Optimization Of Cognitive Function And Quality Of Life In The Elderly With Hypertension Through Chair Based Exercise

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Abstract.

Hypertension becomes a problem in old age, Elderly people with hypertension often experience decreased cognitive function and have an impact on quality of life . Management of hypertension with problems of decreased cognitive function and quality of life can be done with non-pharmacological therapy. One of the non-pharmacological therapy that can be applied to the elderly who have hypertension is chair based exercise. The purpose of this study was to see the effect of chair-based exercise on cognitive function and quality of life in the elderly with hypertension.The design of this study used quasy experiments with pre and post control groups with a large sample of 16 respondents in each group. The sampling technique used is consecutive sampling with independent variables, namely chair based exercise, Dependent variable in this study were cognitif function and quality of life. The research instruments used are Instrumen mini mental state exam (MMSE), quality of life instrument for elderly with hypertention. The research was carried out at the Budi Sejahtera Banjarbaru Elderly Social Protection and Rehabilitation Institution (PPRSLU). The statistical test used in this study was wilcoxon signed test. The test results found that There was an effect of chair based exercise on the cognitive function of the elderly in the intervention group, but there was no effect in the control group. There was an effect of chair based exercise on the quality of life of the elderly in the intervention and control groups. In elderly with hypertension, nurses need to help the elderly so that the problem of hypertension is resolved and able to fight disability. Chair based exercised can be applied for the kognitif function and quality of life.

Keywords: *Chair-based exercise; cognitive function; elderly; hypertension and quality of life.*

I. INTRODUCTION

Hypertension is a common medical condition in the elderly and is one of the main risk factors for cardiovascular disease and decreased cognitive function [3]. Worldwide, the prevalence of hypertension in older age groups continues to increase, with a significant impact on their quality of life [4]. Hypertension can cause vascular damage to the brain, which ultimately disrupts the supply of blood and oxygen to areas of the brain responsible for cognitive functions, such as memory, attention, and problem-solving abilities [5]. Hypertension is one of the main risk factors that contribute to the decline of cognitive function in the elderly. Globally, it is estimated that around 1.28 billion adults have hypertension, and more than 60% of this population is elderly [6]. A decline in cognitive function in people with hypertension is recorded to occur in around 30-40% of the elderly in the world, with prevalence increasing with age and the duration of hypertension [7].In Indonesia, the incidence of cognitive function decline in the elderly with hypertension is also quite significant. Data from the Ministry of Health of the Republic of Indonesia (2024) [8] shows that around 35% of the elderly who suffer from hypertension experience a decline in cognitive function. In South Kalimantan, this figure is slightly higher, reaching 38% of the total elderly with hypertension [9]. Specifically in Banjar Regency, based on the latest report from the Banjar Regency Health Office (2024) [1], the prevalence of cognitive function decline in the elderly with hypertension reaches 40%.

This figure is higher than the provincial and national averages, indicating the need for specialized interventions in these areas to address the problem.This decline in cognitive function has a significant impact on the quality of life of the elderly, including in terms of limited daily activities, increased dependence on others, and increased risk of psychological disorders such as depression and anxiety [2]. Therefore, appropriate interventions such as chair-based exercise are very important to improve cognitive function and quality of life of the elderly with hypertension. This decline in cognitive function can worsen the quality of life of the elderly by causing limitations in daily activities, increased dependence on others, as well as an

increased risk of psychological disorders such as depression and anxiety [2]. Given the significant impact of hypertension on the cognitive health and quality of life of the elderly, an effective and accessible approach is needed to optimize their cognitive function. One potential and safe intervention is physical exercise that can be done by the elderly with limited mobility, such as chair-based exercise.

Chair-based exercise is a type of physical exercise performed sitting in a chair, designed to increase muscle strength, flexibility, balance, and cardiovascular capacity without putting excessive pressure on the joints or increasing the risk of falling [10]. This exercise has been shown to be effective in improving physical function, reducing the risk of falls, and improving mental health in the elderly [11]. Recent studies have also shown that regular physical exercise can increase blood flow to the brain, improve cognitive function, and prevent cognitive decline in the elderly with hypertension [12]. However, despite the many potential benefits of chair-based exercise, research on the specific effects of this exercise on cognitive function and quality of life in the elderly with hypertension is limited. Most of the existing research has focused only on physical benefits or general health, without evaluating their impact specifically on cognitive aspects and quality of life. Therefore, more in-depth research is needed to explore how chair-based exercise can optimize cognitive function and quality of life in the elderly population with hypertension. The purpose of this study was to look at the effect of chair-based exercise in improving cognitive function and quality of life of the elderly with hypertension.

II. METHODS

The design in this study was a quasy experiment with a pre and post control group, the research was carried out from February to March, 2025, the research was carried out at the Elderly Social Protection and Rehabilitation Institution (PPRSLU) Budi Sejahtera Banjarbaru South Kalimantan. The population in this study was all elderly people who had hypertension and the sample used in this study was the elderly who had hypertension of 16 respondents in the intervention group and 16 respondents for the control group, independent variables in this study were chair based exercise, While the dependent variables in this study were cognitive function and quality of life, the way of data collection was carried out by first carrying out pre-tests in both groups then the intervention group was given chair based exercise while the control group was only given according to the procedural of the PPRSLU. The instrument used in this study were *Instrumen mini mental state exam (MMSE), quality of life instrument for elderly with hypertention*. The intervention was carried out for 6 days, after that the two groups were given a posttest and assessed, the data analysis used the wilcoxon signed test.

III. RESULT AND DISCUSSION

Table 1. Characteristics of Respondents

Respondent Characteristics	Intervention Group		Group control	
	Amount	%	Amount	%
Gender				
Man	5	31.3	13	81.3
Woman	11	68.8	3	18.7
Total	16	100	16	100
Age				
55-65 years	2	12.5	6	37.5
66-74 years	9	56.3	6	37.5
75-90 years	5	31.3	4	25
Total	16	100	16	100
Long time in the orphanage				
< 1 year	2	12.5	2	12.5
1-5 years	10	62.5	8	50
>5 years	4	25	6	37.5
Total	16	100	16	100

Table 2. Distribution of cognitive function before and after intervention at PPRSLU Budi Sejahtera in 2025

	Cognitive Function			
	PRE		POST	
	Intervention group	Control Klp	Intervention group	Klp control
Normal	4 (25%)	9 (56.3%)	8 (50%)	8 (50%)
Probable disruption	6 (37.5%)	1 (6.3%)	4 (25%)	0 (0%)
Definitive disorder	6 (37.5%)	6 (37.5%)	4 (25%)	8 (50%)
Total	16 (100%)	16 (100%)	16 (100%)	16 (100%)

Table 3. Quality of Life Distribution before and after intervention at PPRSLU Budi Sejahtera in 2025

	Quality of Life			
	PRE		POST	
	Intervention group	Control Klp	Intervention group	Klp control
Light quality of life	2 (12.5%)	1 (6.3%)	0 (0%)	2 (12.5%)
Quality of life is moderate	14 (87.5%)	15 (93.8%)	16 (100%)	13 (81.2%)
High quality of life	0 (0%)	0 (0%)	0 (0%)	1 (6.3%)
Total	16 (100%)	16 (100%)	16 (100%)	16 (100%)

Table 4. Chair-based exercise on the cognitive function of the elderly at PPRSLU Budi Sejahtera in 2025

	Intervention group			**Control group**		
	N	Mean rank	Sum of ranks	n	Mean rank	Sum of ranks
Negative ranks	2	3.75	7.5	2	1.00	1.00
Positive ranks	13	8.12	97.5	9	6.00	54.00
Ties	1			5		
Wilcoxon test	P=0.005			P=0.007		

Table 5. Chair-based exercise on the quality of life of the elderly at PPRSLU Budi Sejahtera in 2025

	Intervention group			**Control group**		
	n	Mean rank	Sum of ranks	n	Mean rank	Sum of ranks
Negative ranks	13	7.00	84.00	13	7.08	85.00
Positive ranks	2	10.50	21.00	3	11.67	35.00
Ties	1			0		
Wilcoxon test	P=0.000			P=0.000		

Based on the results of the study, it was shown that there was an effect of chair based exercise on cognitive function in the intervention group in the elderly with hypertension with a p value of 0.005 but no effect on the control group (p=0.007). The aging process will cause a decrease in function, one of which is cognitive function [8], In old age, disturbances in acquiring and remembering new information appear. Parents have difficulty remembering names or activities they do [28].The results of a study conducted by Harry Sundariyati, I., Ratep, N., & Westa, W. (2015) [29] show that age is a factor that can affect the cognitive status of the elderly. Based on previous research, it can be concluded that the possibility of cognitive impairment in respondents is influenced by the age factor of the elderly where the results of the study show that the age of the elderly is mostly in the range of 66-74 years. It is important to carry out management to optimize cognitive function in the elderly, one of which is with chair-based exercise. Chair based exercise is a chair-based exercise that can be promoted as a safe exercise and as a progressive activity for those who may be frail or deconditioned in this case elderly. This exercise can reduce the pressure on the joints so that the risk of injury can be avoided and can improve health [18].The method used in this study in delivering light exercise used booklets and demonstrations for 60 minutes every day for 5 consecutive days. This is in line with the research conducted by Mardhiah et al. (2015) [30], namely the intervention carried out in groups in the Indrajaya health center hall using booklet and power point media was given for 60 minutes with health education materials on self-care of hypertension patients.

The duration of 60 minutes is more effective in conducting health education.The results of this study show that chair-based exercise has an effect on the quality of life of the elderly in both the intervention group (p=0.000) and the control group (p=0.000). This is because the elderly always receive health workers and nursing services. The elderly also seem to be still active and independent, as evidenced by the age of the majority of respondents in the range of 66-74 years in both groups. So that the elderly are still able to carry out daily activities independently so that the quality of life of the elderly is mostly in the medium category.Changes in chair based exercise scores before and after treatment showed that chair based exercise interventions affected changes in quality of life, there was an improvement in quality of life before and after the intervention in the intervention group. The results of this study are in accordance with the research conducted by Arija et al. (2018) which stated that the quality of life of hypertension patients who received physical activity interventions had a higher quality of life in the domains of physical function, energy and general health perception compared to the control group [31]. Improving quality of life in the domain of physical function occurs because exercise is able to prevent the onset of comorbidities through its effect as a buffer against stress and stress-related diseases [32].Comorbidities in hypertensive patients decrease the quality of life of hypertensive patients in the domains of pain, energy, social function and general perception of health. In addition, exercise is able to improve physical health, so that the limitations of roles arising from physical problems will decrease, which ultimately improves the quality of life in the domain of physical role [32].

Meanwhile, the increase in the energy domain may be due to the effect of exercise that increases tissue perfusion and oxygen availability for vital organs, so that the individual does not feel tired easily. Although not significantly different, other quality of life domains such as emotional role, emotional health, social function, pain, and general health of patients with mild hypertension who did chair-based exercise also scored higher than the control group. This may be because in this study there are no socio-cultural activities that can have a significant improvement effect on mental health as done by Arija et al. (2018).

IV. CONCLUSION

Based on the results of the study, it was shown that there was an effect of chair based exercise on the cognitive function of the elderly in the intervention group, but there was no effect on the control group. There was an effect of chair based exercise on the quality of life of the elderly in the intervention and control groups.

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REFERENCES

[1] Dinas Kesehatan Kabupaten Banjar. *Profil Kesehatan Kabupaten Banjar 2024*.

[2] Livingston,G.,Huntley,J.,Sommerlad,A.,Ames,D.,Ballard,C.,Banerjee,S.,& Mukadam, N.Dementia prevention, intervention, and care: 2020 report of the Lancet Commission. *The Lancet, 396*(10248), 2020.413-446.

[3] Ahtiluoto, S., Polvikoski, T., Peltonen, M., Solomon, A., Tuomilehto, J., Winblad, B., & Kivipelto, M. Hypertension and risk of cognitive decline in an older population: role of age and early cognitive decline. *International Journal of Geriatric Psychiatry, 36*(6), 2021. 802-812.

[4] Cho, J., Lee, I., Kang, H., Kim, S., Kim, J., & Choi, J. Prevalence and associated factors of hypertension among the elderly population: findings from the Korea National Health and Nutrition Examination Survey (KNHANES). *BMC Public Health, 20*, 2020. 1177.

[5] Iadecola, C., Gottesman, R. F., Zhang, F., Davisson, R., & Hypertension, Brain Injury, and Cognition Workshop Participants.. Hypertension and cognitive function: a scientific statement from the American Heart Association. *Hypertension, 75*(5), 2020. 1148-1160.

[6] World Health Organization (WHO). *Global status report on hypertension prevention and control*. WHO Press. 2024.

[7] International Society of Hypertension. *Hypertension and cognitive decline: A comprehensive review*. 2024
[8] Kementerian Kesehatan Republik Indonesia. *Laporan Nasional Riset Kesehatan Dasar (Riskesdas)*. 2024
[9] Dinas Kesehatan Provinsi Kalimantan Selatan. *Laporan Tahunan Kesehatan Provinsi Kalimantan Selatan*. 2024
[10] Morris, J. N., Littbrand, H., & Olsen, C. F. Chair-based exercise for frail older people: systematic review and meta-analysis of randomized controlled trials. ***Journal of the American Medical Directors Association***, *22*(5), 2021. 993-1001.
[11] Giné-Garriga, M., Roqué-Fíguls, M., Coll-Planas, L., Sitjà-Rabert, M., Salva, A., & Pujol-Ribera, E. Physical exercise interventions for improving performance-based measures of physical function in community-dwelling, frail older adults: A systematic review and meta-analysis. *Archives of Gerontology and Geriatrics*, *93*, 2021. 104298.
[12] Northey, J. M., Cherbuin, N., Pumpa, K. L., Smee, D. J., & Rattray, B. Exercise interventions for cognitive function in adults older than 50: A systematic review with meta-analysis. ***British Journal of Sports Medicine,*** *54*(24), 2020. 1471-1477.
[13] Profil Dinas Kesehatan Provinsi Kalimantan Selatan, 2018.
[14] Susilowati, D. Modul Bahan Ajar Cetak Keperawatan: Promosi Kesehatan, Kementrian Kesehatan Republik Indonesia, p. 201. 2016
[15] Maryam, R. Siti, dkk. Mengenal Usia Lanjut dan Perawatannya. Jakarta: Salemba Medika. 2008
[16] Salma. Aktivitas Fisik Sebagai Faktor Penyebab Tekanan Darah Pada Penderita Hipertensi. ***Jurnal. Program Studi Keperawatan STIKes Yogyakarta***. 2020
[17] Righo. Tetap Sehat Setelah Usia 40: 100 Artikel Kesehatan Pilihan. Gema Insani. Jakarta. 2019
[18] Klempel, N. et al 'The Effect of Chair-Based Exercise on Physical Function in Older Adults: A Systematic Review and Meta-Analysis', ***International Journal of Environmental Research and Public Health***, 18(4), p. 1902. Available at: https://doi.org/10.3390/ijerph18041902. 2021
[19] Bangsa, P.P., Rachmadi, F. And Fahdi, F.K. 'Pengaruh Senam Chair Exercise Terhadap Penurunan Kadar Gula Darah Pada Penderita Diabetes Melitus Dengan Perilaku Sedentari Di Wilayah Kerja UPTD Puskesmas Kecamatan Pontianak Selatan', p. 11. 2018
[20] Yastin, N.T. Pengaruh Chair Based Exercise Terhadap Tingkat Kecemasan Pada Lansia di Panti Jompo Griya Asih Lawang. Muhammdiyah Malang. Tersedia pada: http://eprints.umm.ac.id/id/eprint/46552. 2019
[21] Rahmiyati. Pengaruh Chair Based Exercise Terhadap Penurunan Tekanan Darah pada Lansia dengan Hipertensi di Panti Jompo Griya Asih Lawang. Muhammadiyah Malang. 2019
[22] Prihantoro, Y. dan Ambardini, R.L. "Prevalensi, Karakteristi, dan Penanganan Delayed Onset Muscle Soreness (DOMS)," XVII(2), hal. 126–135. 2018
[23] Santrock, J. W. Live-span development. Thirteenth edition. New York: McGraw-Hill. 2011
[24] Johansson, M. Cognitive impairment and its consequences in everyday life (Medical Dissertation). Faculty of Health Sciences, Linkoping University, Linkoping, Sweden. 2015
[25] Haris, E. R., Steven, R., & Handajani, Y. S. Kualitas hidup pada lansia dengan gangguan kognitif dan mental: Studi cross sectional di kelurahan Kalianyar, Jakarta Barat. ***Journal of Medicine***, 13(2), 117 – 127. 2014
[26] Polit & Beck . Resource Manual for Nursing Research. Generating and Assessing Evidence for Nursing Practice. Ninth Edition. USA : Lippincott. 2012
[27] Budiman. Penelitian Kesehatan, Buku Pertama, Bandung, PT. Refika Aditama. 2011
[28] Hickson M. Malnutrition and aging. Postgrad Med. 82 (963). 2006
[29] Harry Sundariyati, I., Ratep, N., & Westa, W. Gambaran Faktor-Faktor Yang Mempengaruhi Status Kognitif Pada Lansia Di Wilayah Kerja Puskesmas KubuIi. ***E-Jurnal Medika Udayana***, Retrieved from https://ojs.unud.ac.id/index.php/eum/article/view/12634. 2015
[30] Mardhiah, A., Asnawi Abdullah, H.. Pendidikan Kesehatan Dalam Peningkatan Pengetahuan, Sikap Dan Keterampilan Keluarga Dengan Hipertensi-Pilot Study. ***J. Ilmu keperawatan*** 3. 2015
[31] Arija V, Villalobos F, Pedret R, Vinuesa A, Jovani D, Pascual G, et al. Physical activity, cardiovascular health, quality of life and blood pressure control in hypertensive subjects: Randomized clinical trial. Health Qual. Life Outcomes.;16:184. 2018
[32] Deuster PA, Silverman MN. Biological mechanisms underlying the role of physical fitness in health and resilience. Interface Focus. 2014;4(5).
[33] Akiria Santi, A., & Sukarni, S. (2023). The Effectiveness Of Using Corsets On Reducing Pain Scale In Post SC Patients At Eka Hospital, South Tangerang In 2022. ***International Journal of Health and Pharmaceutical (IJHP)***, 3(4), 677–682. https://doi.org/10.51601/ijhp.v3i4.225

[34] Laia, O. ., Lestari Nasution, S. ., & Ginting, . J. . (2023). Evaluation Of The Implementation Of Primary Care (P-Care) Application At Puskesmas Onolalu Nias Selatan In 2022. ***International Journal of Health and Pharmaceutical (IJHP)***, 3(4), 629–636. https://doi.org/10.51601/ijhp.v3i4.224

[35] Duha, K. B., Lestari Ramadhani Nasution, S. ., Girsang, E. ., & Suyono, T. . (2022). Analysis of Efficiency Of KDT-OAT and Removal Preparations on The Recovery of Pulmonary Tuberculosis. ***International Journal of Health and Pharmaceutical (IJHP)***, 2(2), 284–289. https://doi.org/10.51601/ijhp.v2i2.43.