Giving Brain Gym Using Booklets To Reduce The Level Of Depression Among Elderly In The Community

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Abstrak

Lanjut Usia di Indonesia sebanyak 30% mengaku memiliki sindrom depresi. Sindrom depresi menunjukkan gangguan mood, gejala fisik dan kognitif. Gejala kognitif dapat mencakup kesulitan dalam pengambilan keputusan, penurunan konsentrasi, dan gejala fisik. Salah satu penatalaksanaan depresi adalah psikoterapi menggunakan senam otak. Brain Gym memiliki manfaat mengaktifkan tiga dimensi otak, yaitu dimensi konsentrasi, dimensi lateral, dan dimensi fokus. Metode penelitian ini adalah kuantitatif dengan menggunakan desain quasi-eksperimen pretest-posttest without kontrol. Lokasi penelitian berada di Posyandu lansia Desa Pabelan,kecamatan Kartasura, Sukoharjo, Jawa Tengah, waktu penelitian 1 Maret - 4 April 2019, sebanyak 30 responden dengan metode purposive sampling. Kriteria inklusi untuk responden berusia di atas 60 tahun, mengalami depresi ringan dan sedang, tidak mendapatkan obat anti-depresi, anti-psikotik, atau anti-kecemasan. Penelitian ini menggunakan instrumen Geriatric Depression Scale (GDS) dan analisa data menggunakan Paired t-test. Hasil penelitian memperoleh data bahwa dari hasil pre-test, mayoritas responden adalah Depresi Ringan (93,3%), post -test 1 mayoritas tidak Depresi (66,7%), dan Post-test 2 mayoritas Tidak Depresi (83,3%). Nilai P value posttest 1 adalah 0,039, dan posttest 2 adalah 0,001. Kesimpulannya adalah bahwa ada pengaruh yang signifikan dalam Terapi Senam Otak di posttest 2, dengan nilai-P 0,001. Tingkat depresi pada lansia menghasilkan nilai rata-rata pretest lebih tinggi daripada nilai posttest, yang berarti bahwa tingkat depresi setelah terapi senam otak mengalami penurunan.

Kata Kunci: *senam otak; depresi; lanjut usia*

Abstract

The number of older adults found in Indonesia, as many as 30% claimed to have depression syndrome. Depression syndrome shows mood disorders, physical and cognitive symptoms. Cognitive symptoms can include difficulties in making decisions, decreased concentration, and physical symptoms. One of the management of depression is psychotherapy using brain gymnastics. Brain Gym has the benefit of activating the three dimensions of the brain, namely the concentration dimension, the lateral dimension, and the focusing dimension. This research method was quantitative by using a pre-experimental design with the Quasi-experiment pretest-posttest design without control group design. The research site was in the Posyandu for the elderly in Pabelan Village, Kartasura District, Sukoharjo, Central Java, with a time of March 1 - April 4, 2019, as many as 30 sites with a purposive sampling method. The inclusion criteria for respondents were aged over 60 years, experiencing mild and moderate depression, not on an anti-depressant, anti-psychotic, or anti-anxiety

treatments. This research used the Geriatric Depression Scale (GDS) short form instrument and the Paired t-test.The results of the study obtained data that from the results of the pre-test, majority of respondents were Minor Depression (93.3%), from post-test 1, majority not Depressed (66.7%), and from the Post-test 2, majority Not Depressed (83.3%). The p-value of posttest 1 was 0.039, and posttest 2 was 0.001. The conclusion is that there is a significant influence in the provision of Brain Gymnastics in posttest 2, with a P-value of 0.001. The level of depression in the elderly results in the mean value of the pretest is higher than the value of the posttest, which means that the level of depression after brain gym therapy has decreased.

Keywords: *brain gymnastics; depression; elderly*

INTRODUCTION

Elderly is a phase when an organism has reached maturity level and is in the final stages of human development so that they have experienced a gradual decline in function, thinking, remembering, capturing, and responding (1). Indonesia is heading toward an ageing population. Indonesia, In 2014, the population census found that the number of people aged 60 years and above was 18.1 million, or 7.6 percent of the total population. This number is projected to increase to 33.7 million, or 11.8 percent of the population, by 2025 and to reach 48.2 million, or 15.8 percent, by 2035. Indonesia's age structure is gradually shifting toward having more people in higher (2).

High population rate of elderly in Indonesia caused bigger problem will be faced, one of psychological health problem that are often found in elderly namely depression. The World Health Organization (WHO) has identified the elderly as a group of people who are prone to physical and mental deterioration. Various problems that occur in the elderly can cause depression, both mild, moderate and severe depression. Depression is not a normal aging process, depression is a disease. The cause of depression in the elderly is due to psychological changes that make them very vulnerable to various physical diseases (3).

The total elderly in Indonesia, as many as 30% of the elderly claim to have depression syndrome. The results of this study were obtained from the Center for Health Research of Universitas Indonesia and the Oxford Institute of Aging (4). Depression syndrome shows a disturbance in mood, physical, and cognitive symptoms. Symptoms associated with mood disorders such as feeling sad, decreased, and even lost interest in doing activities, feeling useless, and having thoughts about death and suicide. Cognitive symptoms can include difficulties in making decisions, decreased concentration, and physical symptoms that may appear are fatigue, decreased appetite, decreased activity levels, slow motion, and sleep disorder (5).

Management of depression that can be done is in the form of pharmacological therapy and psychotherapy. Specifically, psychotherapy action is performed to reduce depressive symptoms such as music therapy, cognitive therapy, laugh therapy, reminiscence therapy, and brain gym therapy (6).

Brain gym has the benefit of activating the three dimensions of the brain, namely

the dimension of concentration, the lateral dimension, and the focusing dimension. In the centering dimension, it will maximize blood flow and the smooth circulation of oxygen to the brain. Then, in the lateral dimension, it will provide stimulus to all parts of the lobes in the brain, and make the body relax. In the focusing dimension, this exercise will help improve focusing and concentration of the elderly (7).

The novelty of this research is the therapy that will be uses besides brain exercise practices are booklet media and group therapy models so that the elderly can remember and do it at home. Besides the more a person's social interaction with others, the more easily a person is to respond to stressors coming at him, the elderly experience loneliness will feel that they are not useful to make the elderly susceptible to depression.

The purpose of this research is to know the difference of brain gymnastic in reducing level of depression in the elderly in Pabelan village, Kartasura district.

MATERIALS AND METHODS

This research is a quantitative study with quasi-experimental research, one group pretest-posttest without control group design, conducted in the *Posyandu* (Integrated Service Post) of the elderly in Pabelan Village, Kartasura District, Sukoharjo, Central Java, in March 1 - April 4, 2019. The sampling technique is using purposive sampling, with inclusion criteria are over 60 years old, experience mild and moderate depression, not in anti-depressant, anti-psychotic, or anti-anxiety drugs treatments. Total number of respondents are 30. The instrument that will be use in this study is the short form of the Geriatric Depression Scale (GDS) consisting of 15 closed questions with a total score 0-4 (normal), 5-8 (mild depression), 9-11 (moderate depression) and 12-15 (severe depression), with the results of the validity

test that have been done in Gonilan Kartasura Village, Sukoharjo with the results of r count 0.4438 and reliability test 0.886. The provision of brain gymnastics was by demonstration and distribution of booklet media so that the elderly could remember the movements that had been demonstrated by therapist. Previous media were tested for content validity by two experts on the gymnastic movements to be demonstrated, Ethical Approval : The study was approved by the Health Research Ethics Committee Faculty of Medicine, Universitas Muhammadiyah Surakarta with number No.1935/B.1/KEPK-FKUMS/II/2019.

The Research Implementation Stage In the first day, the researchers conducted a pre-test to the respondents using a questionnaire, according to the inclusion criteria, 30 respondents were obtained. After that, researchers formed a group to be given brain gymnastic intervention. The intervention was carried out after the respondents being gathered in an open space. The researchers explained to respondents the contract of time and work procedures, according to the booklet material. The intervention was carried out for a month with a frequency of two times a week, which lasted for ± 20 minutes at each meeting. This research using 2 times post-tests to know the time effectiveness of brain exercise therapy using booklet on reducing depression and this has never been done by the previous researcher. Data analysis was performed using the Paired t-test.

RESULTS AND DISCUSSION
Characteristic of the respondents

All the characteristic of respondent including age, gender, education history, and employment history has the categorized form so they were described in the frequency distribution tables.

From Table 1, it can be seen that the age group is dominated by female respondent with a total number of 29 respondents (96.7). And then, based on the age category, the majority of

respondents are in the 60-74 years age category with a total of 23 (76.7). Referring to the last education, the majority of the respondents from elementary school with 14 respondents (46.7). Marital status of the majority of respondents experiencing not married with 22 respondents (73.7).

Table 1. Distribution of the Elderly with Depression according to characteristics of Age, Gender, Education History, employment and marital status

Characteristics	Frequency (N=30)	%
Age		
60-74	23	76.7
75-90	7	23.3
Gender		
Male	1	3.3
Female	29	96.7
Employment		
Employed	6	20
Unemployed	24	80
Education		
Elementary School	14	46.7
Junior High School	6	20
Senior High School	3	10
No Formal Education	7	23.3
Marital status		
Married	8	26.7
Not married (widow/widower/ single)	22	73.3

Frequency Distribution of Depression Levels

The results below are the distribution of Depression level of Pre-test, Posttest 1, and Posttest 2. The Table 2 above illustrates that prior to intervention, the majority of respondents experienced Mild Depression of 28 (93.3%), after Intervention, or posttest 1, the majority of respondents experienced No Depression of 20 (66.7%), and at the time of Posttest 2, the majority of respondents experienced No Depression was 25 (83.3%).

In this group, before the intervention of brain therapy was carried out, the majority of respondents experienced mild depression with a total of 28 respondents (93.3 %), which means that the elderly experience ongoing sad disturbances, but not so experienced any behavior disorder (8).

In the group before being given the brain gym intervention, all respondents experienced mild depression. It is supported by research from Azzahro that the distribution of the highest level of depression is mild depression (66%), which means that the elderly experience ongoing sad disturbances, but not so experienced any behavior disorder (8).

Depression is influenced by various factors, namely, age, sex, occupation, education, and marital status. Another theory states that depression in old age is inseparable from economic, social, and cultural problems (9). However depression arises from a low mood, the loss of a loved one, suffering from a chronic illness, taking drugs for a long time, and depression (10).

Because the symptoms of depression are somatic, many older adults do not know that they are depressed but complain increased such as sleep, suicide, guilt, and have decrease like interest, energy, concentration, appetite, psychomotor (11). It is because the burden in life is heavier, and physiological functions are increasingly experiencing setbacks in various abilities, such as visual abilities, thinking, listening, and remembering things.

Table 2. Frequency Distribution of Depression Levels of Pre-test, Posttest 1, and Posttest 2

Depression Levels	Pre-test		Posttest 1		Posttest 2	
	Frequency	%	Frequency	%	Frequency	%
No Depression	0	0	20	66.7 %	25	83.3 %
Mild Depression	28	93.3 %	10	33.3 %	5	16.7 %
Moderate Depression	2	6.7 %	0	0	0	0
Severe Depression	0	0	0	0	0	0
Total	30	100%	30	100%	30	100%

Frequency distribution of elderly depression at posttest 1 was 66.7% of the elderly became normal/not depressed, and 33.3% had mild depression. While in posttest 2, 83.3% of the elderly became normal/did not experience depression, and 16.7% experienced mild depression. From the results of a similar study of the effect of brain gym on the reduction in stress levels by Rahayu obtained the same results that most of the respondents experienced a decrease in stress levels (12).

It states that the brain gym has a positive impact on the elderly. Brain gymnastics can reactivate the neural connection between the body and the brain, thereby facilitating the flow of electromagnetic energy throughout the body. When done regularly, it will facilitate the flow of blood and oxygen to the brain because its movements can stimulate the work and function of the brain optimally(13).

Test of Normality and bivariate Analysis

The table below explains the results of the data analysis test and test of Normality

Table 3 shows that the research data is normally distributed and based on the Table 4 above, it can be seen that there are significant differences in results before intervention (Brain gym) and after the intervention. The t-test results showed that the average level of depression of respondents before treatment had 2.07, at posttest 1 the mean decreased by 1.33 with a p-value of 0.039, and there was a decrease in depression again at posttest 2 the mean of 1.17 with a p-value of 0.001. It means that, in posttest 1, there has been no effect of giving brain gym to a decrease in depression levels, whereas, in posttest 2, there has been an influence on giving brain gym to a decrease in depression levels.

Based on the results of the study by comparing the mean values before and after given brain exercise intervention with the paired t-test, it is known that the average level of

Table 3. Test of Normality Pretest with Posttest

Groups	P Value	Summary
Post Test 1	0.482	Normal
Post Test 2	0.367	Normal

Table 4. Test Results of Data Analysis of Depression Level Differences

Variable	Mean	SD	P-value
Pre-test	2.07	± 0.254	
Posttest 1	1.33	± 0.479	0.039
Posttest 2	1.17	± 0.379	0.001

depression of respondents before treatment was 2.07, the mean decreased by 1.33 at posttest 1 with a p-value of 0.039, and decreased depression again in the post-test 2 mean of 1.17 with a p-value of 0.001.It means that at posttest 1, there was no effect of brain gym on decreasing levels of depression, whereas, at posttest 2, there was an effect of giving brain gym on decreasing the levels of depression.

In addition, in the posttest 1, the mean difference value was 0.74 points while in the posttest 2, the mean difference was 0.90 points. The results of this study are supported by the study of Panglipurethias on the Effects of Brain Exercise Gymnastics on the level of depression in the elderly, by providing interventions conducted three times a week for three weeks. The results obtained are a significant difference in mean values after a repeated intervention is given.(14)

This result is supported by the results of the study by Panglipurethias that there is an effect of brain gym on decreasing depression scores in the elderly, with a p-value of 0,000 (α ≤ 0.05).(14)

Brain Gym is a series of learning exercise that are great for all ages especially elderly. Brain Gym helps in to boosting self-esteem. It can improve eyesight and even increase creativity & develop communication skills. Brain Gym brings improvement in areas such as : concentration and focus, memory, depression, relationships and organization skills. (15) Brain Gym therapy can be implemented with individual

therapies or goups therapies. In this research brain gym implemented by groups therapy. Individual therapy according to some experts is the most recent form of therapy to be selected in overcoming mental health problems, which involves group support or social group support. (16) The results of this study revealed that there was a positive outcome or effect of the therapy of brain gymnastics using booklet in reducing depression levels in the elderly. The overall goal of group therapy is to increase the awareness of the individuals, of themselves and the others, help them to start making changes they want to achieve in life, and also to provide the necessary tools to accomplish these changes.

Physical activity therapy can stimulate cognitively, improve the quality of life of the elderly, feel relaxed, to reduce anxiety and depression in the elderly (17). Research by Bishwajit et al., showed that of 48 respondents studied, 34 respondents experienced a significant decrease in depression due to physical exercise at frequent and regular intervals (18)there has been a growing research interest on how physical inactivity correlates with depressive outcomes across countries. The present study aimed to examine 1.

Depression in the elderly is caused by psychosocial factors, namely the environment, while the biological level is serotonin levels.(19) When the elderly are depressed, the serotonin levels in the brain are low. Serotonin functions to send signals to nerves, depression in the elderly is associated with a decrease in serotonin levels almost 30%-50% (20). Brain gym for the elderly can increase the hormone serotonin, endorphins, and melatonin. These three hormones can provide a feeling of calm, comfort, and relaxation so that stress levels can be lowered. Serotonin can encourage the limbic system to increase feelings of comfort, happiness, satisfaction, good appetite, psychomotor balance, and appropriate sexual drive. Endorphins are useful for suppressing pain signals that enter the nervous system by activating the pain regulation system and providing a relaxing effect. Meanwhile, melatonin can relax muscles, reduce tension and anxiety, and provide a comfortable feeling (21).

CONCLUSION AND RECOMMENDATION

There was a significant influence before and after the giving of Brain Gymnastics in Posttest 2 in the *Posyandu* (Integrated Service Post) of the elderly in Pabelan Village, Kartasura District, Sukoharjo, Central Java, with a P-value of 0.001.

The level of depression in the elderly carried out brain gym therapy, resulting in that the mean value of the pretest from 30 respondents is higher than the value of the posttest. From these results, the average value has decreased, which means that the level of depression after given brain gym therapy has changed. Brain gym therapy is good in reducing depression in the elderly, so there is a need for socialization and training to Kader about a brain gym program so that they can become trainers at the elderly *Posyandu*.

REFERENCES

1. Amperawan RH. Perbedaan Tingkat Kecemasan antara Lansia yang Tinggal di Panti Wreda dan yang Tinggal di Rumah. *Universitas Muhammadiyah Semarang*. 2016
2. Mujahid PSMAdG. *Monograph Series: No.1. Indonesia on the Threshold of Population Ageing*. UNFPA, the United Nations Population Fund. 2014.
3. Putri & Fitriyani. Gambaran Tingkat Depresi Lansia yang Melakukan Senam Di Panti Sosial Tresna Werdha di Jakarta. *Jurnal Keperawatan Indonesia* [Internet]. 2016;19(2):92–9. Available from: https://doi.org/10.7454/jki.v19i2.464
4. Helvik AS, Barca ML, Bergh S, Šaltyte-Benth J, Kirkevold Ø, Borza T. The course of depressive symptoms with decline in cognitive function - A longitudinal study

of older adults receiving in-home care at baseline. *BMC Geriatr.* 2019;19(1):1–14.

5. Wongpakaran N, Wongpakaran T, Sirirak T, Jenraumjit R, Jiraniramai S, Lerttrakarnnon P. Predictors of polypharmacy among elderly Thais with depressive and anxiety disorders: Findings from the das study. *BMC Geriatr*. 2018;18(1):1–8.

6. Azizah M. *Keperawatan Lanjut Usia*. Yogyakarta : Graha Ilmu.2011.

7. Yanuarita FA. *Memaksimalkan Otak Melalui Senam Otak (Brain Gym)*. Yogyakarta: Teranova Books.2012.

8. Azzahro, F. D., & Rosyid FN. Hubungan Antara Tingkat Depresi Dengan Kualitas Hidup Lanjut Usia di Panti Wredha Darma Bhakti Pajang Surakarta. *Universitas Muhammadiyah Surakarta* [Internet]. 2016. Available from: http://eprints.ums.ac.id/44896/12/Naskah Publikasi.pdf. Accessed on Mei 2, 2019.

9. Nugroho W. *Keperawatan Gerontik dan Geriatrik*. Jakarta : Buku Kedokteran EGC. 2012.

10. Taylor WD. Depression in the elderly. *N English Jurnal Med* [Internet]. 2014;13(1):371. Available from: doi: 10.1056/NEJMcp1402180. Accessed on November12, 2019

11. Yusuf, A., Fitryasari, R., &Nihayati HE. *Buku Ajar Keperawatan Jiwa*. Jakarta: Salemba Medika. 2015.

12. Rahayu KIN. Brain Gym Terhadap Tingkat Stres Pada Mahasiswa Program Studi Ilmu Keperawatan Fakultas Ilmu Kesehatan Universitas Kediri. *Jurnal Dunia Keperawatan* [Internet]. 2017;5(1):26–36. Available from: http://ppjp.unlam.ac.id/journal/index.php/JDK/article/view/3638. Accessed on October 17, 2019.

13. Basuki, H. O., Haryanto, J., & Kusumaningrum T. Pengaruh Elderly Cognitive Care terhadap Fungsi Kognitif dan Aktivitas Fisik Lansia. *Indonesian Jurnal Heal Res.* [Internet].2018;1(2):37–48.Availablefrom:

http://repository.unair.ac.id/77517/2/TKP 42_18 Bas p.pdf. Accessed on April 7, 2019.

14. Panglipurethias DA. Pengaruh Senam Latih Otak (Brain Gym) Terhadap Tingkat Depresi Lansia di Posyandu Lansia Aji Yuswa Ngebel Tamantirto Kasihan Bantul [Internet]. *Universitas Muhammadiyah Yogyakarta*; 2015. Available from: http://thesis.umy.ac.id/datapublik/t53794.pdf. Accessed on September 8, 2019.

15. Santa B. Brain Gym is a registered trademark of the Educational Kinesiology Foundation. In: Brain Gym® *International Educational Kinesiology Foundation Sourc*e. 2016.

16. O'Brien, P., Kennedy, W., & Ballard K. *Psychiatric Mental Health Nursing: Teory And Practice*. Jakarta: EGC; 2013.

17. Saldivia, Sandra. et al. Effectiveness of a group-based psychosocial program to prevent depression and anxiety in older people attending primary health care centres: arandomised controlled trial. *BMC Geriatr* [Internet]. 2019;19(1):237. Available from: dari Doi.org/10.1186/s12877-019-1255-3. Accessed on November12, 2019.

18. Bishwajit G, O'Leary DP, Ghosh S, Yaya S, Shangfeng T, Feng Z. Physical inactivity and self-reported depression among middle- and older-aged population in South Asia: World health survey. *BMC Geriatr*. 2017;17(1):1–8.

19. Hawari & D. *Manajemen Stres Cemas Dan Depresi*. Balai Penerbit FKUI: Jakarta; 2013.

20. Nurullah, Fitri Afifah., Nuripah, Gemah., Dewi MK. Hubungan Olahraga Rutin dengan Tingkat Depresi pada Lansia di Kecamatan Coblong Kota Bandung. *In: Prosiding Pendidikan Dokter Universitas Islam Bandung* [Internet]. Bandung; 2015. Available from: http://repository.unisba.ac.id/handle/123456789/12085. Accessed on October 18, 2019.

21. Guyton, A., & Hall JE. *Buku Ajar Fisiologi Kedokteran*. In: Elsevier, editor. 12th ed. singapore: Elsevier; 2011.