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## RESEARCH ARTICLE

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# The Effect of Jogging as Intensity Aerobic Exercise on Short-Term Memory at Nursing Science Study Program Faculty of Health Science Institut Kesehatan Sumatera Utara

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## ABSTRACT

Memory is influenced by very complex factors such as physical activity or exercise. Memory has been shown correlated by physical activity. Jogging is an aerobic exercise has a significant effect on health. The purpose of this study was to determine the effect of jogging as a moderate-intensity aerobic exercise on short-term memory in students of the Nursing Science Study Program, Faculty of Health Sciences, Institut Kesehatan Sumatera Utara. This research was a quasi experiment using 15 people control group and 15 people experimental groups with random sampling technique. Experimental group jogging for 30 minutes in 7 days. To measure short-term memory using *Scenery Picture Memory Test* (SPMT). The data were tested using paired-sample t-test. The results showed that there was an effect of jogging as a moderate-intensity aerobic exercise on short-term memory with  $p = 0.000$ . As conclusion, there is an effect of jogging as a moderate-intensity aerobic exercise on the short-term memory of nursing students at Faculty of Health Sciences, Institut Kesehatan Sumatera Utara in 2022.

**Keywords:** jogging; aerobic exercise; short-term memory

## INTRODUCTION

*Jogging* or easy run is one of type aerobic exercise that easy to do and having significant impact in health.<sup>(1)</sup> Exercise activity like jogging having beneficial impact on health, that is to accelerate blood flow to all body so that it will intensify concentration longer than people who rarely having activities.<sup>(2)</sup>

Memory is a storing and retrieving information system that can be obtained from learning process. Memory is human ability to retrieve back information that has been learned and store that information in the brain. Memory can contains components of hearing, vision, and executive center to coordinate information and devise plan.<sup>(3)</sup>

The organ that having role in the memory is the brain, specifically in the temporal lobe, to increase this memory a person need to exercise physically, intellectual stimulus activities, special nutrition, regular exercise and sufficient rest so this memory can function optimally. Physical exercise to improve memory, can be done by light exercise such as walking, jogging, swimming and cycling regularly, this caused by blood vessels having vasodilation and heart rate increased, that lead to blood flow reach all body parts including the brain and can caused structure and brain fuction changes.<sup>(4)</sup> The level of memory can be seen from the length of time a person remembers, memory is divided into two levels, namely short-term memory and long-term memory. Short-term memory is memory that can remember information only for a few moments and a few hours later we have difficulty remembering it while long-term memory is where learners store their general knowledge and beliefs about the world.<sup>(5)</sup>

Based on research that conducted by Anggraheni (2017) about jogging and it's effect on memory, from 45 research subjects obtained the average short-term memory test results after 30 and 60 minutes running treatment showed there're increase in short-term memory, but not for the control group.<sup>(6)</sup> Along with that, based on research from Parmana, et al (2021), results of this research show that sample average short-term memory score before having jogging treatment (pre-test) is  $13.96 \pm 1.72$ , and after having jogging treatment (post-test) increased by 4.652 or around 33.31%, that is to be  $18.60 \pm 1.62$ . This means that there is significant and unidirectional connection between physical activity and short-term memory, so that the results from several research above can

be concluded that jogging has a significant impact on increasing person’s short-term memory if it is carried out regularly and correctly.<sup>(7)</sup>

Based on description above, the purpose of this study is to determine the effect of Jogging as a medium-intensity aerobic exercise on the short-term memory of students nursing science study program at North Sumatera Health Institute.

**METHODS**

Design of this research was nonequivalent control group. Characteristics of this type of research consisted of two class groups, that was control group and experiment class, class selection conducted non-randomly. In nonequivalent control group design both control class and experimental class given a pre-test, then followed by experimental class having treatment but not for control class. After experimental class given treatment both class control and experimental class were given post-test. The treatment that given to experimental class was respondents that jogged for 7 days with duration for jogging around 30 minutes every day. Test that given to respondents was a short-term memory test using Scenery Picture Memory Test (SPMT).<sup>(8,9)</sup>

The population on this research was students of Nursing Science Study Program at North Sumatera Institute of Health. Sample determinate by purposive sampling where each group consisted to 15 respondents. The inclusion criteria in this study were respondents aged 18-24 years old, healthy both in physical and mental. Exclusion sample criteria: experiencing psychiatric disorders, unable to complete the research procedure. Data analysis performed using a paired sample t-test to see the effect of jogging on short-term memory.

**RESULTS**

Characteristics of respondents based on age in Table 1 shows that 43.3% were 19-20 year old students, 36.7% were 21-22 year old respondents, while 23-24 year old students as many as 20.0%. The majority of respondents were female (Table 2). Table 3 shows that 90.0% of students was rarely jogging.

Table 1. Distribution of respondents based on age

No	Age	Frequency	Percentage
1.	19-20	13	43.3
2.	21-22	11	36.7
3.	23-24	6	20.0

Table 2. Distribution of respondents based on gender

No	Gender	Frequency	Percentage
1.	Male	14	46.7
2.	Female	16	53.3

Table 1. Distribution of jogging habits

No	Jogging	Frequency	Percentage
1.	Never	1	3.3
2.	Monthly	27	90.0
3.	Weekly	2	6.7

Table 4. Comparison the jogging habits of pre-test and post-test

Phase	Control ( $\bar{X} \pm SD$ )	Intervention ( $\bar{X} \pm SD$ )	p
Pre-test	9.20 ± 1.781	9.57±1.885	0.000
Post-test	9.87 ± 1.506	16.87 ± 2.295	

Based on the Table 4, it can be seen that the results after treatment for the control group averaged 9.87 while the experimental group averaged 16.87. This had a positive difference so it could be concluded that jogging can affect short-term memory. The p-value was 0.000, so there was an effect of jogging as a medium-intensity aerobic exercise on the short-term memory of students of the Nursing Science Study Program at the North Sumatera Health Institute in 2022.

## DISCUSSION

Short term memory can only last for a short time, nevertheless short term memory can be converted into long term memory activate the short-term memory over and over again. Term memory short has several functions, namely remembering the information that comes from long-term memory, selecting information to receive, repeating information obtained and is also important for the response to choose. Because it has all four Such function, short term memory has an important role in aspects human life, one of which is in the field of education.<sup>(9)</sup>

Based on data that been retrieved, almost all respondents in experimental group already had jogging for 7 continued days with a duration around 30 minutes per day and showed good short-term memory. Based on the results of the data after the treatment, it was found that the post-test of the experimental group was much better before jogging where from an average pre-test of 9.57 there was an increase in post-test of 16.87 on average it can be seen that there was an increase in short-term memory abilities. While respondents from control group that did not having treatment or jogging for 7 consecutives days obtained an average pre-test 9,20, an increase of 9,87 post-test with an average can be seen there is an increase in short-term memory but not as large as that experienced by the experimental group. This study is in line with research that been conducted by Rani Hapsari, who said there is an increase in memory between pre-test and post-test classes, this may be happen because exercise can increase blood flow to the brain and neurotropic stimulation.

The data that been obtained by researchers concluded that jogging as an aerobic exercise has a good role in improving short-term memory disorders for youth aged 19-24 years old that can be classified as teenagers. This also influenced students memory level because they are still in young age where their hearing, vision, physique and other body parts still function optimally, they don't get tired easily and are able concentrate well compared to the elderly. Regular physical activities during leisure time has been proven to be connected with good health outcomes. In addition, several researchers have proven that exercise can increase cognitive function because it can affect brain function.<sup>(6)</sup>

Memory abilities can be improved through short-term memory exercise. This exercises are techniques to improve focus and association skills. The point in this training to improve short-term memory is how we constantly activate brain functions so that the brain will not stay still which can be weaken. Because brain that is always active can make the brain become healthy and having better short-term memory.

Based on previous study that conducted by Sutrisno, et al (2019), there was a significant increase in short-term memory values ( $p = 0.000$ ) after the fast walking exercise treatment with an average of  $17.20 \pm 1.40$  to  $20.75 \pm 1.86$ . This significant increase was not found in the control group ( $p = 0.83$ ). Brisk walking can increase the value of short-term memory function in young adults. In line with the research above by other researcher, the results of the study showed that there was a significant positive relationship between the level of physical activity and short-term memory with  $p = 0.003$  ( $p < 0.05$ ) with a correlation coefficient of 0.375. This means that there is a significant connection and in line between physical activity with short-term memory in female student of Physiotherapy Study Medical School UNUD, that is the higher one's physical activity, the higher short-term memory ability.<sup>(10)</sup>

The increase that occurs is due to vasodilation of the blood vessels that carry blood supply to the brain. Aerobic exercise such as cycling, light walking, jogging, etc that are conducted regularly can increase memory function, this happened cause by blood vessels that experienced vasodilation and increasing heart rate, so that blood flows throughout the body including the brain and can cause changes in brain structure and function.<sup>(11-16)</sup>

## CONCLUSION

Based on results of the study and discussion, there is impact of jogging as medium-intensity aerobic exercise on the short-term memory of Students in the Nursing Study Program at the North Sumatera Health Institute 2022

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