Journal of Associated Medical Sciences 2024; 57(3): 204-211

JAMS
Journal of Associated Medical Sciences

Scopus Indexed & Thai-Journal Citation Index Centre (TCI)

Journal of Associated Medical Sciences

Journal homepage: https://www.tci-thaijo.org/index.php/bulletinAMS/index

Educational media utilization for rehabilitation among community-dwelling stroke survivors and their caregivers: a pilot study

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ARTICLE INFO

Article history:
Received 29 May 2024
Accepted as revised 1 August 2024
Available online 5 August 2024

Keywords:
Stroke survivors, caregivers, community, educational media, active information.

ABSTRACT

Background: Recently, there has been an increasing number of stroke patients. Those who survive still need continuous rehabilitation after being discharged from the hospital. The information and knowledge on stroke rehabilitation at home is crucial for these patients and their caregivers. However, there has never been a study of educational media on rehabilitation for those patients and their caregivers in Thailand.

Objective: To explore the educational media used in stroke rehabilitation, list their benefits, and the most satisfying media type for stroke participants and their caregivers after hospital discharge.

Materials and methods: Twenty-eight stroke patients and twenty-one primary caregivers from two Subdistrict Municipalities and two Districts in Chaing Mai province were recruited using purposive sampling methods. All participants were aged 18 years and over and could communicate in Thai. All the stroke participants had no cognitive impairment screening by the Mental Status Examination-10 (MSET-10) and had self-rehabilitation therapy at home. A Questionnaire on the use of educational media in stroke rehabilitation with the index of item objective congruence (IOC) range between 0.67-1.00 was used for data collection. The statistics used were descriptive.

Results: Stroke patients used information obtained primarily from medical personnel in the community (78.57%), while caregivers used advice from medical personnel the most in the hospitals (57.14%). Regarding the highest satisfaction with educational media, 59% of stroke patients and 42% of caregivers were satisfied with advice from medical personnel in the community. Stroke patients revealed that using a combination of advice from medical professionals, brochure-based media, and only document media was the most beneficial in providing knowledge about rehabilitation. For caregivers, the use of a combination of advice from medical professionals along with paper and video media, and the use of knowledge gained from online channels were the most beneficial.

Conclusion: Rehabilitation education materials used by stroke patients and their caregivers at home offer the highest level of satisfaction for the patients and caregivers if the medium of people who can give advice and communicate on issues meets their needs. In addition, patients and caregivers agreed that rehabilitation education should include more than one form of media for maximum benefit. Therefore, health professionals should consider the format of educational media appropriate to the needs of service recipients to be able to use them most effectively.

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doi: 10.12982/JAMS.2024.062
E-ISSN: 2539-6056

Introduction

In Thailand, the rate of stroke in the population aged 15 years and over was 278.49 per 100,000 people in 2017 and increased to 330.72 per 100,000 people in 2021.[1]

Stroke is the second leading cause of death among chronic non-communicable diseases, and those who survive are left with physical disabilities that cause difficulty for them. Many have to be cared for by immediate family members or relatives.[2, 3] A previous study has shown that only 18% of Thai stroke patients receive rehabilitation while in hospitals.[4] This means that there are still many stroke patients living at home who do not receive direct care and rehabilitation from medical personnel.

Additionally, these people do not receive knowledge and rehabilitation skills from rehabilitation institutions. Stroke patients and their family members should receive information and knowledge about many aspects of stroke. For example, issues about the causes of stroke, symptoms, risk factors, prevention of complications, consequences after a stroke, treatment, and rehabilitation when returning home should be better understood by the patients and their caregivers.[5] Therefore, health professionals should provide rehabilitation education to stroke patients and their caregivers before discharging them from hospitals.

The clinical practice guideline for stroke rehabilitation specifies that health professionals should provide information and knowledge about stroke, its complications, processes, and goals for rehabilitation, both through interactive conversation and in a written format.[6] This is consistent with a study on the rehabilitation information needs of stroke patients and their caregivers after being discharged from the hospital, which found that these individuals wanted to receive knowledge about stroke and care through mixed media methods that included both verbal communication such as interactive or face-to-face conversation and in written formats such as documents or pamphlets that can be stored and reread when needed.[7, 8]

Thailand still encounters problems in treating stroke patients when they must return to their homes since the caregivers do not receive knowledge and training in basic rehabilitation skills for practice with the patients. Some stroke survivors and their caregivers may receive some advice from therapists, but it is not sufficient for self-practice. Another issue is that the person caring for the patient in the hospital is not the primary caregiver. Therefore, when the patient returns home, the primary caregiver lacks knowledge and confidence in providing rehabilitation to the patient and cannot perform therapy correctly.[9]

Rehabilitation professionals, which include occupational therapists (OTs), play essential roles in encouraging physical and mental conditions for stroke patients. These therapists also promote the patient's ability to perform daily activities by directly providing knowledge and basic rehabilitation skill training to the patients and their caregivers.[10-12] Health professionals should use appropriate media to provide knowledge for self-rehabilitation at home that meets the needs of stroke patients and caregivers. Notably, each form of media has different advantages and limitations.

However, to our knowledge, no studies have been conducted on the use of educational media for rehabilitation in stroke patients living at home in Thailand, including determining the level of satisfaction with the media received.

Therefore, the researchers conducted a pilot study on media used for rehabilitation, examined the benefits of using the media, and determined the level of satisfaction with current media used in stroke rehabilitation from the perspective of stroke patients and their caregivers.

Materials and methods

This research is a pilot study of the use of educational media regarding the rehabilitation of people with stroke in the community. Forty-nine subjects participated in the study, consisting of 28 stroke patients and 21 caregivers who lived in Nong Pa Khrang Subdistrict Municipality, Mueang District, and Ban Waen Subdistrict Municipality, Hang Dong District, Chiang Mai Province. The inclusion criteria were as follows:

Inclusion criteria for stroke patients

1. be a stroke patient who has self-rehabilitation therapy at home.
2. aged 18 years and over.
3. do not have impaired cognitive function (using the Thai version of the Mental State Examination 10 or MSET10).
4. able to communicate in Thai

Inclusion criteria for caregivers of stroke patients

1. be the primary caregiver for a stroke patient at home.
2. aged 18 years and over.
3. able to communicate in Thai

Instruments

1. MSET10 is used to screen stroke patients for impaired thinking and understanding. It has good psychometric properties, with a sensitivity and specificity of 100.0 and 98.4-99.4, respectively.[13]
2. A Questionnaire on the use of educational media in stroke rehabilitation. It is an instrument developed by the research team by asking the patient to choose the type of educational media they use after being discharged from the hospital. The questionnaire consists of three parts, including 1) the type of media used, 2) the benefits of the media, and 3) the most satisfying media type to utilize for rehabilitation. Regarding the benefits of using media, each question has a minimum score of 1, meaning it is least helpful, and the highest score of 5, meaning it is most beneficial. The final section is an open-ended question about the highest satisfaction with an educational media type of educational media used for stroke rehabilitation. This questionnaire has been checked for content validity by 3 experts. Content validity was determined by using the index of item objective congruence (IOC) technique. The analysis found that every question in the questionnaire had an acceptable score, ranging from 0.67 to 1.00.

Procedure

1. After the research project received approval to proceed from the Human Research Ethics Committee, Faculty of Associated Medical Sciences, Chiang Mai University, the principal researcher coordinated

with officials of Nong Pa Khrang Subdistrict Municipality, Mueang District, and Ban Waen Subdistrict Municipality, Hang Dong District, Chiang Mai Province, to request permission to conduct research in the area.

2. After receiving permission, the researcher publicized the project by placing posters on the public relations boards in the target areas. The posters specified details of the research project, including methods for contacting researchers, so those interested can apply to participate in the study.
3. The main researcher performed preliminary cognition screening of stroke patients using MSET10 before data collection to prevent errors in the study's results. This is because most stroke patients are elderly and often experience impaired cognitive function.

Data collection

The study was conducted between November and December 2022 using face-to-face interviews. Before collecting data, subjects received information about the research project and all signed consent forms before participating.

Data analysis

This study analyzed data using descriptive statistics, reporting frequency, percentage, mean, and standard deviation (SD).

Results

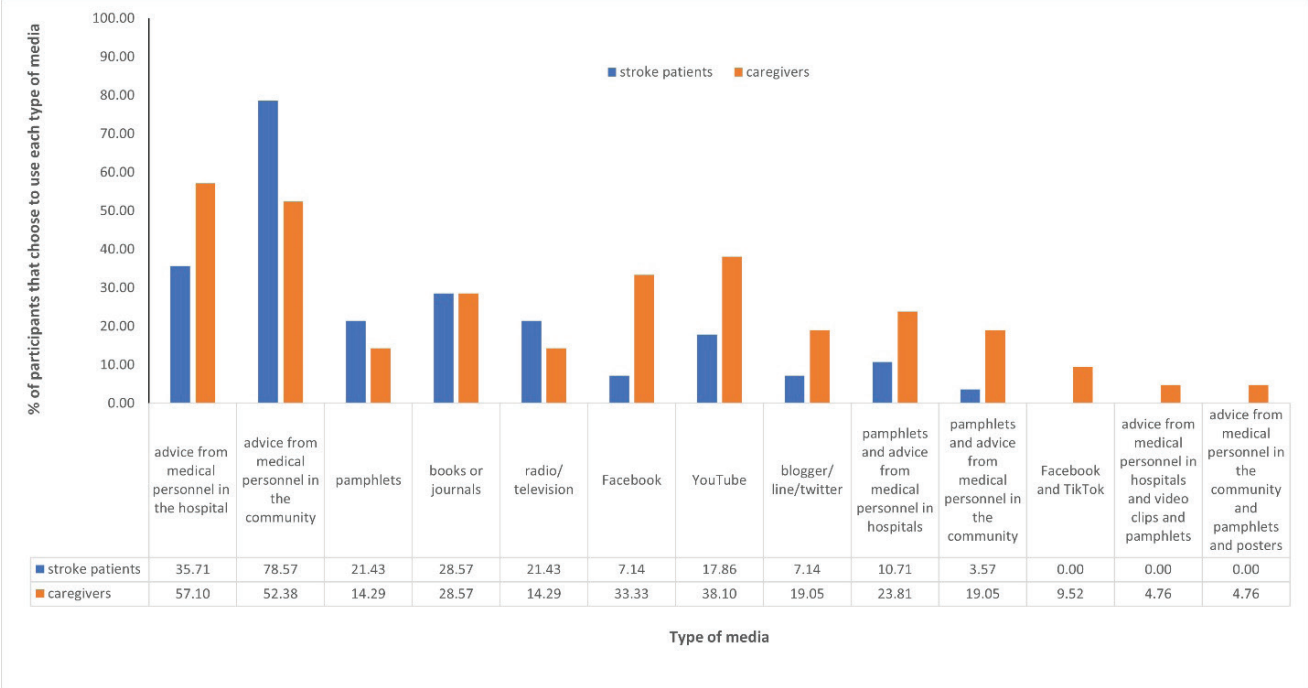
Data from Table 1 demonstrated that most stroke patients have had symptoms for more than 24 months. It determines whether they are unemployed, have insufficient income, have finished primary school education, or are not ready for communication equipment and internet connection.

Table 1. Sociodemographic data of stroke participants and caregivers.

Variables	Stroke participants (N=28) Frequency (percentage)	Caregivers (N=21) Frequency (percentage)
Age (years)		
Maximum	86	71
Minimum	40	18
Mean (SD)	65.21 (11.96)	46.95 (12.56)
Times since stroke onset/Times since care for stroke survivors (months)		
1-12	6 (21.43)	4 (19.05)
13-24	3 (10.71)	3 (14.28)
>24	19 (67.86)	14 (66.67)
Sex		
Male	18 (64.29)	5 (23.81)
Female	10 (35.71)	16 (76.19)
Occupation		
Paid employment	9 (32.15)	19 (90.48)
No employment	19 (67.85)	1 (4.76)
Students	0 (0.00)	1 (4.76)
Sufficiency of incomes		
Sufficient	8 (28.57)	13 (61.90)
Insufficient	20 (71.43)	8 (38.10)
Education levels		
No education	1 (3.57)	1 (4.76)
Elementary	16 (57.14)	3 (14.29)
Secondary	5 (17.86)	7 (33.33)
College/University	6 (21.43)	10 (47.62)
Own devices that can connect to the internet (smartphone/iPad)		
Yes	11 (39.29)	21 (100.00)
No	17 (60.71)	0 (0.00)
Availability of the home internet (monthly WIFI/internet)		
Available	9 (32.14)	19 (90.48)
Not available	19 (67.86)	2 (9.52)
Relationship with stroke survivors under care		
Son/daughter	-	14 (66.67)
Spouses	-	3 (14.29)
Mother/Father	-	1 (4.75)
Relatives	-	3 (14.29)
Responsibility of care		
Primary caregiver	-	9 (42.86)
Co-caregiver	-	12 (57.14)

Most stroke caregivers were female and had provided care to patients for more than 24 months. Most were the patients' sons or daughters who could pursue a career and earn enough income. Most caregivers graduated from college and universities and have their communication equipment with an internet connection.

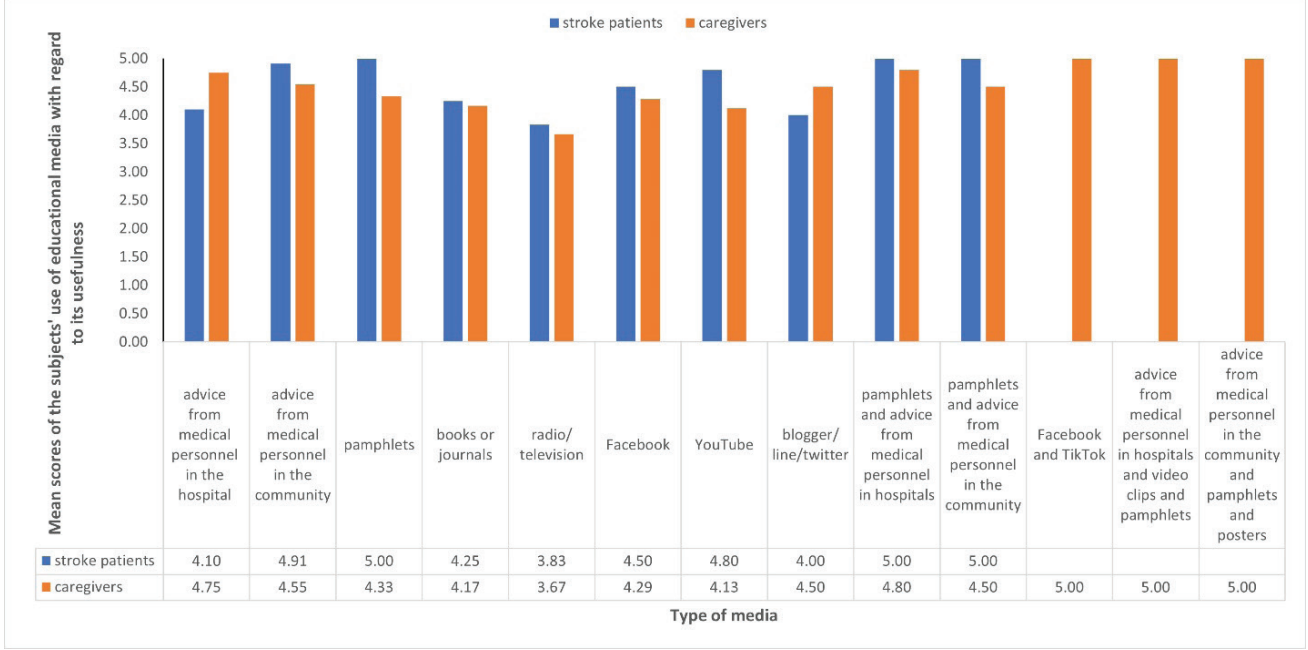
Data from Figure 1 shows that stroke patients choose to use educational media through verbal communication from medical personnel in the community the most (78.57%), followed by information from medical personnel in hospitals (35.71%) and media such as books or journals (28.51%). Caregivers chose to use media from medical personnel in hospitals the most (57.14%), followed by media from medical personnel in the community (52.38%) and YouTube internet media (38.10%).



	advice from medical personnel in the hospital	advice from medical personnel in the community	pamphlets	books or journals	radio/ television	Facebook	YouTube	blogger/ line/twitter	pamphlets and advice from medical personnel in hospitals	pamphlets and advice from medical personnel in the community	Facebook and TikTok	advice from medical personnel in hospitals and video clips and pamphlets	advice from medical personnel in the community and pamphlets and posters
stroke patients	35.71	78.57	21.43	28.57	21.43	7.14	17.86	7.14	10.71	3.57	0.00	0.00	0.00
caregivers	57.10	52.38	14.29	28.57	14.29	33.33	38.10	19.05	23.81	19.05	9.52	4.76	4.76

Figure 1. *Types of educational media and the number of samples that choose to use each type of media.*

The usefulness of educational media used by the participants in each category was calculated as an average score (highest score of 5 and lowest score of 1), as shown in Figure 2.



	advice from medical personnel in the hospital	advice from medical personnel in the community	pamphlets	books or journals	radio/ television	Facebook	YouTube	blogger/ line/twitter	pamphlets and advice from medical personnel in hospitals	pamphlets and advice from medical personnel in the community	Facebook and TikTok	advice from medical personnel in hospitals and video clips and pamphlets	advice from medical personnel in the community and pamphlets and posters
stroke patients	4.10	4.91	5.00	4.25	3.83	4.50	4.80	4.00	5.00	5.00			
caregivers	4.75	4.55	4.33	4.17	3.67	4.29	4.13	4.50	4.80	4.50	5.00	5.00	5.00

Figure 2. *Mean scores of the subjects' use of educational media concerning its usefulness.*

Figure 2 demonstrates that from the patient's point of view, the use of pamphlets, receiving advice from medical personnel in the hospital using pamphlets, and receiving advice from medical personnel in the community along with using pamphlets were the most useful, with an average score of 5 points. The second was receiving advice from medical personnel in the community (score of 4.91), followed by YouTube (score of 4.80). The caregiver's view was that using Facebook in combination with TikTok, receiving advice from medical personnel in the hospital in combination with using pamphlets and videos, and receiving advice from medical personnel in the community in combination with using pamphlets and educational posters were the most valuable (score 5), followed by receiving advice from medical personnel in the hospital along with using pamphlets (score 4.80).

Figure 3 displays the percentages of educational media forms that the patients were most satisfied with using during their recovery. Figure 4 displays the percentage of media types caregivers were pleased with employing in the patient's rehabilitation.

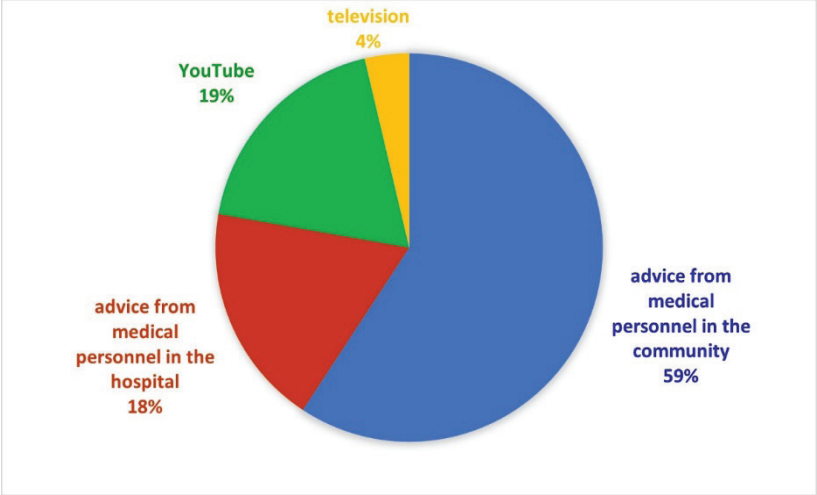


Figure 3. *The percentage of media types that patients feel most satisfying media type to utilize for rehabilitation.*

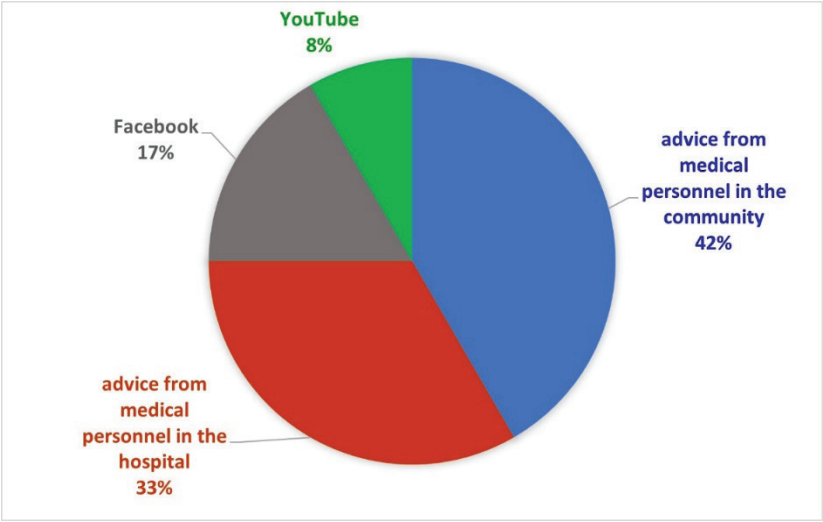


Figure 4. *The percentage of media types that caregivers feel most satisfying media type to utilize for rehabilitation.*

According to data shown in Figure 3, well over half of the patients liked the media that offered advice from community health experts and hospital medical staff.

According to the data shown in Figure 4, most caregivers expressed the most satisfaction with media featuring recommendations from community-based medical professionals, followed by recommendations from hospital-based medical professionals.

Discussion

The present study explores the types and benefits of educational media used in rehabilitation, including the degree of satisfaction with using each type of media among stroke patients living at home and their family caregivers in Chiang Mai Province, Thailand.

The study's results demonstrated that stroke patients and their caregivers used educational media in verbal, active

information communication the most (Figure 1). Patients chose to follow advice from medical personnel in the community the most, while caregivers chose to use advice from medical personnel in the hospital the most.

This may be because many stroke patients received services at rehabilitation centers in their communities. Therefore, they received advice from medical personnel working in that rehabilitation center, which includes occupational therapists, physical therapists, village health volunteers, etc. In contrast, the caregivers did not receive services at a rehabilitation center in the community because community rehabilitation centers have vehicles to pick up persons with disabilities from their homes directly to the rehabilitation center, yet do not provide transportation for the caregivers. Therefore, most caregivers did not come to receive counseling from medical personnel in their community rehabilitation centers. However, caregivers often receive advice on health and rehabilitation care only from medical personnel in hospitals such as the subdistrict health promotion hospitals, the district community hospitals, and the provincial general hospitals. This is because caregivers can meet these people when accompanying stroke patients under care to see doctors, nurses, physical therapists, occupational therapists, etc.

This study's results also showed that stroke patients and their caregivers are most satisfied with the type of educational media and two-way verbal communication between themselves and medical personnel, as shown in Figures 3 and 4. According to the study's findings, most stroke patients and their caregivers choose to use verbal communication media based on their level of satisfaction with it.

These findings are consistent with the studies of Eames *et al.* and Eames *et al*. on providing educational information for stroke patients in community health services in Australia, which found that most rehabilitation knowledge was provided through interactive verbal communication and verbal communication combined with paper-written forms.[14,15] The type of education stroke patients and their caregivers were most satisfied with was a combination of clinical information and practical management strategies. As for receiving knowledge about healthy lifestyles after hospital treatment, patients are most confident with face-to-face communication with medical personnel. Another form of health education that stroke patients were satisfied with, rated second after the strategies mentioned above, was using passive information in written format. At the same time, caregivers were confident using active information media such as a telephone conversation.

Verbal communication, in which patients and caregivers can talk and interact directly with health professionals, helps promote personal participation in receiving information better than receiving knowledge communicated one way (passive information), such as information in pamphlets.[16] Furthermore, stroke patients have distinct symptoms, and both patients and caregivers have different needs.[8] Therefore, it is the type of media that people can communicate verbally and interact with each other, which can better respond to the specific needs of each individual. As a result, it is the media that patients and caregivers prefer and are most satisfied with.

Previous studies demonstrated the benefits of rehabilitation education programs recommended by occupational therapists or trained health village volunteers for improving ADL performances in community-dwelling stroke survivors.[17,18] Although the most common media used by the patients and caregivers were advice from community health professionals and advice from hospital health professionals, stroke patients and their caregivers agreed that mixed media provides the most significant benefits for rehabilitation. The patients with cerebrovascular disease noted that two-way verbal communication and written media (pamphlets) give the most essential benefits for rehabilitation. The caregivers maintained that using personal communication media and media in written letters (pamphlets or posters) and a combination of online media (Facebook, TikTok) are the most beneficial, as shown in Figure 2.

This is consistent with the study results regarding satisfaction with media used in rehabilitation shown in Figures 3 and 4, where both stroke patients and their caregivers choose to use personal communication media the most. In addition, some stroke patients expressed their opinions that media in written form (pamphlets) was most helpful, and some caregivers expressed the idea that using online media through two applications (Facebook and TikTok) was the most useful.

This opinion difference may be due to patients' and their caregivers' age and educational level. Most stroke patients are elderly, while most caregivers are middle-aged and are still working. Furthermore, most stroke patients need more available equipment and an internet connection. In contrast, almost all caregivers own online equipment using a smartphone and computer and have an internet connection, as shown in Table 1. This allows caregivers to use online media, and they are more satisfied with it than stroke patients, who are primarily elderly and are less tech-savvy.

This is in line with the study of Teuschl and Brainin, which found that sociodemographic factors, including being female, middle-aged, and possessing a high level of education, correlate with more excellent knowledge of stroke. [19] However, no study has concluded which media or methods are most effective in educating people about knowledge of stroke, care, and methods of rehabilitation after stroke. Practical knowledge should be culturally adapted and transmitted appropriately according to the social context.

This study's findings are consistent with an earlier study done in Thailand on providing knowledge about stroke and care after leaving the hospital. This study found that caregivers wanted to receive information about the symptoms and methods of rehabilitation; the information obtained must be explained verbally, and relevant documents should be kept for further usage.

Limitation

This study had some limitations, including 1) the

small sample size of participants. Therefore, this study's results may be used as evidence for further studies but may need to be more generalizable with a broad sample of the exact nature. 2) most stroke patients have had symptoms for more than 24 months, which is considered a group with chronic symptoms; therefore, the use of rehabilitation education methods may be different from those who have recently experienced stroke. Recruitment that ensures greater homogeneity of the samples' characteristics should be considered in future studies. In addition, further research should investigate the use of educational media for rehabilitation in patients with similar sociodemographic characteristics and use the data to produce specific conclusions for each group. 3) The types and formats of media used by patients and caregivers for rehabilitation in this study do not cover all types of educational media. This depends on the media source; for example, some patients or caregivers may not have received advice from healthcare professionals in hospitals or community rehabilitation centers or have not received knowledge pamphlets. Therefore, the study's results regarding the benefits and satisfaction with these media types are missing.

Conclusion

A study of the use of educational media for rehabilitation in 28 stroke patients and 21 of their caregivers living at home revealed that verbal communication offers the most excellent satisfaction to stroke patients and caregivers. Results also showed that the educational media that provided the most benefit from the perspective of stroke patients and their caregivers was a combination of advice from medical personnel and media in the form of a written format. The results of the present study indicated that providing education to stroke patients and caregivers in the matter of rehabilitation while at home should use a combination of educational media, namely giving advice or communicating verbally together with providing knowledge in the form of documents such as pamphlets, where people can read them at any time after that. Additionally, the patient's physical symptoms and needs, including their sociodemographic characteristics, should be considered when providing appropriate educational media to these individuals.

Conflict of interest

The authors declare no potential conflicts of interest regarding the research, authorship, and/or publication of this article.

Ethical approval

Ethical approval was obtained from the Human Research Ethics Committee, Faculty of Associated Medical Sciences, Chiang Mai University, Thailand. Project number AMSEC-65EX-087, and ethics clearance number 579/2565.

Funding

This study did not receive funding.

Acknowledgements

Researchers would like to thank all participants for their valuable time in responding to the questionnaire and thank all Nong Pa Khrang Subdistrict Municipality staff and Ban Waen Subdistrict Municipality for their cooperation.

References

[1] Tiamkao S. Incidence of stroke in Thailand. Thai J Neurol 2022; 39: 39-46.
[2] Murphy SJ, Werring DJ. Stroke: causes and clinical features. Medicine (Abingdon). 2020; 48(9): 561-6. doi:10.1016/j.mpmed.2020.06.002.
[3] Suwanwela NC. Stroke epidemiology in Thailand. J Stroke. 2014; 16(1): 1-7. doi:10.5853/jos.2014.16.1.1.
[4] Suksathien R. Accessibility to Medical Rehabilitation Service for Acute stroke at Maharat Nakhon Ratchasima Hospital: Related Factors and Outcomes. J Thai Rehabil Med. 2014; 24(2): 37-43.
[5] Pindus DM, Mullis R, Lim L, Wellwood I, Rundell AV, Abd Aziz NA, *et al*. Stroke survivors' and informal caregivers' experiences of primary care and community healthcare services - A systematic review and meta-ethnography. PLoS One. 2018; 13(2): e0192533. doi:10.1371/journal.pone.0192533.
[6] Duncan PW, Zorowitz R, Bates B, Choi JY, Glasberg JJ, Graham GD, *et al*. Management of Adult Stroke Rehabilitation Care: a clinical practice guideline. Stroke. 2005; 36(9): e100-43. doi:10.1161/01.STR.0000180861.54180.FF.
[7] Changmai S. Supportive care needs of family caregiver. CUTJ. 2016; 22(3): 424-35.
[8] Finch E, Minchell E, Cameron A, Jaques K, Lethlean J, Shah D, *et al*. What do stroke survivors want in stroke education and information provision in Australia? Health Soc Care Community. 2022; 30(6): e4864-e72. doi:10.1111/hsc.13896.
[9] Pitthayapong S. Situations, problems, and barriers of post-stroke care in the transitional period from hospital to home. TRC Nurs J. 2018; 11: 26-39.
[10] Gillen G, Nilsen DM, Attridge J, Banakos E, Morgan M, Winterbottom L, *et al*. Effectiveness of interventions to improve occupational performance of people with cognitive impairments after stroke: an evidence-based review. Am J Occup Ther. 2015; 69(1): 6901180040p1-9. doi:10.5014/ajot.2015.012138.
[11] Hatem SM, Saussez G, Della Faille M, Prist V, Zhang X, Dispa D, *et al*. Rehabilitation of Motor Function after Stroke: A Multiple Systematic Review Focused on Techniques to Stimulate Upper Extremity Recovery. Front Hum Neurosci. 2016; 10: 442. doi:10.3389/fnhum.2016.00442.
[12] Jolliffe L, Lannin NA, Cadilhac DA, Hoffmann T. Systematic review of clinical practice guidelines to identify recommendations for rehabilitation after stroke and other acquired brain injuries. BMJ Open. 2018; 8(2): e018791. doi:10.1136/bmjopen-2017-018791.
[13] Boongird P. Mental State Examination T10. Dementia Association of Thailand Newsletter. 2018; (10).
[14] Eames S, Hoffmann T, Worrall L, Read S. Stroke patients' and carers' perception of barriers to accessing stroke

information. Top Stroke Rehabil. 2010; 17(2): 69-78. doi:10.1310/tsr1702-69.

[15] Eames S, Hoffmann T, Worrall L, Read S. Delivery styles and formats for different stroke information topics: patient and carer preferences. Patient Educ Couns. 2011; 84(2): e18-23. doi:10.1016/j.pec.2010.07.007.

[16] Crocker TF, Brown L, Lam N, Wray F, Knapp P, Forster A. Information provision for stroke survivors and their carers. Cochrane Database Syst Rev. 2021; 11(11): CD001919. doi:10.1002/14651858.CD001919.pub4.

[17] Pakdee P, Chinchai P. The influence of home visit program on functional abilities and quality of life in persons with disabilities resulting from stroke. Bull Chiang Mai Assoc Med Sci. 2016; 49(2): 276-85. doi:10.14456/jams.2016.24.

[18] Chinchai P, Jindakham N, Punyanon T. Effect of rehabilitation education to village volunteers toward activities of daily living performance of people with disabilities resulting from stroke. Bull Chiang Mai Assoc Med Sci. 2015; 48(3): 241-50. doi:10.14456/jams.2015.15.

[19] Teuschi Y BM. Stroke Education: Discrepancies among Factors Influencing Prehospital Delay and Stroke Knowledge. Int J Stroke. 2010; 5(3): 187-208. doi:10.1111/j.1747-4949.2010.00428.x.