THE EFFECT OF PHYSICAL PROGRAMMING EXERCISE ON BDNF SERUM RECEIVER ON LANSIA IN HEALTHY HEALTH CLUB PALEMBANG

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Abstrak

Along with the age increase, most elder people are lazy to exercise, doing physical activity regularly and periodically will make the cognitive function better . When performing physical activity, the brain will be stimulated to increase the protein in the brain called Brain Derived Neutrophic Factor. BDNF is an important role to keep the nerve cells healthy and fit. The aim for this study is to analyze the influence of programmed physical activity on BDNF serum levels in elderly people at healthy heart palembang clubs. This study is a Cross Sectional research with sample used are elderly people who regularly do programmed physical activity at Club Jatung Sehat Kambang Iwak Palembang Branch. Sample in this Research are the healthy elderly and are over 60 years old, in total of 25 people. Result of analysis of the influence between the level of physical activity with the function of BDNF serum level in elder people was obtained and shows that respondents with regular physical activity have a good level of BDNF serum. The statistical test result obtained shows a significant increase of BDNF levels (p = 0,014) thus can be concluded that there are influence among activity level against BDNF serum levels on elderly.

Keywords: Physical Activity, BDNF Serum Level , Elderly

PRELIMINARY

The number of elderly people in Indonesia each year has increased. According to the Central Bureau of Statistics (2013) the projected number of elderly (> 60 years) in Indonesia, by 2014 the number are estimated to reach 207.93 million souls, and in 2035 estimated to reach 481.987.0000 million people. Increasing number of elderly people in Indonesia significantly make Indonesia into the top 5 countries that have the largest population of elderly in the World (World Health Organization, 2014). Increasing number of elderly also affects the increase of life expectancy in Indonesia. According to the United Nations 2011 report, in 2000-2005 life expectancy reached 66.4 years (with the percentage of elderly in 2000 of 7.74%). This figure will increase in the year 2045-2050 with estimated life expectancy to be 77.6 years (with the percentage of the elderly population in 2045 of 28.68%). The Central Bureau of Statistics (BPS) also said there was an increase in life expectancy, from 64.5 years (with an elderly population percentage of 7.18%) in 2000 to 69.43 in 2010 (with per-centage of elderly population of 7, 56%), and in 2011 to 69.65 years (with percentage of elderly population of 7.58%) (Center for Data and Information Ministry of Health, 2013).

The increasing proportion of elderly raises some health problems. Based on data from the Ministry of Health's Data and Information Center (2013), the elderly's biggest

health problem is a degenerative disease. It is estimated that in 2050 about 75% of elderly people with degenerative diseases cannot move. Degenerative diseases in elderly is one of the decline in cognitive function (memory). Cognitive function is a mental process in acquiring knowledge or ability and intelligence, which includes thinking, memory, understanding, planning, and implementation (Santoso & Ismail, 2009).

Basically, memory will decrease in corresponds with age. In addition, there are risk factors that can affect the decline in function, namely the offspring of the family, education level, brain injury, toxins, not doing physical activity, and chronic diseases such as Parkinson's, heart disease, stroke, and diabetes (The US Department of Health and Human Services, 2011). Actually, the decline in this function can be inhibited by doing preventive act. One of the preventive measures that can be done elderly is by increasing physical activity (Blondell, Hammersley-Mather, & Veerman, 2014). One way to maintain cognitive function (memory) in elderly people who experience cognitive impairment (memory) is by providing physical activity, where the activity is an exercise that helps maintain health and fitness in the elderly. Continuous physical exercise has an advantage for the elderly, which can increase brain plasticity and growth and cell survival in the brain. The results showed that the brain image of individuals who perform physical paths with intensity medium could increase the brain volume in the most important parts such as memorization, knowledge and planning significantly compared to inactive individuals. Physical exercise improves connections between parts of the brain and has better cognitive function. This gives the impression that many brain cells and interconnected with others, and help the brain to function very effectively (Farrow et al ., 2013).

According Muzamil, et al (2014), high levels of physical activity and routine have a relationship with the high score of cognitive function. However, elderly who have low or moderate activity levels are associated with decreased cognitive function, particularly memory and language function (Makizako, et al., 2014). Studies conducted by Busse, et al., (2009) shows that physical activity can improve executive function, attention, speed of thinking, memory work and long / short memory.

According to Jones and Rose (2005) by conducting short-term physical activity programs such as physical exercise can bring meaningful improvement in the performance of elderly cognitive function. In addition, by doing physical activity on a regular basis and periodically including walking will make the cognitive function better. This is because physical activity can maintain optimal blood flow and deliver nutrients to the brain. If the elderly does not perform physical activity on a regular basis then the blood flow to the brain decreases, and will cause the brain lack of oxygen. (Marhamah, 2008; Weuve, et al ., 2004).

Physical activity is also thought to stimulate nerve growth that may inhibit the decline in cognitive function in the elderly (Muzamil, Afriwardi, & Martini, 2014). According Kirk-Sanchez and McGough (2013) during physical activity, the brain will be stimulated so that it can increase the protein in the brain called Brain Derived Neutrophic Factor (BDNF). This BDNF protein plays an important role in keeping nerve cells healthy and healthy. However, if low levels of BDNF will cause dementia disease (Antunes, et al., 2006).

Previous research conducted by Bob (2016) informs that correlation levels of Brain-derived neurotrophic factor (BDNF) and Levels of mice’s Brain Tissue

Malondialdehyda (Mus musculus) of a Control group, and Aerobics Acute and Chronic Group. From the above studies, it is known that there is a relationship between BDNF and cognitive function, but research that examines the physical exercise and BDNF in the elderly is still very limited, therefore it need futher research about it to know the influence physical exercise on BDNF serum levels in elderly who performed a programmed physical exercise in the “Healthy Heart Palembang Cub".

RESEARCH METHODS

This research is a type of descriptive quantitative research, obtained based on research in the laboratory located in Bio Science Research Palembang. This research uses experimental method by using Crossextional approach. Subject of the research is the elderly who are programmed to follow physical activities (healthy heart gymnastics) in Club Healthy Heart Palembang. A number of sample in this research is as much as 25 people with the characteristics of an elderly, aged more than 60 years old, physically and spiritually healty.

Data gathering is done by taking blood samples before and after doing physical activity (healthy heart gymnastics and walked for 6 minutes). After that, the sample will be researched in laboratories and the results obtained from the average BDNF test results founds that there are increasing number of average BDNF levels before doing physical activity. Data obtained then processed using SPSS version 23. Data were analyzed using bivariate with proportion test on each variable including the physical activity and levels of elderly BDNF serum. The study used unpaired t-test with significance $p<0,05$ to know the effect of programmed physical exercise to BDNF serum level in elderly of Palembang Healthy Heart Club.

RESULTS

Physical activity. Based on table 1 it can be seen that the elderly who follow regular gymnastics program has a good physical ability.

Table 1. Physical activity of the elderly (walked for 6 minutes)

Number of samples (n)	%	Information
6	24%	Very well
10	40%	Good
4	16%	Enough
3	12%	Deficient
2	8%	Very Deficient
25	100%	

Levels of elderly BDNF Serum. Based on table 2 after conducting laboratory tests it can be seen that there was an elevated level of BDNF serum in the elderly before

and after performing the programmed physical activity at Club J antung Sehat Palembang.

Table 2. Elderly BDNF Serum Levels

Group	n	Mean ± SD(pg/ml)
Before physical activity	25	313,158 ± 67,952
After physical activity	25	365,2974 ± 76,012
Total	50	

The effect of programmed activity on BDNF serum levels. Based on table 2 and 3 it can be concluded that there was an increase in elderly BDNF serum levels after performing an activity by 16.6%. Statistical test results obtained by value p=0,014 then it can be concluded that there is significant relationship between physical activity terproram against BDNF serum levels in the elderly in Palembang Healthy Heart Club.

Table 3. The influence of programmed activity on BDNF serum levels in the elderly

Group	n	Mean ± SD (pg/ml)	Pvalue
Before physical activity	25	313,158 ± 67,952	0,781
After physical activity	25	365,2974 ± 76,012	
Total	50		

DISCUSSION

After performing the calculation with spss version.23 using unpaired t-test (independent sample t-test) obtained p value = 0.014, The result is smaller than the significant level of 0.05. With these results can be concluded that there is an influence of programmed physical activity against elderly BDNF serum levels in Healthy Heart Club Palembang. The average number of BDNF serum level in elderly before and after physical activity was large before physical activity (313,158 ± 67,952 pg / ml) and after physical activity (365,2974 ± 76,012 pg / ml), that means the physical activity are influencing BDNF serum levels in elderly who perform programmed physical activity. Based on these results it can be concluded that physical activity could stimulate

occurrence process of neorological that is related with nerve growth in the brain and could be improved with protein (BDNF), which will helps elderly to maintain physical conditions and help inhibit the degenerative process or senility.

According Muzamil, et al (2014), high levels of physical activity and routine have a relationship with the high score of cognitive function. However, the elderly who have low or moderate activity levels are associated with decreased cognitive function, particularly memory and language function (Makizako, et al., 2014). Studies conducted by Busse, et al., (2009) show that physical activity can improve executive function, attention, speed of thinking, memory work and long / short memory.

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Previous research conducted by Bob (2016) reports that Correlation Levels of Brain-derived neurotrophic factor (BDNF) and Levels of mice's Brain Tissue Malondialdehyda (Mus musculus) Control group, Aerobics Acute and Chronic Group.

Bherer, Erickson, and Ambrose (2013) also said they still do not understand the impact of physical activity on the rate of decline in cognitive function. One major issue is whether the physical activity is broadly defined or structured exercises that lead to the same benefits in preventing cognitive decline. Therefore, it is not yet known which dimensions of physical activity most affect cognitive function in the elderly.

Further research is needed to understand the intensity, duration, and type of exercise better to improve cognitive function in the elderly. Therefore, cognitive function decline one of them can be prevented by doing physical activity, especially physical exercise. Good physical activity performed for> 150 minutes / week can have an impact on improving cognitive function (Makizako, et al., 2014). Several studies suggest elderly to adopt physical activity and exercise as part of their lifestyle to reduce negative impact on body and mind (Bherer, Erickson, & Ambrose, 2013).

CONCLUSION

The results showed that physical activity plays an important role in elevated BDNF serum levels in the elderly. There was a 16.6% increase in BDNF serum levels

after physical activity. And from unpaired t-test showed the influence of programmed physical activity on BDNF serum level in elderly.

The results of this study can be used as input for health workers, especially community nurses to optimize the role of nurses in providing nursing services related efforts to prevent the decline in cognitive function by increasing the physical activity of the elderly in the form of physical exercise. Things that can be done by community nurses by knowing the types of physical activity that can be done by the elderly in accordance with its ability to minimize the incidence of injury or things that do not want to happen in the elderly.

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