


The Combination of Sensor Digital Kariasa Early Detection Prototype and Health Education for Self-Management in Preventing Recurrent Ischemic Stroke

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Abstract

Introduction: Recurrent stroke is one of the concerns that not only causes functional disability but also economic and psychosocial problems. Self-management is one of the indicators to predict recurrent stroke. Field observations indicate there is currently no tool to increase the survivors' self-awareness.

Objective: The study aimed to investigate if an early detection tool and health education can improve patient self-awareness toward self-management in ischemic stroke patients in order to prevent recurrent ischemic stroke.

Methods: This study consisted of two stages. In the first stage, the study used research and development methods to develop a digital sensor tool named *Sensor Digital Kariasa* (SenDiKa). In the second stage, the study used a quasi-experimental design with a pretest–posttest control group involving 44 postischemic stroke patients who were selected by using consecutive sampling. The subjects were divided into intervention and control groups, and the length of the intervention was 12 weeks.

Results: This study found a significant difference between the two groups ($P < .001$). The intervention group who used the early detection tool and received health education showed better self-management compared to the control group. The use of SenDiKa early detection prototype and health education for self-management was perceived useful and gave positive effect to the improvement of self-management in poststroke patients to prevent recurrent stroke.

Conclusion: The combination of SenDiKa early detection prototype and health education for self-management can be used for patients to identify the major risk factors of recurrent stroke, such as blood pressure, blood sugar, and cholesterol.

Keywords

motivation, health education, self-awareness, self-management, digital sensor, recurrent ischemic stroke

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Introduction

The proportion of stroke cases increases every year, particularly ischemic stroke which reaches to 76% of all stroke cases. The 90-day mortality rate after hospital discharge for ischemic stroke was 3%–7% and 17% for intracerebral hemorrhage (Hong et al., 2013). In 2012, there were more than 420,000 people living with the effects of stroke, consisting of 233,171 males (56%) and 187,099 females (44%). Two-thirds of these people had a physical disability that impaired their ability to perform daily activities unassisted (Hong et al., 2013).

Stroke is a cerebrovascular disease when clots or blood vessel rupture occur in a certain part of the brain. The

extent and location of brain damage determine the stroke severity, from mild to severe. The brain has different parts and functions; so any specific effect of a stroke depends on which part of the brain is affected. When the stroke occurs in a very small part, if it is a vital part, it can paralyze the limbs or cause death. Brain cells do not regenerate, and

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the damage to the nerve cells is permanent. Millions of brain cells will die every minute if the stroke is not treated quickly and immediately. This condition will cause worse neurological deficits (Schmidbauer & Wollenweber, 2020).

In Indonesia, which consists of 34 provinces, the stroke cases based on the diagnosis in the population aged over 15 years were quite high. The provinces with cases more than 10 per mill are Yogyakarta with 10,975 cases (14.6 per mill), Riau Islands with 5,463 cases (12.9 per mill), Bangka Belitung Islands with 3,915 cases (12.6 per mill), East Java with 113,045 cases (12.4 per mill), Jakarta with 28,986 cases (12.2 per mill), Central Java with 96,794 cases (11.8 per mill), West Java with 131,846 cases (11.4 per mill), Banten with 33,587 cases (11.0 per mill), West Sumatra with 13,410 cases (10.8 per mill), Bali with 12,092 cases (10.7 per mill), and South Sumatra with 22,013 cases (10.0 per mill). Meanwhile, other provinces range from 6.8 per mill in Riau until 9.3 per mill in North Sumatra (Kemenkes, 2018).

Review of Literature

The increase of stroke cases cannot be separated from the risk factors, divided into modifiable and non-modifiable factors. The modifiable factors include the history of hypertension, diabetes mellitus, cholesterol, and heart disease, while the non-modifiable factors include the age, sex, ethnicity, and genetics (Diagne et al., 2016). Based on the modifiable factors, the cumulative risks of stroke recurrence in stroke patients were 39.2%, where 13% of them have it within the first year (Evans-Hudnall et al., 2014).

Another study also found that within the first year after the first attack, a stroke patient might be re-hospitalized for the second attack, and it is more common in ischemic stroke patients where the percentage ranged from 26.3% to 33% (Rao et al., 2016).

Many stroke patients during 1-year poststroke remain living unhealthily, which can be seen from the data where 22% of patients were still smoking, 36% did not maintain their weight, and 4% consumed excessive amounts of alcoholic drinks. The current population with stroke tends to occur at a younger age where men keep smoking while women remain obese. This noncompliance behavior has more serious consequences for some people with hypertension, diabetes mellitus, cholesterol, or heart disease because it can stimulate the risk factors for recurrent attacks (Slark & Sharma, 2014).

Many preventive actions and behavioral change programs have been implemented. However, the number of stroke recurrence and readmission has not been significantly decreased (Rao et al., 2016). Therefore, real action is needed to reduce stroke and recurrent stroke cases. It was in line with American Heart Association (AHA) statement which aims to reduce death caused by cardiovascular

disease and stroke by 20%. The implementation is manifested by maintaining a healthy and simple lifestyle with an improvement program called Life's Simple 7 (blood pressure, physical activity, blood cholesterol, healthy diet, healthy weight, smoking status, and blood glucose) (Mozaffarian et al., 2016). In this case, nurses play an important role as educators to increase the patients' understanding of stroke risk factors and how to modify these factors to have a healthy life by utilizing the existing technology to facilitate the monitoring (Lawrence et al., 2009).

Until recently, there were no practical programs or tools to assist nurses in detecting stroke risk factors. It is because there was no specific tool that could be used by the patients to detect the risk factor easily and safely. In this study, the authors developed a noninvasive tool by using a detection sensor that can recognize the risk factors in a patient's body, namely *Sensor Digital Kariasa* (SenDiKa). This tool was a prototype to help check and control blood pressure, blood sugar, and cholesterol, so it can be applied without invasive procedure. This tool is easy to use; by one-time fingerprint check, it can show three indicators of stroke cause, namely blood pressure, blood sugar, and cholesterol which also are the dominant factors of recurrent stroke.

Conceptually, SenDiKa tool will notice the patients or individuals if they have uncontrolled blood pressure, sugar, and cholesterol. The situation leads them toward feeling fear related to stroke recurrence (Townend et al., 2006). That problem could be solved through education that would improve self-awareness (Rasheed et al., 2019). Two previous studies found education could help to prevent stroke recurrence (Kim et al., 2013; Kronish et al., 2014). Increasing understanding of their health condition through educational program would help patient self-management (Figure 1).

Therefore, the study aimed to create a self-care model by combining early detection prototype and health education for self-management in order to prevent recurrent stroke.

Hypothesized Model

Using the combination of SenDiKa early detection prototype and health education will be effective in the self-management of ischemic stroke patients.

Methods

Design

This study consisted of two stages. In the first stage, a digital sensor tool named SenDiKa was developed by using research and development methods, and the second stage used a quasi-experimental design with a pretest–posttest control group.

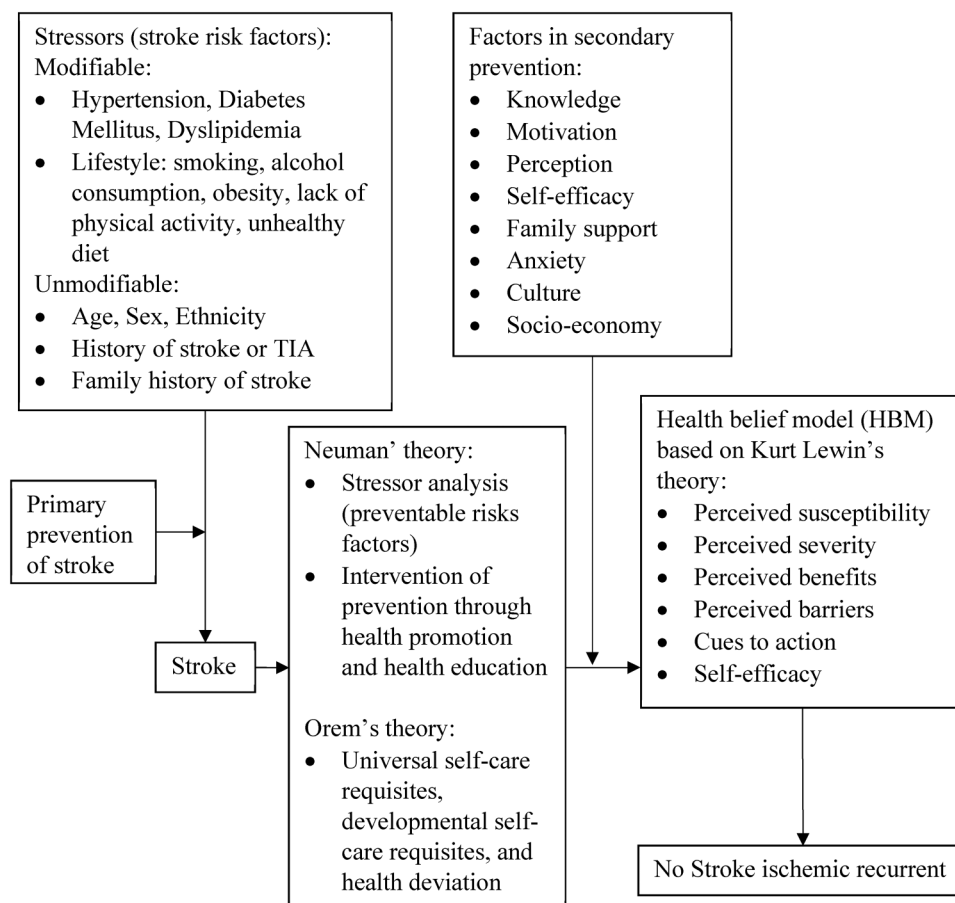


Figure 1. Theoretical framework.

Research Question

How is the effect of the SenDiKa prototype tool combined with self-management health education to increase the awareness of someone who has risk factors to improve their behavior and lifestyle in order to avoid repeated strokes?

Samples

In the first stage, the study involved three hospitals in Jakarta through 153 measurements to check sensitivity and specificity (Hajian-Tilaki, 2014).

The second stage used in two places, namely Hospital and Stroke Survivors Foundation involved 44 postischemic stroke patients who were determined by calculating the total sample for each group, that is, 15 persons. Charan and Biswas's (2013) formulation was used to count the number of samples in two unpaired groups. The authors anticipated the possibility of dropout, loss to follow-up, or noncompliant subjects, so a correction related to the sample size was necessary in order to meet the required sample size. By considering 30% dropout rate, each group consisted of 22 persons.

The inclusion criteria of this study were (a) postischemic stroke patients with first attack; (b) able to read, write, and speak Indonesian; (c) willing to be the respondents of the study; and (d) have good orientation to people, place, and time (through MMSE). The exclusion criteria were patients with sensory aphasia and/or global aphasia.

The sampling technique used in this study was consecutive sampling and divided into intervention and control groups. The duration of the intervention was 12 weeks for each respondent.

Stage I: Sensor Digital Kariasa

Early detection tools have been developed for dominant risk factors that have been selected to be risk factor markers. These biomarker factors are blood pressure, cholesterol levels, and blood sugar. The tool that has been developed is a noninvasive tool (SenDiKa prototype) that can detect the marker factor according to the respondent's condition. These marker factors are calculated cumulatively and synergistically to obtain a diagnostic percentage of risk for recurrent stroke. The more factors detected in the respondent will provide an indication of the percentage of stroke risk that

appears. The detection results will display the categorical value of each marker, namely high, medium and normal values. This categorization had been adjusted according to the reference of the standard value of each clinical marker. The value categories that are set into the Kariasa Digital Sensor prototype (SenDiKa) early detection tool are (a) systolic blood pressure (normal 100–120.5 mmHg, moderate 120.5–139.5 mmHg, high >139.5 mmHg), (b) blood sugar (normal <145 mg/dl, moderate 145–200 mg/dl, high >200

mg/dl), (c) cholesterol (normal <200 mg/dl, high >200 mg/dl). The value of each of these markers contributes differently in producing the interpretation of the final results of risk factor detection. The final detection is categorized into three, namely red means high risk, yellow is medium risk and green is low risk.

The results of the sensitivity analysis were true positive 94.5% and false negative 72.7% for blood pressure, true positive 96.3% and false negative 79.4% for blood sugar, and true positive 64.5% and false negative 89.4% for cholesterol, which means that the sensitivity level of the designed measuring instrument has a good value for three biomarkers.

Table 1. Distribution of Frequency Based on the Characteristics in the Intervention and Control Groups ($n = 44$).

Respondent's characteristics	Intervention group Freq. (%)	Control group Freq. (%)	<i>P</i>
Sex			.629
Female	12 (54.6)	13 (59.1)	
Male	10 (45.4)	9 (40.9)	
Total	22	22	
Education			.595
Primary education/ unschooled	16 (72.8)	11 (50)	
Secondary education	5 (22.7)	9 (40.9)	
Higher education	1 (4.5)	2 (9.1)	
Total	22	22	
Occupation			.712
Employed	16 (72.7)	19 (86.4)	
Unemployed	6 (27.3)	3 (13.6)	
Total	22	22	
Length of illness			.253
1 year	5 (22.7)	18 (81.8)	
2–5 years	12 (54.6)	4 (18.2)	
>5 years	5 (22.7)	0	
Total	22	22	
Limb impairment			.374
Right	11 (50)	15 (68.2)	
Left	11 (50)	7 (31.8)	
Total	22	22	
Habits history			.959
Smoking	3 (13.6)	6 (27.3)	
Alcohol	1 (4.5)	1 (4.5)	
Both	2 (9.1)	0	
None	16 (72.8)	15 (68.2)	
Total	22	22	
Comorbidity			.774
Hypertension	12 (54.6)	13 (59)	
Heart disease	3 (13.6)	0	
Diabetes mellitus	1 (4.5)	0	
Dyslipidemia	2 (9.1)	1 (4.5)	
None	4 (18.2)	8 (36.5)	
Total	22	22	
Medication			.328
Antihypertensive	13 (59)	15 (68.2)	
Insulin	1 (4.5)	0	
None	8 (36.5)	7 (31.8)	
Total	22	22	

Stage II: Intervention

Health Education Self-Management Prevention of Recurrent Stroke consists of eight phases and is distributed through pocketbooks and educational videos that are intended for people with stroke (Appendix 1). The contents of the pocketbook and educational video are public understanding of the signs and symptoms of stroke, stroke triggers, stroke risk factors, self-monitoring or paying attention to early symptoms that arise due to stroke equipped with appropriate self-management based on the risks they have. The main materials in the pocketbook and/or educational video are (a) recognizing stress as a trigger for stroke and its management; (b) recognizing hypertension and its management; (c) recognizing hyperglycemia and its management; (d) recognizing hypercholesterolemia and its management; and (e) fitness management with appropriate exercise. The evaluation is declared good if the respondent is able to follow and comply with the education in a pocketbook or video accompanied by a final assessment of the risks they have, namely blood pressure, blood sugar, or cholesterol. These eight phases of Health Education were applied to 12 meetings where each phase has its own pattern (full details can be found in the attachment to the research Gantchart). In addition, a complete discussion of theory and management for research health workers includes the health service module as a guide for providing services for the combination of the prototype of SenDiKa and health education on self-management for the prevention of repeated stroke.

Instrument

This study used pretest and posttest questionnaires to obtain the data related to the characteristics of the respondents, self-awareness, motivation, and self-management. Self-awareness consists of 23 items that were adapted from Sherer (2004) and Caplan (2016) with internal consistency reliability of 0.76. Motivation scale consists of 16 items that were adapted from Indrawati (2012) with internal consistency reliability at 0.76. Self-management scale has 31 items that were developed by the principal investigator (PI). The internal consistency reliability was 0.91.

Data Collection and Ethical Review

The data were collected by using early detection tool, followed by giving education and counseling before the intervention started. Respondents were given a procedure response form and asked to write the time and the result. As a reminder, the authors used several ways, including contacting them via WA Group or phone calls, to remind the respondents to do the suggested activities based on the results from SenDiKa prototype. Measurements were carried out again after the intervention.

Ethical Considerations

Ethical clearance was approved by the Ethics Committee of the University (No. 16/UN2/F12.D/HKP.02.04/2018). The ethical principles were applied during the study, by providing complete information of the study including the benefits and the risks of the study, voluntary participation, free to withdraw at any time, confidentiality of information, and maintaining justice by giving SenDiKa to the control group immediately after completing the questionnaire post-intervention.

Data Analysis

The data were analyzed by using univariate and bivariate analysis. Univariate analysis comprised numerical data (*M*, median, mode, *SD*, maximum–minimum) and categorical data (percentage and proportion). Wilcoxon analysis was used to analyze the difference between pre-posttest.

Results

Sample Characteristics

Table 1 shows that the distribution of respondents' characteristics by gender in both groups was almost equal between male and female. Most of the respondents in the intervention group had been diagnosed with stroke 2–5 years ago (54.6%), while in the control group, most of them had it for a year ago (81.8%). The intervention group had equal proportion between the right and left limbs (50%), while the control group has unequal proportion (68.2%)—mostly had right limb impairments. In terms of ethnicity, Balinese dominated in both groups (100% and 95.4%, respectively). Likewise, in terms of habits, most of the respondents in both groups did not have bad habits history (72.8% and 68.2%, respectively). More than a half of each group had similar comorbidity, namely hypertension (54.6% and 59%, respectively), so the medication frequently used was antihypertensive drugs (59% and 68.9%, respectively).

SenDiKa Tool and Health Education for Self-Management

The analysis results in Table 2 showed that there are significant differences on self-awareness, motivation for stroke

prevention, and self-management between the intervention and control groups. This result can explain that the change in value only occurred in the intervention group, where the intervention had a better effect in the intervention group than the control group.

Discussion

The study showed significant improvement in self-awareness, motivation, and self-management in the intervention group after using self-detection and receiving structured self-management education from pocketbook and videos within 12 weeks. Moreover, the results were encouraged by the significant difference between the intervention and control groups. Self-management education and self-detection seemed effective in increasing self-awareness, motivation, and self-management behavior (Anker et al., 2018; Heinrich et al., 2010).

A meta-analysis study supported the findings that self-management could improve individual awareness and motivation to control self-care behavior (Sakakibara et al., 2017). A former study revealed that self-care management behavior is essential for preventing and managing stroke and cardiovascular disease. Intervention to support knowledge and skills and uses technology for monitoring or detection would increase individuals' self-awareness, motivation, and self-management behavior (Juanamasta et al., 2021; Riegel et al., 2017). A qualitative study described individual needs regular education to understand their condition and refresh their knowledge. Then, understand the results of risk factors (e.g., hypertension, hypercholesterolemia, and hyperglycemia) and how to make it better, and periodic detection or monitoring would help individual self-management behavior (Despins & Wakefield, 2020).

Furthermore, the essential regular checking of risk factors was supported by Mi et al. (2018). His study involving 343 ischemic stroke patients in China found that high blood sugar levels could be an indicator that causes fatality in stroke patients. Self-detection on the clinical history of stroke patients is necessary to reduce the symptoms of risk factors that trigger recurrent attacks and to learn the proper treatment to deal with blood sugar. Stroke patients should be checked regularly for their blood sugar level, cholesterol, and blood pressure to adjust to a healthy lifestyle (Wang et al., 2019).

Using a noninvasive technology for regular checking might affect patient motivation in this study. SenDiKa works by infrared. Patients place their finger, and electromagnetic waves send it to the microprocessor. The processor processes the data and shows the result on the small LCD that would alert with the color red or yellow if above the normal and green otherwise. When patients see red and yellow, they may notice something happening in their bodies. Thus, that condition makes them aware of the results. The previous studies found that color can affect human visual awareness,

Table 2. Differential Analysis of Self-Awareness, Motivation for Stroke Prevention, and Self-Management (Posttest) Between the Intervention and Control Groups.

Variables	Group	M	SD	Median	Min-Max	95% CI	Z score (pre-posttest within groups)	Z score (post-posttest between group)
Pretest Self-Awareness	Intervention	56.91	9.56	58.00	35-69	52.67-61.15		
	Control	58.45	8.47	59.50	35-69	54.58-62.33		
Posttest Self-Awareness	Intervention	87.05	5.728	87.00	75-103	84.51-89.59	-4.110**	-5.659**
	Control	58.45	7.658	59.00	37-68	55.06-61.85	0.972	
Pretest Stroke Prevention Motivation	Intervention	56.91	2.96	45.00	39-51	43.92-46.54		
	Control	58.45	7.16	50.00	32-62	45.60-51.95		
Posttest Stroke Prevention Motivation	Intervention	56.82	3.62	56.00	53-64	55.21-58.42	-4.112**	-5.701**
	Control	48.86	6.79	50.50	32-60	45.85-51.87	0.771	
Pretest Self-Management	Intervention	80.77	4.14	80.50	73-89	78.94-82.61		
	Control	81.59	3.97	81.50	75-90	79.83-83.35		
Posttest Self-management	Intervention	99.91	4.48	100.00	95-112	97.92-101.90	-4.109**	-5.762**
	Control	81.50	4.31	81.50	76-92	79.68-83.50		

**P < .01.

which would give different psychological reactions (Elliot et al., 2007; Huang et al., 2007).

Using video and pocketbook as the media for education had a good impact because the messages related to cholesterol management were delivered interestingly and were easy to understand and apply to lead to positive behavior. The audiovisual media, in the form of video and pocketbook, also offer many advantages, such as, it is easy to understand, involving all senses, and more interesting because of the audio and the images used. Sullivan et al. (2010) explained image of illustrations and lifestyle animations can create a long-term impression, is easy to remember, and the message conveyed can reach the target with low literacy levels.

Strengths and Limitations of the Study

The prototype of SenDiKa early detection tool, from the sensitivity and specificity tests, showed a significantly higher score, but it can only be represented through notifications: high, alert, and normal in red, yellow, and green, respectively, which have been formulated with certain intervals. These shortcomings have been overcome by performing an invasive test to ensure the scores obtained by the respondents. Therefore, this tool needs more improvements to be completed with unit values of blood pressure, blood sugar, and cholesterol.

Implications for Practice

A nursing management system that accommodates the development of nursing services and care is necessary to ensure the efforts to improve the quality of services; through a policy on the use of a combination of noninvasive technologies and health education for self-management in the form of modules and/or videos to empower poststroke patients as educational media for poststroke patients. Therefore, it is necessary to add additional material on disease control and prevention to the nursing curriculum related to the information technology assessment model so that graduates can carry out these competencies well. Furthermore, in implementing the improved curriculum, it is necessary to prepare the lecturers in academic and professional programs to have service and care competencies for stroke patients, especially regarding Health Education that is ready to be delivered to the students.

Conclusion

The combination of SenDiKa prototype and the health education for self-management statistically described the clinical condition of the patient according to the results of the noninvasive test. This tool is easier, faster, and more practical to use and does not cause pain. Just by placing a finger, this tool will work with the sensor through the skin layer to

detect the patient's condition, so they can take appropriate action to reduce these risk factors.

The patient's self-awareness was increased after using SenDiKa prototype and receiving health education for self-management, as seen in the intervention group who were enthusiastic about improving their lifestyle in order to have a stable condition. Education about the color explanations, such as red, yellow, or green became a stimulus for the respondents to make changes to get a green one.

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Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.


Ethical Considerations

This study was reviewed by the University Research Review Committee (IRB No. 16/UN2/F12.D/HKP.02.04/2018) and was received and implemented.

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Appendix I

Meeting month first	Implementation	Description stages program
Meeting 1 Phase 1: social assessment	Pre-implementation test to <i>self-awareness</i> , motivation, and patient <i>self-management</i> stroke Check with <i>SenDiKa</i> , pocketbook, and educational videos (Health Education for Self-Management)	<ol style="list-style-type: none"> 1. Stroke patient answers the questionnaires of the study (pre-intervention) 2. Patient will be checked with <i>SenDiKa</i> whether is on red value range, yellow or green 3. The results of the assessment of the patient's condition through three indicators discussed through educational videos and stroke pocketbook with points, self-awareness, self-management, and self-empowerment. Education also given to family as caregiver patient
Meeting 2 Phase 2: epidemiology assessment	Check with <i>SenDiKa</i> , pocketbook, and educational videos (Health Education for Self-Management)	<ol style="list-style-type: none"> 1. The results of the assessment of the patient's condition through three indicators will be discussed through educational videos and pocketbook 2. In this second meeting also determine the social issues related to low quality of life on first phase, identified health problems or other factors related to impaired quality of life. Health problems will be analyzed according to two factors: how they relate to social indicators that were identified in the social assessment, and whether they agree for change health problem 3. The next step in this assessment is to investigate the cause of the disease, such as environmental factor, behavioral factor and genetic factor (e.g., family history)

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Meeting month first	Implementation	Description stages program
Meeting 3 Phase 3: education and ecology assessment	Check with <i>SenDiKa</i> , pocketbook, and educational videos (Health Education for Self-Management)	<ol style="list-style-type: none"> 1. The results of the assessment of the patient's condition through three indicators will be discussed through educational videos and pocketbook 2. This phase focuses on mediating factors that help or hinder an environment's upbeat or positive behavior. These factors are grouped into three categories: predisposing factors (predisposing factors), enabling factors (enabling factors), and reinforcing factors (amplifier factors)
Meeting 4 Phase 4: assessment of administration and policy, and harmony intervention	Check with <i>SenDiKa</i> , pocketbook, and educational videos (Health Education for Self-Management). First-month evaluation	<ol style="list-style-type: none"> 1. The results of the assessment of the patient's condition through three indicators will be discussed through educational videos and pocketbook 2. Focus mainly on the fourth phase, which is an inspection to ensure that the facility supports have adequate resources for implementing the program, such as nutrition intake or the patient's physical environment at home 3. Evaluation of changes in the patient's condition from the first meeting to the fourth based on risk factors of blood pressure (hypertension), blood sugar (diabetes mellitus), and cholesterol
Meeting 5 Phase 5: implementation	Check with <i>SenDiKa</i> , pocketbook, and educational videos (Health Education for Self-Management)	<ol style="list-style-type: none"> 1. The results of the assessment of the patient's condition through three indicators will be discussed through educational videos and book pocket 2. This phase conducts along with the first evaluation. If there is something that is not suitable and not fully able to run by stroke patients, it will be explored and modified
Meeting 6 Phase 5: implementation advanced	Check with <i>SenDiKa</i> , pocketbook, and education videos (Health Education for Self-Management)	<ol style="list-style-type: none"> 1. The results of the assessment of the patient's condition through three indicators will be discussed through educational videos and pocketbook 2. The approach used in this model is Gestalt learning theory (field theory). It is a model of social interaction that emphasizes the harmonious relationship between individuals and society through noninvasive, effective, and efficient approach (learning to live together) and striving to empower themselves
Meeting 7 Phase 5: implementation advanced	Check with <i>SenDiKa</i> , pocketbook, and educational videos (Health Education for Self-Management)	<ol style="list-style-type: none"> 1. The results of the assessment of the patient's condition through three indicators will be discussed through educational videos and pocketbook 2. Evaluation Learning means the significance of an element related to supporting the rehabilitation process is optimal
Meeting 8 Phase 5: implementation advanced	Check with <i>SenDiKa</i> , pocketbook, and educational videos (Health Education for Self-Management). Second-month evaluation	<ol style="list-style-type: none"> 1. The results of the assessment of the patient's condition through three indicators will be discussed through educational videos and pocketbook 2. Evaluation of changes in the patient's condition from the fifth meeting to the eighth based on risk factors of blood pressure (hypertension), blood sugar (diabetes mellitus), and cholesterol

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Meeting month first	Implementation	Description stages program
Meeting 9 Phase 6: evaluation process	Check with <i>SenDiKa</i> , books pocketbook, and educational videos (Health Education for Self-Management)	<ol style="list-style-type: none"> 1. Formative evaluation, which occurs during the implementation program. The purpose of the evaluation is to gather data, assess the appropriateness of programs, and ensure quality program delivery. The results match with the destination also measured in this phase 2. The results of the assessment of the patient's condition through three indicators will be discussed through educational videos and pocketbook
Meeting 10 Phase 7: evaluation impact	Check with <i>SenDiKa</i> , pocketbook, and educational video (Health Education for Self-Management)	<ol style="list-style-type: none"> 1. Impact evaluation: Treatment, change individual behavior following results from learning 2. The results of the assessment of the patient's condition through three indicators will be discussed through educational videos and pocketbook
Meeting 11 Phase 7: evaluation impact advanced	Check with <i>SenDiKa</i> , pocketbook, and educational videos (Health Education for Self-Management)	<ol style="list-style-type: none"> 1. Evaluation impact: Patients get feedback from the behavior that has been done 2. The results of the assessment of the patient's condition through three indicators will be discussed through educational videos and pocketbook
Meeting 12 Phase 8: evaluation result	Check with <i>SenDiKa</i> , pocketbook, and educational videos (Health Education for Self-Management) Implementation of Post test to <i>self-awareness</i> and <i>self-management</i> , patient stroke motivation	<p>The focus on this last phase is the same as the focus of the whole process. It starts with the evaluation of indicators of prevention factor risk recurrent stroke and health status</p> <ol style="list-style-type: none"> 1. The results of the assessment of the patient's condition through three indicators will be discussed through educational videos and pocketbook 2. Stroke patient answers questionnaires for post interventions 3. Final evaluation from first month to third. Evaluation of changes in the patient's condition from the ninth meeting to the twelfth based on risk factors of blood pressure (hypertension), blood sugar (diabetes mellitus), and cholesterol