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Development of a self-care guideline to prevent rehospitalization in stroke patients: a modified Delphi study

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ABSTRACT

Introduction: Since 2007, the number of stroke cases in Indonesia has continued to increase. Stroke patients who have passed the acute phase of stroke still have a risk of recurrent stroke and rehospitalization. This study aimed to develop self-care guidelines to prevent the rehospitalization of stroke patients.

Methods: A three-round modified Delphi study was applied to a panel of 24 experts with different fields of expertise, consisting of doctors, nurses, families, and patients. In the first round, data were collected through a literature review and semi-structured interviews. In the second and third rounds, data were collected using a survey questionnaire on a 9-point Likert scale.

Results: The first round produced seven themes around self-care activities, including drug therapy, physical exercise, diet and nutrition, stress management, self-motivation, functional status screening, and control for risk factors. In the second round, all types of self-care in the first round were agreed upon for content in preparing the guidebook. The third round resulted in agreement on the guidebook that had been designed, with scores of 8 and above by 100% of the expert panel.

Conclusions: The development of a self-care guidebook to prevent rehospitalization of stroke patients through a three-round Delphi study has reached a consensus among the entire panel of experts. Further research by testing guidebooks in the healthcare system is needed to determine their effectiveness in preventing re-hospitalization in stroke patients.

Keywords: guidelines, readmission, self-care, stroke

Introduction

Stroke is the third-most frequent cause of disability and the second-greatest cause of mortality worldwide (American Stroke Association, 2019). The prevalence of stroke continues to increase globally every year. In 2019, there were 12.2 million new stroke cases and 101 million people struggling with stroke worldwide (Feigin *et al.*, 2021). Asia is the most significant contributor to the total cases in the world, with as many as 58.1 million cases. Indonesia has the second-highest stroke rate, following Mongolia, with 193.3 cases per 100,000 person-years (Venketasubramanian *et al.*, 2017; Mboi *et al.*, 2022).

Indonesia has experienced an increase in stroke cases of 2.1% in five years, based on Basic Health Research data for 2013 and 2018. East Kalimantan has the highest stroke case rate, namely 14.7‰ while the Province of Bali ranks 17th with 10.7‰ stroke cases. However, the number of stroke cases in Bali is very significant; it has more than doubled in five years (Riskesdas, 2018). Stroke survivors who survive the first attack are also still at risk of experiencing a recurrence. With stroke recurrence, stroke survivors are twice as

likely to die from a subsequent attack as those who suffer a first stroke (Supriyadi, 2012). A stroke recurrence risk affects one in every four stroke patients (American Stroke Association, 2022). As many as 45.8% of the 238 stroke patients had recurrent strokes (Trisetiawati, Yuniar and Besral, 2018). Cases of stroke recurrence increased every year by 35% from 1995–1999 and increased rapidly to 67% for 2010–2015) (Flach *et al.*, 2020). One of the causes of high cases of recurrence is the lack of awareness among stroke patients about routine controls at health facilities. Stroke patients who do not regularly monitor their condition after the first attack have an 8.7 times higher risk of stroke recurrence than the first stroke (Trisetiawati, Yuniar and Besral, 2018). Only 39.4% of stroke patients in Indonesia routinely seek care at health facilities. Whereas in the province of Bali, the awareness of stroke patients to carry out controls is higher than the national average, less than, half of stroke patients carry out routine controls, namely 44% (Riskesdas, 2018).

According to the World Health Organization, one way to better control stroke is to involve patients in monitoring their own care. Self-care is the ability of individuals, families, and communities to improve their own health, prevent disease, maintain health, and overcome illness and disability with or without the support of health workers (World Health Organization, 2022). Many studies related to self-care have been conducted and have proven effective in improving quality of life and self-efficacy (Fryer *et al.*, 2016), resulting in improved conditions as well as the recovery of poor outcomes such as dependency and death (Parke *et al.*, 2015). Even though it has been proven to have a positive impact, in its implementation there are still obstacles that result in the not-optimal results expected, and recurrence in stroke patients still occurs frequently. In its implementation, at least four main obstacles were found, namely from the stroke patients, the health system, professional health, and the national health policy level (Baatiema *et al.*, 2017). Further research has been recommended to deepen understanding of the views of all stakeholders and address unmet needs during the transition period for stroke patients (Chen *et al.*, 2021).

To our knowledge, there has been no research related to the development of self-care guidelines to prevent rehospitalization in stroke patients using a Delphi study. By using the opinions of experts who have a high reliability value in obtaining agreement, the Delphi method is very suitable and important to use to explore, identify, compile, and obtain consensus in preparing guidebooks. This information is important for stroke patients and their families to use as a reference source for carrying out independent care at home. So, this study aims to compile and seek consensus regarding a self-care guidebook to prevent rehospitalization in stroke patients.

Materials and Methods

Design

The Delphi method was used to design and develop self-care guidelines to prevent stroke hospitalization. The Delphi study design has been widely applied to the health sector, especially to prioritize problems and needs (Suyasa and Sutini, 2021). This method has also been used previously in similar research, namely for developing guidelines (McMaster *et al.*, 2016; Virgara *et al.*, 2018). The application of the Delphi study in this study is based on three reasons. First, there is the suitability of the Delphi study design in utilizing expert opinion, which has a high reliability value in obtaining agreement on the self-care needs of stroke patients through a series of questionnaires accompanied by providing feedback on the agreement. Second, in expert groups, anonymity encourages participants' candor. Thirdly, it reduces the possibility of a "halo effect," in which the opinions of members of a dominant group or a higher-profile position are accorded additional weight (Winkler and Moser, 2016).

Population, Samples, and Sampling

The population of this study is a panel of experts with different areas of expertise who understand the need for self-care among stroke patients and consists of stroke survivors, families, doctors and nurses in Bali, Indonesia. This research involved 24 experts consisting of doctors, nurses, families, and patients who were recruited using purposive sampling and snowballing techniques. These two techniques are used to reach the most appropriate expert panel. The inclusion and exclusion criteria in this study were stroke patients who survived their first stroke > 3 months, family as the main caregiver who cared for stroke patients > 3 months, doctors and nurses who had or were caring for stroke patients for at least five5 years, skilled nurses who work in the stroke unit, and neurologists who work in the stroke unit. Such sample sizes have been shown to provide reliable and effective assessments (Akins, Tolson and Cole, 2005).

Instruments and Data Collection

The Delphi technique with three rounds was employed between September 2022 to February 2023 in this study: *Round One*: To gather expert opinions

regarding the self-care required for stroke patients to prevent rehospitalization. Qualitative data were collected through semi-structured interviews using an interview guide prepared through a literature review and adapted to the research objectives. Feedback from the first round was used to develop the survey questionnaire for the second round; *Round Two*: Quantitative data were collected through a survey questionnaire containing the types of self-care obtained in the first round. A survey questionnaire via Google Forms was used to seek agreement on each type of self-care. The results of the second round of agreement were used as the basis or material for preparing the guidebook and were agreed upon in the third round; *Round Three*: Quantitative data collection was carried out using a questionnaire via Google Form to seek agreement regarding the guidebook that had been prepared.

The second and third rounds of survey questionnaires were prepared using a 9-point Likert scale ranging from 1 (not important at all) to 9 (very important). The nine-point Likert scale is a commonly used rating scale in Delphi studies (Blanco-Aparicio *et al.*, 2023; Guiguet-Auclair *et al.*, 2023). In filling out the questionnaire via Google Form, the researcher accompanied a panel of experts one by one to ensure the accuracy of the responses.

Data Analysis

Thematic analysis was used in this study to analyze and present the first round of data. Researchers found the responses of each expert separately. Researchers applied a deductive analysis approach to present relevant guidelines regarding the self-care of stroke patients to prevent rehospitalization. Data from the second round were analysed through descriptive statistical analysis with IBM SPSS version 27 to see the median, range, and interquartile range (IQR) values. The higher the median, the smaller the IQR and range, meaning the higher the priority level of the type of self-care needed. This analysis method is commonly used in Delphi studies (Suyasa and Sutini, 2021). After the agreement in the second round was obtained, it was used in the preparation of the guidebook and again agreed upon in the third round. Consensus was reached when scores were 7 and above by more than 70% of participants and scores less than 4 by less than 30% of participants (Pandor *et al.*, 2019). If consensus was not found, the questionnaire was be revised, and data collected again until consensus was met. Apart from that, comments submitted by the expert panel through the comments column in the questionnaire were also used as consideration for preparation and agreement.

Ethical Consideration

This study received ethical approval from the Research Ethics Commission of the Faculty of Health, Bali Institute of Technology and Health (ethical license number 04.0529/KEPITEKES-BALI/X/2022). All participants gave informed consent and were made aware of their right to disengage from the study without negative consequences. This research applies the ethical principle of anonymity to protect the identity and confidentiality of expert panel information by using codes or initials, deleting personal identification information, and monitoring data security.

Results

Characteristics of the Expert Panel

Based on Table 1, most of the expert panel of doctors and nurses were late adults with an age range of 36-45 years, namely five participants (83.3%) and three participants (50%), respectively. The expert panel from families was dominated by late adults and the elderly, namely two participants each (33.3%). All expert panels of stroke patients are elderly with the age category of 56-65 years. The proportion of gender on the panel of experts from nurses and families was dominated by women, namely five participants (83.3%) and four participants (66.7%), respectively, while the panel of experts from the majority of patients were men, namely four participants (66.7%). Judging from the level of education, the entire panel of expert doctors held a Master's degree, and the entire panel of expert nurses and most of the families held a Bachelor's degree,

Table 1. Characteristics of the expert panel

Characteristics	Doctor (D)		Nurse (N)		Family (F)		Patient (P)	
	n	%	n	%	n	%	n	%
Age								
17-25 years	-	-	-	-	1	16.7	-	-
26-35 years	1	16.7	2	33.3	1	16.7	-	-
36-45 years	5	83.3	3	50	2	33.3	-	-
46-55 years	-	-	1	16.7	-	-	-	-
56-65 years	-	-	-	-	2	33.3	6	100
Gender								
Male	3	50	1	16.7	2	33.3	4	66.7
Female	3	50	5	83.3	4	66.7	2	33.3
Education level								
Senior High School	-	-	-	-	-	-	4	66.7
Diploma	-	-	-	-	1	16.7	1	16.7
Bachelor	-	-	6	100	5	83.3	1	16.7
Masters	6	100	-	-	-	-	-	-
Duration of stroke/care/work								
5-10 years	6	100	2	33.3	6	100	6	100
11-15 years	-	-	4	66.7	-	-	-	-

Table 2. Types of self-care in the first round

No	Theme	Category	Excerpts
1	Physical activity	Physical activity to prevent complications	"*Patients with pneumonia or decubitus ulcers are very vulnerable to patients who only lie in bed, so physical activity in patients is very important.*" (D5)
		Physical activity guide	"*The problem is that our patients don't know what kind of movement is preferred.*" (D4)
		Light physical activity and not forced	"*We still ask the patients to socialize together, keep exercising, keep exercising as usual. Keep doing light and not forced example activities...*" (D3)
		Less interest in physical activity	"*Lazy to move, even though his condition had improved but he didn't make any movements.*" (F4)
2	Diet/Nutrition	Diet/nutrition settings	"*Make them a guide to their calorie needs, how much protein, how many carbohydrates, how many fats and all kinds of things.*" (D2)
		Decreased appetite	"*The doctor suggested a low-salt diet, but after we prepared the food, you didn't want to eat, my father's appetite went down so he didn't want to eat.*" (F3)
		Food recommendations and restrictions	"*Diet low in salt, then avoid fried or foods that contain fat / oil like that.*" (D6)
3	Drug therapy	Withdrawal from drug therapy	"*Many patients stop taking their medication for 2 reasons, because they are afraid to go to the hospital (pandemic) and feel that they are already healthy.*" (D1)
		Adherence to taking medication	"*…maybe that's starting from discipline in taking medicine.*" (F1)
		Fear of taking medication	"*Often patients ask how long should he take the medicine? Is it for life? When will I recover?*" (D2)
4	Control of risk factors	Hypertension control	"*That's why it's important for patients to stay under control so that the risk factors, for example blood pressure are stable*" (D2)
		Diabetes control	"*For example, blood sugar must be controlled, what is the target blood sugar and diligent control.*" (N2)
		Cholesterol control	"*Routinely check blood cholesterol levels.*" (N6)
5	Stress management	Depression with a state of weakness	"*They feel depressed because they themselves feel mentally healthy and strong but how come their body still has weakness*." (D2)
		Stress worsens the condition	"*If the patient is easily anxious and stressed, sometimes they really don't want to be trained like that*." (N1)
		Stress control	"*Always try to avoid emotions from occurring, and often pray so that stress can be controlled.*" (P5)
6	Self-motivation	Loss of motivation	"*For example, young people with stroke are still productive at work but are weak in half of their body, usually their motivation is lost.*" (D3)
		Awareness and motivation to improve conditions	"*Making patients aware and motivating about their condition and guiding them to be able to continue treatment is very important.*" (D6)
7	Functional Status Screening	Screening for severity	"*For self-care at home, we first look at when the patient is hospitalized or hospitalized, how severe the stroke is.*" (D2)
		Developmental screening	"*Knowing what the score was at the time of the stroke, then what the score was after the stroke, and after rehabilitation, what the score was like to see whether there was a change in progress.*" (D4)
		Adjustment of the patient's condition and ability	"*For independent treatment, perhaps the first thing we have to do is look at the patient's condition to determine whether it is possible for the patient to carry out treatment independently. So usually we first check the patient's functional status.*" (N5)

namely six participants (100%) and five participants (83.3%), respectively, while the expert panel patients were dominated by high school education level, namely four participants (66.7%). Based on experience, the expert panel of doctors and families all have experience treating stroke patients for 5-10 years. Most of the expert panel nurses had longer caring experiences (11-15 years), namely four participants (67.7%). The expert panel of stroke patients involved in the study had all struggled with their condition for 5-10 years. The expert panel in this study had different ages, educational backgrounds, and occupations. However, these different characteristics can enrich the point of view of each opinion, recommendation, and assessment of the book being prepared. So the potential bias from differences in these characteristics has been anticipated.

Round I

The results of the first round of research were in the form of semi-structured interviews conducted with a panel of experts from October to December 2022. This produced a series of themes related to self-care to prevent rehospitalization in stroke patients. Based on

the results of the data analysis, seven core themes of self-care were identified: physical activity, diet and nutrition, drug therapy, control for risk factors (hypertension, cholesterol, and hyperglycemia), stress management, self-control, motivation, and functional status screening (Table 2).

Round 2

The second round of research through a survey questionnaire was conducted in December 2022 and January 2023. The expert panel in the second round was the same expert panel as the first round, with a total of 24 expert panels.

Based on Table 3, most types of self-care scored 8–9 from a 100% expert panel. Only one type of self-care received a score of 3, namely blood sugar control, according to a panel of experts (8.3%). A score of 3 is given because it is considered situational, only needed when someone has diabetes. However, based on >70% of the expert panel giving an assessment score of 7-9 and <30% giving a score of 1-3 for each type of self-care, it was concluded that all types of self-care had been agreed to serve as material or content for the preparation of the guidebook.

Round 3

The results of the third phase of the research are the agreements in the guidebook that have been prepared based on the results of the agreement on types of self-care in the second round. The guidebooks and assessment questionnaires were distributed to all expert panels in February and March 2023, and after being analyzed, they yielded a median value of 8, IQR = 1, Range 1, with the highest score being 9 and the lowest score being 8. Based on the results of the assessment, 100% of the panel of experts gave a score of 8–9. It can be concluded that all expert panels agree with the guidebook that has been compiled, namely self-care to prevent rehospitalization in stroke patients. Several expert panels also provided input and considerations, such as larger font sizes to make them easier to read, especially for the elderly. A compact size and being available in an e-book are also recommended to make it easier for those who will read it.

Table 3 Descriptive analysis of self-care types

Types of Self Care	Median	IQR	Range (Max-Min)
Drug Therapy	9	0	0 (9-9)
Blood Pressure Control	9	0	0 (9-9)
Physical Activity	9	0	I (9-8)
Diet/Nutrition	9	0	I (9-8)
Stress Management	9	0	I (9-8)
Self-motivation	9	0	I (9-8)
Functional Status Screening	9	0	I (9-8)
Cholesterol Control	9	0	I (9-8)
Blood Sugar Control	9	0	6 (9-3)

Discussions

This study produced a self-care guidebook to prevent rehospitalization in stroke patients which had been agreed upon by the entire panel of experts. The contents in the guidebook are arranged based on the types of self-care that have been explored in the first round and agreed on in the second round. The agreed types of self-care were drug therapy, physical activity, diet/nutrition, stress management, self-motivation, functional status screening, and control for risk factor.

The entire panel of experts agreed that it is very important to include drug therapy as content in a self-care guidebook. Drug therapy such as anticoagulants and antiplatelets can help prevent excessive blood clots and reduce the risk of forming blood clots that can block blood vessels in the brain. It is recommended for individuals who have a high risk of recurrent stroke (Evans *et al.*, 2020; Paciaroni *et al.*, 2022). However, patient adherence to drug therapy is still low (Kronenberg *et al.*, 2017), and forgetfulness is the most common reason why participants do not adhere to therapy (Aparecida *et al.*, 2017). Therefore, it is essential to investigate and resolve the factors that contribute to noncompliance (Tene *et al.*, 2018). Good information about treatment, including potential drug interactions, potential side effects, and when to contact a doctor, is considered to improve patient compliance (Liu *et al.*, 2019). In addition, the use of technology, such as applications that can be used to provide reminders, combined with educational support, is also recommended to increase medication adherence. (Al-Arkee *et al.*, 2021). Consequently, it is essential to develop guidelines for the autonomous management of drug therapy, with the expectation that this will increase treatment adherence and prevent recurrent strokes or readmissions.

Physical activity is the next type of self-care that has received approval to be one of the contents in the preparation of the guidebook. Physical activity is believed to improve blood circulation, reduce systolic blood pressure, fasting glucose, and increase high-density lipoprotein cholesterol after a stroke or transient ischemic attack, and evidence supports the use of physical activity as a recurrent stroke prevention strategy (Love *et al.*, 2020). Stroke survivors who do light, regular, and long-term exercise (more than five sessions per week and lasting an average of 40 minutes per session) have a lower relapse rate (Pérez-de la Cruz,

2020). However, this is not in line with the low adherence to exercise in stroke patients, and a lack of knowledge about the importance of physical activity (Hussain *et al.*, 2022). This low adherence to exercise is influenced by several factors, namely physical disorders, balance, fear of falling, decreased self-efficacy, a lack of staff and support from health services, physiotherapists or gym trainers, transportation, and sports facilities (Tabah *et al.*, 2020). Based on this, the type of self-care physical activity is one of the important contents to be included in the preparation of this guidebook, so that it is expected to improve conditions and prevent rehospitalization of patients.

In addition to drug therapy and physical activity, all expert panels agree that diet and nutrition self-care play an important role for stroke patients. A diet rich in fruits, vegetables, and whole cereals, low in sodium, high in lean protein, and containing healthy lipids can help reduce blood pressure and cholesterol levels and enhance blood sugar regulation (Dearborn, Urrutia and Kernan, 2015). A Mediterranean-type diet is recommended to reduce the likelihood of stroke recurrence (Estruch *et al.*, 2018; Rees *et al.*, 2020). Patients with hypertension, stroke, or Transient Ischemic Attack (TIA) are advised to reduce their sodium intake by at least 1 g/day (2.5 g/day of salt) to reduce the risk of recurrent stroke (He *et al.*, 2020). However, this is not supported by practical knowledge and nutrition training that is less than optimal (Benameur, Gandrakota and Ali, 2022). In addition, the quality of diet in stroke patients was also found to be poor (Dearborn *et al.*, 2019). To increase compliance and motivation, nutritional care recommendations must consider patient lifestyle, preferences, and psychological aspects in the assessment, planning, intervention, and evaluation stages of nutritional care. Patients and caregivers must also have awareness of the basics of nutritional care and nutritional literacy capable of supporting decision-making regarding nutritional care. The possibility to understand why certain foods and fluids should be prioritized and to choose between different options helps shift responsibility from healthcare providers to older people, giving them the opportunity to feel more involved (and thus more compliant and motivated) in nutritional care (Batista de Lima and Eleuteri, 2021). Therefore, self-care by managing diet and nutrition is important for stroke patients to prevent recurrent strokes and rehospitalization.

Stress management is the next type of self-care that has been approved by a panel of experts for content in the guidebook. Stress is a prognostic factor in determining the quality of psychological and emotional recovery (Kronenberg *et al.*, 2017). Several epidemiological studies have shown that higher levels of post-stroke stress are associated with poorer long-term outcomes (Aparecida *et al.*, 2017; Tene *et al.*, 2018; Gyawali *et al.*, 2020). Several observational studies consistently report a significant correlation between stress and worse stroke outcomes (Liu *et al.*, 2019). Stress management with meditation (Love *et al.*, 2020), memory rehabilitation (Chouliara and Lincoln, 2016), aquatic therapy (Pérez-de la Cruz, 2020), and positive psychotherapy (Cullen *et al.*, 2018) are some examples of therapy considered effective in managing stress in stroke patients. However, lack of access, limited time, training, financial placement, resources, lack of self-confidence, negative beliefs about therapy, lack of desire, and the time-consuming nature of behavior change are some of the potential things that can hinder the progress of stress management therapy (Köpsén and Sjöström, 2020). So, by increasing self-awareness and identifying appropriate sources of stress, not feeling the need to overcome all obstacles at once, and seeking support from friends, family, or mental health professionals can help overcome obstacles and maintain motivation. Seeking professional help and time management are some steps that can be taken to carry out stress management therapy (Wabschall, 2023). Therefore, self-care in the form of stress management in stroke patients is indeed very important to be one of the contents in preparing a guidebook for preventing worsening of conditions up to recurrent strokes or rehospitalization.

The entire expert panel has agreed to include self-motivation as another form of self-care in the guidebook, in addition to stress management. Stroke is a condition that requires long-term or continuous care, so a high level of compliance and consistency is required from patients in the process of treatment or rehabilitation. In this achievement, motivation is considered an important point in the patient's intensive rehabilitation process (Pickrell, Bongers and Hoven, 2015; Gangwani *et al.*, 2022). Unfortunately, patients' self-motivation after stroke is limited (Connell *et al.*, 2015; Peters, Calvo and Ryan, 2018; Ezeugwu and Manns, 2020). Even after patients reach their physiotherapy training target, they lose motivation to practice further (Vourganas *et al.*, 2019), even though a study found a significant correlation between motivation and the prevention of recurrent strokes (Lilipory, Pattipelohy and Tuarissa, 2019). Seven strategies, including adjusting task difficulty and establishing rehabilitation objectives, have proved

effective at boosting patient motivation (Oyake *et al.*, 2020). In addition, family support by paying attention to multidimensional aspects such as emotional, instrumental, and informational is one of the important points in increasing patient self-motivation (Kamaryati and Malathum, 2020). There are two strategies that can help in motivating, setting, and achieving goals. First, consideration of key goal characteristics (e.g., approach vs. avoidance goals, performance vs. mastery goals, level of difficulty) may result in more appropriate and feasible goal selection. Second, action planning can help individuals realize goals through action. Clinicians can help patients utilize these strategies to motivate, set, and achieve health behavior change goals (Bailey, 2019). Therefore, efforts to maintain and increase patient motivation in undergoing the rehabilitation process are very important to be discussed in the guidebook so that they can be implemented and improve conditions so that recurrent strokes or hospitalizations can be prevented.

Functional status screening was approved by all expert panels for content in the handbook. Functional status screening is considered important in terms of evaluating the success of the intervention and the progress of the patient's condition. Especially in the first three months of stroke recovery, because most of the functional recovery occurs during this period (Lee *et al.*, 2015). Functional status screening is important to determine the right time and what rehabilitation interventions will be given to patients (Selves, Stoquart and Lejeune, 2020). Functional Independence Measurement (FIM), Frenchay Activity Index, and Modified Rankin Scale (mRS) are some of the tools commonly used to assess patients' functional status (Rayegani *et al.*, 2016; Kim *et al.*, 2018). Although validated tools are available to assess functional status, they are typically administered by healthcare professionals. As far as researchers have conducted literature reviews, functional status screening is generally not carried out independently by stroke patients. Assessment of functional status in stroke patients is usually carried out by health professionals, such as physical therapists, occupational therapists, or other members of the rehabilitation team. Stroke patients who carry out functional status measurements independently indicate that self-assessment is less invasive than direct assessment by a health professional. Rather, asking about difficulty with activities versus the need for assistance are different and complementary concepts, and providing context is especially important when discussing sensitive topics such as functional impairment (Nicosia *et al.*, 2020). Knowing their functional status allows patients to be involved in setting goals and participating in their own rehabilitation. Therefore, screening for functional status is important as soon as possible to become a benchmark for when and what type of self-care the patient can do independently at home so as to reduce the risk of stroke recurrence and rehospitalization.

All expert panels have agreed that one of the contents of the guidebook should be the control of risk factors like hypertension, cholesterol, and blood sugar. Control of hypertension, such as routinely controlling blood pressure both independently at home and by coming to the nearest health service, administering drugs, and targeting blood pressure to be achieved is considered to reduce the risk of stroke recurrence and rehospitalization. A BP target of <130/80 mm Hg is recommended to reduce the likelihood of stroke recurrence and vascular events (Zonneveld *et al.*, 2018). In patients who have a mean office blood pressure of ≥130/80 mmHg, antihypertensive drug therapy is recommended to reduce the risk of recurrent stroke and other vascular events (Kitagawa, Yamamoto *et al.*, 2019). Individual drug regimens that consider patient comorbidities, patient preferences, and classes of pharmacological agents are recommended to maximize drug efficacy (Zhong *et al.*, 2016).

Cholesterol control, such as routinely checking cholesterol levels and paying attention to dietary adjustments and drug therapy, is considered important to prevent recurrent strokes or rehospitalization. LDL cholesterol levels <120 mg/dL and CRP <1g/L indicate a 51% reduction in the risk of recurrent stroke (Kitagawa, Hosomi *et al.*, 2019). Cholesterol is one of the three determinants of recurrent stroke (Rahayu *et al.*, 2019). According to a study conducted in China, there is a significant correlation between dyslipidemia and recurrent stroke (Akhtar *et al.*, 2019).

In individuals suffering from ischemic stroke or TIA and diabetes, achieving a goal HbA1c of ≤7% is recommended to lower the probability of microvascular complications (Nathan *et al.*, 1993). It has been found that treatment of diabetes with glucose-lowering agents reduces the risk of future adverse cardiovascular events (e.g., stroke, myocardial infarction, cardiovascular mortality) (Hernandez *et al.*, 2018; Gerstein *et al.*, 2019). To achieve glycemic goals and reduce stroke risk factors, multidimensional care (i.e., lifestyle counselling, medical nutrition therapy, diabetes self-management education, support, and medication) is recommended (Kleindorfer *et al.*, 2021). Acute hyperglycemia and diabetes are associated with worse outcomes after ischemic or hemorrhagic stroke, including higher mortality, worse

neurological and functional outcomes, longer hospitalization, higher rates of hospitalization, and relapse (Lau *et al.*, 2019). Research conducted by Wahyuningsih and Kamaryati (2019) supports the results of this study that hypertension, diabetes, and heart problems are risk factors in stroke patients and must be controlled immediately to prevent recurrent strokes. Based on this, risk factor control is one of the important types of treatment included in the guidebook to be carried out or applied to stroke patients to prevent recurrent strokes and re-hospitalization.

This research is a study to develop self-care guidelines to prevent rehospitalization of stroke patients through the first application of the Delphi study method. This research involves multi-professionals (doctors and nurses), families, and patients to achieve the best quality guidelines that are applicable and according to user needs.

Although the number of expert panels or participants in this research is considered sufficient, the category of health workers involved in this research could be larger, such as involving nutritionists, physiotherapists, and other related health workers involved in the rehabilitation of stroke patients. Also, the expert panel in this research is only from Indonesia. Apart from that, this research has only reached the product design stage and has not yet reached the testing stage.

Conclusion

Consensus on the development of self-care guidelines through a Delphi study was obtained through three rounds. In the first round, the semi-structured interview method produced seven themes consisting of drug therapy, physical activity, diet and nutrition, stress management, self-motivation, functional status screening, and controlling risk factors. Through the second round, seven types of self-care from the first round were agreed to be included in the guidebook. In the third round, the results of preparing a self-care guidebook based on the contents of the agreement in the second round received consensus from the entire expert panel. The guidebook based on the results of this research can be integrated into the health service system. This manual is an integral part of the patient care process. This may include providing books to patients during visits, providing digital access, or placing them in health information libraries at care facilities. To improve this book, further research is needed by testing guidebooks in health services using an experimental study approach to maximize the quality of the guidebook. Apart from that, involving more complete health workers from across countries is also needed to obtain guidelines that can be applied globally.

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Conflict of interest

All authors in this article declared no potential conflict of interest.

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