Stroke self-management program based on health behavior theory on neurological function and quality of life of post-ischemic stroke patients

Imamatul Faizah[1*], Yanis Kartini[1], Ratna Yunita Sari[1], Riska Rohmawati[1], Abdul Muhith[1]

ABSTRACT

Introduction: The two biggest issues for post-ischemic stroke patients are disability and mortality. Patients with post-ischemic stroke have a decline in quality of life due to alterations in neurological function. Additionally, post-stroke patients require ongoing education to improve their independence in completing daily tasks. His research thus sought to examine the impact of stroke self-management on post-ischemic stroke patients' neurological function and quality of life using the framework of health behavior theory.

Methods: The sampling method utilized in the study design was successive sampling with a quasi-experimental design to choose the sample following the inclusion and exclusion criteria. 58 intervention and control groups were created from a total sample of 116 respondents. This research used the National Institute of Health Stroke Scale (NIHSS) and Stroke Specific Quality of Life Scale (SS-QoL). Statistical analysis using t-test with p<0.5.

Results: According to the findings, the mean neurological function in the intervention group before and after the intervention was 8.259, whereas the mean quality of life before and after the intervention was -20.93. In the control group, the mean neurological function was -0.179 before and after the intervention, whereas the mean quality of life was 0.069. Data analysis revealed a significant difference between health behavior therapy-based stroke self-management programs and neurological function and quality of life in post-ischemic stroke patients with p = 0.00.

Conclusion: Stroke self-management based on health behavior theory can be applied over the long term to help patients' neurological function and quality of life.

Keywords: health behavior theory, neurological function, stroke self-management program, quality of life.
Cite This Article: Faizah, I., Kartini, Y., Sari, R.Y., Rohmawati, R., Muhith, A. 2023. Stroke self-management program based on health behavior theory on neurological function and quality of life of post-ischemic stroke patients. *Bali Medical Journal* 12(3): 2859-2863. DOI: 10.15562/bmj.v12i3.4404

[1]Department of Nursing, Faculty of Nursing and Midwifery, Universitas Nahdlatul Ulama Surabaya, Indonesia.

*Corresponding author:
Imamatul Faizah;
Department of Nursing, Faculty of Nursing and Midwifery, Universitas Nahdlatul Ulama Surabaya, Indonesia.
imamafaizah@unusa.ac.id

INTRODUCTION

Disability and death are major problems in post-ischemic stroke patients.[1] Post-stroke patient experience changes in neurological function, including cognitive, sensory, and motoric. Hence, the quality of life of post-ischemic stroke patients decreases.[2] According to statistics from the international stroke organization, there are 13.7 million new instances of stroke each year, and 87% of stroke-related deaths and disabilities occur in developing nations. In Indonesia, the incidence of stroke increased from 7% to 10.9% in 2013 and 2018.[3] The majority of the 52 participants (81.2%) in a study at the Neurology Polyclinic of RSI Surabaya Jemursari experienced cognitive impairment. The majority of the 42 (65.6%) individuals had moderate impairments, whereas just 10 (15.6%) had severe ones. The analytical test revealed a significant relationship between post-stroke patients' levels of disability and cognitive impairment. Treatment for post-stroke patients with cognitive impairment is essential to preventing disability that adversely affects their psychosocial well-being and quality of life.[4]

Post-stroke patients experience decreased motor and cognitive functions that affect emotional status.[5] Stroke rehabilitation that lasts a long time makes patients unable to manage themselves.[6] One of the important components of long-term care is the patient's ability to treat and manage stroke.[7] Lo et al. (2017) research on stroke self-management programs on self-efficacy and self-management behavior using the pre-posttest method showed different significance between the intervention and control groups.[8] Additionally, Hekmatpou et al. (2019) looked at patient education on the care burden and quality of life of stroke patients and found that the intervention group achieved significantly better results. To promote and prevent repeat strokes, persons with strokes require ongoing education.[9] A stroke self-management program refers to the self-management of post-stroke patients to increase the patient's confidence, motivation and ability in diet, treatment and rehabilitation.[10] Therefore, it is necessary to intervene in health behavior theory to maintain improving health.[11] Unfortunately, there is no research on stroke self-management programs based on health behavior theory on neurological function and quality of life of patients, so it needs to be researched.

According to the issue explained before, this study aimed to analyze the effect of a stroke self-management program based on health behavior theory on neurological function and quality of life of post-ischemic stroke patients.

METHODS

Design and Sample

The post-stroke patient population at the Outpatient Clinic of the Islamic Hospital Surabaya served as the target population for this study's quasi-experimental methodology. There will be 116 people in the sample, as expected. In addition, 58 respondents in the intervention group and 58 in the control group were split into the gathered sample.

A straightforward random sampling procedure will be used to choose the sample per the inclusion and exclusion criteria. The inclusion criteria were first-attack ischemic stroke patients, stable vital signs, age over 20 years, CT scan showing ischemic stroke, and ischemic stroke patients in the rehabilitation phase. The exclusion criteria were ischemic stroke patients who have complications of myocardial infarction, congestive heart failure, stage renal disease and arrhythmias, elderly >60 years, and patients with mental disorders.

Data Collection Procedures

The instrument used in this study is Neurological Function using the National Institute of Health Stroke Scale (NIHSS) by Brott et al. (1989) and updated by Lyden (2017).[12,13] Quality of life of post-stroke patients using the Stroke Specific Quality of Life Scale (SS-QOL) by William et al. (1999).[14] The study was conducted in June-August 2022 with a training time of 30 minutes per meeting consisting of two sessions a week and monitoring using a cellular phone or WhatsApp social media with the following stages:
a. First week, asked about the patient's knowledge of his condition.
b. Second week, advised to inform about stroke education, treatment, diet and rehabilitation.
c. The third and fourth weeks assessed a plan of action together to achieve the goals set, then valued the motivation,
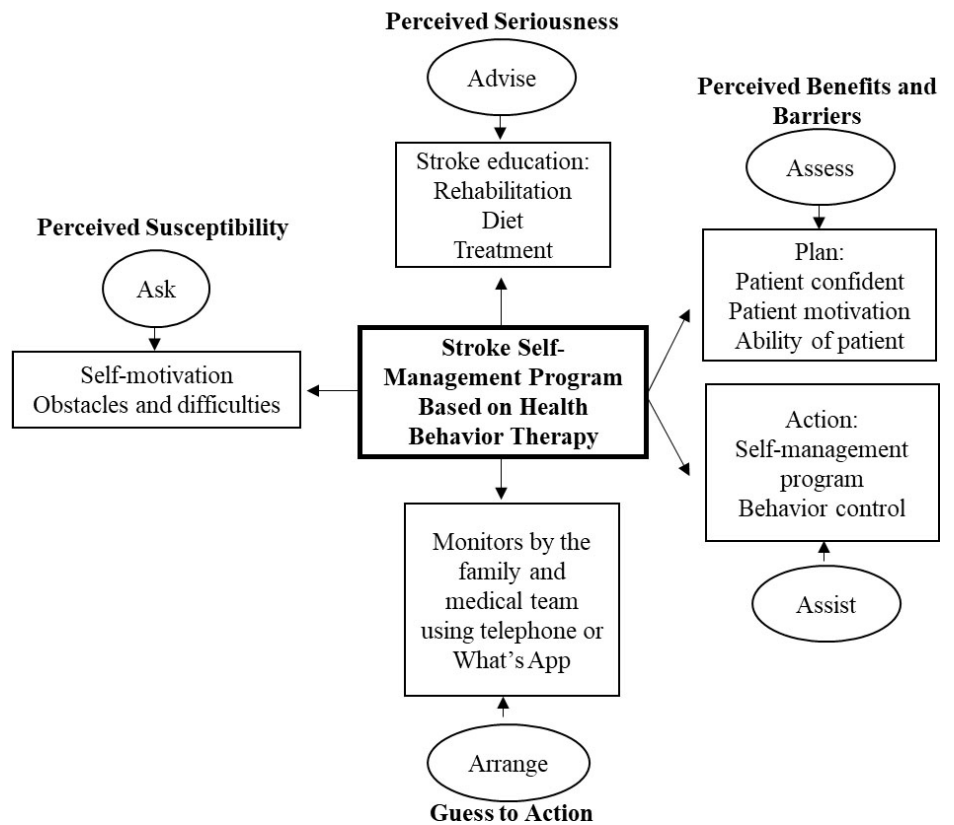

Figure 1. Intervention chart stroke self-management program based on health behavior therapy.

the level of patient confidence, and the patient's ability.
d. The five and six weeks helped patients achieve a self-management plan for post-stroke rehabilitation.
e. The seventh and eighth weeks of Arrange were monitoring plans made by telephone or WhatsApp, helping patients use community resources, and providing professional support through peer groups.

Data Analysis

Data were analyzed as descriptive and analytic. The descriptive analysis was reported in the table. The bivariate analysis was tested using paired sample t-test and independent samples t-test. The significant p was <0.005

RESULTS

Regarding our descriptive analysis, we classified the groups in two, and each group contains 58 samples. The two groups had a similar average age. The mean age of the intervention group was 43.59 and ±7.910 years old. Meanwhile, the control group was 42.53±8.236 years old. Most gender of each group was male (55.17% from the intervention group and 70.69% from the control group). Almost both of the groups had another disease besides stroke. Most of the intervention group had one disease besides stroke (55.17%). In contrast, the control groups mostly had two conditions (51.72%) besides stroke. Moreover, 63.80% of stroke patients in the intervention group had no smoking history. Meanwhile, most of the control group had a history of it (65.52%).

Lavene's test made use of the homogeneity test to compare the traits of respondents in the intervention group and the control group. The results indicated a p-value of age (p-value=0.760), gender (p-value=0.764), education (p-value=0.851), and occupation (p-value=0.705) paired with another disease (p-value=0.789) and smoking (p-value=0.432). The results of the homogeneity test in the two groups revealed no distinction in the traits of the respondents in the two groups.

Table 1. **Subject characteristics**

	Intervention group (n=58)	Control group (n=58)	p-value
Age (mean ± SD, years)	43.59±7.910	42.53±8.236	0.760
Gender (n, %)			
Male	32 (55.17)	41(70.69)	0.764
Female	26 (44.83)	17(29.31)	
Education (n, %)			
Middle school	9(15.52)	4(6.89)	0.851
High school	35(60.34)	37(63.79)	
College	14(24.14)	17(29.32)	
Professional (n, %)			
Civil servant	8(13.79)	5(8.62)	0.705
Worker	34(58.62)	38(65.52)	
Entrepreneur	12(20.63)	14(24.14)	
Other	4(6.89)	1(1.72)	
Combined with another disease (n, %)			
0	8(13.79)	9(15.52)	0.789
1	32(55.17)	19(32.76)	
2	18(31.04)	30(51.72)	
Smoking (n, %)			
Yes	21(36.20)	38(65.52)	0.432
No	37(63.80)	20(34.48)	

Table 2. **Neurological function and quality of life pre and post-intervention and control group**

Variable	Group	Pre		Post		t	n	*p-value*
		Mean	**SD**	**Mean**	**SD**			
Neurological Function	Intervention	16.66	3.16	8.40	3.32	26.499	58	0.000
	Control	17.98	3.67	18.16	4.17	-1.135	58	0.261
Quality of Life	Intervention	24.60	5.46	45.53	11.31	-18.536	58	0.000
	Control	22.84	5.82	22.78	5.94	1.427	58	0.159

Table 3. **The value of the difference in neurological function and quality of life pre and post in the intervention group and the control group**

Variable	Group	Mean	SD	n	t	*p-value*	
						Pre	**Post**
Neurological Function	Intervention	8.259	0.312	58	-2.085	0.339	0.000
	Control	-0.179	1.129	58			
Quality of Life	Intervention	-20.93	0.152	58	1.677	0.096	0.000
	Control	0.069	0.048	58			

According to Table 2, the intervention group's mean neurological function before the action was 16.6, and the standard neurological function after the auction was 8.40. Before the intervention, an average of 24.60 was found for the intervention group's quality of life. After receiving a stroke self-management program based on health behavior theory, the average value was 45.53 (p-value = 0.000), indicating a substantial improvement in quality of life and a reduction in neurological impairment. In contrast, the control group's mean neurological function before the action was 17.98, and the mean neurological function after the intervention was 18.16. In contrast,

the control group's mean neurological function before the action was 17.98, and the mean neurological function after the intervention was 18.16. Before the action was taken, a mean score of 22.84 was found for the control group's quality of life. Following the intervention, the average value was 22.78, with neurological function showing a p-value of 0.261 and quality of life offering a p-value of 0.157. The control group's neurological deficiency diminished, but their quality of life did not change noticeably.

According to Table 3's data analysis findings, the neurological function and quality of life following the intervention had a p-value of 0.000. While the difference

in the mean rate of life before and after the intervention in the intervention group was -20.93, the mean neurological function before and after the intervention in the control group was -0.179, while the mean of quality of life before and after the intervention was 0.069.

DISCUSSION

Stroke patients experience cerebral hemodynamic disorders, which will cause a decrease in the flow of Cerebral Blood Flow (CBF). It will result in neurological disorders in the patient.[15] Decreased CBF can be caused by a thrombus or embolism in the blood flow to the brain that lasts a long time, resulting in neurological deficits

in stroke patients.[1] Also, several risk factors can be prevented in stroke patients to avoid stroke. Risk factors that can be controlled include smoking and some comorbidities.[16] The study results in Table 1 were found in the intervention group (36.20%) and the control group (65.52%) smoking. While in the intervention group (55.17%) had one comorbid disease, and the control group (51.72%) had two comorbidities. Comorbidities can increase the risk of recurrence, and stroke patients' healing process tends to be longer.

The neurological function of the intervention and control groups differs significantly (p=0.000) in Table 2. According to the findings, a health behavior therapy-based stroke self-management program can inspire post-stroke patients to take charge of their health by keeping an eye on their condition and educating themselves about their present position. The NIHSS score provides insight into changes in neurological function.

Neurological deficit scores on the NIHSS observation sheet showed the highest scores on arm and leg motor points. This indicates that from the study results, the neurological function of patients who experience decreased function, namely in motor function. Stroke patients may experience a decline in motor function. A decrease in neurological deficit score means a change in neurological status in stroke patients. This is by the concept of a pattern of improvement in the neurological quality of stroke patients.[12]

The intervention group was given stroke self-management for 2 months with a program to monitor the clinical condition experienced by the patient and plan positive behavior changes using rehabilitation by doing sports. Providing structured physical activity by giving a range of motion for 2 months every day can increase blood flow in the motor cortex and somatosensory so that CBF increases.[17] The repair process quickly occurs in the first 7-10 days. This process occurs because of the growth factors in cerebral cells. These factors include neurotrophic, oligotrophic, angiogenic, and multipotential.[18] These four factors work together in the repair process of cerebral nerve cells, improving stroke patients' neurological status. The pattern of

improvement in the patient's neurological function increased dramatically from the first week to the fourth week. The process slowly progressed after the fifth week the patient suffered a stroke.[19,20] The control group only received a rehabilitation program by hospital rules, namely by conducting a rehabilitation program with physiotherapy once every two weeks.

Table 2 reported a statistically significant difference between the two groups in the total quality of life score on all dimensions (p=0.000). This finding explains that stroke self-management can improve the patient's quality of life. The intervention model based on health behavior therapy and the theory of integrated planned behavior enhances the patient's quality of life.[2] In this study, the patient's quality of life scores and scores for each dimension were higher than in the related research.

In the control group, there was no improvement in quality of life because patients only received education from the medical team when visiting the neurology polyclinic, education in the form of drug and activity control. Post-stroke patients stay at home with family supervision. Families in the control group could not help provide the physical activity needed by the patient because of the family's knowledge deficit in caring for sick family members. Therefore, the need for stroke self-management based on health behavior therapy in changing the behavior of patients and families into positive behavior will improve patients' quality of life.

This study combines several patient criteria and controls the behavior that the patient has applied. In addition, researchers also conduct behavioral control under daily behavior that patients can carry out. Behavioral rules that patients can do to improve health include limiting salt in one day, not exceeding 6 grams for patients with comorbid hypertension and limiting sugar and regularity in taking medication and physical activity for all patients in the intervention group. Patients are taught better self-management to improve their quality of life with some easy things to achieve.[21]

The intervention process cannot be separated from the role of family

members.[7] The family is a measure of the success of the recovery of post-stroke patients undergoing treatment at home. Families are involved in the research process to improve communication and provide social support for patients. So, the total quality of life score in the intervention group was higher than in the control group. Families play a role in caring for post-stroke patients at home. The intervention group can communicate with medical staff via telephone or WhatsApp. Researchers encourage patients to share the difficulties experienced so that all parties can provide solutions to problems faced by patients. The limitation of this study was that each component of the quality of life of stroke patients needed to be tested one by one. The authors only examined the quality-of-life variables as a whole.

CONCLUSION

This study aims to analyze the effect of a stroke self-management program based on health behavior theory on neurological function and quality of life of post-ischemic stroke patients. There is a significant difference in neurological function and quality of life between the intervention and control groups. In future research, researchers include a stroke self-management program in the discharge planning of post-stroke patients with applications owned by the hospital, namely telemedicine and telenursing, that can be accessed by every stroke patient undergoing treatment at home.

DISCLOSURE

Author Contribution
Conception: IF; Design: IF, RYS, YK; Literature search: IF, RR, AM; Analysis and interpretation of the data: IF, RYS, AM; Manuscript preparation: IF, YK; Manuscript editing: IF, RR; Manuscript review: all authors.

Ethical Clearance

ACKNOWLEDGMENT

REFERENCES

1. Corcoran N, McCullagh L. troke 5: health promotion for primary stroke prevention. Nurs Times. 2018;115(3):53–6. Available from: https://www.nursingtimes.net/clinical-archive/neurology/stroke-5-health-promotion-for-primary-stroke-prevention-12-02-2018/

2. Li Y, Zhang S, Song J, Tuo M, Sun C, Yang F. Effects of Self-Management Intervention Programs Based on the Health Belief Model and Planned Behavior Theory on Self-Management Behavior and Quality of Life in Middle-Aged Stroke Patients. Evid Based Complement Alternat Med. 2021;2021:8911143. Available from: https://pubmed.ncbi.nlm.nih.gov/34707678

3. Kemenkes RI. Stroke Don't Be The One. Jakarta: Kementrian Kesehatan Republik Indonesia; 2018. p. 10.

4. Hasina SN, Ainiyah N, Wardhini ADN, Wijayanti L. Analysis between cognitive impairment with the level of disability post-stroke patients: A cross-sectional study. Bali Med J. 2022;11(2):742–6.

5. Chen Y, Wei Y, Lang H, Xiao T, Hua Y, Li L, et al. Effects of a Goal-Oriented Intervention on Self-Management Behaviors and Self-Perceived Burden After Acute Stroke: A Randomized Controlled Trial. Front Neurol. 2021;12:650138. Available from: https://pubmed.ncbi.nlm.nih.gov/34354655

6. Fugazzaro S, Denti M, Accogli MA, Costi S, Pagliacci D, Calugi S, et al. Self-Management in Stroke Survivors: Development and Implementation of the Look after Yourself (LAY) Intervention. Int J Environ Res Public Health. 2021;18(11):5925. Available from: https://pubmed.ncbi.nlm.nih.gov/34072998

7. Ruksakulpiwat S, Zhou W. Self-management interventions for adults with stroke: A scoping review. Chronic Dis Transl Med. 2021;7(3):139–48. Available from: https://pubmed.ncbi.nlm.nih.gov/34505014

8. Lo SHS, Chang AM, Chau JPC. Stroke Self-Management Support Improves Survivors' Self-Efficacy and Outcome Expectation of Self-Management Behaviors. Stroke. 2018;49(3):758–60. Available from: http://dx.doi.org/10.1161/strokeaha.117.019437

9. Hekmatpou D, Mohammad Baghban E, Mardanian Dehkordi L. The effect of patient care education on the burden of care and the quality of life of caregivers of stroke patients. J Multidiscip Healthc. 2019;12:211–7. Available from: https://pubmed.ncbi.nlm.nih.gov/30936715

10. Fryer CE, Luker JA, McDonnell MN, Hillier SL. Self-Management Programs for Quality of Life in People With Stroke. Stroke. 2016;47(12). Available from: http://dx.doi.org/10.1161/strokeaha.116.015253

11. Glanz K, Rimer Barbara K, Viswanath K. Theory, Research, and Practice. In: Health Behavior. 5th ed. 2015. p. 512.

12. Lyden P. Using the National Institutes of Health Stroke Scale. Stroke. 2017;48(2):513–9. Available from: http://dx.doi.org/10.1161/strokeaha.116.015434

13. Brott T, Adams HP, Olinger CP, Marler JR, Barsan WG, Biller J, et al. Measurements of acute cerebral infarction: a clinical examination scale. Stroke. 1989;20(7):864–70. Available from: http://dx.doi.org/10.1161/01.str.20.7.864

14. Williams LS, Weinberger M, Harris LE, Clark DO, Biller J. Development of a Stroke-Specific Quality of Life Scale. Stroke. 1999;30(7):1362–9. Available from: http://dx.doi.org/10.1161/01.str.30.7.1362

15. Wahyudi A, Tamtomo DG, Soemanto RB. Effects of Social Support, Functional Status, and Depression on the Quality of Life of Stroke Patients: A Meta-Analysis. J Heal Promot Behav. 2020;5(4):284–95. Available from: http://dx.doi.org/10.26911/thejhpb.2020.05.04.06.

16. Salinas J, Schwamm LH. Behavioral Interventions for Stroke Prevention: The Need for a New Conceptual Model. Stroke. 2017/05/09. 2017;48(6):1706–14. Available from: https://pubmed.ncbi.nlm.nih.gov/28487341

17. Muchada M, Rubiera M, Rodriguez-Luna D, Pagola J, Flores A, Kallas J, et al. Baseline National Institutes of Health Stroke Scale–Adjusted Time Window for Intravenous Tissue-Type Plasminogen Activator in Acute Ischemic Stroke. Stroke. 2014;45(4):1059–63. Available from: http://dx.doi.org/10.1161/strokeaha.113.004307

18. Huseyinsinoglu BE, Ozdincler AR, Krespi Y. Bobath Concept versus constraint-induced movement therapy to improve functional arm recovery in stroke patients: a randomized controlled trial. Clin Rehabil. 2012;26(8):705–15. Available from: http://dx.doi.org/10.1177/0269215511431903

19. Moritz DJ, Fox PJ, Luscombe FA, Kraemer HC. Neurological and Psychiatric Predictors of Mortality in Patients With Alzheimer Disease in California. Arch Neurol. 1997;54(7):878–85. Available from: http://dx.doi.org/10.1001/archneur.1997.00550190066016

20. Gilmour GS, Nielsen G, Teodoro T, Yogarajah M, Coebergh JA, Dilley MD, et al. Management of functional neurological disorder. J Neurol. 2020/03/19. 2020;267(7):2164–72. Available from: https://pubmed.ncbi.nlm.nih.gov/32193596

21. Goldmann E, Jacoby R, Finfer E, Appleton N, Parikh NS, Roberts ET, et al. Positive Health Beliefs and Blood Pressure Reduction in the DESERVE Study. J Am Heart Assoc. 2020/04/28. 2020;9(9):e014782–e014782. Available from: https://pubmed.ncbi.nlm.nih.gov/32340524