



Effectiveness of Physical Activity: Silent Walking on Cognitive Impairment in Young Adults

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Abstract

Physical activity is an activity that we often do, especially walking, so far we have considered walking to be tiring, but it has great benefits for our body physiology both mentally, cognitively and physically, managing emotional functions related to cognitive function. Cognitive is an important part of humans in thinking and reasoning. Especially with the many activities of the younger generation today but who are less sensitive to their health, so that they are at risk of cognitive disorders. One can be done by walking. The purpose of the study was to determine the Effectiveness of Physical Activity: Walking on Cognitive Disorders in young adults. The research method used a pre-experimental pretest and posttest design with control, with a total of 44 samples, consisting of 22 interventions and 22 controls, walking activities were carried out for three consecutive days, with a duration of 60 minutes, at 16.00-17.00 WIB, on December 16-18, 2024. The sample criteria were first-year nursing students who carried out walking activities continuously for three days. The results of the study showed that the significance value of cognitive impairment obtained was ($Z = -2.646$, $p = 0.008$). This means that there is a significant difference in the level of cognitive impairment between before and after the intervention of physical activity. The significance value of cognitive impairment obtained was ($Z = 0.000$, $p = 1.000$). This means that there is no difference in the level of cognitive impairment in the control group. The significance value of cognitive impairment obtained was ($Z = -.935$, $p = 0.350$). This means that there is no significant difference in the level of cognitive impairment between the intervention group and the control group after the intervention of physical activity. These results explain that there is no significant difference between intervention and control. Suggestions are that there needs to be continuous and periodic activities so that the results can be maximized, because cognitive cannot change

simultaneously, so it must be accompanied by routine activities, not just incidental activities, to get good results.

Keywords: physical activity, cognitive, young adults

Introduction

Cognitive function has an important role in the human cycle (Phirom et al., 2020). physical activity and exercise can improve adult cognition (Jia et al., 2019). Physical exercise (PE) is an important environmental factor that has positive impacts on the brain and health behaviors across life stages. (Aguirre-Loaiza et al., 2019). a short walk in the forest causes physiological and psychological relaxation (Song et al., 2019). The effect of exercise on cognitive function in individuals with cancer patients has a positive impact on their mental and cognitive function (Campbell et al., 2020). Research results show that physical activity improves cognitive health throughout the human lifespan. Aerobic fitness prevents age-related brain tissue loss during aging, and improves functional aspects (Gomez-Pinilla & Hillman, 2013). Poor environmental conditions are associated with lower levels of physical activity for older adults, but the socio-ecological model suggests that physical activity depends on both environmental and individual factors (Cheval et al., 2019). Physical activity (PA) has been hypothesized to be effective in maintaining cognitive function and delaying cognitive decline in older adults, but physical fitness (PF) may be a better predictor of cognitive function. (Daimiel et al., 2020).

Physical activity can maintain neuronal plasticity, increase synapse formation, and cause the release of hormonal factors that promote neurogenesis and neuronal function (Shimada et al., 2017). Physical activity of someone who exercises regularly is useful for improving the antioxidant system, metabolic system, autonomic function of the heart, and blood pressure in people with hypertension (Prasertsri et al., 2022). Moderate physical activity is important for teenagers to improve their brain (Ploughman, 2008). Physical activity at a moderate pace is considered to be an activity that is beneficial to the body's physiology (Booth et al., 2020). Physical activity reduces age-related decline. Increased cortical thickness suggests that aerobic exercise contributes to brain health in individuals aged 20 years. (Stern et al., 2019). Thinking, Walking, Talking: The Integrated Motor and Cognitive Functions of the Brain (Leisman et al., 2016). Walking reduces the total hemoglobin available to the bilateral prefrontal cortex. Increasing environmental complexity reduces oxygenated hemoglobin and increases deoxygenated hemoglobin in the bilateral prefrontal cortex. (McKendrick et al., 2017). Aerobic physical exercise is more beneficial than cognitive gait training (Maeneja et al., 2023). These middle-aged activities may play a role in maintaining cognitive health. (Najar et al., 2019).

Physical activity is closely linked to the processes and conditions of the individual, in accordance with existing developments. (Pranata, 2020). The development process affects other functions (Nget & Min, 2024). The environmental conditions that begin to be dense so that they can affect physical, psychological and cognitive conditions, especially in young adults, experiencing a transition process from adolescence and starting to build self-

confidence, thus triggering disorders if not given and managed properly (Segita & Munawarah, 2024). So one of the existing problems is walking, therefore with the existing problems, research tries to explore the effectiveness of physical activity walking on cognitive disorders. (Manaf, 2023)

Literature Review

In everyday life, physical activity can be categorized into work activities, sports, conditioning, household, or other activities. Physical exercise is a planned, organized, and repeated physical activity with the ultimate goal or intermediate goal of improving or maintaining physical fitness (Aji, 2023). Walking, according to the Great Dictionary of the Indonesian Language (KBBI), is the process of moving forward or moving from one place to another by stepping. In addition, a study conducted by researchers from North Carolina showed that walking or other aerobic activities are carried out for 30 to 45 minutes every day.

Regular walking can improve joint mobility, prevent bone aging, and even reduce the risk of fractures. During a walk, you burn calories, and the longer you walk, the more calories you burn, helping you maintain a healthy weight. This is especially important for maintaining heart health. While it may seem like an easy thing to do, a regular walking or brisk walk has many health benefits, including weight loss, increased bone strength, reduced stress, and increased endurance (Azhar, 2023)e. According to Healthline, walking after meals can aid digestion and lower blood sugar, according to several studies. Walking strengthens your bones, especially as estrogen levels decline as we age. Walking can also improve memory and concentration. A study conducted at the University of Michigan found that walking, especially in nature, can improve attention and memory by twenty percent.

Research Method

This study used a pre-experimental pretest and posttest design with control, with a total of 44 samples, consisting of 22 interventions and 22 controls, walking activities were carried out for three consecutive days, with a duration of 60 minutes, at 16.00-17.00 WIB, on 16-18 December 2024. The sample criteria were first-year nursing students who carried out walking activities continuously for three days. Measurement of cognitive impairment using MMSE, a pretest was carried out before the intervention and a posttest was carried out on the third day after the third day.

Result**Frequency Distribution of Cognitive Disorders in the Intervention Group****Table 1.** Frequency Distribution of Cognitive Disorders Pre-Test and Post-Test of the Intervention Group

No.	Cognitive Disorders	<i>Pre-test</i>		<i>Post-test</i>	
		Frekuensi	Persentase	Frekuensi	Persentase
1.	Normal	1	4,5%	2	9,1%
2.	Light	8	36,4%	13	59,1%
3.	Currently	13	59,1%	7	31,8%
4.	Heavy	0	0%	0	0%
Total		22	100%	22	100%

The data in Table 1 above describes that cognitive impairment before being given physical activity intervention was mostly in the moderate category with 13 respondents (59.1%). After being given physical activity intervention, data was obtained that the majority of respondents' cognitive impairment was in the mild category with 13 respondents (59.1%) and there were 2 respondents in the normal category (9.1%).

Frequency Distribution of Cognitive Disorders in the Control Group**Table 2.** Frequency Distribution of Cognitive Disorders Pre-Test and Post-Test Control Group

No.	Cognitive Disorders	<i>Pre-test</i>		<i>Post-test</i>	
		Frekuensi	Persentase	Frekuensi	Persentase
1.	Normal	4	18,2%	4	18,2%
2.	Light	15	59,1%	13	59,1%
3.	Currently	5	22,7%	5	22,7%
4.	Heavy	0	0%	0	0%
Total		22	100%	22	100%

The data in Table 2 above describes that cognitive disorders in the control group were mostly in the mild category with a total of 15 respondents (59.1%) before the implementation of the treatment and after the implementation of the treatment in the intervention group which was measured the same as the control group, it was found that the majority were in the mild category with a total of 15 respondents (59.1%).

Differences in Cognitive Disorders Before and After Treatment in the Intervention Group

The results of paired data analysis before and after being given physical activity treatment in the intervention group are presented in Table 3 below:

Table 3. Wilcoxon Signed-Rank Test Before and After Being Given Physical Activity Treatment (n=22)

	Test	N	Mean of Rank	Sum of Rank	Z	p
Cognitive Disorders (Post test – Pre test)	<i>Decrease</i>	7	4,00	28,00	-2,646	0,008
	<i>Increase</i>	0	0,00	0,00		
	<i>No changes</i>	15				

Based on the results of the statistical test in Table 3 above, 7 respondents experienced a decrease or improvement in cognitive impairment values, no respondents experienced an increase in cognitive impairment, and there were 15 respondents whose cognitive impairment category remained the same in the intervention group. The significance value of cognitive impairment obtained was ($Z = -2.646$, $p = 0.008$). This means that there is a significant difference in the level of cognitive impairment between before and after the physical activity intervention.

Differences in Cognitive Disorders Before and After Treatment in the Control Group

The results of paired data analysis before and after physical activity treatment was given to the control group are presented in Table 4 below:

Table 4. Wilcoxon Signed-Rank Test for Control Group (n=22)

	Test	N	Mean of Rank	Sum of Rank	Z	p
Cognitive Disorders (Post test – Pre test)	<i>Decrease</i>	0	0,00	0,00	0,000	1,000
	<i>Increase</i>	0	0,00	0,00		
	<i>No changes</i>	22				

Based on the results of the statistical test in Table 4 above, 15 respondents were obtained whose cognitive impairment category remained the same as in the control group. The significance value of cognitive impairment obtained was ($Z=0.000$, $p=1.000$). This means that there is no difference in the level of cognitive impairment in the control group..

Differences in Cognitive Disorders between the Intervention Group and the Control Group After Treatment

The results of the analysis of unpaired data between the intervention and control groups after being given physical activity treatment are presented in Table 5 below:

Table 5. Mann-Whitney U Test (n=22)

	Test	N	Mean of Rank	Sum of Rank	Z	p
Cognitive Impairment Score Level Disorder	<i>Post Intervention Group</i>	22	24,09	530,00	-,935	0,350
	<i>Post Control Group</i>	22	20,91	460,00		
	<i>Total</i>	44				

Based on the results of the statistical test in Table 5 above, the significance value of cognitive impairment obtained was ($Z=-.935$, $p=0.350$). This means that there is no significant difference in the level of cognitive impairment between the intervention group and the control group after being given physical activity intervention.

Discussion

The results of the study stated that physical activity activities seen from the pretest and posttest showed differences, this stated that there was a change in terms of the benefits of cognitive function, from these results it shows that the activity can be done, but after testing between intervention and control, its effectiveness was not found. This can be associated with the process of walking activities that have only been carried out for three days and have not been continuous, this is accidental, we know that cognitive function can be triggered by repeated and continuous activities.

Conclusion

Walking prevents dementia, reduces the risk of Alzheimer's, and improves mental health because it reduces mental stress and maintains high endorphin levels in the body. "Walking 4,000 steps can be considered an investment in brain health. It can improve cognitive function, improve concentration, and even help prevent the risk of neurodegenerative diseases. When you walk, the flow of blood, oxygen, and nutrients to the brain increases.

A protein called brain-derived neurotrophic factor (or BDNF) is also released, which stimulates the growth of new brain cells and connections. Individuals who exercise regularly experience an increase in the size of the hippocampus, which is correlated with improved thinking and concentration skills. In other words, exercise helps the brain work more efficiently while slowing cognitive decline, especially in older age. These results show that there needs to be continuous and routine physical activity of walking, in order to obtain optimal benefits.

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