

The Effects of Brain Gym on Quality of Sleep, Anxiety in Elderly at Nursing Home Care Case Medan

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Abstract

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BACKGROUND: The ageing process of human will cause changes in anatomy and physiology. Biologically, ageing is associated with the gradual accumulation of various molecular and cellular damage. Disorders of sleep quality are influenced by several factors, such as the medical condition of illness, stress, anxiety, and others. Brain gym is a collection of simple movements that aim to connect or unite the mind and body.

AIM: To find out the effect of brain gym in the quality of sleep and anxiety in the elderly at nursing home Karya Kasih Medan.

SETTING AND DESIGN: This is an experimental pre and post-test design with non-probability consecutive sampling.

METHODS: This study involved 68 elderly who undergone brain gym for eight weeks. These patients were recruited from the nursing home Karya Kasih Medan, Indonesia. This study was conducted in July-November 2018. This study was approved by the local ethical committee. The Pittsburgh Sleep Quality Index (PSQI) is used to assess sleep quality. Anxiety is assessed using the Hamilton Rating Scale for Anxiety (HARS). Data were analysed by paired t-test of SPSS version 22.

RESULTS: PSQI score pre-test [mean (SD); 16.39 (0.68)] and post-test [mean (SD); 8.99 (0.89)], ($p < 0.001$). HARS score pre-test [mean (SD); 20.4 (6.7)] after post-test [mean (SD); 10.7 (5.2)], ($p < 0.001$).

CONCLUSION: Brain gym increased the score level of the PSQI and HARS in the intervention group ($p < 0.001$).

Introduction

Elderly is an age group in humans who have to enter the final stage of a life phase. The group that categorised as the elderly will have a process called the ageing process. According to the World Health Organization (WHO), the elderly or someone who has reached the age of 60 and above [1].

According to WHO, the elderly are individuals aged 60 years and over comprising: (1) Elderly is 60-74 years old; (2) Old Age is 75-90 years old, and (3) very old age (very old) is over 90 years old. In Indonesia, based on national law, the elderly are aged

60 years and over [2].

The ageing process is characterised by the loss of progressive physiological integrity, which causes impaired function and increases susceptibility to death. This damage is a major risk factor for various diseases, including cancer, diabetes, cardiovascular disorders, and neurodegenerative diseases [3].

Sleep deprivation was found to interfere with cognitive performance, mood, glucose metabolism, regulation of appetite, and immune function. Physiologically, sleep is an internally and externally controlled process structured by the interaction of circadian clock and homeostatic mechanisms. In a

variety of conditions such as cardiovascular disease, type 2 diabetes, depression, some cancers, and arthritis, physical activity and exercise are advocated as effective interventions to treat sleeping disorder [4].

The US National Heart, Lung, and Blood Institute state that the decrease in sleep quality is caused by a medical condition regarding an illness, stress, anxiety, and other factors [5]. About 50% of older adults living in private homes and 70% living in nursing homes experiencing impaired in sleep quality [6].

A study from Nathalia et al. found that stress was associated with several individual factors, such as age, employment status, type of work, personality, level of education, and socioeconomic status. Depression was considered important in stress relative to sleep quality [7].

Increased instability of both NREM and REM sleep is a crucial neurophysiological mechanism in insomnia. Insomnia is also often associated with other mental disorders and may be considered a risk factor for depression. Insomnia has also been associated with increased emotion regulation difficulties [8].

Brain Gym was an intervention designed by Paul and his wife, Gail Dennison, in 1970 to improve various outcomes, including attention, memory, and academic skills. This intervention requires participants to be involved in various movements to coordinate their hands, eyes, ears, and the whole body. Brain gym is a kinesiology education program that is promoted and applied in over 87 countries. Also, the brain gym material has been translated into over 40 languages [9].

A study conducted by Raissa in 2014 at nursing home TresnaWerdha in South Lampung concerning the effects of brain gym for the elderly with insomnia or sleep disorders with the quasi-experimental pre-post with an intervention method of brain gym test by recruiting 90 elderly people using the Insomnia Rating Scale found that there was a brain gym influence to reduce insomnia scores in the elderly ($p = 0,000$) [10].

Physical activity contributes to reducing psychological distress among the elderly because it promotes psychosocial interactions, increases self-esteem, helps in maintaining and improving cognitive function, and serves to reduce the frequency of recurrence of depression and anxiety. Exercise, as a therapeutic tool, has several advantages, especially to reduce the sensitivity of serotonin receptors in certain brain areas that are considered as the designated down-regulation system [11].

A study conducted by Daffa in 2010 with an experimental, analytical method based on the community with a quasi-experimental study design pre and post-test one-group design. The anxiety level was measured by the Hamilton Anxiety Rating Scale (HARS) questionnaire before and after the gymnastic

exercise. Data analysis was performed using the Paired Sample T-test with a confidence level of 95%. We found that the mean score of HARS before brain gym was 9.38 ± 6.01 , which means it goes into the category of mild anxiety. The mean score of HARS after brain gym was 5.12 ± 5.24 , which meant entering into the category of not anxious.

As the ages evolved, we investigated many efforts to overcome the problem of sleep disorders and anxiety in the elderly. Based on the background described above, we want to know the relationship of giving brain gym interventions for eight weeks to the quality of sleep, anxiety in the elderly at nursing home Karya Kasih in Indonesia, Medan.

Methods

This study was an experimental pre and post-test with paired numerical analysis, which assessed the relationship of brain gym interventions for eight weeks to the quality of sleep, anxiety in the elderly. The number of samples in the study was 68 elderly who were in nursing homes Karya Kasih Medan. The sampling technique was non-randomization consecutive sampling method, which was based on the inclusion and exclusion criteria.

All research subjects who were by the inclusion and exclusion criteria in the study were asked for approval to take part in the study after getting informed consent. The inclusion criteria were cooperative elderly aged > 60 , willing to take part in the study and the exclusion criteria of the subjects in this study were elderly who had emotional, mental disorders and had physical disabilities. We assessed emotional mental disorders using the MINI ICD-10 questionnaire. Examination of blood pressure, blood sugar levels, and cholesterol to support physical health in the elderly as a condition can follow the brain gym intervention.

Brain gym intervention was conducted on samples for eight consecutive weeks consisting of 3 sessions per week. We assessed the sleep quality in the elderly using the Pittsburgh Sleep Quality Index (PSQI), consists of a study of subjective sleep quality, the time of start sleeping, sleep duration, sleep efficiency, sleep disturbances, drug use habits to help sleep, and related daily activities by sleeping. The level of anxiety was assessed using the Hamilton Rating Scale for Anxiety (HARS), which consisted of 14 groups of symptoms, each of which was divided into more specific symptoms [12]. This study was approved by the medical ethics committee of the Sumatera Utara University.

Statistics

The collected data were tabulated and presented in the form of a frequency distribution table, and data analysed statistically using a paired t-test of Statistical Package for the Social Sciences (SPSS).

Results

Based on the demographic characteristics of the study, male subjects are 35 (51.47%), and female is 33 (48.53%). The average age is 63.27 ± 3.41 . At the educational level, 10 primary schools (14.71%), 24 elementary schools (35.29%), 27 high schools (39.71%), 7 universities (10.29%). Based on the history of previous illnesses, there were 43 (63.24%) diabetes mellitus, 38 (55.88) hypertension, 40 cholesterol (55.82%), and 21 stroke history (30.88%) (Table 1).

Table 1: Distribution of Demographic Characteristics of Participants

Variable	n	%
Gender		
Male	35	51.47
Female	33	48.53
Age 63.27 ± 3.41		
Education		
Primary school	10	14.71
Elementary School	24	35.29
High School	27	39.71
University	7	10.29
History of previous Illness		
Diabetes mellitus	43	63.24
Hypertension	38	55.88
Cholesterol	40	55.82
Stroke	21	30.88

Table 2 shows that the results of the paired t-test on the Pittsburgh Sleep Quality Index (PSQI) score pre-test is [mean (SD); 16.39 (0.68)] and post-test [mean (SD); 8.99 (0.89)].

Table 2: Brain Gym Intervention and Sleep quality

Variable	Mean (SD)	Difference (SD)	Confidence Interval	P
Baseline		7.4 (1.09)	7.30-7.91	< 0.001
Before Brain Gym (n = 68)	16.39 (0.67)			
Week 8				
After Brain Gym (n = 68)	8.99 (0.89)			

*paired t-test.

There is a significant decrease in sleep quality for eight weeks, giving brain gym interventions in the intervention group ($p < 0.001$).

Table 3: Brain Gym Intervention and Anxiety

Variable	Mean (SD)	Difference (SD)	Confidence Interval	P
Baseline		9.4 \pm 4.8	9.31-9.82	<0.001
Before Brain Gym (n = 68)	20.4 \pm 6.7			
Week 8				
After Brain Gym (n = 68)	10.7 \pm 5.2			

*Paired t-test.

The table shows the results of the paired t-test on the Hamilton Rating Scale for Anxiety (HARS) score pre-test [mean (SD); 20.4 (6.7)] and post-test [mean (SD); 10.7 (5.2)]. It shows that there is a significant decrease in anxiety over eight weeks after brain gym interventions in the intervention group ($p < 0.001$).

Discussion

This study is similar to the study conducted by Raissa, 2014 at Nursing House Tresna Werdha in South Lampung, using a measuring instrument called Insomnia Rating Scale. The score of insomnia in the elderly shows the average value of the study with the respondent's score of insomnia before the brain gym intervention is 25.5181. The score of respondents for insomnia after brain gym intervention is 21.4578. Insomnia scores among respondents after brain gym is lower than the insomnia score in the community before the brain gym, with a difference of 4.0603 ($p = 0.001$) [10].

Jatmiko, 2013, found that the implementation of brain gym conducted for three weeks can reduce insomnia scores in the elderly with an average difference of 4.70 [16]. The results of this study are supported by the study of Doewes (2009), which states that brain gym can reduce sleep disturbances by relaxing the muscles, and the result is $p = 0.000$ [12].

The reduction hours of sleep do not become a problem if the elderly get adequate quality of sleep because of the high quality of sleep, even if only two hours can restore body and brain function. Also, insomnia in the elderly is caused by biological factors and psychological factors. Biological factors such as the presence of certain diseases may cause in a person not being able to sleep well. Psychological factors can be anxiety, psychological stress, fear and emotional tension [13].

In conclusion, brain gym significantly decreases sleep quality and anxiety of the elderly after eight weeks of intervention ($p < 0.001$).

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