

## MEAN EXERCISE DURATION AND FINE MOTOR SPEED IN ELDERLY LIVING IN BHAKTI LUHUR TROPODO ORPHANGE AND NURSING HOME

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### ABSTRACT

**Introduction:** For the elderly to live independently and productively, good fine motor skill is needed. It is well known that exercise can preserve fine motor skills. Still, the effect of practices in Bhakti Luhur Orphanage and Nursing Home: Oma-oma's gym and tai chi haven't been explored before.

**Aim:** The goal of this research is to analyze the correlation between the median of the exercise duration and fine motor skills represented by the average of finger tapping test on trial three to trial five.

**Methods:** This cross-sectional research employed purposive sampling yielding 22 elderly ( $\geq 60$  years old) who understood the order given, agreed to join the research, and also free from motor impairment due to cerebrovascular accidents, parkinsonism, pain or arthritis on the dominant hand, and nil from psychiatric drugs as samples.

**Result:** There was a slight correlation between the two variables, which is insignificant ( $r=0,341$ ,  $p=0,120$ ) between the duration of the exercises and motor speed.

**Conclusion:** There is no significant correlation between exercise duration and fine motor skills in the elderly in Bhakti Luhur Orphanage and Nursing Home.

**Keywords:** elderly, exercise duration, fine motor skill

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## INTRODUCTION

The elderly population, according to Law no. 13 of 1998, is defined as a population over the age of 60 years. In 2017, the proportion of older people was 9.03% of Indonesia's population and was predicted to increase to 15.77% in 2035<sup>1</sup>. This makes Indonesia into a country with an aging population because the proportion of the elderly population is more than 7%. In order not to become a burden on the country, it is essential that the elderly live healthy, independent, and productive lives.

The independence and productivity of the elderly are reflected in the Activities of Daily Living (ADL) and the Instrumental Activities of Daily Living (IADL). A critical component in ADL and IADL is fine motor skills, where 6 out of 10 ADL functions according to the Barthel scale<sup>2</sup>, and 7 out of 8 IADL functions according to the Lawton scale<sup>3</sup> require useful fine motor functions. Fine motor functions, which include strength, stability, and control, are reflected in motor speed. In the elderly, it was found that motor speed will decrease with age<sup>4</sup> due to various changes in the nervous system, especially in motor pathways<sup>5,6</sup>.

Sports is one of the cheap and easy activities to maintain motor function, both in the young and elderly population<sup>7,8,9</sup>.

However, according to a 2015 Central Statistics Indonesia survey, only 10.5% of the elderly exercised during the past week<sup>1</sup>. This is unfortunate because a lack of exercise can increase morbidity and mortality<sup>10</sup>, including a decrease in fine motor function. From this study, it is expected to provide insight into the relationship between sports and motor function in the elderly, so sports can be a routine part of elderly activities so that the elderly can live healthy, independent, and productive lives.

This study aims to analyze the correlation between the average duration of exercise per week with the fine motor speed in the elderly in the Orphanage and Nursing Home of the Bhakti Luhur Tropodo.

## METHODS

This study uses analytical research methods and is carried out with cross-sectional study design.

The sample of this study is all the elderly in the orphanage and the Bhakti Luhur Tropodo Nursing Home who meet the criteria of 22 people from 66 total population. The inclusion criteria of this study are the elderly (aged  $\geq 60$  years), willing to follow the research by signing informed consent, and can follow the

instructions given and cooperative. The exclusion criteria of this study are: having a motor injury in accordance with the task of the Motricity Index of Motor Impairment on the dominant hand, having symptoms of parkinsonism on the dominant hand, having arthritis in the dominant hand, taking drugs that directly work by influencing the neurotransmitter of the brain, such as anxiolytic, antidepressant, antipsychotic, and antiepileptic, there is a pain in the dominant hand when doing the Finger Tapping Test. The sampling technique used in this study was the purposive sampling technique.

For samples that meet the inclusion and exclusion criteria, the researcher collects data in the form of average exercise duration

per week made by the board of the Orphanage and Nursing Home Bhakti Luhur, conducts a finger tapping test through the HLTapper application, and collects other data that are potential to be a nuisance variable in the form of age, history of diabetes, history of hypertension, medications taken, depressive symptoms, and history of coffee consumption. Then the collected data is entered into the SPSS application and tested for correlation using the Spearman correlation test.

## RESULT

Characteristics of research subjects can be seen in table 1.

**Table 1** Characteristics of research subjects

Variable	Classification	Freq (n)	Avg ± Std. Dev / Percentage (%)
Age			69,05± 7,53
Level of Education	Does not go to school	1	4,55
	Elementary	4	18,20
	Junior High School	7	31,85
	Senior High School	10	45,50
History of diabetes	Have Diabetes	6	27,27
	No Diabetes	16	72,73
History of hypertension	Have Hypertension	10	45,45
	No Hypertension	12	54,55
Drugs taken	Glucosamine	1	4,55
	Metformin	4	18,20
	Amlodipine	3	13,65
	Captopril	2	9,09
	Vitamin B complex	6	27,30
	Dexamethasone	1	4,55
	Meloxicam	1	4,55
	Aspilet	1	4,55
Depression Symptoms	Positive	2	9,09
	Negative	20	90,91
Coffee consumption in the last 24 hours	Yes	2	9,09
	No	20	90,91

Based on Table 1, it can be seen that the average age of the study subjects was 69.05 ( $\pm$  7.53) years. In addition, ten research subjects (45.45%) had the last high school education. The rest, there are seven people (31.85%) research subjects who have a junior high school education, four people (18.20%) who have an elementary school education, and one person (4.55%) who have never attended school. Also, it was also known that six people (27.27%) had a history of diabetes, and 10 study subjects (45.45%) had a history of hypertension. Most of the 20 study subjects (90.91%) did not have symptoms of depression based on PPDGJ III. Most of the research subjects totaling 20 people were also known not to consume coffee in the last 24 hours. The most widely consumed drug is the B complex vitamin, which is taken as many as six research subjects.

**Table 3** Spearman's Rank Correlation test results to find a correlation between the duration of exercise per week with fine motor speed.

		Fine Motor Speed
Duration of exercise per week (minutes)	Correlation Coefficients (r)	0,341
	Significance (p)	0,120

Note: Statistically significant if  $p < 0.05$

**Table 2** The average duration of exercise per week for 12 weeks and the third-fifth finger tapping test

Variable	Avg $\pm$ Std. Dev
Duration of exercise per week (minutes)	78,41 $\pm$ 90,40
Fine motor speed (beat / 10 seconds)	31,50 $\pm$ 10,83

From Table 2, it was found that the duration of exercise varied with an average of 78.41 ( $\pm$  90.4) minutes, and the fine motor speed of the study subjects was 31.50 ( $\pm$  10.83) beats per 10 seconds.

From Table 3, it was found that there was a slight correlation between exercise duration per week and fine motor speed ( $r = 0.341$ ). The correlation is not significant ( $p = 0.120$ ).

**Table 4** The results of the analysis of variable data that have the potential to be a confounding variable.

Variables that Potentially Become Disturbing Variables	The average duration of exercise per week for 12 weeks			Average finger tapping results in the third-fifth experiment		
	Mean ranks Positive	Mean ranks Negative or r value	p	Mean ranks Positive	Mean ranks Negative or r value	p
Age		0,015	0,986		0.017	0,941
Level of education		0,21	0,404		0,085	0,737
History of diabetes	10,92	11,72	0,783	11,42	11,53	0,971
History of hypertension	10,65	12,21	0,549	11,05	11,88	0,767
Depression	12	11,45	0,903	13,5	11,30	0,648
Metformin Usage	8,7	12,32	0,241	11,9	11,38	0,875
Glucosamine Usage	6	11,76	0,354	22	11	0,098
Amlodipine Usage	14,5	11,03	0,357	15,33	10,89	0,271
Captopril Usage	18	10,85	0,112	11,75	11,48	0,954
Vitamin B-complex Usage	12	11,39	0,856	11,5	11,40	0,932
Dexamethasone Usage	6	11,76	0,354	10	11,57	0,813
Meloxicam Usage	6	11,76	0,354	10	11,57	0,813
Aspilet Usage	6	11,76	0,354	11	11,52	0,937
Coffee Consumption	9	11,75	0,541	2,5	12.4	0,040

Note: Statistically significant if  $p < 0.05$

From the results of the analysis in Table 4, there are no variables that have a significant relationship to the two main variables to be analyzed, namely the duration of exercise per week and fine motor speed so that it can be concluded that these variables cannot be said to be confounding variables.

## DISCUSSION

The results of finger tapping in research subjects were lower than in previous studies using the same measuring

instrument (HL Tapper), where the average finger tapping in previous studies was  $54.50 \pm 11.53$  times / 10 seconds<sup>11</sup>. This might occur because the average age of the study subjects was younger ( $53.4 \pm 14.8$  years), and there were male subjects where the results of male tapping were indeed faster than that of women<sup>3,4</sup>. There are no epidemiological studies that examine the duration of exercise per week, especially in the elderly population of Indonesia.

In this study, there was an insignificantly weak positive correlation

between the average duration of exercise per week with the fine motor speed in the elderly at the Tropodo Bhakti Luhur Nursing Home ( $r = 0.341$ ,  $p = 0.120$ ). This is different from the results of other studies<sup>7,8</sup>, where the study found a significant relationship between exercise with fine motor speed. These differences may occur due to population differences. The population tested in the study were adults with controlled movements. In contrast, this study was a cross-sectional study that had deficiencies which we felt were the most important deficiencies, i.e., we could not control the movements of gymnastic participants, and the researchers did not know whether the research subjects gymnastics seriously or lazy every time the gymnastics. The cross-sectional research design also cannot control other activities carried out by the research subjects. From the results of the questions and answers during the study, there were research subjects who usually did not attend gymnastics, but he walked to the church near the nursing home every day. This has the potential to be a confounder, which is also a limitation in research.

In addition to the research design, the weakness of this study is the validity of existing data. We entrust the absenteeism

entirely to the management of the orphanage, and the data in the form of education level and history of drinking coffee that is not recorded in the master book are asked directly to the subject of research and caregiver based solely on memory alone. However, the ratio of caretakers and residents of each homestead is 1:3, so caregivers should remember whether the residents of the orphanage drink coffee or not.

Another weakness of the research is that we cannot control the motivation of the research subjects. The results of finger tapping are influenced by motivation<sup>12</sup>. The thing that also influences the motivation of the research subjects is because the research conducted is a joint study of five students so that one research subject takes approximately 30 minutes. This can trigger the boredom of the research subject.

The research population is quite a lot, with a total of 66 people, but those who meet the inclusion criteria and meet the exclusion criteria are only 22 people. The sample taken could be more, but we were not given access to the study population living in the home of Ignacia. With the number of samples, the power of this research is less than the conventional

research power, which is 80 percent. Less power makes research sensitivity lower.

Another possibility that causes the results of the study is not significant is the type of exercise in the form of a combination of the Oma-oma's gym, and tai-chi does not have an effect on fine motor skills, and/or the duration of the exercise is not enough to affect the fine motor skills of the study subjects. But this can only be proven if the research is in the form of experimental with an adequate number of samples.

## CONCLUSION

There was no significant correlation between the average weekly duration of exercise for 12 weeks with the average finger tapping test results of the third-fifth trial in the elderly at the Bhakti Luhur Nursing Home ( $r = 0.341$ ,  $p = 0.120$ ).

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