THE EFFECT OF "HENS" APPLICATION (HEALTHY EMOTIONAL FREEDOM TECHNIQUE OF STROKE PATIENTS) ON THE STRESS LEVEL OF POST STROKE PATIENTS

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Abstract

Introduction: *Stroke is characterized by neurological deficits resulting fromacute focal injury to the central nervous system, originating from blood vessels such as cerebral infarction, cerebral hemorrhage and subarachnoid hemorrhage. This study explores the effectiveness of a mind body therapy, specifically the HENS application on Android in reducing stress in post stroke patients.*

Method: *The study employs a quasi-experimental design with a pre-test and post-test with control group. The sampling technique in the study was convenience sampling with a sample size of 48 post-stroke patients (24 for each intervention and control group). The HENS application was given to the intervention group. Data was collected using the DASS-42 questionnaire to measure stress level. Paired t-Test and Independent t-Test were used in this study to determine differences in one pre-post paired group and to analyze the changes after intervention between two different groups (post-post intervention)*

Result: *The results revealed significant changes in stress levels before and after the six-day intervention with the HENS Application. The intervention group showed a p value=0.000 indicating a significant reduction in stress levels. In contrast, p value for the control group's was 0.853, suggesting no significant change without treatment.*

Conclusion: *The HENS application has the potential to provide post-stroke patients with independent support for managing stress. It offers clear and useful guidelines for implementing HENS techniques which can improve confidence of post stroke patients in independently managing stress.*

Keywords *post stroke, stress level, EFT, HENS*

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INTRODUCTION

Stroke is a classic neurologic deficit associated with acute focal injury of the central nervous system of vascular origin, including cerebral infarction, cerebral hemorrhage and subarachnoid hemorrhage. It remains a leading cause of disability and death worldwide (Sacco et al., 2013). There are 13.7 million new cases of stroke each year, resulting in about 5.5 million stroke-related death (Feigin et al., 2022). About 70% of stroke cases and 87% of stroke-related deaths and disabilities occur in low and middle-income countries (Feigin et al., n.d.; Setiawan & Barkah, 2022).

Stroke is triggered by several risk factors; and the presence of more risk factors increases the likelihood of stroke(World Stroke Organization, 2023). Among these risk factors, stress ranks as one of the most influential factor to stroke (Pangastuti et al., 2020). Prolonged stress can lead to elevated blood pressure. Increased blood pressure can result in thickening of blood vessel walls, which in turn, may lead to deposition of cholesterol and other fatty substances causing damage to the arterial wall and blockages in the brain arteries. Furthermore, increased stress within the blood vessels of the brain can weaken the blood vessel walls, potentially leading the blood vessels to rupture and eventually cause a stroke (Puspitasari, 2020). Post-stroke stress can be considered an independent predictor of recurrent stroke (Wu et al., 2019). This finding is supported by a study conducted by Sari (2016), which established a 28% correlation between stress and the risk of recurrent stroke.

Exercise therapy is an intervention for post-stroke patients aimed to alleviating stress (Singh et al., 2023). It involves a systematic, and planned physical activity and body movement with the aim of preventing functional damage, preventing health risk factors, optimizing health and fitness status, and improving functional abilities(Krisnawati & Anggiat, 2021; Singh et al., 2023). Emotional Freedom Technique (EFT) is an effective therapy for overcoming psychological and emotional distress such as anxiety, depression, stress, fear, and fatigue (Church & Brooks, 2010; Feinstein, 2019; Irmak Vural & Aslan, 2019; Rancour, 2017). EFT is recognized in primary medicine as a safe, fast, reliable, and effective treatment for promoting relaxation in both the body and mind (Church & Brooks, 2010; Dincer & Inangil, 2021; Hartman, 2014). EFT can be developed as an intervention in various conditions such as wound healing, rehabilitation progress, stress, pain management and treatment of various cases (Rancour, 2017). Stroke or post stroke rehabilitation is time-consuming, therapist-dependent, and resource-intensive (Ameer & Ali, 2017). In view of these challenges in conventional rehabilitation programmes, there is a new call for novel strategies including use of technology-based treatment or rehabilitation programs (Ameer & Ali, 2017).

Technology-based treatment programs are emerging, offering a practical and convenient approach to healthcare (Peters et al., 2021). Currently, technology has the potential to enhance treatment processes by serving as a self-help and interactive tool for patient's treatment process (Lee et al., 2019; Peters et al., 2021). The results shows that 51% of Android apps are designed to address issues such as sleep disorders, depression, or eating problems by incorporating various features to motivate users to consistently engage (Ryan, 2018). These Android apps can serve as a promising tool to assist individual suffering from anxiety and other

disorders, given their anytime and anywhere accessibility (Drissi et al., 2020). This study will use the Healthy Emotional Feedom Technique of Stroke Patients (HENS) application to reduce post-stroke stress levels. This HENS application is an Android-based application developed by researchers. This application combines EFT intervention (which adds spiritual elements of Balinese people to increase confidence when undergoing intervention as an important point in affirmation) and education (about how stroke patients can live a healthy and quality life).

The aim of this study was to analyze the effect of the Healty Emotional Freedom Technique of Stroke Patients (HENS) application on stress levels in stroke patients.

METHODS

Study Design

This study was a quantitative study with a quasi-experimental research design with a pre-test and post-test approach, including a control group. The independent variable in this study is the application of EFT via the application of HENS (Healthy Emotional Freedom Technique of Stroke Patient), while the dependent variable is the stress levels of post stroke patient.

HENS application is an Android-based application developed by researchers. This application combines EFT intervention (which adds spiritual elements of Balinese people to increase confidence when undergoing intervention as an important point in affirmation) and education (about how stroke patients can live a healthy and quality life). The features in the HENS application were: ID-List, Pre-List, Set-Up, EFT Implementation, Post-list, Self-Remid and Self-Report.

The stress levels of post stroke patient measured using DASS-42 and categorized as follows:

Table 1. Stress level categorization

Assessment Indicators	Stress Level
Normal	0 – 14
Light	15 – 18
Medium	19 – 25
Severe	26 – 33
Very severe	> 34

Population, Samples, and Sampling

The population in this study comprised all post-stroke patients at Amaranee Foundation (Tapasya Stroke Center) in Tabanan, Bali. Sample selection was carried out by convenience sampling. The inclusion criteria for this study were as follows: (1) Post stroke patients with the ability to read and write, (2) have a Mini Mental State Exam (MMSE) scores within normal limits, (3) aged between 40 and 60 years, (4) possess e an android-based mobile phone communication device. A total of 48 post-stroke patients were included in the study. The research sample was 48 respondents which divided into 2 groups, namely 24 respondents in the intervention group and 24 respondents in the control group. The group division was based on days when the respondents regularly attended the Amaranee Foundation (Tapasya Stroke Center) Tabanan, Bali. The intervention group was the Monday and Tuesday group, while the control group was the Thursday and Friday group.

The division of control and intervention groups is based on respondents' routine visits to the Yayasan Amaranee (Tapasya Stroke Center) in Tabanan, Bali. Intervention Group (Monday

and Tuesday): Respondents visiting the center on Monday and Tuesday are included in the intervention group. This means they will receive intervention using the HENS application (Healthy Emotional Freedom Technique of Stroke Patients). Control Group (Thursday and Friday): respondents whose visits fall on Thursday and Friday are assigned to the control group. They do not receive intervention using the HENS application, but they will continue to undergo regular post-stroke care as determined by standard care with deep breathing exercises. The selection of routine visit days as the basis for group allocation ensures an even distribution of respondents between the control and intervention groups. Thus, the study can avoid biases that may arise from differences in characteristics between the two groups.

Instruments

The survey instrument utilized in this research was the DASS-42 (Ngurah & Sedana, 2020) developed by Lovibond and Lovibond (1995). A validity test was conducted at Public Health Center II East Denpasar using 30 respondents who met the predetermined inclusion and exclusion criteria. Based on the validity test, all statement items were confirmed to be valid. The results of the reliability test for the DASS 42 questionnaire showed a Cronbach alpha value of 0.939. Therefore, it can be concluded that the questionnaire was reliable.

Procedure

In the implementation stages, the researchers invited the participants to join WhatsApp groups to facilitate communication. The study began with a pre-test measurement of post-stroke stress levels in two groups. The intervention group was provided with EFT therapy through the HENS application. The EFT through the HENS Application in the intervention group is administered 6 times within a 30-minute period for each EFT session. Before introducing the application, the participants were gathered to explain how to perform EFT by the researchers. Subsequently, participants practiced EFT independently and documented through sessions through the HENS application. The explanation of each feature was as follows:

(1) ID-List. This feature contains a username (respondent's name) and password (respondent's NIK) where participants will log in for the first time with their username and password to complete the data first, the data entered will be saved automatically;
(2) Pre-List. This feature contains a range of values regarding the psychological condition that present the respondent's feeling when starting EFT therapy using SUDS (Subjective Units of Distress Scale). In this feature, respondents were asked to choose a score of 1-10 according to the emotions or problems that are bothering them at the moment. A scale of 0 means you don't feel anything and a scale of 10 means the negative emotions are very disturbing;
(3) Set-Up. This feature will display positive affirmations and respondents were asked to say positive affirmations three times.
Example:
"Even though I feel.....sad and helpless (feeling emotions), regarding the stress I feel (the problem that occurred), I accept it sincerely and respect myself completely. I intend and decide to let go with easy and fast, all these negative emotions are now and forever with the permission and mercy of God Almighty for the sake of health and happiness in my life."
Affirmations were done while tapping the afternoon spot (inter costae 2 sinistra).
(4) Implementation of EFT (Emotional

Table 2. Frequency and percentage distribution characteristics of intervention group and control group respondents (n=24 for each group)

No	Characteristics	Groups			
		Intervention (n=24)		Control (n=24)	
		n	%	n	%
1	Age				
	a. 40-45 Years	5	20,8	6	25
	b. 46-55 Years	10	41,7	10	41,7
	c. 56-60 Years	9	37,5	8	33,3
2	Gender				
	a. Male	12	50	12	50
	b. Female	12	50	12	50

Table 3. Stress's level of intervention group and control group respondents (n=24 for each group)

Stress Level	Control Group				Intervention Group			
	Pre-test		Post-test		Pre-test		Post-test	
	f	%	f	%	f	%	f	%
Normal	0	0	0	0	0	0	0	0
Light	0	0	0	0	0	0	5	21
Medium	11	46	11	46	15	63	17	71
Severe	13	54	13	54	9	38	2	8
Very severe	0	0	0	0	0	0	0	0

Table 4. Results of analysis of stress of post-stroke patients before and after in the intervention group and in the control group (n=24 for each group)

Variables	Group	P *value*	P *value*
		Paired T-Test	***Independent T-Test***
Stress level of post-stroke patients	**Intervention**	**0,000**	**0,000**
	Control	**0,853**	

Freedom Technique). This feature contains a tutorial for implementing EFT that participants must follow. Respondents will carried out EFT independently based on the tutorial provided. Respondents will carried out EFT for 2 weeks every day with a duration of 15 minutes for each session.

(5) Post-List. This feature contains a range of values regarding the psychological condition that the respondent is feeling after completing EFT therapy according to the tutorial provided. In this feature, respondents were asked to re-select a score of 1-10 according to the emotions or problems they feel after applying EFT therapy according to SUDS (Subjective Units of Distress Scale). A scale of 0 means you don't feel anything and a scale of 10 means the negative emotions are very disturbing.

(6) Self-Reminder. This feature contains a reminder alarm so that respondents do not forget to carry out EFT every day

(7) Self-Report. This feature contains the

results of the track record of EFT implementation that has been carried out by the respondent (how many times it has been carried out, date of implementation and time of implementation)

During the evaluation phase, participants were given a questionnaire online to provide feedback on their experiences with the HENS application, allowing for potential improvements in subsequent phases.

Data Analysis

This study was a quantitative study with a quasi-experimental research design with a pre-test and post-test approach with a control group. The Kolmogorov-Smirnov test was used to assess data normality in this study and homogeneity was determined using the Levine test. The Paired T-Test test is employed to identify differences in a paired group before and after a study with a significance value of $p>0.005$. The Independent T-Test test was utilized to assess differences between the two distinct groups after the study with a significance value of $p>0.005$.

Ethical Clearance

The study was conducted after obtaining a research permit and ethical approval from Research Ethics Commission of the BALI Institute of Technology and Health (ITEKES) number: 04.0326/KEPITEKES-BALI/VI/2023. Prior to data collection, informed consent was obtained from all participants, who were provided with a detailed explanation of the study's purpose, benefits, and procedures. All research information and data is used solely for scientific purposes. The research subjects' identities are kept strictly confidential.

RESULTS

Based on the data collected, majority of the participants in both the control and intervention groups were in the early elderly age category (46-55 years), with 10 participants (41.7%) in this age range (Table 2). Moreover, gender distribution was identical in both the control and intervention groups with an equal number of women and me, each comprising 12 people (50%).

Table 3 displays the stress levels of respondents in both the control and intervention groups, each consisting of 24 participants, measured at pre-test and post-test stages. The stress levels are classified into five categories: Normal, Light, Medium, Severe, and Very Severe. In the control group, there were no changes in stress levels from the pre-test to the post-test. In the intervention group, there were notable changes in stress levels from pre-test to post-test. The percentage of participants with "Light" stress increased from 0% to 21%. Those with "Medium" stress increased from 63% to 71%, while the percentage of participants with "Severe" stress decreased significantly from 38% to 8%. No participants in the intervention group were classified as "Normal" or "Very Severe" at either stage.

Table 4 shows that the p value in the intervention group is 0.000, indicating statistical significance, while the p value in the control group is 0.853 indicating a lack of significant change. This table also shows that the p value for both the intervention group and control group is 0.000, affirming the statistical significance of the results.

DISCUSSION

The control and intervention groups in this research were well matched in terms of age and gender. A significant

disparity in post-stroke stress levels was observed in the intervention group after six days of consistent HENS application use, as indicated by statistical tests (p=0.000). This demonstrates the convenience and accessibility of stress reduction techniques available to participants via the Android application, particularly for those with physical limitations or difficulties attending in-person sessions (Hwang & Jo, 2019). Technology such as the HENS application can prove to be more beneficial for certain patients, increasing motivation to participate in stroke intervention and fostering a supportive environment, especially when combined with clear and effective EFT techniques (Hwang & Jo, 2019).

Emotional Freedom Techniques (EFT) is a psychological energy technique that uses positive affirmations to address emotional or physical issues. It reduces emotional and physical stress, which can benefit for stroke patients (Dewi et al., 2020). The study suggests that non-pharmacological interventions can help stroke survivors reduce risk factors such as stress, hypertension, cholesterol, and diabetes (Dewi et al., 2020). The intervention can also enhance intrinsic motivation for recovery, a factor that can be monitored using digital sensors or applications (Kariasa et al., 2022; Pangastuti et al., 2020). Stress management through the HENS Application helps induce relaxation especially with the addition of positive affirmations during the intervention (Anagnostou & Drigas, 2022). The integration of affirmative statements is an important part of the intervention process.

In Bali where spiritual traditions and rituals often incorporate mantras and positive sentences. The utilization of positive language and affirmations within the HENS application focuses on the customs and is readily embraced. The EFT technique embedded within the HENS application, which focuses on the body's meridian points, exudes positive energy and resonates with the Balinese worldview and spirituality. The HENS application is programmed with a non-invasive approach, centering on energy management within the body, making it compatible with local beliefs. Furthermore, the active involvement of participants in their own healing process significantly contributes greatly to the reduction of post-stroke stress levels.

The study results demonstrates a contrast between the intervention group and the control group. In the control group, the statistical analysis revealed a high p-value (0.853), signifying that there was no significant difference in the post-stroke stress levels before and after without receiving the HENS application intervention. This implies factors outside the HENS intervention may not affect the post-stroke stress levels in the control group. The post-stroke recovery process is known to involve complex emotional and psychological changes. While some patients may naturally experience a decrease in stress over time, others may experience increased stress or persistent stress levels (Hinwood et al., 2023). Each individual's response to stress is inherently unique. It is essential to acknowledge that not all post-stroke patients experience an inherent reduction stress without any external intervention, especially if they face difficulties in managing the physical and psychological adjustments brought about by the stroke (Lehman et al., 2020). Unmitigated stress following a stroke can impede the the post-stroke recovery process. Elevated stress levels can affect the body's response to physical therapy and rehabilitation, slowing down physical and functional recovery capabilities. In addition,

excessive stress can negatively affect patient's cognitive function, leading to difficulties in concentration, attention, and memory. These cognitive challenges can interfere with the recovery process and daily activities. In addition, post-stroke patients who experience unmanaged stress faced a risk of developing emotional disorders such as depression and anxiety. These emotional disorders can significantly diminish the quality of life and interfere with social interactions among stroke survivors (Gyawali et al., 2023).

Currently, technology has become an invaluable asset in the field of medical, contributing significantly to both physical and psychological recovery of patients (Chen et al., 2020; Peters et al., 2021). The efficacy of the HENS application in reducing stress levels illustrates the potential for Android applications to offer accessible support for post-stroke patients in stress management. Beyond merely reducing stress, stroke survivors can employ this application to continuously monitor stress levels. This allows them to be more aware of changes in stress and take preventive action before stress increases. The constant self- monitoring empowers them to stay attuned to stress fluctuations, enabling preventive measures before stress escalates. The HENS application is also equipped to deliver timely reminders for relaxation exercises and stress management techniques. This functionality fosters consistently in adhering to stress management practices, which is a crucial aspect of the recovery journey. In addition, stress management packaged with the HENS application allows patients to track changes in their stress levels over time. This feature is invaluable for both participants and researchers as it facilitates a deeper understanding of the effectiveness of the adopted stress management strategies.

The limitation of this study is that we could not control the stress experienced by stroke survivors which was greatly influenced by the stressors experienced throughout the rehabilitation process. Another limitation in this research is the hormonal aspect which may also influence the emotional condition of female respondents. We suggest that future research needs to pay attention to restrictions on certain genders and pay attention to other stressors during the rehabilitation process.

CONCLUSION

The study found significant differences in the treatment outcomes between intervention and control groups. HENS applications with EFT technology displayed effectiveness in in reducing post-stroke stress and improving motivation for stroke treatment. The non-invasive approach of the HENS application, emphasizing energy management, harmonizes with the cultural values and spirituality of Bali. Implementing the HENS application can empower stroke patients in stress management, improve their physical activity, and ultimately contribute to an improved quality of life.

LIMITATIONS

The limitation of this research is that researchers cannot fully control the possibility of communication between two groups via social media groups. So this allows groups to exchange information regarding the interventions provided.

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CONFLICT OF INTEREST

There is no conflict of interest in this study.

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