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Research Article

Effectiveness of Cognitive Behavioral Therapy with In Vivo Exposure on Anxiety Levels in Elderly Stroke Patients

Ridho Fidrajaya[1*], Tria Astika Endah Permatasari[2], Lily Herlinah[3]
1Faculty of Nursing, Universitas Muhammadiyah Jakarta, Indonesia
*Email Corespondent: fidrajaya@gmail.com

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Abstract

Background: Stroke is a serious condition that can have a significant psychological impact on patients, including anxiety. Cognitive Behavioral Therapy (CBT) is a therapy that can influence attitudes and behaviors as well as cognitive changes, resulting in the desired attitude changes.
Objectives: The objective of this study is to determine the effect of CBT on anxiety levels in elderly individuals diagnosed with stroke.
Methods: This study employed a quasi-experimental design with a nonequivalent control group design. The sample consisted of 36 elderly stroke patients. The analysis in this study used the dependent T-Test.
Results: The average anxiety level decreased by 14.89, and the statistical test results showed a P-Value of 0.000, indicating that the intervention had a significant effect.
Conclusion: This study concludes that Cognitive Behavioral Therapy (CBT) using in vivo exposure techniques is significantly effective in reducing anxiety levels in the intervention group compared to the control group. Although there are other influencing variables such as education, these variables are not statistically significant.

Keywords: Anxiety, Elderly, Cognitive Therapy, Stroke.

Introduction

Aging is an unavoidable part of the life process that every individual will inevitably experience.[1] The elderly, referring to individuals aged 60 years or older, undergo various physiological changes, including musculoskeletal changes and alterations in the nervous system.[2] One of the diseases affecting the elderly, commonly caused by a sedentary lifestyle, is a Cerebral Vascular Accident (CVA), also known as a stroke.[3] Stroke occurs due to a sudden loss of blood flow to the brain, which is usually caused by occlusion or rupture of a major cerebral artery.[4] Globally, stroke remains a significant health challenge, both in terms of mortality and long-term disability. Recent global estimates indicate that stroke cases are rising dramatically, with the World Health Organization (WHO) reporting

approximately 13.7 million new cases of stroke in 2016 alone, and 5.5 million deaths resulting from the disease annually.[5] Alarmingly, 70% of these strokes and 87% of stroke-related deaths occur in low- and middle-income countries, highlighting a major health inequity. Asia, in particular, bears a substantial burden of stroke due to factors such as urbanization, unhealthy lifestyle changes, and aging populations.[5]

In Indonesia, stroke has become a critical public health issue. The 2018 Basic Health Research Survey (Riskesdas) reported that the prevalence of stroke in Indonesia was 10.9 per 1,000 people, showing a notable increase from previous years.[6] Furthermore, stroke is now the leading cause of death in the country, contributing to 21.1% of all deaths, surpassing other non-communicable diseases such as heart disease.[6] This rising trend in stroke incidence and mortality in Indonesia underscores the urgent need for targeted prevention strategies and improved healthcare services for early detection and management, especially among the aging population.

Stroke is a serious condition that not only causes physical problems but can also have a significant psychological impact on patients. According to research by Hackett and Pickles (2014), anxiety is common after a stroke and can affect the patient's quality of life.[7] A meta-analysis study conducted by Ayerbe et al. (2013) also showed that anxiety is one of the most common psychological problems following a stroke.[8] Several factors that may contribute to the high prevalence of anxiety among the elderly in Indonesia include social and economic factors, physical health, life changes, knowledge, and understanding, as well as stigma and negative perceptions.[2]

Appropriate nursing interventions can reduce anxiety in the elderly through non-pharmacological management such as Cognitive Behavioral Therapy (CBT).[9] his intervention is a therapy that can influence attitudes and behaviors as well as cognitive changes, resulting in the desired attitude changes.[10] Based on a study conducted on 87 elderly individuals, there was a reduction in anxiety scores following the intervention.[10] Although previous research has indicated that CBT interventions can reduce anxiety, the exact mechanism by which CBT reduces anxiety, especially in elderly stroke patients, remains unclear. Therefore, the purpose of this study is to determine the extent to which CBT can reduce anxiety in elderly individuals who have experienced a stroke.

Methods

The design of this study used a quasi-experimental approach with a nonequivalent control group design. The sample in this study consisted of 36 respondents, divided into two groups: 18 in the intervention group and 18 in the control group. The sampling technique used in this study was purposive sampling. According to Sugiyono (2017), purposive sampling is a technique for selecting samples based on specific criteria.[11] The reason the researchers used purposive sampling is that not all samples met the pre-determined inclusion and exclusion criteria.[11] In this study, elderly individuals who had experienced a stroke at the Tresna Werdha Budi Mulia I Social Home were included based on the established inclusion and exclusion criteria. The inclusion criteria included elderly individuals over 60 years of age who were cooperative and willing to participate as respondents. On the other hand, the exclusion criteria included elderly individuals who were very weak, had medical complications or had speech and hearing impairments that could hinder communication during the study.

The study was conducted over 30 days in 6 sessions, with each session lasting between 90 to 120 minutes. The determination of 6 meetings was adjusted according to the planned meeting agenda; each session's agenda was organized and implemented sequentially with planned stages and utilized aids such as modules, worksheets, and methods tailored to the characteristics of the clients. The instrument used was the Hamilton Rating Scale for Anxiety (HARS), which includes 14 indicators of anxiety symptoms observed in the respondents. After summing the results of these indicators, the researcher classified them into 5 levels of anxiety scores: no anxiety (<14), mild anxiety (14-20),

moderate anxiety (21-27), severe anxiety (28-41), and panic (42-56). The Hamilton Anxiety Rating Scale (HAM-A) is a widely used tool to assess anxiety severity, consisting of 14 items that measure both psychic and somatic anxiety symptoms. The scale has demonstrated good reliability, with studies reporting satisfactory inter-rater reliability and internal consistency, as indicated by Cronbach's alpha values. In terms of validity, the scale has been validated across various populations, with confirmatory factor analysis (CFA) supporting its two-factor structure of psychic and somatic anxiety.[12] Data analysis was performed using the dependent T-test and Multivariate Analysis of Variance (MANOVA).

Results

Table 1. Frequency Distribution of Respondents Based on Characteristics of Elderly Stroke Patients

Variable	Intervention		Control	
	n	%	n	%
Age				
60-69 Years	6	33,3	3	16,7
70-79 Years	7	38,9	10	55,5
>80 Years	5	27,8	5	27,8
Total	18	100	18	100
Gender				
Male	3	16,7	3	16,7
Female	15	83,3	15	83,3
Total	18	100	18	100
Education				
Elementary School (SD)	12	66,6	13	72,2
Junior High School (SMP)	3	16,7	2	11,1
High School (SMA)	3	16,7	3	16,7
Total	18	100	18	100
Occupation				
Unemployed	5	27,8	6	33,3
Self-Employed	5	27,8	2	11,1
Private Employee	8	44,4	10	55,6
Total	18	100	18	100

Table 1 shows that the intervention group (38.9%) and the control group (55.5%) had the largest proportion in the age group between 70-79 years. In terms of gender, the majority of both the intervention and control groups were female, with the same proportion of 83.3%. The educational level in both groups was predominantly elementary school, with proportions of 66.6% in the intervention group and 72.2% in the control group. The employment history of the intervention group (44.4%) and the control group (55.6%) indicates that most participants were employed as private employees.

Table 2. The Effect of Age, Gender, Education, and Employment History on Anxiety Levels

Variable	Value	Observe Power	P–Value
Age	0,822	0,233	0,520
Gender	0,834	0,287	0,235
Education	0,831	0,221	0,549
Occupation	0,583	0,638	0,064

Based on Table 2, the variable that has the most significant impact on the anxiety levels of the elderly is education. This is indicated by the P-value of the education variable, which is closest to 1, meaning it has a stronger correlation compared to the other variables.

Table 3. The Effect of Intervention on Anxiety Levels in the Intervention and Control Groups of Elderly Stroke Patients

Anxiety Level	n	Mean	Mean Difference	P-value
Intervention				
Pretest	18	28,61	14,89	0,000
Posttest		13,72		
Control				
Pretest	18	29,78	2,34	0,000
Posttest		27,44		

Based on Table 3, the average anxiety level in the intervention group decreased by 14.89, and the statistical test results show a P-value of 0.000, indicating that the intervention had a significant effect. In the control group, the average anxiety level also decreased by 2.34, and the statistical test results show a P-value of 0.000, indicating a significant result.

Discussion

Characteristics of Elderly Stroke Patients

In this study, the most common age group was between 70 and 79 years. According to several sources, age is an important factor in the incidence of stroke. The theory suggests that the sensory system undergoes physical changes and damage to the long nerve fibers, which reduces coordination and the capacity to perform daily tasks.[13] Furthermore, the study found that there were more females than males, which is notable because stroke incidence is higher among elderly women. The supporting theory is that hormonal differences make women more prone to stroke. Men are predominantly influenced by testosterone, while women are influenced by estrogen. The vasoprotective effects of testosterone contribute to better clinical outcomes for men compared to women, especially those who have already gone through menopause.[14]

The research results based on the education level of elderly stroke patients show that the majority have only elementary school education, indicating a lower level of education. The researchers argue that education plays an important role, including in a person's awareness of the risks of stroke. With better awareness, individuals are more likely to seek information and utilize available healthcare facilities to prevent stroke. The study also found that most elderly stroke patients were employed in private sector jobs compared to other types of employment. This is supported by the theory of Masruro et al. (2023), which states that working in the private sector involves high activity and job demands, leading to stress that can increase peripheral vascular resistance. Additionally, stress stimulates sympathetic nervous system activity, causing the heart to pump blood faster, which raises the risk of diseases, including stroke.[15]

The Effect of Age, Gender, Education, and Employment History on Anxiety Levels in Elderly Stroke Patients

Based on the research and multivariate statistical testing of confounding variables such as age, gender, education, and employment history, the variable with the coefficient correlation closest to perfect is education, with a value of 0.549. Research indicates that higher levels of education are associated with better knowledge, which can also influence the effectiveness of cognitive behavioral therapy in reducing anxiety. Higher education facilitates understanding instructions during therapy.[16] According to the researchers, while

each confounding variable affects the success of the intervention, education is perceived as having a stronger impact on cognitive function. This is because cognitive behavioral therapy with in vivo exposure for elderly stroke patients involves significant cognitive functions, skills, support, and abilities. Thus, education has a strong influence in this study. Additionally, despite the majority of stroke patients having a low level of education (elementary school), there was a significant reduction in anxiety levels. This demonstrates that cognitive behavioral therapy using in vivo exposure has a very positive impact on addressing anxiety issues in elderly stroke patients.

Average Anxiety Levels in Elderly Stroke Patients Before and After Cognitive Behavioral Therapy with In Vivo Exposure

The results of the study show differences in average anxiety levels before and after intervention in both the intervention and control groups. For the intervention group, the average anxiety level before receiving cognitive behavioral therapy with in vivo exposure was 28.61, which decreased to 13.72 after the intervention. According to theory, Cognitive Behavioral Therapy (CBT) is highly effective, as it has repeatedly been proven to be a viable and successful therapy for various mental health issues.[10] The in vivo exposure technique in CBT involves facing feared situations or objects directly.[17] The goal is to reduce the client's fear and anxiety and to help the client learn to manage negative feelings and change negative thought patterns related to the feared object or situation.[18] Based on the explanation, several assumptions can be drawn. First, Cognitive Behavioral Therapy (CBT) with in vivo exposure is assumed to be effective in significantly reducing anxiety levels, as indicated by the decrease from an average score of 28.61 before the intervention to 13.72 afterward. The technique of in vivo exposure plays a crucial role in helping individuals confront feared objects or situations directly, suggesting that direct exposure is a key component in anxiety reduction. Additionally, it is anticipated that clients will not only experience a temporary reduction in anxiety but will also gain long-term skills in managing negative emotions and altering maladaptive thought patterns. Given that CBT has been proven to be an effective therapeutic approach for various mental health conditions, it is assumed that the positive outcomes observed in this study may be generalizable to similar populations outside the study. Furthermore, although both the intervention and control groups may experience some changes, it is assumed that the intervention group will show a more significant anxiety reduction, underscoring the specific effectiveness of CBT in this context.

Effectiveness of Cognitive Behavioral Therapy with In Vivo Exposure on Anxiety Levels in Elderly Stroke Patients

The results of the study, using bivariate statistical analysis before and after the intervention in both the intervention and control groups, showed significant results. The intervention group had a p-value of 0.000, and the control group also had a p-value of 0.000. This indicates that the hypothesis is accepted, confirming the effectiveness of cognitive behavioral therapy with in vivo exposure on the anxiety levels of elderly stroke patients. The theory explains that cognitive behavioral therapy involves the in vivo exposure method, which includes sequential stages. In this process, subjects are confronted with real and realistic objects or situations, helping them become braver and face new behaviors with increasing challenges.[19] According to the researchers, many factors contribute to anxiety, and each experiences different levels of anxiety. In this context, cognitive behavioral therapy is a technique for changing behavior and transforming irrational beliefs into more rational understanding, thus helping to manage disturbed emotions. In many cases, stroke in the elderly is often accompanied by anxiety due to fear. Both theoretically and based on previous research, cognitive behavioral therapy with in vivo exposure appears to be a viable solution and has a positive impact on complex emotional issues, such as those experienced by elderly stroke patients.

Based on the results, the significant p-value in the control group indicates that the standard care at Panti Sosial Tresna Werdha 1 for managing anxiety in elderly stroke patients also has an impact on reducing anxiety levels. This suggests that, even without cognitive behavioral therapy with in vivo exposure, the anxiety levels in elderly stroke patients would still decrease. However, the management is not yet well-structured. This is evident from the significant difference in the average post-test results between the intervention and control groups. The average anxiety score in the intervention group decreased by 14.89, while the control group only saw a reduction of 2.34.

Conclusion

The conclusion of this study indicates that Cognitive Behavioral Therapy (CBT) with in vivo exposure has a significant effect in reducing anxiety levels in the intervention group compared to the control group. The reduction in anxiety levels in the group receiving the therapy showed better results than the control group. Although there are influences from variables such as age, gender, education, and employment history, multivariate analysis reveals that the effects of these confounding variables are not statistically significant, with education being the most influential variable. This underscores the effectiveness of CBT with in vivo exposure in addressing anxiety in the studied population.

Conflict of Interest Declaration

There is no conflict of interest in this study.

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