THE EFFECT OF BRAIN GYM ON IMPROVING COGNITIVE FUNCTION IN THE ELDERLY WITH THE RISK OF DEMENTIA AT PANTI SOSIAL TRESNA WERDHA BUDI MULIA 1

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ABSTRACT
Background : Decreased cognitive function is one of the impacts of the aging process in the elderly , which begins with a decrease in memory . This can also have an impact on the decline in the abilities to speak , understand space , and the abilities to judge and pay attention will result in inhibition of long-term memory and information processing in the elderly . If not treated properly , the cognitive decline function can lead to dementia which results in decreasing intellectual function and memory . Brain Gym is a collection of movement exercises that increase blood flow and oxygen to the brain , and stimulate the right and left brain to improve concentration and memory . Objective : To determine the effect of Brain Gym on improving cognitive function in elderly people at risk of dementia at PSTW Budi Mulia 1. Method : This study used a pre-experimental method with one group pre-test and post test approach . A total of 18 people who have met the inclusion and exclusion criteria . Measuring instrument used MMSE. Results : Of all the research objects , the average result of cognitive function before intervention was 17.94 and after intervention 24.72. Hypothesis testing shows there is an effect of Brain Gym on improving cognitive function . Conclusion : Brain Gym has an effect on improving cognitive function in elderly people with dementia risk at Tresna Social Home Elderly Noble 1.
***Keywords** : Cognitive function , Elderly , Elderly at Risk of Dementia , Brain Gym .*

ABSTRACT
Background: Decreased cognitive function is one of the impacts of the aging process. aging in the elderly, begins with a decline in memory ability or memory power. This can also have an impact on decreasing the ability to speak, understand movement space, the ability to assess and pay attention will result in memory impairment long term and information processes in the elderly. If you do not get proper treatment right, a decrease in cognitive function can cause dementia , resulting in a decrease intellectual function and memory. Brain Gym is a collection of movement exercises increases blood and oxygen flow to the brain, also stimulates the right and left brain so as to improve the concentration and memory of the elderly. Objective: To find out Brain influence Gym on improving cognitive function in elderly at risk dementia at PSTW Budi Mulia 1. Method: This study used a pre -experimental method with a one-way approach. group pre-test and post-test . A total of 18 people have met the inclusion and exclusion criteria . The measuring instrument used is MMSE. Intervention conducted 3 times a week for 3 weeks. Results: From all research objects, The average results of cognitive function before the

intervention were 17.94 and after the intervention 24.72. Hypothesis testing shows that there is an influence of Brain Gym for functional improvement cognitive. Conclusion: Brain Gym has an effect on improving cognitive function in the elderly with the risk of dementia at the Budi Mulia 1 Social Home for the Elderly .

Keywords: Cognitive function, Elderly, Elderly with Dementia Risk , Brain Gym

INTRODUCTION

Number of life elderly in the world will Keep going increased . The number of The elderly population in the world in 2019 reached 13.4 %, in 2050 it is estimated increase to 25.3% and in 20100 it is estimated to 35.1% of the world's total population (WHO, 2019). Meanwhile , the number of elderly in Indonesia also experience increase in 2019 to 27.5 million or 10.3% And 57.0 million soul or 17.9% on year 2045 (Ministry of Health , 2019).

Elderly is someone who has enter stages end from life they are on the range age certain . The World Health Organization (WHO) states that someone who has enter 60 years old to the top enter in category elderly . Along with with increase age someone , then there are also changes in various system in body human . System cognitive or intellectual is one of system body that experiences decline , which is known as dementia (Lolo, 2019).

Process aging on elderly side by side with decline ability function cognitive (Triyulianti et al., 2022). In 2016 , the Indonesian Ministry of Health reported that 39% of elderly people aged 50-59 years experience decline function the lightest cognitive , and increased to 8.03% at the age of more from 80 years . In the World Alzheimer Report in 2015 it was estimated Globally there are 46.8 million people living throughout the world with disturbance cognitive like dementia . Number This estimated will become two time fold every 20 year , reach 74.7 million on year 2030 and 131.5 million in 2050 (Suswanti et al., 2020).

Disturbance cognitive is condition when somebody experience difficulty remember , learn things new , concentrate , decline orientation to time , space , place or make decision (Triyulianti et et al., 2022). The decline function cognitive will also influence life daily or *quality of life* in the elderly The occurrence of dementia can diagnosed with existence decline function cognitive like Power remember , ability speaking , ability understand information , ability understand room movement , and ability assess and give attention (Anisa et al., 2016).

Dementia is the occurrence decline function in section network the brain that causes existence decline function intellectual or Power remember a elderly . As a result , the activity life daily somebody disturbed Because happen decline skills and no can finish problem *(problem solving)* , loss ability For communicate , and experience difficulty in control emotions (Triyulianti et al., 2022).

Problem dementia is disturbance intellectual and power remember at age carry on is problem that needs to be solved quick get action prevention and handling Good . Decrease function cognitive on carry on age can covering various aspect that is orientation , registration , attention and calculation , memory and language (Yuly et al., 2021). Functions cognitive elderly can maintained with Good with he did intervention physiotherapy in the form of *Brain Gym* (Pratidina et al., 2023).

Physiotherapy have role important in maintain and improve function motion body so that someone can doing activities independent with facilitate public in form giving recommendations , exercises prevention and action therapy and rehabilitation (Shamsi & Khan, 2019). The Indonesian Ministry of Health stated that that physiotherapy is service health aimed at to society that aims For develop , maintain as well as restore movement and function body throughout range life . *Brain Gym* is step preventive For optimize , stimulate function brain become the more relevant to the elderly , and facilitates flow blood and oxygen to brain (Ana, 2018).

Brain Gym is a program that includes 26 movements. simple For stimulate second hemisphere brain so that allow achievement performance optimal brain (Muthoharoh , 2023). According to Paul And Gail E. Dennison in Gemstone 2023, brain to in three dimensions , namely lateral dimension (brain left-right), dimensions focus (brain) front back), dimensions centralization (brain up and down), And Because That movement exercise must varies for each dimension . According to study Wulandari et al., 2020 on " Implementation of *Brain Gym* Against Level Dementia On Carry on Age " prove that *brain gym* have an impact on increasing function cognitive lanisa . In study Guidance 2017 concludes that , movement *brain gym* can increase balance activity brain right and left in a way simultaneously , increasing supply blood and oxygen to brain , and improve ability brain For develop through stimulation or stimulation on

structure and function second split coordinated brain in a way physiological through corpus colosum , which can increase Power remember and function cognitive .

Reviewing from number population elderly in the world and in Indonesia, Panti Social Tresna elderly (PSTW) Budi Glorious Which located in Cipayung , Jakarta East, is a Service Institution Welfare Social (WBS) for inhabitant foster social services established by the DKI Regional Government for provide place For service and coaching inhabitant foster social in various areas of DKI Jakarta. Through interview with head orphanage and head nursing , number elderly people who are in PSTW Budi Mulia 1 has 250 inhabitants with 91 men and 159 women , with a total of 14 guesthouses and divided into 7 rooms . There are various type category elderly among them , the elderly independent , elderly with disturbance souls , total care elderly , semi total care elderly , and elderly with disease infectious .

Based on background behind said , the author interested For do study with title " Influence *Brain Gym* Against Improvement Function Cognitive in the Elderly With Risk Dementia at PSTW Budi Mulia 1".

METHOD

Method study This use method quantitative with study *Pre- Experimental* with design *one group pre - post test* . The population taken in study This is elderly people living in the orphanage Social Tresna Elderly Budi Mulia 1 Cipayung with total sample as much as 18 person. The sample selection technique uses purposive sampling where the researcher determines inclusion and exclusion criteria in the research. Criteria inclusion in ths study is

(1) Elderly woman or men aged ≥ 60-74 years ; (2) Results of the value EDQ screening ≥ 8; (3) MMSE score 10-21; (4) Respondent follow a training program until finished . Meanwhile , the criteria exclusion study This is (1) Respondent suffered a fracture in the limb motion lower in time not enough from 2 months ; (2) Respondents currently follow other research programs with drop out criteria , namely , (1) Respondents No follow the program exercise during more from 2 time; (2) Respondents to resign self . As for variable free in study This that is *Brain Gym* and variables bound study This in the form of improvement function cognitive in the elderly with risk dementia .

This research was conducted from August 2023 to February 2024. This research began with arranging research ethics and permit applications from August 2023 to December 2024. Continued with data collection and interventions carried out from January to the end of February 2024. Starting with a location survey and study observations at PSTW Budi Mulia 1. So that you get a permit and introduction from the study program to the DKI Provincial Social Service Jakarta.

After getting licensing Then determine criteria inclusion sample For determine appropriate respondents with procedure research . After that it is determined population And method taking sample . So, prepare equipment For carry out inspection like instrument research , explanation of training programs , and *informed consent* . In the research This done screening use *Early Dementia Questionnaire* (EDQ) for determine that respondents in the study This is individuals at risk dementia . After that , it was carried out measurement level function cognitive in the elderly with use *Mini Mental Status Exam* (MMSE). Continued inspection *pre-test* , giving intervention , as well as at the end meeting done inspection end or *post-test* .

Research data This Then processed And analyzed in a way systematic using computer programs . Research data analysis This use analysis univariate aiming For describe characteristics every variable research , namely in the form of age data , type gender , education and outcomes MMSE measurements before and after intervention . After that , it was carried out analysis bivariate with normality test use *Shapiro -Wilk test* and continued with *Paired samples T-test* . Study This has get agreement ethics from Commission Ethics Health Research of Semarang State University with number letter : 039/KEPK/FK/KLE/2024.

RESULTS AND DISCUSSION

1. Analysis Univariate
   a. Age

Table Characteristics Respondents Based on Age

Age (years)	Frequency (n)	Percent (%)	Mean ± SD	Min - Max
60 - 65	7	39.1	66.94 ± 4.13	60 - 74
66 - 70	8	44.5		
71 - 74	3	16.8		
Total	18	100.0		

Based on table on show characteristics Respondent based on age consisting of on three

group age that is group age 60-65 years a total of 7 people (39.1%), aged 66-70 years a total of 8 people (44.5%), and aged 71-74 years a total of 3 people (16.8%). Average age Respondent is 66.94 years and standard deviation of 4.13 with minimum value of 60 years and maximum 74 years old .

b. Type Sex

Table Characteristics Respondents Based on Type Sex

Type Sex	Frequency (n)	Percent (%)
Man	3	16.7
Woman	15	83.3
Total	18	100.0

Based on table on show that type sex man a total of 3 people (16.7%) and women a total of 15 people (83%).

c. Education

Table Characteristics Respondents Based on Education

Education	Frequency (n)	Percent (%)
No School	17	94.4
College Tall	1	5.6
Total	18	100.0

Based on table on show that Respondent dominant No own background education with mark No school as many as 17 people (94.4%) and those who received college tall as many as 1 person (5.6%).

d. Measurement Function Cognitive

Table Results Measurement Function Cognitive with MMSE

MMSE	Mean	Median	SD	Min - Max
Before	17.94	18.00	1.51	15 - 20
After	24.72	25.00	2.39	20 - 28

Based on table on show improvement after done intervention , from 17.94 become 24.72 with standard deviation before intervention 1.51 And after intervention 2.39. Median value or mark middle from results measurement obtained before intervention 18.00 And after intervention 25.00. Mark minimum And

maximum before intervention 15-20 And mark minimum And maximum after done intervention 20-28.

2. Analysis Bivariate

a. Normality Test

Table Results Test Normality Data to Function Cognitive Respondents at PSTW Budi Mulia 1

Shapiro – Wilks Test				
Group Data	**Mean**	**SD**	***p- value***	**Information**
After	24.72	2.39	0.375	Normal
Before	17.94	1.51	0.182	Normal
Difference	6.78	1.59	0.590	Normal

Based on table on show *p-value* test normality function data cognitive before and after intervention *Brain Gym* has *p-value* > 0.05, so state that the data normally distributed .\

b. Test Hypothesis

Next, to find out the difference in the results of the *Mini Mental Status Exam* (MMSE) on respondents, before and after being given intervention in the form of *Brain Gym* , then parametric tests are carried out *Paired Sample T- Test* .

Table Results Test *Paired Sample T* to Function Cognitive Respondents at PSTW Budi Mulia 1

Paired Sample T- Test				
Group Data	**Mean**	**SD**	***p- value***	**Information**
Before	17.94	1.51	0.000	Significant
After	24.72	2.39		

Based on table *Paired Sample T* test results obtained average before and after given *Brain Gym* is 17.94 And 24.72. Standard deviation before namely 1.51 and after which is 2.39. The significance value (*p-value*) is 0.000 ($p < 0.05$), so H_0 rejected and Ha accepted , which shows there is influence after given intervention in the form of *Brain Gym* on respondents .

DISCUSSION

Study This done with overall Respondent that is elderly with disturbance function cognitive currently Which own range mark *Mini-Mental States Examination* 10 – 21. Along with the aging process occurs in a person elderly , decline function cognitive is also common happened . This is in line with statement Triyulianti et al, (2022) stated that the aging process in the elderly side by side with decline ability function cognitive . Decline cognitive in dementia usually started with decline memory or Power remember (Suryatika & Pramono , 2019).

Based on the results of the bivariate analysis , the *Mini Mental Status Exam value was obtained* (MMSE) before the intervention *(pre-test)* had a mean value of 17.94 and a value after the intervention *(post-test)* of 24.72 with a difference of 6.78. Then, through the results of the Hypothesis Test using *Test Paired Sample T- Test* own results *p- value* 0,000 (<0.05) And concluded that there is influence intervention in the form of *Brain Gym* vs. improvement function cognitive in the elderly with risk dementia at PSTW Budi Mulia 1. Function cognitive attached close with the aging process occurs , to That giving term time intervention very influential to improvement function cognitive in the elderly . In matter term time giving intervention , research conducted by Al-

Fainatunni'mah , A And Nurhidayati , T, (2020) with title " Implementation Exercise Brain For Improvement Function Cognitive in the Elderly with Dementia " states that brain gymnastics exercises provided for 1 week obtained results increased MMSE scores , with minimum – maximum value *pre-test* 11-14 and *post-test* 12-16. In addition that , in the research Suryatika , A and Pramono , W, (2019) with title " Application of Brain Gymnastics " To Function Cognitive in the Elderly With Dementia " indicates improvement significant MMSE values after given brain gymnastics for 7 days with minimum – maximum value *pre-test* 10-15 And *post test* 12-16. Second study the own duration which are more fast from study This that is 1 week with 7 meetings , with difference the resulting MMSE value Enough Far different from study This with minimum – maximum value *pre-test* 15-20 And *post test* is 20-28. Term time giving intervention the longer in study This show improvement function more cognitive Good .

Study other Which done by Ramayana , (2020) with title *"Effects of Brain Gym on Cognitive Function in Elderly Dementia"* has longer duration , namely 4 weeks with 11 time meeting . Although duration on study previously more long time, but results mark *p-value* as big as 0.005 or Can called with *negative rank* Which It means function cognitive elderly after given intervention more small compared to with before given intervention , while in study This results mark *p-value* of 0.000 which shows there is influence after given intervention in the form of *Brain Gym* on respondents . So that from results study This can concluded that giving intervention *Brain Gym* is given to elderly with risk dementia in the Home Social Tresna Elderly Budi Mulia 1 has significant influence to improvement function cognitive . Matter This proven in study This , that *Brain Gym* own influence in increase function cognitive in the elderly with risk dementia , with increase concentration , confidence self , desire For learn , and ability For controlling stress in the elderly .

Study This reinforced with research conducted by Estrada et al, (2022), with title *"The Effect of Brain Gym on Global Cognitive Function of Institutionalized Older People"* , which states that there is effectiveness from *Brain Gym* for increase function cognitive on elderly , with results test influence *Brain Gym* on function Global cognitive of elderly in groups intervention more there is change significant ($p < 0.05$) than the group control with results *post-test* ($p > 0.05$). Pratidina et al, (2023), also mentioned in his research entitled " *Literature Review* : The Influence of Therapy Brain Gym Modalities For Increase Function Cognitive in the Elderly

With Dementia " concluded results analysis of the 13 articles journal study that brain gymnastics beneficial For maintain And Also increase function cognitive elderly Because brain gymnastics movement can stimulate brain right and left so that increase concentration and power remember elderly with dementia .

In the research that I do do , look improvement function cognitive after done intervention *Brain Gym* Which implemented 3 time a week during 3 Sunday or 9 meetings . *Brain Gym* is step useful preventive For optimize , stimulate function brain become the more relevant to the elderly , and facilitates flow blood and oxygen to brain (Ana, 2018). According to Surahmat , (2017) in his research Which titled " Influence Therapy Exercise Brain To Level Cognitive Elderly Which Experience Dementia In Home Social Tresna elderly Inhabitant Tama Inderalaya " *Brain Gym* has ability For increase Power remember and repeat return to letter or numbers , increase sharpness hearing and vision , reducing error reading , memory , and ability comprehensive in groups someone who experiences disturbance language , as well as increase response to visual stimulation .

Movements in *Brain Gym* done by body , *hand and visual* Which cross the center line from body can increase potential brain with give stimulation new Which will strengthen connection between nerve in brain And make brain become more responsive . This will happen Because *parietal lobe* which has not quite enough answer For integrate various information in the body And control motion body through signal motor For furthermore sent to nerve peripheral . On system nerve center signal in brain then , sent to the spinal cord and to extremities through system nerve composed edge from nerve And ganglia Which elongated in outside brain And *medulla spinalis* . Nerve give track For impulse nerve reach part body . Impulse push balance tone muscle required For create each motion agile in hand And part other in body (Widanti et al., 2021).

Brain Gym fixes fibers in *the corpus callosum,* which provide Lots connection nerve two direction between cortical areas second *hemisphere* brain (*hippocampus)* and *amygdala*). Stimulus changes structure brain in a way significant (Kirnanoro and Maryana , 2017). Inner movement *Brain Gym* balancing activity second hemisphere brain in a way simultaneously , increasing flow blood and oxygen to brain , and can also increase ability structure And function

brain For Keep going develop Because existence stimulation Because stimulate brain right and left so that increase concentration and power remember elderly (Triyulianti et al., 2022). Limitations of the research This among them is researcher No take into account intervention addition For decline function cognitive experienced by respondents . In addition that , the lack of commitment accuracy time Respondent in implementation intervention because of There is some of the ones that are follow other activities at the same time .

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