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Health Belief Model-Based Education for Stroke Patient Families: A Research and Development Study

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ABSTRACT
This study aims to develop educational media based on the Health Belief Model (HBM), to analyse the effectiveness of this educational media in terms of the HBM, and to enhance family capacity. Using a modified Borg & Gall model, this study employed a Research and Development (R&D) methodology. The process included a needs analysis, product design, expert validation, limited testing, and subsequent adjustments. The efficacy of an educational pamphlet based on HBM in enhancing the knowledge and caregiving abilities of carers was evaluated. Purposive sampling was used to choose thirty stroke carers from Jember, Indonesia, with a minimum caregiving duration of at least one month. Pre- and post-tests, as well as HBM-based perception questionnaires, were used to gather data. Descriptive statistics, the Wilcoxon signed-rank test, and thematic analysis were used for analysis. The leaflet's quality was confirmed by the high Content Validity Index (CVI = 0.88) obtained through validation by three experts. Following the intervention, the percentage of carers with low knowledge decreased from 40% to 7%, while the percentage of carers with good knowledge grew considerably from 13% to 67% ($p < 0.05$). Furthermore, 76.7% of participants provided positive feedback, emphasising the leaflet's utility, clarity, and simplicity. Improvements in carers' motivation, self-assurance, and comprehension of stroke care were revealed by thematic analysis. Stroke carers' knowledge and self-efficacy were both improved by the HBM-based educational pamphlet. Knowledge retention and behavioural modification were facilitated by the well-organised, understandable content and visually appealing design. These results highlight the value of empowering families to provide long-term stroke care at home by utilising theory-based, easily navigable instructional resources.

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INTRODUCTION

Stroke is one of the leading causes of death in the world and a leading cause of long-term disability. More than 12 million people worldwide experience a stroke each year (World Stroke Organisation, 2022). In Indonesia, the 2018 Riskesdas recorded a stroke prevalence of 10.9 per mil, with the majority of cases occurring in people over the age of 55 (Kemenkes, 2023). Most stroke patients require ongoing home care, which is highly dependent on the participation and ability of the family as the primary caregiver.

However, research shows that many families do not yet have the knowledge and skills needed to care for stroke patients. This is particularly relevant to transportation, nutrition, the prevention of complications, and psychological support (Choliq et al., 2020). A lack of training can lead to treatment errors, an increased risk of recurrence, and delays in rehabilitation. One behavioural model frequently used to promote health is the Health Belief Model (HBM). The HBM states that individual perceptions of vulnerability, disease severity, benefits of action, barriers, cues to action, and self-efficacy influence changes in health behaviour (Rumiati et al., 2021). Because it focuses on individual beliefs, HBM-based education is thought to increase health demands and behaviour (Rahmanian et al., 2023).

Based on HBM, educational measures, knowledge, attitudes, and maintenance behaviours in various groups, including caregivers and patients with chronic conditions, are improved. However, the only educational materials specifically developed for families of stroke patients in Indonesia are behavioural theories, particularly HBM (Ymeraj et al., 2025). To achieve this, we need to develop a systematic, HBM-based, easily accessible educational media. The developed training is expected to improve families' ability to ensure sustainability for stroke patients through research and development approaches (Alinejad et al., 2023). The objectives of this study are to develop educational media based on the Health Belief Model (HBM), to analyse the effectiveness of this educational media in terms of the HBM, and to enhance family capacity.

METHOD

Study Design

With the help of Research and Development Design (R&D), this study developed an educational brochure based on the Health Model (HBM). The aim is to help families better care for patients at home. In this study, the Borg & Gall development model was changed in five primary stages. The method used is as follows: needs assessment, product design, validation, and trial.

Respondent

One of the hospitals in Jember Regency is the site of a research study. This study will be conducted from November 2024 to January 2025. Respondents will be caring for stroke patients for more than a month, living, reading, and writing with patients. The number of respondents for the exam was limited to 30. The measures used include surveys for family knowledge and abilities—the Evaluation of family knowledge about stroke patient care (physical, psychological, and social aspects). The HBM-based perception *questionnaire measures six key components of HBM. It encompasses perceptions of security, severity, benefits,* barriers, behaviour, and sensitivity to self-efficacy. Respondents were selected using wrap samples with inclusion criteria.

Interventions

This material is written in simple language and features an attractive visual design that incorporates HBM principles. This pamphlet provides instructions for caring for stroke patients at home, with a focus on enhancing self-efficacy and family understanding. Expert verification: The brochures created were subsequently verified by three experts to assess the feasibility of content and media design.

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Statistic analysis

Expert verification sheet for assessing the quality and design of leaflet content with three validators: (1) Expert evaluator: three experts were selected based on their expertise, a community health specialist, a Neurologist/Stroke, and an Educational Media Expert; (2) Responsibility: Families who support stroke patients at home. The effectiveness of the interview guide leaflet in collecting feedback from respondents. Pre- and post-tests were used to gauge the knowledge and perceptions of 30 families of stroke patients who had received booklets. Data Analysis Methods: To explain the characteristics and results of respondents from previous test contributions, quantitative data were analysed using the Wilcoxon Signed Test. Descriptive statistics were employed to determine significant differences between family and skills. Qualitative data from interviews are analysed using thematic analysis to extract important topics related to family experiences and perceptions of educational sheets by CVI. This allows > 0.79

RESULTS AND DISCUSSION

Results

1. Respondent Characteristics

Table 1
Respondent Characteristics

Variable	Characteristics	Frequency (n = 30)	Percentage (%)
Age	25–35 years	5	168
	36–45 years	10	33
	46–60 years	12	40
	>60 years	3	10
Total		**30**	**100**
Gender	Man	10	33
	Woman	20	67
Total		**30**	**100**
Education	Basic Education	6	20
	Secondary Education	15	50
	Higher Education	9	30
Total		**30**	**100**
Duration of Treatment	< 6 months	12	40
	> 6 months	18	60
Total		**30**	**100**

This study involved 30 families of stroke patients who cared for patients at home (see Table 1). Respondent characteristics included: Age - The age range of respondents was 25 to 60 years. The average age was 45 years. Gender: The survey results indicated that 65% of respondents were female, while 35% were male. Education: 50% of respondents had secondary education, 30% had higher education, and 20% had only primary education. Duration of Care: 60% of respondents had cared for stroke patients for more than 6 months.

2. Category of Family Perception of HBM-Based Education Leaflets

Table 2
Category of Family Perception of HBM-Based Education Leaflets

Category	Total Score	Number of Respondents (n)	Percentage (%)
Negative	< 60	2	6.7%
Netral	60–79	5	16.6%
Positive	≥ 80	23	76.7%
Total	—	**30**	**100%**

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The majority (76.7%) of stroke patients' relatives follow a class plan based on HBM (see Table 2). This indicates that the benefits, language, design, and content of information are considered relevant, practical, and understandable. Only 6.7% of respondents expressed disadvantageous opinions, stating that they had limited education and may have preferred alternative educational materials.

3. Family Perception of Education Leaflets

Table 3
Family Perception of Education Leaflets

No	Question	Agree (%)	Disagree (%)
1	Leaflets are easy for families to understand	90	10
2	Attractive and clear leaflet design	85	15
3	Leaflets help improve families' understanding of stroke care	88	12
4	Provides valuable information for home care	85	15
5	Leaflets increase family confidence in caring for stroke patients	92	8
6	The leaflet motivates families to be more proactive in caring for stroke patients	90	10

Table 3 provides details on the validation of the leaflet by experts, deeming the level of quality and suitability of the material.

4. Product

Fig. 1 *Stroke Management Leaflet at Home*

The leaflet contains educational material on the topic: Stroke Management at Home: Great Family, Strong Care: A Practical Guide to Caring for Stroke Patients at Home (See Fig. 1).

Objective: To increase the knowledge, motivation, and ability of families to care for stroke patients independently and consistently at home using the Health Belief Model (HBM) approach.

1. Recognise the Risks and Danger Signs (Perceived Susceptibility & Severity) contains symptoms to watch out for: a crooked face, Weak arms, slurred speech, Sudden dizziness, and Visual disturbances.

2. What are the Benefits of Home Care (Perceived Benefits): Accelerates physical and mental recovery, Prevents complications and recurrent strokes, Reduces treatment costs, Strengthens emotional bonds within the family.
3. What are the barriers and how to overcome them? (Perceived Barriers) limited time, not knowing how to care for the child, mental fatigue, fear of making mistakes in care
4. Cues to Action: Post reminder posters for medication and patient activity schedules, Use alarms/calendars to check blood pressure and take medication, Consult regularly with health centre staff, Follow available family education
5. Self-Efficacy: I am confident in my ability to help stroke patients recover at home. I know what to do when symptoms appear.

5. Expert Leaflet Validation

Table 4
Results of Validation of Leaflet Content by Three Experts

Item	Expert 1	Expert 2	Expert 3	Amount Assessed3/4	I-CVI
Conformity of the content with educational purposes	4	4	3	3	1.00
Language clarity	3	3	3	3	1.00
Illustration/ image accuracy	2	3	3	2	0.67
Relevance of information to needs	4	4	3	3	1.00
Conformity with HBM principles	3	3	3	3	1.00
Text readability	3	2	3	2	0.67
Format and layout suitability	4	3	3	3	1.00
Amount I-CVI ≥ 0.78	**-**	**-**	**-**	**-**	**5/7**
Average S-CVI (Ave)	**-**	**-**	**-**	**-**	**0.88**

The majority of respondents believe that the content, language, and structure of the pamphlet are highly relevant for use in stroke education and are suitable for this purpose, as indicated by the CVI of 0.88 (see Table 4).

6. Knowledge Level Before and After the Intervention

Table 5
Knowledge Level Before and After the Intervention Respondent

Knowledge Categories	Pretest (n)	Pretest (%)	Post-test (n)	Post-test (%)
Low (≤ 59%)	12	40	2	7
Medium (60–79%)	14	47	8	27
High (≥ 80%)	4	13	20	68
Total	**30**	**100%**	**30**	**100%**

Before the intervention, most families had a low to intermediate level of understanding regarding the care of stroke patients. After completing the HBM-based leaflet intervention, the proportion of responders in the high category rose from 4 (13.3%) to 20 (66.7%) with a p value of 0,03 (see Table 5).

Discussion

The study's results showed that HBM-based educational leaflets were effective in improving the understanding of stroke patients' families regarding home patient care. Low pretest scores and increasing post-test scores indicate an increase in this knowledge. This suggests that education provided through leaflets

can enhance family understanding of the importance of structured post-stroke care, encompassing both physical care and psychological support (Alinejad et al., 2023). The study's results showed that HBM-based educational leaflets were effective in improving the understanding of stroke patients' families regarding home patient care. Low pretest scores and increasing post-test scores indicate an increase in this knowledge. One way to provide health information is through the use of the Health Belief Model. This model can be used to describe health behaviours and perceptions, as well as disease therapy. Providing health information using the Health Belief Model aims to understand the influence of demographic changes and the knowledge and responses of individuals to what they have learned about their health conditions, which can be assessed by their motivation and belief in their ability to recover (Fitriah et al., 2023). This suggests that education provided through leaflets can enhance family understanding of the importance of structured post-stroke care, encompassing both physical care and psychological support. Educational treatments also had a positive influence on post-stroke patients, enhancing their quality of life, functional capacities, and ability to perform daily activities (ADL), as well as lowering cognitive impairment, anxiety, and depression levels (Rumiati et al., 2021).

The factor that affects the ease of education is creating a simple and easy-to-understand leaflet design. It has been recommended that the content and design be evaluated by competent experts, such as those specialising in content and media in health promotion. Word and language choices, as well as visual media, also influence the conveying of messages. Research also suggests that clear and engaging educational media can enhance family understanding and involvement in caring for patients and their families with stroke (Rehman et al., 2024). The impact of transferring information through easy-to-understand leaflets will enhance the efficacy of one of the components of HBM's achievements, thereby increasing family confidence. In treating stroke patients at home (Afrin et al., 2024). Families' understanding of the Health Belief Model (HBM) has been shown to significantly improve their ability to care for stroke patients at home. This model emphasises six key components—perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. When families understand these principles, they tend to be more proactive, organized, and confident in caring for stroke patients.

Research indicates that after receiving HBM-based education, families exhibit improved skills in symptom management, medication scheduling, psychosocial support, and the early detection of post-stroke complications (Afrin et al., 2024). They are also better equipped to recognise the risks and symptoms of stroke recurrence and understand the importance of secondary prevention through blood pressure control, a balanced diet, and regular physical activity (Rehman et al., 2024). Family capacity improves not only in the technical aspects of care but also in motivation and attitudes. Increased perceptions of the benefits of care and self-efficacy help families become more committed to providing consistent care (Damaiyanti et al., 2023). Furthermore, previously perceived barriers such as lack of time, fear of making mistakes, and limited information can be overcome through education tailored to their needs (Abbasian et al., 2024). Studies also show that cues to action, such as leaflets, posters, or digital reminders, can strengthen family involvement in the daily care of stroke patients at home (Rahmanian et al., 2023). By understanding the HBM concept, families become not only providers of care but also drivers of positive health behaviour change within the home environment.

HBM's theory-based education through leaflet media offers efficiency and effectiveness as an extension of the support provided by health workers to families in caring for stroke patients at home. Increasing the family's knowledge and skills in caring will provide confidence and ease the burden of conflict within the family, aiming to improve the quality of life of patients and prevent re-attacks and further complications (Abbasian et al., 2024). Exhaustion; as a result, the carers felt demoralised because they were juggling multiple responsibilities at once, such as caring for patients and taking on other jobs. It was a particularly challenging instance when a family member opposed taking on the role of household head, thereby assuming the financial responsibilities and expenses of the family, which negatively impacted the health of the caregivers (Utaisang et al., 2021). Studies demonstrate the significant impact of the self-management

program on the self-efficacy of stroke patients. Various members of the healthcare team can utilise these findings to enhance patients' self-efficacy (Amiri et al., 2022). Some of the challenges encountered during this research include a lack of time available to the family for accessing educational materials. Because of this, there is a need for a more flexible and long-term approach, such as online education or based on digital technology, that can make it easier for families to access more information.

CONCLUSIONS

Education based on the Health Belief Model (HBM) is effective in increasing family capacity to care for stroke patients at home. Providing educational leaflets designed based on HBM principles can increase family knowledge, strengthen perceptions of vulnerability and severity, and enhance their self-efficacy in providing care. Further research is needed to evaluate the long-term effectiveness of education.

1. Health Belief Model (HBM) based educational media
   Health Belief Model (HBM)-based education is a practical, strategic approach to improving family capacity in caring for stroke patients at home. By developing educational media based on HBM components, such as perceived vulnerability, disease severity, benefits of action, barriers, cues to action, and self-efficacy, families can better understand the importance of consistent care and are motivated to participate in the patient's recovery process actively. This study confirms that a systematic, theory-based educational approach can improve family caregiving behaviour and support successful post-stroke care in the home environment.
2. Effectiveness of HBM-based educational media
   Educational media based on the Health Belief Model (HBM) has proven to be a practical approach in increasing family understanding and preparedness in caring for stroke patients at home. Through a research and development process, this media was designed to consider the six primary components of the HBM: perceived vulnerability, perceived severity, benefits, barriers, cues to action, and self-efficacy. The development results indicate that this educational media not only strengthens family motivation but also facilitates more positive, independent, and sustainable changes in care behaviour. Thus, HBM-based education can be an innovative solution to increase family care capacity for stroke patients in the home environment.
3. Family capacity
   The development of educational media based on the Health Belief Model (HBM) has significantly contributed to improving the capacity and ability of families to care for stroke patients at home. This media is designed based on the real needs of families and reinforces psychological factors that influence care behaviour, such as perceived risks, benefits of actions, barriers, and self-confidence. Through this approach, families are better prepared in terms of knowledge, attitudes, and skills to provide consistent and appropriate daily care. HBM-based education has been proven to empower families as a vital part of stroke patients' recovery, while also encouraging active involvement and sustainable long-term care at home.

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