Optimizing mental health: smartphone discharge planning's on impact on stroke survivor' mood

Dwi Retnaningsih[1], Desi Ramadhani[1], Eviwindha Suara[2]

[1]Nursing Study Program, Faculty of Nursing Business and Technology, Widya Husada University, Semarang, Indonesia
[2]RSUD Dr. Adhyatma, MPH Tugurejo, Semarang, Indonesia

Article Info	ABSTRACT
	Stroke is a disease that causes a variety of physical and psychological disorders, resulting in limitations in a person's life. Stroke patients often experience psychological problems such as depression, anxiety, and stress as a result of changes in their life activities. Discharge planning is considered an intervention that can reduce complications and improve the quality of life of stroke patients. However, there are still reports that the implementation of discharge planning is not optimal, and one of the reasons is the use of inappropriate methods. The aim of the study was to demonstrate the impact of the use of discharge planning applications on the levels of depression, anxiety, and stress in stroke patients. The research method used is quasi-experimental quantitative research with a one-group pretest and posttest design. A total of 21 respondents used purposive sampling techniques. The results showed changes in levels of depression, anxiety, and stress after application-based discharge planning. The Wilcoxon statistical test results obtained a p-value of 0.000 (p<0.005), which suggests that there is an influence of application-based discharge planning on the levels of depression, anxiety, and stress in stroke patients.
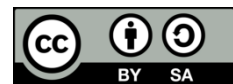
Corresponding Author:

Dwi Retnaningsih
Nursing Study Program, Faculty of Nursing Business and Technology, Widya Husada University
Subali Raya Street No.12, Krapyak, Semarang Barat, Semarang, Central Java 50146, Indonesia
Email: dwi.retnaningsih@uwhs.ac.id

1. INTRODUCTION

Stroke is the leading cause of disability worldwide and the number two cause of death [1]. A stroke occurs when the blood vessels of the brain are blocked or broken. As a result, some parts of the brain do not get the blood supply that carries the necessary oxygen, resulting in the death of cells and networks [2]. A stroke can cause many clinical manifestations, both physically and psychologically. Strokes result in a variety of physical disorders that cause individuals to experience limitations in their lives. Patients with higher socio-economic status have a lower risk of more severe strokes than those with lower socio-economic status. Therefore, we need to focus on improving socio-economic status as part of stroke management [3]. A stroke has a number of complications that can arise, one of which is a psychological problem. Depression, stress, and anxiety are psychological problems that often occur in stroke patients. In stroke patients, psychological problems can arise as a result of changes in activity, nutritional needs, mobilization, and other needs.

For stroke patients, discharge planning is an important component in order to minimize further complications and improve their quality of life. Although the patient has received good care in the hospital, nursing care associated with further care should be continued until home care so that the recovery of the stroke victim can be accelerated [4]. Effective stroke discharge planning for hospitalized patients can reduce the risk of rehospitalization or re-inpatient treatment. Indicators of the quality of care at home have been

developed that cover the physical and psychological aspects of patients and their families, the management of home care providers involving officers, and the availability of administrative services [5]. Patients who survived an early stroke are at risk of having recurring strokes of the same or a different type [6].

But at the moment, there are still many reports related to the not-optimal implementation of discharge planning in stroke patients. Inadequate methods and the inactivity of professionals in implementing discharge planning are the main factors causing the inoptimal implementation of discharge planning [7]. Ineffective implementation can result in disruption of continuity of care when the patient is at home and increased patient dependence on treatment [8]. Still, unoptimal discharge planning has an impact on the increase in the number of hospitalizations, and eventually patients bear the funding of hospital costs. The recurrence of the patient's condition or re-hospitalization is very detrimental to the patient and his family, as well as to the hospital [9]. Although patients and families have already received explanations from the health care providers, they tend not to follow the instructions given because the information provided is considered inadequate, so patients and family members are less aware of how to implement it, and patients and relatives are not in an ideal situation in preparation for recovery [10], [11].

The purpose of this application-based discharge planning program is to provide an effective solution to the use of discharge planning in the modern era by utilizing information technology that is easily accessible by patients anytime and anywhere. With the availability of this app-based discharge planning, patients can improve their quality of life as well as reduce anxiety, stress, and depression. The research aims to demonstrate the impact of the application's use on the levels of depression, anxiety, and stress in stroke patients.

2.   METHOD

The research method used is quasi-experimental quantitative research with a one-group pretest and posttest design [12]. The research was conducted from August 2023 to October 2023. The DASS-42 questionnaire is the tool employed [13]. The sample population in this study was the entire stroke population that underwent hospitalization in the KRMT Wongsonegoro district of Semarang. The sample was taken using purposive sampling, with a total of 21 respondents. The 40 respondents were gathered during the research procedure; however, during the data collection phase, some of the respondents had communication issues, low patient awareness, and other general characteristics that made it impossible to conduct the study. Consequently, 21 respondents satisfied the inclusion requirements.

Before conducting the study, researchers ask for permission to involve respondents in the study (informed consent) and show their identity and purpose of the research so that respondents understand the intentions and purposes of the study. When respondents are allowed to be studied, they are required to sign a letter of consent that has been provided. If respondents do not want to, the researchers are obliged to respect the wishes of respondents and not continue the research process; i) The researchers measured the respondent's depression, anxiety, and stress prior to the discharge planning intervention. ii) Researchers provided discharging planning using an Android-based application. The intervention was given for 30-45 minutes each session, with the duration of the intervention being given twice. iii) The researcher re-measured the level of depression and stress of respondents after they were given discharge planning through the application using a depressive, anxious, and stressful questionnaire. The researchers did not reveal the identities of the respondents and only used the code on the data collection sheet or the results of the research to be displayed. The researchers guarantee that the information that has been created will remain confidential. The research ethics test was conducted at KRMT Wongsonegoro Kota Semarang under the number 009/Kom.EtikRSWN/IX/2023.

3.   RESULTS AND DISCUSSION
3.1. Overview of respondents

The majority of respondents were eight between the ages of 50 and 60 (38.1%), and eight were over 60 years of age, or 38.1%. Most of the respondents had a stroke, 52.4%, or 11 people. Most had a high school education, with 10 people having 47.6%. The history of hypertension was 11 people with 52.4 percent. Most had strokes for less than 1 month, which is 19 people with 90.5%; most had a first stroke of 18 people, or 85.7% as shown in Table 1.

The results indicate that a sizable portion of the stroke patients in the nursing room are in the 50–60-year-old and older age groups. Physical alterations and the prevalence of health issues in the senior population are some of the primary causes of older people's increased risk of stroke [14]. It implies that, given the circumstances of this investigation, age might be a relevant risk factor [15]. One way to explain a gender risk difference in strokes could be the higher rate of strokes among males (52.4%). To find out if particular

characteristics that are more prevalent in men raise risk, more research may be required. According to data in Indonesia based on gender characteristics, men experience a higher rate of stroke victims than women. Because of the hormone estrogen, which acts as a barrier against the progression of atherosclerosis, women have a lower incidence of strokes than men. Although women will experience a stroke after menopause, men are more likely than women to experience one at an early age. Women were protected from menopause by esterogens, which contributed to an increase in high-density lipoprotein (HDL) cholesterol [16].

The majority of patients are unemployed and have a high school education. This may indicate that socio-economic factors can play a role in stroke incidence in this population. Further analysis of the socio-economic aspects may be needed. Respondents who have a higher level of education have knowledge and information about health compared to those with lower levels of education. The level of education directly affects the level of knowledge of the individual [17]. The least knowledgeable people are limited to remembering, defining, and stating facts; they are unable to demonstrate comprehension, application, analysis, or appraisal of their current abilities. Stroke women's high rates of death, morbidity, and disability upset the delicate balance in the family unit, particularly for those who take on the role of housemothers. A householder's multifaceted duty as a caregiver for children, a husband, and an administrator of the home leaves her open to the damaging effects of strokes. Furthermore, there is an increased risk of stroke for those who are sedentary or unemployed. A lack of physical exercise may be the cause of this illness, as it can lead to impaired blood flow throughout the body and a lack of muscular mobility. Furthermore, a correlation has been observed between the degree of work-related stress and an elevated risk of heart disease in two distinct demographic groups: middle-aged women and men aged 50 and above [18].

The significance of this factor in relation to stroke risk was underscored by the high prevalence of hypertension history (52.4%). Strategies for preventing stroke in this population may place a significant emphasis on the management and prevention of hypertension. Whether it is an ischemic or hemorrhagic stroke, hypertension is a substantial risk factor [19]. Increased peripheral blood pressure from hypertension results in a faulty hemodynamic system, thicker blood vessels, and heart muscle hypertrophy [20]. It can be made worse by the patient's habit of smoking, consuming foods high in fat, and using a lot of salt, all of which can cause plaque atherosclerosis. Age, gender, ancestry, race, diabetes mellitus, high blood pressure, high cholesterol, smoking [21], atherosclerosis, heart disease, obesity, alcohol intake, stress, favorable socioeconomic circumstances, poor eating habits, insufficient physical activity, and use of anti-pregnancy medications are some of the factors that can influence the risk of stroke [22]. Strokes can be caused by a variety of conditions, including high blood pressure [23]. Most individuals experience their first stroke within a month or less. In order to lessen the effects of strokes, this can focus attention on early detection initiatives and early treatments following the initial assault.

Table 1. History of stroke and response features

Variable	Number (%)
Age group (year)	
30-40 years	1 (4.8)
40-50 years	4 (19)
50-60 years	8 (38.1)
>60 years	8 (38.1)
Gender	
Men	11 (52.4)
Woman	10 (47.6)
Level of education	
No school	1 (4.8)
Elementary school	3 (14.3)
Junior high school	2 (9.5)
Senior high school	10 (47.6)
College	5 (23.8)
History of disease;	
Diabetes mellitus	3 (14.3)
Hypertension	11 (52.4)
Diabetes mellitus and hypertension	7 (33.3)
Long stroke	
<1 month	19 (90.5)
6 months-1 year	2 (9.5)
Stroke history	
Never	18 (85.7)
I've never been	3 (14.3)

3.2. Distribution of depression levels

Depression levels before discharge planning were obtained on an application basis. The 12 patients, or 57.1%, had normal depression; two patients, or 9.5%, had mild depression; one patient, or 4.8%, had moderate depression; three patients, or 14.3%, had severe depression; and three patients, or 14.3%, had very severe depression. Depression rates after given application-based discharger planning were achieved on 14 patients, or 66.7%, who had normal depressions; four patients, or 19%, had mild depressions; three patients, or 14.3%, had moderate depression; and 0 (0.0%) patients had severe and very serious depression as presented in Table 2.

Table 2. Depression before and after intervention

Depression	Pre test		Post test	
	Frequency	%	Frequency	%
Normal	12	57.1	14	66.7
Mild	2	9.5	4	19
Moderate	1	4.8	3	14.3
Severe	3	14.3	-	-
Very severe	3	14.3	-	-
Total	21	100	21	100

Following the implementation of application-based discharge planning, the overall depression rate among stroke patients increased [24]. The percentage of patients who initially had normal depression rose to 66.7% from the initial 57.1%. This suggests that using discharge planning has some positive potential. The decline in the prevalence of severe and very severe depression deserves particular emphasis. The 14.3% of patients had extremely severe depression, and 14.3% had severe depression before the intervention. Nevertheless, none of the patients reported major depression during their discharge planning. This indicates that the intervention was successful in lowering greater levels of depression, which is a favorable outcome. While there has been an overall improvement, it should be highlighted that 19% of patients still have mild depression following treatments. It implies that, in order to deal with milder cases of depression more successfully, the intervention may need to be modified or changed.

Depression is a highly prevalent clinical sign among stroke victims [25]. Mood disorders, such as depression, are emotional conditions that persist and impact mental functions, including thinking, emotions, and behavior [26]. This is a result of the patient's ignorance about stroke treatment. A few patients expressed their confusion regarding the next course of treatment if they were receiving it at home. In addition, the patient has low self-esteem as a result of their stroke-related incapacity or impairment and their negative thoughts, which trigger the start of depression. Depression treatment for stroke victims involves expedited rehabilitation and healing of stroke-related illnesses [27]. Post-stroke depression can be brought on by a number of things, such as gender, a history of depression, socioeconomic circumstances in the family, and brain injury. Stroke victims' rates of depression may be influenced by their families' provision of both material and moral support [28]. Data showing a decline in the rate of depression were acquired based on the study's findings. This is due to the fact that most stroke patients see a reduction in their degree of depression following discharge planning. This is because each patient has a different level of awareness when it comes to the discharge planning that has been provided for their stroke, as well as how the patient has responded to coping with issues associated with their stroke [29].

3.3. Distribution of anxiety levels

The level of emergency prior to the application-based discharge planning was obtained: two people, or 9.5%, had mild anxiety, three people, or 14.3%, had moderate anxieties, two people, or 9.5%, had severe anxieties, and five people, or 23.8%, had very severe alarms as presented in Table 3. Following the implementation of application-based discharge planning, the typical level of emergency significantly increased. From 42.9% of patients prior to intervention to 85.7% following intervention, this indicates that most patients' anxiety levels have been positively impacted by the intervention. Prior to the intervention, 9.5% of patients had severe anxiety, 23.8% had very severe anxiety, and 14.3% of patients had moderate anxiety. This implies that lowering anxiety levels to higher levels may be accomplished by application-based discharge planning. As a result, additional assessment of the variables that could lead to this degree of emergency is required, and intervention tactics should be modified as needed [30].

According to this study, stroke patients feel anxious [31] prior to receiving assistance because they don't know enough about how a stroke is performed and because there could be more significant problems. Respondents report experiencing a variety of symptoms, such as regular worry, fear, and sleep difficulties. A

significant contributing element to anxiety that compromises emotional stability is a high fear of dying. Motor abnormalities, verbal communication impairments, perceptual impairments, cognitive dysfunction, psychosocial problems, and bladder dysfunctions are all brought on by stroke [32], [33]. Strokes can result in incorrect route patterns, pain and sublocation on the affected portion, and paralysis, particularly on the affected side. Consequently, stroke victims experience anxiety as a result of a decline in bodily function that impacts day-to-day activities.

According to the study's findings, stroke victims' anxiety decreased following intervention. Good discharge planning can lower the risk of death, lower treatment costs, lower the likelihood of recurrence or relapse, boost patient and family satisfaction, lower family worry, and lower complications once patients return home [34]. According to study findings, stroke patients who received an application-based discharge planning intervention saw a reduction in their anxiety.

Table 3. Anxiety levels before and after intervention

Anxiety	Pre test		Post test	
	Frequency	%	Frequency	%
Normal	9	42.9	18	85.7
Mild	2	9.5	-	-
Moderate	3	14.3	3	14.3
Severe	2	9.5	-	-
Very severe	5	23.8	-	-
Total	21	100	21	100

3.4. Distribution of stress levels

Fourteen people, or 66.6%, had normal stress, three people, or 14.3%, had mild stress, one person, or 4.8%, had moderate stress, three people, or 14.3%, had severe stress. No respondents experienced severe stress after being given application-based discharge planning as shown in Table 4. Normal stress levels significantly increased with the implementation of application-based discharge planning. The 95.2% of patients following intervention compared to 66.6% before it. This implies that most patients may benefit from such interventions in terms of stress reduction. The 14.3% of patients reported light stress, 4.8% reported moderate stress, and 14.3% reported severe stress prior to the intervention. However just 4.8% of patients had mild symptoms following intervention, and none of the respondents had severe or extremely severe symptoms. This demonstrates how well the intervention worked to lower stress levels at an elevated level. 4.8% of patients continued to experience mild stress following intervention, despite the majority of patients experiencing a rise in normal stress levels. As a result, it's critical to assess the variables that contribute to stress in this population and think about modifying or expanding therapeutic techniques.

Table 4. Stress levels before and after intervention

Stress	Pre-test		Post-test	
	Frequency	%	Frequency	%
Normal	14	66.6	20	95.2
Mild	3	14.3	1	4.8
Moderate	1	4.8	-	-
Severe	3	14.3	-	-
Very severe	-	-	-	-
Total	21	100	21	100

Due to the need to adjust to the physical changes brought on by the stroke, some patients express complaints about feeling stuffed. If the patient feels useless and is unable to perform the activity from before the stroke, they get fearful. Due to anxiety and their physical incapacity to carry out regular tasks, stroke victims experience stress [35], which makes them feel worthless. Their quality of life is impacted, and they feel worthless as a result of this stress. Stress-related outcomes from acute stroke episodes can include hostility, low self-esteem, self-rejection, stress, malfunction, and mortality. Patients may experience stress due to their fear and lack of knowledge about their illness [27].

The study's findings show that, after receiving application-based discharge planning, 20 respondents, or 95.2%, reported normal stress, one respondent, or 4.8%, experienced mild stress, and 0% of respondents, or none at all, suffered severe and very severe stress. Following application-based discharge planning, patients gain knowledge on how strokes are implemented, including what they need to eat and how much physical activity to do [36]. Some patients had a reduction in stress from severe to mild depression

following an application-based discharge planning intervention, while those who were already experiencing stress saw their stress levels drop to mild or even normal. This is a result of each patient's own level of comprehension of the stroke they have experienced as well as their reaction to dealing with issues associated with the disease [37].

3.5. Effects of discharge planning on levels of depression, anxiety, and stress

The discharge planning intervention received a negative rank of 20 at the depression level, a positive rank of 0, a tie value of 1, and other ratings that indicated a change in the respondents' depression levels from before and after application-based discharge planning. One respondent did not report any changes in their depression levels. The discharge planning intervention was given a negative rank of 20 and a positive rank of 0 at the anxiety level. The study's tie of 1 indicates that there was a change in the respondents' level of alarm between the pre- and post-intervention periods, with one respondent not changing it.

Based on the stress level, the application-based discharge planning intervention received a negative rank of 19 and tied 2, indicating that there was a change in the respondents' stress levels between the prior and post-intervention periods. Two respondents did not alter their stress levels. The p-value is shown to be 0.000 for the levels of stress, anxiety, and depression. This can be proven as follows because the significance level (0.05) indicates a rejection of the zero hypothesis (Ho) and an acceptance of the alternative hypothesis (Ha), it may be concluded that discharge planning has an impact on stroke patients' levels of stress, anxiety, and depression as presented in Table 5.

Table 5. Effects of discharge planning on levels of depression, anxiety, and stress

| | Frequency | | | |
	Depression	Anxiety	Stress	p-value
Negative ranks	20	20	19	0.000*
Positive ranks	0	0	0	
Ties	1	1	2	

Notes: *means p-value$\leq$0.005

Patients who have had a stroke may feel anxious, stressed, or depressed [38]. All things considered, application-based discharge planning has been shown to be successful in lowering stroke patients' levels of stress, anxiety, and depression. These findings back up the idea of incorporating app-based technology into stroke patients' recovery plans to enhance their mental health. Following the implementation of this application-based discharge planning intervention, patients report increased comprehension, zeal, and overall well-being. The quality of life and everyday activities of stroke patients will improve with proper discharge planning and family preparation to care for them. Enhanced physical activity, avoiding health issues, medication adherence by patients, and regular illness management are a few examples. In order to develop a technology-driven discharge planning system that facilitates the family of a stroke patient's access to information, the discharge planner needs to possess strong technical and interpersonal abilities [39].

Families and patients can benefit from relearning the information by using audiovisual materials during the discharge planning process [40]. In addition to providing directions on how to receive treatment in the hospital from the time of hospitalization until their discharge, it can aid in their comprehension and help them retain the information that was presented [41]. Other research also showed that patients' and families' assessments of their degree of confidence after hospital discharge were positively impacted by the introduction of discharge planning education. Research has demonstrated that delivering discharge planning education in a consistent, progressive, and continuous manner has an impact on patients' and families' comprehension and ease of reaction [42].

In terms of knowledge, quality of life, and daily activities, stroke patients who are exposed to discharge planning for stroke have better average scores [43]. Discharging strategy affects how a family handles a stroke patient in the hospital [44]. Patients, families, and caregivers urgently need the application for discharge planning of patients with stroke during home care in order to lower treatment costs and offer information on how to treat a stroke patient [45]. As stroke patients gain more awareness, they will be more confident to pursue post-stroke treatment and lead normal lives. Individuals who have experienced a stroke and are unable to carry out their regular tasks on their own require psychological support when they notice behavioral changes in themselves [46]. Elevated self-worth will expedite the recovery from a stroke, enhance bodily capabilities, and elevate one's standard of living [47]. Stroke patients benefit from the support of their families because they feel less alone and have a higher quality of life when they are well-cared for [48].

4. CONCLUSION

Stroke patients at KRMT Wongsonegoro Kota Semarang RSD experience significantly lower levels of stress, anxiety, and sadness when application-based discharge planning techniques are used. The implication is that by offering a more creative and methodical approach to recovery planning, these applications may be a useful tool for enhancing the quality of life for stroke victims. As a result, using this approach can be advised as a component of a therapy plan for stroke patients in order to address psychological issues and enhance overall recovery results.

REFERENCES

[1] C. A. Northuis, C. J. Crandall, K. L. Margolis, S. J. Diem, K. E. Ensrud, and K. Lakshminarayan, "Association between post-stroke disability and 5-year hip-fracture risk: the women's health initiative," *Journal of Stroke and Cerebrovascular Diseases*, vol. 29, no. 8, pp. 1–9, 2020, doi: 10.1016/j.jstrokecerebrovasdis.2020.104976.

[2] B. Whitehead, D. Corbin, A. Albowaidey, N. Zhang, K. Karelina, and Z. M. Weil, "Mild traumatic brain injury induces pericyte detachment independent of stroke vulnerability," *Neuroscience Letters*, vol. 818, no. September 2023, p. 137552, 2024, doi: 10.1016/j.neulet.2023.137552.

[3] N. Yamanie *et al.*, "High socioeconomic status is associated with stroke severity among stroke patients in the National Brain Centre Hospital, Jakarta, Indonesia," *Preventive Medicine Reports*, vol. 32, p. 102170, 2023, doi: 10.1016/j.pmedr.2023.102170.

[4] L. Indrawati, R. Fitryasari, and Ahsan, "Effectiveness of nursing discharge planning interventions for stroke patient: a systematic review," *STRADA Jurnal Ilmiah Kesehatan*, vol. 10, no. 1, pp. 1066–1072, 2021, doi: 10.30994/sjik.v10i1.762.

[5] N. Chayati, C. Effendy, and I. Setyopranoto, "Validity and reliability testing of home care stroke quality indicators," *International Journal of Public Health Science*, vol. 10, no. 4, pp. 873–879, 2021, doi: 10.11591/IJPHS.V10I4.20846.

[6] K. Aunthakot, W. Loahasiriwong, and S. Tiamkao, "Recurrence stroke of ischemic stroke patients in Thailand: a nationwide study," *International Journal of Public Health Science*, vol. 12, no. 2, pp. 614–620, 2023, doi: 10.11591/ijphs.v12i2.22504.

[7] A. Berg, T. Tapiola, and M. Hujala, "Spouses' need for information and satisfaction with the patient's care and rehabilitation after stroke. Importance of depression and prescheduled follow-up," *Patient Education and Counseling*, vol. 107, no. December 2022, p. 107589, 2023, doi: 10.1016/j.pec.2022.107589.

[8] R. Small, P. H. Wilson, D. Wong, and J. M. Rogers, "Who, what, when, where, why, and how: a systematic review of the quality of post-stroke cognitive rehabilitation protocols," *Annals of Physical and Rehabilitation Medicine*, vol. 65, no. 5, p. 101623, 2022, doi: 10.1016/j.rehab.2021.101623.

[9] S. Simbolon, A. Y. S. Hamid, Mustikasari, and Besral, "The effectiveness of discharge planning stroke patient due to hypertension to improve patient satisfaction and independence," *Enfermeria Clinica*, vol. 29, no. Insc 2018, pp. 703–708, 2019, doi: 10.1016/j.enfcli.2019.06.011.

[10] M. A. Komolafe, O. E. Olorunmoteni, and F. O. Fehintola, "Effect of health education on level of awareness and knowledge of Nigerian in-school adolescents on stroke and its risk factors," *Journal of Stroke and Cerebrovascular Diseases*, vol. 29, no. 5, p. 104757, 2020, doi: 10.1016/j.jstrokecerebrovasdis.2020.104757.

[11] C. Smyth, P. Broderick, P. Lynch, H. Clark, and K. Monaghan, "To assess the effects of cross-education on strength and motor function in post stroke rehabilitation: a systematic literature review and meta-analysis," *Physiotherapy (United Kingdom)*, vol. 119, pp. 80–88, 2023, doi: 10.1016/j.physio.2023.02.001.

[12] C. J. Miller, S. N. Smith, and M. Pugatch, *Experimental and quasi-experimental designs in implementation research*, vol. 283. Elsevier, 2020. doi: 10.1016/j.psychres.2019.06.027.

[13] S. H. Lovibond and P. F. Lovibond, *Manual for the depression anxiety stress scales*, 2nd ed., vol. 56. Sydney, N.S.W. SE -: Psychology Foundation of Australia Sydney, N.S.W., 1995. doi: LK - https://worldcat.org/title/222009504.

[14] R. Purohit, S. Wang, S. Dusane, and T. Bhatt, "Age-related differences in reactive balance control and fall-risk in people with chronic stroke," *Gait and Posture*, vol. 102, no. December 2021, pp. 186–192, 2023, doi: 10.1016/j.gaitpost.2023.03.011.

[15] H. G. Nuamah *et al.*, "The effect of age on the relationship between body mass index and risks of incident stroke subtypes: the JPHC study," *Journal of Stroke and Cerebrovascular Diseases*, vol. 33, no. 2, p. 107486, 2024, doi: 10.1016/j.jstrokecerebrovasdis.2023.107486.

[16] M. Hanna, A. Wabnitz, and P. Grewal, "Sex and stroke risk factors: a review of differences and impact," *Journal of Stroke and Cerebrovascular Diseases*, vol. 33, no. 4, p. 107624, 2024, doi: 10.1016/j.jstrokecerebrovasdis.2024.107624.

[17] D. Li *et al.*, "The effect of educational level on the recurrence rate and number of episodes of stroke in stroke survivors," *Journal of Stroke and Cerebrovascular Diseases*, vol. 32, no. 12, p. 107442, 2023, doi: 10.1016/j.jstrokecerebrovasdis.2023.107442.

[18] N. Power, S. S. Deschênes, F. Ferri, and N. Schmitz, "Job strain and the incidence of heart diseases: a prospective community study in Quebec, Canada," *Journal of Psychosomatic Research*, vol. 139, no. October, p. 110268, 2020, doi: 10.1016/j.jpsychores.2020.110268.

[19] Q. Lin *et al.*, "Hypertension in stroke survivors and associations with national premature stroke mortality: data for 2·5 million participants from multinational screening campaigns," *The Lancet Global Health*, vol. 10, no. 8, pp. e1141–e1149, 2022, doi: 10.1016/S2214-109X(22)00238-8.

[20] V. Giani *et al.*, "Neurological hypertensive emergencies: correlation of blood pressure values with in-hospital outcomes in ischemic stroke," *European Journal of Internal Medicine*, vol. 124, no. January, pp. 61–68, 2024, doi: 10.1016/j.ejim.2024.01.029.

[21] K. Ling, E. Smolev, R. P. Tantone, D. E. Komatsu, and E. D. Wang, "Smoking is an independent risk factor for complications in outpatient total shoulder arthroplasty," *JSES International*, vol. 7, no. 6, pp. 2461–2466, 2023, doi: 10.1016/j.jseint.2023.07.009.

[22] T. Uhe *et al.*, "Intensive heart rhythm monitoring to decrease ischemic stroke and systemic embolism-the Find-AF 2 study-rationale and design," *American Heart Journal*, vol. 265, pp. 66–76, 2023, doi: 10.1016/j.ahj.2023.06.016.

[23] A. Chiangkhong, C. Suwanwong, and Y. Wongrostrai, "Lifestyle, clinical, and occupational risk factors of recurrent stroke among the working-age group: a systematic review and meta-analysis," *Heliyon*, vol. 9, no. 3, p. e13949, 2023, doi: 10.1016/j.heliyon.2023.e13949.

[24] X. Deng, D. Liu, M. Li, J. He, and Y. Fu, "Association between depression and stroke and the role of sociodemographic factors: a study among hypertensive populations," *Journal of Stroke and Cerebrovascular Diseases*, vol. 32, no. 12, p. 107457, 2023, doi: 10.1016/j.jstrokecerebrovasdis.2023.107457.

[25]   A. Lin, A. M. Vranceanu, M. Guanci, D. Salgueiro, J. Rosand, and E. L. Zale, "Gender differences in longitudinal associations between intimate care, resiliency, and depression among informal caregivers of patients surviving the neuroscience intensive care unit," *Neurocritical Care*, vol. 32, no. 2, pp. 512–521, Apr. 2020, doi: 10.1007/s12028-019-00772-x.

[26]   H. Zhou, Y. J. Wei, and G. Y. Xie, "Research progress on post-stroke depression," *Experimental Neurology*, vol. 373, no. October 2023, p. 114660, 2024, doi: 10.1016/j.expneurol.2023.114660.

[27]   D. Sibbritt, J. Bayes, W. Peng, J. Maguire, and J. Adams, "Associations between fatigue and disability, depression, health-related hardiness and quality of life in people with stroke," *Journal of Stroke and Cerebrovascular Diseases*, vol. 31, no. 7, p. 106543, Jul. 2022, doi: 10.1016/j.jstrokecerebrovasdis.2022.106543.

[28]   F. H. Lin, D. N. Yih, F. M. Shih, and C. M. Chu, "Effect of social support and health education on depression scale scores of chronic stroke patients," *Medicine*, vol. 98, no. 44, p. e17667, Nov. 2019, doi: 10.1097/MD.0000000000017667.

[29]   P. R. Bosch *et al.*, "Association of caregiver availability and training with patient community discharge after stroke," *Archives of Rehabilitation Research and Clinical Translation*, vol. 5, no. 1, 2023, doi: 10.1016/j.arrct.2022.100251.

[30]   J. F. de Oliveira *et al.*, "Persistent symptoms, quality of life, and risk factors in long COVID: a cross-sectional study of hospitalized patients in Brazil," *International Journal of Infectious Diseases*, vol. 122, pp. 1044–1051, 2022, doi: 10.1016/j.ijid.2022.07.063.

[31]   C. Redmond *et al.*, "Association of in-hospital depression and anxiety symptoms following stroke with 3 months- depression, anxiety and functional outcome," *Journal of Clinical Neuroscience*, vol. 98, no. October 2021, pp. 133–136, 2022, doi: 10.1016/j.jocn.2022.02.010.

[32]   D. Dutta, S. Sen, S. Aruchamy, and S. Mandal, "Prevalence of post-stroke upper extremity paresis in developing countries and significance of m-Health for rehabilitation after stroke-a review," *Smart Health*, vol. 23, no. March 2021, p. 100264, 2022, doi: 10.1016/j.smhl.2022.100264.

[33]   S. C. Bao, C. Chen, K. Yuan, Y. Yang, and R. K. Y. Tong, "Disrupted cortico-peripheral interactions in motor disorders," *Clinical Neurophysiology*, vol. 132, no. 12, pp. 3136–3151, 2021, doi: 10.1016/j.clinph.2021.09.015.

[34]   A. Azizi, M. Khatiban, Z. Mollai, and Y. Mohammadi, "Effect of informational support on anxiety in family caregivers of patients with hemiplegic stroke," *Journal of Stroke and Cerebrovascular Diseases*, vol. 29, no. 9, p. 105020, 2020, doi: 10.1016/j.jstrokecerebrovasdis.2020.105020.

[35]   S. Feng, M. Yang, S. Liu, Y. He, S. Deng, and Y. Gong, "Oxidative stress as a bridge between age and stroke: a narrative review," *Journal of Intensive Medicine*, vol. 3, no. 4, pp. 313–319, 2023, doi: 10.1016/j.jointm.2023.02.002.

[36]   Y. Hou *et al.*, "Postacute expenditures among patients discharged home after stroke or transient ischemic attack: the COMprehensive post-acute stroke services (COMPASS) trial," *Value in Health*, vol. 26, no. 10, pp. 1453–1460, 2023, doi: 10.1016/j.jval.2023.06.018.

[37]   L. J. Weaver and A. Karasz, "'Tension' and distress in South Asia: a systematic literature review," *SSM - Mental Health*, vol. 2, no. February, p. 100092, 2022, doi: 10.1016/j.ssmmh.2022.100092.

[38]   U. Sagen-Vik, A. Finset, T. Moum, T. G. Vik, and T. Dammen, "The longitudinal course of anxiety, depression and apathy through two years after stroke," *Journal of Psychosomatic Research*, vol. 162, no. August, 2022, doi: 10.1016/j.jpsychores.2022.111016.

[39]   H. Uchida *et al.*, "An iPad application-based intervention for improving post-stroke depression symptoms in a convalescent rehabilitation ward: a pilot randomized controlled clinical trial protocol," *Internet Interventions*, vol. 21, p. 100340, 2020, doi: 10.1016/j.invent.2020.100340.

[40]   N. Kurniati, N. Nursalam, and Y. Kartini, "The Effect of discharge planning combines audiovisual with the family centered nursing preparedness caring for acute post stroke patients," *Interest : Jurnal Ilmu Kesehatan*, vol. 10, no. 2, pp. 154–165, 2022, doi: 10.37341/interest.v0i0.345.

[41]   U. Sutin, S. Paluangrit, S. Dangkrajang, W. Sutthinarakorn, and V. Prasert, "Problems and needs when caring for stroke patient at homes," *International Journal of Public Health Science*, vol. 11, no. 2, pp. 695–705, 2022, doi: 10.11591/ijphs.v11i2.21013.

[42]   A. T. Hedqvist, S. Pennbrant, and M. Karlsson, "Older persons and relatives' experience of coordinated care planning via a video meeting," *Nursing Open*, vol. 7, no. 6, pp. 2047–2055, Nov. 2020, doi: 10.1002/nop2.600.

[43]   A. Said Taha and R. Ali Ibrahim, "Effect of a design discharge planning program for stroke patients on their quality of life and activity of daily living," *International Journal of Studies in Nursing*, vol. 5, no. 1, p. 64, 2020, doi: 10.20849/ijsn.v5i1.724.

[44]   H. Mou, S. K. K. Lam, and W. T. Chien, "The effects of a family-focused dyadic psychoeducational intervention for stroke survivors and their family caregivers: a randomised controlled trial," *International Journal of Nursing Studies*, vol. 143, p. 104504, 2023, doi: 10.1016/j.ijnurstu.2023.104504.

[45]   D. Retnaningsih, E. Suara, and R. Isnaini Nugraha, "Applications: discharge, planning, and stroke patients," *Jurnal Keperawatan*, vol. 16, no. 1, pp. 71–78, 2023, doi: 10.32583/keperawatan.v16i1.1459.

[46]   H. Y. Park, I. S. Yeom, and Y. J. Kim, "Telehealth interventions to support self-care of stroke survivors: an integrative review," *Heliyon*, vol. 9, no. 6, p. e16430, 2023, doi: 10.1016/j.heliyon.2023.e16430.

[47]   S. C. Yao, S. I. Hsieh, J. Der Lee, T. P. Chu, and J. Y. Fan, "Physical function, depressive symptoms, and quality of life with post-acute stroke care," *Collegian*, vol. 30, no. 3, pp. 475–482, 2023, doi: 10.1016/j.colegn.2023.01.001.

[48]   Z. Fatema, A. Sigamani, V. G, and D. Manuel, "'Quality of life at 90 days after stroke and its correlation to activities of daily living': a prospective cohort study," *Journal of Stroke and Cerebrovascular Diseases*, vol. 31, no. 11, pp. 1–6, 2022, doi: 10.1016/j.jstrokecerebrovasdis.2022.106806.

BIOGRAPHIES OF AUTHORS

Dwi Retnaningsih is a lecturer in the Bachelor of Nursing Study Program, Faculty of Nursing Business and Technology, Widya Husada University, Semarang, Central Java, Indonesia, who concentrates on researching health and nursing issues both in the community setting and in health services. The author has published several books, conducted research, and demonstrated dedication in the field of nursing. She can be contacted at email: dwi.retnaningsih@uwhs.ac.id.

Desi Ramadhani is a graduate of the Nursing Study Program, Faculty of Nursing Business and Technology, Widya Husada University, Semarang, Central Java, Indonesia. The author dedication in the field of nursing. She can be contacted at email: 2007013@student.uwhs.ac.id.

Eviwindha Suara is a nurse at RSUD Dr. Adhyatma, MPH Tugurejo Semarang, Central Java, Indonesia. The focus of research is in the field of nursing. She can be contacted at email: eviwindhas@gmail.com.