science, and Health dr. Soepraoen Hospital, Malang, East Java, Indonesia
Corresponding Email: amin@itsk-soepraoen.ac.id

ABSTRACT

Cognitive decline is one of the health problems often experienced by the elderly due to the ageing process, which can affect their ability to remember, concentrate, and maintain independence in daily activities. Physical activity plays an important role in maintaining cognitive function by increasing blood flow to the brain, stimulating neuroplasticity, and slowing down the degenerative process. This study aims to analyse the relationship between physical activity and cognitive function in elderly at Anggrek Health Centre in Japan Village, Sooko District, Mojokerto. This study used a quantitative method with a correlational analytical design and a cross-sectional approach. A total of 73 elderly people were sampled using total sampling technique. Physical activity was measured using the PASE, while cognitive function was assessed using the MMSE. The data were analysed using the Chi-Square test with a significance level of 0.05. The results showed that the majority of elderly people were in the active physical activity category (68.5%) and had normal cognitive function (67.1%). There was a significant relationship between physical activity and cognitive function ($p = 0.001$), where physically active elderly people tended to have better cognitive function. These findings have important implications for nursing and public health practice, highlighting the role of nurses in promoting regular physical activity as a preventive strategy to maintain cognitive function among older adults at the community level.

Keywords

Physical activity, Cognitive function, Elderly

INTRODUCTION

Aging is an inevitable biological process that occurs naturally in every individual. Along with increasing age, various physiological and psychological changes begin to appear, especially among older adults. One of the most common conditions experienced by the elderly is a decline in cognitive function, which includes the abilities to remember, think, concentrate, and make decisions. When cognitive decline occurs, older adults often show symptoms such as forgetfulness, difficulty focusing, or slower responses (Yuliana, 2020). Reduced physical activity due to retirement, illness, or other limiting conditions may accelerate this decline, whereas older adults who maintain regular physical activity tend to demonstrate better memory and concentration (Nguyen et al., 2023).

The global elderly population continues to rise and is projected to reach 1.4 billion by 2030 (WHO, 2023), accompanied by an increasing risk of cognitive impairment such as dementia and Alzheimer's disease (Smith et al., 2024). Indonesia is entering an aging population phase, with older adults accounting for 10.82% of the population in 2023 (BPS, 2023). According to the World Alzheimer Report (2019), approximately 1.8 million people in Indonesia were living with dementia, a number predicted to increase to 7.5 million by 2050. Previous studies have consistently shown a positive relationship between physical activity and cognitive function. Johantoro (2024) reported a correlation coefficient of 0.685, indicating better cognitive performance among physically active older adults.

Preliminary data from Posyandu Anggrek I and II in Japan Village, Sooko District, Mojokerto identified 73 older adults, several of whom exhibited symptoms such as forgetfulness, disorganized speech, and slowed thinking processes. This location was selected because many older adults remain physically active through work, gardening, and community participation, making it relevant to examine the relationship between physical activity and cognitive function in this setting.

Cognitive decline in older adults is influenced not only by biological aging but also by lifestyle factors such as physical activity. Regular physical activity improves cerebral blood circulation, supports neuronal function, and reduces psychological stress (Erickson et al., 2019), while physical inactivity may accelerate cognitive deterioration (Kim, 2024). Cognitive impairment also represents a significant public health concern, as it increases dependency and reduces quality of life (Setiati, 2019).

Preventive strategies to maintain cognitive health include regular physical exercise, cognitively stimulating social activities, early screening, family involvement, and the utilization of community-based health services (Kandola et al., 2020; WHO, 2021; Sinuraya, 2023). Therefore, studies examining the relationship between physical activity and cognitive function are essential to support evidence-based interventions.

Based on these considerations, this study aims to determine the relationship between physical activity and cognitive function among older adults at Posyandu Anggrek, Desa Japan, Kecamatan Sooko, Mojokerto

METHOD

This study employed a quantitative design with a correlational analytical approach and a cross-sectional design. This design was used to analyze the relationship between physical activity and cognitive function in the elderly at a single point in time. The study received ethical clearance from the Research Ethics Committee of Institute of Technology, Science, and Health dr. Soepraoen Hospital, Malang, East Java, Indonesia. All participants provided written informed consent after receiving a full explanation of the study's objectives and their right to withdraw at any time.

The population consisted of all elderly individuals registered at the Anggrek I and Anggrek II Health Centers in Japan

Village, Sooko District, Mojokerto, totaling 73 people. Using a total sampling technique, all 73 individuals who met the inclusion criteria were included as the study sample.

Physical activity was measured using the Physical Activity Scale for the Elderly (PASE), covering leisure, household, and work activities. Cognitive function was assessed using the Mini-Mental State Examination (MMSE) across six domains: orientation, registration, attention and calculation, recall, language, and visual-construction ability. Both instruments utilized Indonesian-validated versions specifically adapted for the Indonesian elderly population to ensure cultural and linguistic accuracy. PASE scores were categorized as inactive (<125) and active (>125), while MMSE scores were classified as normal (24–30), mild impairment (17–23), or severe impairment (0–16).

Data were collected by the researcher and trained assistants between [Insert Month/Year]. Measurements were conducted at the health centers, with each session lasting approximately 20–30 minutes per respondent. Data were analyzed using the Chi-Square test with a significance level of $p < 0.05$. It is important to note that while the cross-sectional design identifies correlations, it cannot establish causal relationships between variables.

RESULTS

1. Respondent Characteristics

The study involved 73 elderly from the Anggrek Health Centre in Japan Village, Sooko District, Mojokerto. The general characteristics of the respondents are presented in Table 1.

Table 1. General Characteristics of Respondents

Characteristics	Category	n	%
Gender	Male	28	38.35
	Female	45	61.65
Age	45–54 (pre-elderly)	7	9.58
	55–64 (elderly)	33	45.21
	>65 (old seniors)	33	45.21
Marital Status	Marry	39	53.42
	Widow/er	34	46.58
Last Education	Elementary	6	8.21
	Middle high	8	10.96
	High School	38	52.05
	Collage	21	28.78
Employment History	Doesn't Work	10	13.69
	Work	63	86.31
Current Employment	Doesn't Work	50	68.49
	Work	23	31.51
Disease History	Stroke	5	6.86
	Hypertension	38	52.05
	Heart Disease	6	8.21
	Osteoarthritis	3	4.10
	Uric Acid	8	10.95
	Other	13	17.83
Live With	Alone	4	5.47
	Wive/Husband	39	53.42
	Son/Daugfter	26	35.64
	GrandSon/Daugh	4	5.47
Total		**73**	**100**

Most respondents were female (61.65%), in the elderly and very elderly age groups (45.21% each), had a high school education (52.05%), and the majority had a history of hypertension (52.05%).

2. Physical Activity of the Elderly

Physical activity among the elderly was measured using the PASE. The results are shown in Table 2.

Table 2. Physical Activity of the Elderly

Physical Activity	n	%
Less Active	23	31,5
Active	50	68.5
Total	**73**	**100**

The majority of elderly people are in the active category (68.5%), indicating that most respondents are still involved in daily physical activities.

3. Cognitive Function in the Elderly

Cognitive function was measured using the MMSE. The measurement results are shown in Table 3.

Table 3. Cognitive Function of the Elderly

Cognitive Function	n	%
Normal	49	67.1
Mild Impairment	10	13.6
Severe Impairment	14	19.3
Total	**73**	**100**

Most respondents (67.1%) had normal cognitive function, while the rest experienced mild to severe cognitive impairment.

4. Relationship between Physical Activity and Cognitive Function

Chi-square analysis was used to identify the relationship between physical activity and cognitive function, as presented in Table 4.

Table 4. Relationship between Physical Activity and Cognitive Function in the Elderly

Physical Activity	Cognitive Function			
	Normal n (%)	Mild n (%)	Severe (%)	Total n (%)
Less Active	0 (0%)	10 (41.7%)	14 (58.3%)	24 (100%)
Active	34 (64.9%)	15 (30.6%)	0 (0%)	49 (100%)
Total	**34 (46.6%)**	**25 (34.2%)**	**14 (19.2%)**	**73 (100%)**

Table 5. Chi-Square Test of Physical Activity and Cognitive Function

Statistic Test	Mark	p-value
Chi-Square Test	45.811	0.001
Likelihood Ratio	58.812	0.001
Linear-by-Linear Association	44.498	0.001
N of Valid Cases	73	

With a p-value of 0.001 ($p < 0.05$), these results indicate a significant association between physical activity and cognitive function in the elderly. Active elderly individuals dominated the normal cognitive function category (64.9%), while less active elderly individuals tended to experience moderate to severe cognitive impairment (100%).

DISCUSSION

The results of this study reveal that the majority of older adults at the Anggrek Health Center in Mojokerto maintain an active lifestyle, with 68.5% of respondents falling into the active category. This high level of physical engagement suggests that aging does not inevitably lead to a decline in productivity, provided that daily routines are well-maintained. Regular physical activity is essential for the elderly, not only to preserve musculoskeletal strength but also to sustain the integrity of the overall physiological system (WHO, 2020). These findings contribute significantly to filling the research gap regarding community-based data in Indonesia, proving that rural environments and tight-knit social structures can effectively mitigate the negative impacts

of degenerative processes and comorbidities (de Oliveira et al., 2019; Ferreira et al., 2023). Furthermore, active participation in social activities and emotional support from spouses or family members act as a stress buffer, motivating the elderly to remain physically independent (Zhang et al., 2024). In line with their physical health, most respondents also demonstrated normal cognitive function, indicating a strong link between mental stimulation and daily activities. Respondents with higher educational backgrounds and active work histories tended to achieve better cognitive scores, a finding that reinforces the Cognitive Reserve Theory. Through long-term mental engagement in work or learning processes, the brain develops complex neural networks that are more resilient to age-related damage (Cabeza et al., 2023; Wang et al., 2021). Additionally, for those living with family, daily social interaction functions as a constant form of cognitive stimulation that prevents memory decline more effectively than for those living alone (Feldman et al., 2021). These daily communication patterns force the brain to process information continuously, which indirectly preserves orientation and language skills.

Statistical analysis confirmed a significant relationship between physical activity and cognitive function ($p = 0.001$). Biologically, regular physical activity increases cerebral blood flow and oxygenation, triggering the release of neurotrophic factors such as BDNF. This factor is crucial in supporting synaptic plasticity and the survival of neurons in brain regions responsible for memory (Erickson et al., 2019; Stillman et al., 2020). Conversely, a sedentary lifestyle tends to accelerate neurodegeneration through the mechanisms of social isolation and diminished mental stimulation (Livingston et al., 2020). However, it is recognized that this study has limitations, particularly its cross-sectional design, which captures only a single point in time and cannot definitively establish causality. Furthermore, potential recall bias when using the PASE instrument and the limited sensitivity of the MMSE for respondents with low formal education should be considered for future research. Other confounding factors, such as nutritional status, sleep quality, and psychological conditions like depression, were not fully controlled in this study, despite their significant influence on cognitive performance.

As a practical implication for community nursing, these findings recommend strengthening health programs at the *Posyandu* (community health post) level. Interventions should move beyond routine physical check-ups to integrate structured exercise groups, such as elderly gymnastics, combined with cognitive stimulation activities. Community nurses are encouraged to facilitate periodic cognitive screenings using the MMSE for the early detection of organic mental disorders. Moreover, family education is vital to raise awareness that accompanying the elderly during physical activities is not merely physical assistance but a form of psychological support that helps maintain mental sharpness in old age.

CONCLUSIONS

The results of this study show that the majority of elderly people at the Anggrek Health Centre in Japan Village, Sooko District, Mojokerto, have active levels of physical activity and cognitive function in the normal category. Bivariate analysis using the Chi-Square test produced a p-value of 0.001, indicating a significant relationship between physical activity and cognitive function. Elderly people who are physically active are more likely to have better cognitive function, while elderly people with low physical activity experience more mild to severe cognitive impairment. These findings confirm that physical activity acts as a protective factor against cognitive decline, so efforts to increase physical activity need to be a priority in community health programmes to prevent cognitive impairment in the elderly.

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