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ORIGINAL RESEARCH

Factors Predicting Stroke Survivors' Activities of Daily Living from Family Caregivers' Perspectives in Thailand

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Abstract

Background: Stroke survivors tend to face disabilities that impact activities of daily living (ADL). However, limited studies, particularly across diverse cultural contexts in Thailand, have examined the factors affecting the ADL of stroke survivors from the perspectives of family caregivers.
Purpose: This study aimed to examine factors predicting the activities of daily living of stroke survivors from the perspectives of family caregivers.
Methods: A cross-sectional correlational research design using secondary data was employed. Ninety-nine family caregivers from diverse cultural backgrounds who met the inclusion criteria were recruited into the study using stratified random sampling and completed seven questionnaires, including demographics, perceived self-efficacy, ADL, family relationships, social support, caregiver stress, and illness beliefs. All data were analyzed using Pearson's product-moment correlation coefficient, chi-square test, and multiple linear regression with the stepwise method.
Results: Family caregivers perceived that stroke survivors had a moderate level of ADL ($M = 12.88$, $SD = 6.23$). Age, gender, communication ability, and severity of stroke were significantly correlated with ADL ($p < 0.01$). Moreover, the severity of stroke, gender, improved symptoms, education, and age of stroke survivors were significant predictors of ADL, accounting for 41.6% of the variance ($F = 13.27$, $p < 0.001$).
Conclusion: This study indicated that the severity of stroke, gender, improved symptoms, education, and age of stroke survivors could predict ADL. These findings offer valuable insights for nurses, highlighting the importance of effectively rehabilitating stroke survivors before discharge from the hospital to home to achieve better clinical outcomes and an improved quality of life.

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1. Introduction

Over 101 million people are faced with strokes, which is one of the major causes of permanent disability and death worldwide, affecting not only patients but also families and society. Also, 12.2 million new stroke cases are reported every year, resulting in six and a half million people dying from strokes, with stroke survivors often left with a range of physical, psychological, and cognitive impairments, resulting in a decrease in overall quality of life (Kuakool et al., 2024; NCD Alliance, World Stroke Organization, and American Stroke Association, 2022). In Thailand, strokes are the second-highest cause of death, having accumulated 34,727 deaths between 2019 and 2023 (Division of Noncommunicable Diseases, Ministry of Public Health Thailand, 2024). As a consequence, strokes significantly impact stroke survivors and their families, especially those with disabilities. These influences hinder the activities of daily living (ADL) of stroke survivors, creating a dependency burden on family caregivers that requires continuing care and support (Deepradit et al., 2023).

Many earlier studies have examined the burdens or psychological problems experienced by family caregivers (Ngoc & Hsu, 2021; Petrizzo et al., 2022). Such burdens, associated with the recovery of a stroke survivors in terms of physical function and mental consequences (stress, anxiety, depression), depended on stroke survivors' ADL for more than six months, such as bed baths, shampooing, food preparation, excretion, medication management, complication preventions (bedsores, respiratory and urinary infections), and also mental health supports (Deepradit et al., 2023; Petrizzo et al., 2022). Moreover, looking after stroke survivors for such a long period results in family caregivers becoming isolated from society, lacking a personal life, and having less time to take care of their physical health, including chronic diseases, such as diabetes, hypertension, heart disease, and so on. Thus, family caregivers may face a greater burden, including tiredness, depression, and uncertainties, such as loss of income. The more severe the disability, the greater the ADL, resulting in the increased burden of family caregivers, leading to poor relationships between stroke survivors and their family caregivers, causing less recovery (Deepradit et al., 2023). Poor recovery might affect the ADL of stroke survivors.

Moreover, the ADL of stroke survivors, assessed by most nurses and health care providers, was associated with various factors, including stroke survivor-related characteristics such as age (Kuakool et al., 2024; Olafsdottir et al., 2022), gender, marital status (Kuakool et al., 2024), communication ability (Pakdeewongse et al., 2024), cultural influences (Tyagi et al., 2021), comorbidities (Kuakool et al., 2024), severity of stroke, social support (Fan et al., 2025), caregiver preparedness (Kuakool et al., 2024; Petrizzo et al., 2022), and duration of rehabilitation (Kuakool et al., 2024). However, limited studies, especially in diverse Thai cultural contexts, have examined factors affecting the ADL of stroke survivors from family caregivers' perspectives at home. While previous studies were conducted in the hospital (Kuakool et al., 2024; Petrizzo et al., 2022), this study was conducted among stroke survivors and family caregivers at home to understand their contexts, as Bronfenbrenner's theory stated.

Bronfenbrenner's Ecological Systems Theory, consisting of four components: the "Process-Person-Context-Time Model (PPCT Model)," may be helpful for guiding this study in diverse cultures. The process refers to the direct and indirect interactions between the persons and their context or environment, including the micro-system (individual systems), meso-system (interactions between different microsystems), exo-system (community or societal systems), macro-system (social value and cultural context), and chronosystem (time for changes across process, context, and life span). Individuals have the most interaction with the environment closest to them, extending outward to the levels of family, community, and society (Bronfenbrenner, 1986; Bronfenbrenner & Morris, 2007). Hence, the five elements in this study have interacted with each other, and the three factors directly influencing the ADL of stroke survivors were as follows: first, the characteristics of stroke survivors and family caregivers; second, interpersonal factors, such as family relationships; and third, care time (chronosystem) for stroke survivors. In addition, the other two factors were community or societal factors, including social support and illness beliefs (cultural context), which indirectly influence ADL. Thus, the ADL of stroke survivors from the perspectives of family caregivers could be associated not only with characteristics and relationships between stroke survivors and family caregivers, but also with social support and illness beliefs (Bronfenbrenner, 1986; Bronfenbrenner & Morris, 2007).

Thus, our study based on the PPCT Model aimed to examine factors predicting the ADL of stroke survivors from the perspectives of family caregivers in Thailand. We hypothesized that family caregivers' characteristics (age, gender, education, chronic diseases, self-efficacy, stress), stroke survivors' characteristics (age, gender, education, communication, symptoms improved, severity of stroke diseases, illness time), interpersonal factors (family income, relationships between stroke survivors and family caregivers), and societal factors (social support, illness beliefs) and care time can mutually predict the ADL of stroke survivors from the perspectives of family caregivers. The findings will serve as a guideline for planning tailored nursing care to support stroke survivors' rehabilitation from hospital to home.

2. Methods

2.1 Research design

This study employed a cross-sectional correlational research design, used secondary data with permission (Suanpan et al., 2019), and included more variables based on the PPCT model to predict ADLs assessed from the perspectives of family caregivers.

2.2 Setting and samples

The primary study and this study were conducted at the home of stroke survivors and family caregivers in Uttaradit province, the Northern regions of Thailand. This province encompasses a diverse landscape of river plains, valleys, hills, and high mountains, making access to hospitals or health care centers difficult. There are distinct cultural regions, including Lanna, Lanchang, and the central region, resulting in a diverse combination of health behaviors, beliefs, and customs. People in Lanna typically eat salty food, while those in Lanchang and the central region prefer a combination of salty, sweet, and oily dishes. Both Lanna and Lanchang have traditional healers who use herbal medicine, and some people believe that ghosts affect their health. Thus, some people use conventional, unconventional, and integrative therapy to care for stroke survivors, resulting in the recovery of stroke survivors (Uttaradit Provincial Health Office, 2023).

Family caregivers were family members responsible for stroke survivors with at least mild impairment and passed the inclusion criteria: age 18 years and older (the Short Portable Mental Status Questionnaire (SPMSQ) scores above 8 points for those more than 60 years); more than six weeks of caring duration for a stroke survivor; and able to communicate in the Thai language. The participants were selected through stratified random sampling, based on the proportion of five sub-district health-promoting hospitals to obtain the target participants, and then recruited using the convenience sampling approach.

The sample size was calculated using G*Power software for linear multiple regression with a small effect size of 0.10 (Kuakool et al., 2024), 80% power, an alpha level of 0.05, and 18 predictors. After adding 20% to account for higher confidence and greater precision, we obtained 101 caregivers. As many as 99 participants remained after outlier data were excluded.

2.3 Measurement and data collection

The instruments employed in the study consisted of seven questionnaires that had obtained permission from all developers. The demographic questionnaires were created by the researchers, including characteristics of family caregivers (age, gender, education, chronic diseases, care duration), characteristics of stroke survivors (age, gender, education, communication, symptoms improved, illness time), and family income.

The first questionnaire was the self-efficacy questionnaire developed by Wilai Surasakhon in 2006, based on Bandura's 1997 conceptual framework, containing 10 items. The responses were rated on a 4-point Likert scale from "not confident" (1) to "highly confident" (4). The total possible scores ranged from 10 to 40 points, divided into three levels of care for stroke survivors: low (10-20), moderate (21-30), and high (31-40). The higher score meant higher self-efficacy . The content validity of the questionnaire from a previous study was assessed by three experts, who provided equal ratings of 1.0, while the Cronbach's alpha coefficient was 0.92 (Prombut et al., 2014).

The second questionnaire, the Barthel activities of daily living index (ADL), was developed by Collin and colleagues in 1988, then translated into Thai and modified by Suthichai Jitapunkul and colleagues in 1994. The questionnaire consisted of 10 items designed to assess stroke survivors' ability to care for themselves at home, including activities such as eating, bathing, dressing, and mobility. The items were not scored equally because responses depended on the activity assessed. The total possible scores ranged from 0 to 20 points, divided into three levels: low (0-6.67), moderate (6.68-13.34), and high (13.35-20); the lower the ADL score, the more severe the dependence. The content validity and Cronbach's alpha coefficient of the previous study were 1.0 and 0.79, respectively (Supphasri et al., 2024).

The third questionnaire, the relationships between stroke survivors and family caregivers, was created by Crandall in 1980 and translated into Thai by Lawang and colleagues in 2004. The instrument contained 18 items, with responses rated on a 5-point Likert scale ranging from "never" (1) to "regularly" (5). The total possible scores ranged from 18 to 90 points, divided into three levels of relationships: low (18-42), moderate (43-66), and high (67-90); the higher the score, the higher the level of relationships. The content validity involving three experts in the previous study was 0.90, with a Cronbach's alpha coefficient of 0.88

The fourth questionnaire, the Thai version of the caregiver social support questionnaire, was created by Schaefer and colleagues in 1981, then translated into Thai and modified by Somjit Hanucharoenkul in 1988. The instrument comprised 15 items, divided into three dimensions: emotional support, material and service support, and informational support. The questions covered support from the following three groups: family members (spouses, parents, and children), close acquaintances (relatives and neighbors), and medical personnel (doctors, nurses, and other medical staff) (Prombut et al., 2014). The researcher added a section on social network support, including online society and independent organizations. The instrument contained 18 items, with responses rated on a five-point Likert scale ranging from “none” (0 points) to “the most” (4 points). The total possible score ranged from 0 to 72, divided into three levels: low (0-24), moderate (25-48), and high (49-72); the higher the score, the higher the social support. The content validity of the questionnaire was 1.0, with a Cronbach’s alpha coefficient of 0.97 in the previous study (Prombut et al., 2014).

The fifth questionnaire, the caregiver stress questionnaire, was created by Zarit in 1990 and subsequently translated and modified by Srirat Khumsin in 2003. The instrument consisted of 20 items, and responses were rated on a five-point Likert scale, ranging from “never” (0 points) to “regularly” (4 points). The total possible scores ranged from 0 to 80 points, divided into three levels: low (0-26.67), moderate (26.68-53.34), and high (53.35-80.00). A higher score indicated higher stress. The content validity of the questionnaire was 0.96, with a Cronbach’s alpha coefficient of 0.87 (Numdokmai et al., 2016).

The sixth questionnaire, the Illness Beliefs Questionnaire, was created by Sornarkars et al. (2015) and contained eight statements in which responses were rated on a four-point Likert scale from “disagree” (1 point) to “strongly agree” (4 points). Total possible scores ranged from 8 to 32 points, divided into three levels: low (8-16 points), moderate (17-24 points), and high (25-32 points); the higher the score, the better the illness belief. Content validity of the questionnaire using three experts was 1.0, with a Cronbach’s alpha coefficient of 0.86 (Sornarkars et al., 2015).

The seventh questionnaire, the NIH stroke scale, a standardized, 15-item neurological examination, was used to assess stroke severity and was developed by the National Institute of Neurological Disorders and Stroke (2025). This checklist was used to assess alertness, gaze, communication, and the ability to perform simple movements. The total possible scores ranged from 0 to 42 points, divided into four levels: mild impairment (<4), mild to moderate impairment (5-14), severe impairment (15-24), and very severe impairment (>25). The higher the score, the worse the severity of stroke disease. The interrater reliability of the NIH Stroke Scale’s Thai version was 0.98 (Charmnanpoh et al., 2020).

The data collection used data from the previous study with permission (Suanpan et al., 2019). After obtaining IRB approval, researchers prepared all the data for analysis.

2.4 Data analysis

Descriptive and inferential statistics were analyzed using Statistical Package for the Social Sciences (SPSS) version 18.0, licensed by Mahidol University. A p-value of < 0.05 was used to determine statistical significance. The characteristics of participants and all dependent variables were described by mean, standard deviation (SD), range, frequency, and percentage. Pearson’s product-moment correlation coefficient, chi-square, and Fisher exact test were used to examine variable relationships between family caregivers (age, gender, education, chronic diseases, self-efficacy, stress), stroke survivors (age, gender, education, communication, symptoms improved, severity of stroke diseases, illness time), interpersonal factors (family income, relationships between stroke survivors and family caregivers), societal factors (social support, illness beliefs), care time, and ADL. After passing all assumptions, including multivariate normality, linearity, homoscedasticity, independence (no autocorrelation), and the absence of multicollinearity, a stepwise multiple linear regression was applied to address the research objectives.

2.5 Ethical consideration

Ethical committee approval was obtained from the Faculty of Medicine, Ramathibodi Hospital, Mahidol University (COA No. MURA 2019/27), and Muang District Uttaradit Province Public Health Office before this secondary data analysis was conducted. Participants who willingly signed the informed consent form were asked to participate in the study. All data were collected with informed consent from all participants at their homes, kept confidential and anonymous.

3. Results

3.1 Family caregivers’ *and stroke survivors’ characteristics*

The participants included 99 caregivers with an average age of 55.60 years (SD = 12.46). Most were female (71.72%), had a primary school education (70.71%), were married (78.79%), and were spouses of stroke survivors (52.53%). The average family income was 7,619.19 Bath (SD = 3,470.02). Most caregivers had no chronic diseases (60.61%), no prior caregiving experience (83.84%), and provided care for an average of 65.36 months (SD = 35.54) and 17.40 hours/day (SD = 7.45). Most stroke survivors were male (68.69%) with an average age of 68.32 years (SD = 11.15). The majority had primary education (84.85%), were married (67.68%), had experienced stroke for an average of 67.21 months (SD = 36.16), showed improved symptoms in better health (56.57%), had mild impairment (57.58%), and were able to communicate (77.78%) (Table 1).

Table 1. Characteristics of family caregivers and stroke survivors (n=99)

Characteristics	f (%)	Mean	SD	Min-Max
Family caregivers				
Gender				
Female	71 (71.72)			
Male	28 (28.28)			
Age (Years)		55.60	12.46	22 – 80
Highest education				
No education	3 (3.03)			
Primary school	70 (70.71)			
Secondary school	21 (21.21)			
Bachelor's degree and more	5 (5.05)			
Marital status				
Marriage	78 (78.79)			
Single	11 (11.11)			
Divorced	10 (10.10)			
Family income (Baht)		7,619.19	3,470.02	1,200-25,000
Chronic disease				
No	60 (60.61)			
Yes	39 (39.39)			
Care duration (months)		65.36	55.54	2-246
Prior care experience				
No	83 (83.84)			
Yes	16 (16.16)			
Stroke survivors				
Gender				
Female	31 (31.31)			
Male	68 (68.69)			
Age (Years)		68.32	11.15	41-93
Highest education				
No education	2 (2.02)			
Primary school	84 (84.85)			
Secondary school	9 (9.09)			
Bachelor's degree	4 (4.04)			
Marital status				
Marriage	67 (67.68)			
Divorced	21 (21.21)			
Illness duration (months)		67.21	56.16	2-246
Communication				
Yes	77 (77.78)			
No	22 (22.22)			
Symptoms improved				
Better health	56 (56.57)			
Stable	36 (36.36)			
Worse	7 (7.07)			
Severity of stroke disease				
Mild Impairment	57 (57.58)			
Mild to Moderate	31 (31.31)			
Severe Impairment	11 (11.11)			

Notes: M=Mean; SD=Standard Deviation

3.2 *ADL* and *independent factors*

As shown in Table 2, the average ADL score of survivors was 12.88 (SD = 6.23), indicating a moderate dependence with a lower severity of stroke disease (M = 6.03, SD = 5.15). The average caregiver's perceived self-efficacy was 33.57 (SD = 3.80), reflecting high confidence in caring for stroke survivors. The average rating for family relationships was 69.39 (SD = 9.07), indicating a generally good relationship. Moreover, caregivers had an average of 39.29 (SD = 10.47) in social support, indicating moderate social support. Similarly, the average belief about illness was 25.98 (SD = 4.65), indicating greater belief in the survivors' rehabilitation and health. Additionally, the average stress level of caregivers was 21.29 (SD = 13.64), indicating lower stress levels.

Table 2. Mean and SD of ADL and independent factors (n= 99)

Variables	Range		M(SD)	Level
	Possible range	Actual score		
Stroke survivors' activities of daily living	0-20	0-20	12.88 (6.23)	Moderate
Stroke survivors' severity of stroke disease	0-42	0-27	6.03 (5.15)	Low
Family caregivers' perceived self-efficacy	10-40	25-40	33.57 (3.80)	High
Family Relationships	18-90	49-90	69.39 (9.07)	High
Family caregivers' social support	0-72	17-63	39.29 (10.47)	Moderate
Family caregivers' illness beliefs	8-32	13-32	25.98 (4.65)	High
Family caregivers' stress	0-80	0-60	21.29 (13.64)	Low

Notes: M=Mean; SD=Standard Deviation; ADL = Activity of Daily Living

3.3 *Relationships between ADL and independent factors*

As shown in Table 3 and Table 4, stroke survivors' age (r = -.26, *p* < .01) and severity of stroke disease (r = -.46, *p* < .001) were negatively significantly correlated with ADL. Furthermore, survivors' gender (*p* < 0.01) and communication (*p* < 001) were significantly correlated with ADL.

Table 3. Factors correlated with stroke survivors' ADL from family caregivers' perspectives using Pearson's product-moment correlation coefficient (n=99)

Variables	M	r	*p*-value
Family caregivers' age	55.60	.015	.884
Family income	7,619.19	-.028	.783
Family caregivers' care duration	65.36	.022	.831
Stroke survivors' age	68.32	-.263**	.009
Stroke survivors' severity of stroke disease	6.03	-.457***	.000
Stroke survivors' illness time	67.21	.034	.736
Family caregivers' self-efficacy	33.57	-.116	.253
Family Relationships	69.39	.092	.366
Family caregivers' social support	39.29	.137	.178
Family caregivers' illness beliefs	25.98	.167	.098
Family caregivers' stress	21.29	-.085	.403

Notes: M=Mean; **p<0.01, ***p<0.001, ADL = Activity of Daily Living

4. Discussion

The study aimed to examine factors predicting activities of daily living in stroke survivors from the perspective of family caregivers. The findings from the perspectives of Thai family caregivers revealed that stroke survivors' age and severity of stroke disease were significantly negatively correlated with ADL. This indicates that stroke survivors who were getting older experienced a decline in the ability to perform ADL. Besides, the severity of stroke disease causes disability, resulting in limited ADL. This is due to elderly stroke survivors experiencing limitations in nervous system and muscle recovery, resulting in a decline in the growth of healthy nerve cells to replace injured parts and in reduced connections (Maneechot & Sasat, 2019). However, stroke survivors in the present study had early elderly age and mild impairment of stroke disease, resulting in better ADL capability.

Table 4. Factors correlated with stroke survivors' ADL from family caregivers' perspectives using chi-square (n=99)

Variables	Activities of Daily Living			X^2	*p*-value
	Low (0-6.67)	Medium (6.68-13.34)	High (>13.34-20)		
Family caregivers' gender				5.88	0.053
Male	3	12	13		
Female	15	14	42		
Family caregivers' education				5.33	0.070
Primary school or lower	13	15	45		
Secondary school or higher	5	11	10		
Family caregivers' chronic diseases				5.00	0.082
No	8	20	32		
Yes	10	6	23		
Stroke survivors' gender				12.46	0.002**
Male	7	16	45		
Female	11	10	10		
Stroke survivors' education				1.99	0.370
Primary school or lower	14	24	48		
Secondary school or higher	4	2	7		
Stroke survivors' communication				10.05	0.007**
Able to speak	9	21	47		
Unable to speak	9	5	8		
Stroke survivors' improved symptoms				4.51	0.105
Better	7	13	36		
Stable or worse	11	13	19		

Note: $*p<0.05$, $**p<0.01$, ADL = Activity of Daily Living

Moreover, most stroke survivors in this study were male. This tends to result in better muscle recovery than in females, leading to improved ADL (Kuakool et al., 2024). Thus, stroke survivors' gender was significantly correlated with ADL in this current study, which is similar to a previous study (Kuakool et al., 2024). Furthermore, stroke survivors could perform ADL at a moderate level and ask family caregivers to assist with some activities. This caused stroke survivors' communication ability to be significantly correlated with ADL. These ADL relationships were supported only by micro-systems from Bronfenbrenner's Ecological System Theory (Bronfenbrenner, 1986; Bronfenbrenner & Morris, 2007), and were congruent with previous studies in terms of age (Kuakool et al., 2024; Olafsdottir et al., 2022), gender (Kuakool et al., 2024), communication ability (Pakdeewongse et al., 2024), and severity of stroke disease (Fan et al., 2025) among stroke survivors. Thus, the older the stroke survivors and the more severe the stroke and the poorer the communication ability, the lower the ADL.

However, other factors in the mesosystem, including family caregivers' age, chronic diseases, self-efficacy, stress, illness beliefs, and care time, did not support relationships with the ADL, as per Bronfenbrenner's Ecological System Theory (Bronfenbrenner, 1986; Bronfenbrenner & Morris, 2007). This might be because stroke survivors had mild impairment from stroke and needed some help with ADL from family caregivers. In addition, most participants in this study had no chronic diseases and were spouses or cousins of stroke survivors who were willing to help stroke survivors with ADL. Moreover, participants had high-level illness beliefs, showing they thought that the more they rehabilitated stroke survivors, the better the physical activity. They also trusted that respecting the sacred, religion, and spirit would help them rehabilitate stroke survivors better. These results differed from those of previous studies (Kuakool et al., 2024; Petrizzo et al., 2022).

In addition, the severity of stroke disease, gender, improved symptoms, education, and age of stroke survivors were mutually significant influences on ADL, accounting for 41.6% of the variance (F = 13.27, $p < 0.001$). The results partially supported some of the hypotheses in this study, specifically those related to the microsystem of the PPCT model. This predicted outcome was also partially different from the bivariate analyses, which found that stroke survivors' age, gender, severity of stroke disease, and communication ability were significantly correlated with ADL. This might be because most stroke survivors had a lower severity of stroke disease and better symptoms, especially being able to communicate with family caregiver participants in order to assist with some ADLs. These predictors were similar to those in previous studies in some factors, including the severity of stroke disease (Fan et al., 2025), age (Petrizzo et al., 2022; Tubklay et al., 2025), education (Tubklay et al., 2025), and gender of stroke survivors (Kuakool et al., 2024; Petrizzo et al., 2022; Tubklay et al., 2025). This finding is different from a previous study, which found that stroke survivors commonly struggle to speak clearly or have communication difficulties, resulting in frustration and a decrease in interactions with others (Pakdeewongse et al., 2024). Moreover, most family caregivers were spouses who had no chronic diseases, had good relationships, high self-efficacy, moderate social support, and high illness beliefs to effectively rehabilitate the stroke survivors, resulting in better health outcomes. A previous study also found that stroke survivors who were dependent within the first 2 days after stroke had higher rates of dependence at 3- and 12-month post-stroke (Wurzinger et al., 2021), resulting in an effect on ADL from family caregivers.

However, the findings of this study did not support some factors, including family caregivers' characteristics in terms of age, gender, education, chronic diseases, self-efficacy, and stress; stroke survivors' characteristics (illness time); interpersonal factors (family income, relationships between stroke survivors and family caregivers; societal factors (social support, illness beliefs); and care time in relation to ADL. This might be because most stroke survivors in this study had mild impairment from stroke disease. Thus, they required partial assistance from their family caregivers. Additionally, most family caregiver participants were adults without chronic diseases, had high self-efficacy, strong family relationships, and moderate social support in rehabilitating stroke survivors within diverse cultures (Kuakool et al., 2024), resulting in limited interactions among stroke survivors, family caregivers, or other environmental factors. Moreover, a previous study has found that the burden on family caregivers could predict ADL or functional dependence (Ngoc & Hsu, 2021). Further study should consider stroke survivors with high dependence in ADL, or at least moderate impairment, as well as the characteristics of family caregivers, especially those with chronic diseases.

5. Implications and limitations

The results indicated that factors influencing the ADL of stroke survivors include severity of stroke disease, gender, improved symptoms, education, and age. The severity of stroke disease and symptoms could be improved if stroke survivors received effective early rehabilitation. Thus, nurses, healthcare professionals, and family caregivers should provide continuous care to help stroke survivors transition from the hospital to home. Nurses also need to evaluate multiple factors related to stroke survivors' ADL from the perspectives of family caregivers before hospital discharge, including stroke survivors' dependence, the need and ability of family caregivers to care for the stroke survivors, and self-efficacy. Afterward, nurses should assess ADLs with family caregivers to provide better care, reduce rehabilitation time, and allow family caregivers to have free time, thereby reducing caregiver burden. In the future, family caregivers should be supported in continuing long-term care at home.

However, this study had certain limitations. Firstly, it was a single-center study conducted in a province with cultural diversity, which may limit the generalizability of the findings to dissimilar populations in other countries. Second, stroke survivors in this study had high self-care performance. Thus, they required little assistance from their family caregivers, resulting in limited interaction between stroke survivors and family caregivers or other environmental factors.

6. Conclusion

This study found that the severity of stroke disease, gender, symptoms, education, and age of stroke survivors significantly influenced the ADL. These findings offer valuable insights for nurses, highlighting the importance of effectively rehabilitating stroke survivors before discharge from the hospital. Nurses must evaluate multiple factors related to stroke survivors' ADL from the perspectives of family caregivers before hospital discharge, including stroke survivors' level of dependence, the need and ability of family caregivers to care for stroke survivors, and self-efficacy. Afterward, assessing ADL to support the continuation of long-term care at home with family caregivers may provide better care, reduce the time required for rehabilitation, and allow family caregivers more free time, thereby reducing caregiver burden. Thus, the severity of stroke disease and symptoms could be improved if stroke survivors receive effective rehabilitation. Further studies should be designed to develop home-based ADL programs involving family caregivers during the transition from hospital to home in order to improve health outcomes of stroke survivors, improve quality of life, and reduce the ADL-related burden on family caregivers.

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Author contribution

ST and NR contributed to the conceptual design and planning of the research methodology. ST and NR completed the data collection. ST performed data analysis and wrote the manuscript. All authors approved the final version for publication.

Conflict of interest

The authors have no conflict of interest to disclose

Declaration of the use of Artificial Intelligence (AI)

The authors declare that no generative artificial intelligence (AI) tools were used in this manuscript. All content, including the literature search, analysis, discussion, and interpretation, was performed by the authors without assistance from AI.

References

Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology, 22*(6), 723-742. https://doi.org/10.1037/0012-1649.22.6.723

Bronfenbrenner, U., & Morris, P.A. (2007). *The bioecological model of human development: Handbook of child psychology*. John Wiley and Sons. https://doi.org/10.1002/9780470147658.chpsy0114

Charmnanpoh, R., Sangchan, H., & Chinnawong, T. (2020). ความสัมพันธ์ระหว่างประสบการณ์การมีอาการ การจัดการอาการ และความรุนแรงของโรคหลอดเลือดสมองของผู้ป่วยโรคหลอดเลือดสมองขาดเลือดเฉียบพลัน [Relationship between symptom experiences, symptom management, and stroke severity of patients with acute ischemic stroke]. *Songklanagarind Journal of Nursing, 40*(1), 140-153.

Deepradit, S., Powwattana, A., Lagampan, S., & Thiangtham, W. (2023). Effectiveness of a family-based program for post-stroke patients and families: A cluster randomized controlled trial. *International Journal of Nursing Sciences, 10*(4), 446–455. https://doi.org/10.1016/j.ijnss.2023.09.020

Division of Noncommunicable Diseases, Ministry of Public Health Thailand. (2024). *รายงานประจำปี 2567* [Annual report 2024]. Ministry of Public Health, Thailand. https://ddc.moph.go.th/dncd/journal_detail.php?publish=16681

Fan, X., Xia, Y., Wu, J., Jia, S., & Hu, J. (2025). Influencing factors related to stroke patients' rehabilitation motivation: A scoping review. *Frontiers in Neurology, 16*, 1615905. https://doi.org/10.3389/fneur.2025.1615905

Faul, F., Erdfelder, E., Lang, A.G. & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175-191. https://doi.org/10.3758/BF03193146

Kuakool, N., Suwankhong, D., Boonrod, T., & Chinnasee, C. (2024). Factors predicting the ability to perform activities of daily living among stroke patients in rural community Southern Thailand. *Malaysian Journal of Medical Sciences, 31*(5), 256-266. https://doi.org/10.21315/mjms2024.31.5.18

Maneechot, B., & Sasat, S. (2019). ปัจจัยคัดสรรที่สัมพันธ์กับการทำหน้าที่ด้านร่างกายของผู้สูงอายุโรคหลอดเลือดสมอง [Selected factors related to physical functional ability among stroke older persons]. *Journal of Nursing Science Chulalongkorn University, 31*(3), 87-100. https://he01.tci-thaijo.org/index.php/CUNS/article/view/242329/164777

National Institute of Neurological Disorders and Stroke. (2025). *NIH stroke scale*. National Institute of Neurological Disorders and Stroke. https://www.ninds.nih.gov/health-information/stroke/assess-and-treat/nih-stroke-scale

Ngoc, P.T., & Hsu, S.C. (2021). Caregivers of stroke survivors: Factors associated with caregiver burden. *International Journal of Caring Sciences, 14*(2), 825-836. https://www.internationaljournalofcaringsciences.org/docs/4_ngoc_original_14_2.pdf

Numdokmai, S., Wacharasin, C., & Deoisres, W. (2016). ผลของโปรแกรมการพยาบาลตามรูปแบบความเชื่อความเจ็บป่วยต่อความเครียดและการดูแลสุขภาพผู้ป่วยโรคหลอดเลือดสมองของครอบครัวผู้ดูแล [Effects of nursing intervention program based on illness belief model on family caregivers' stress and caring for stroke patients]. *Journal of Faculty of Nursing Burapha University, 24*(1), 27-38. https://nurse.buu.ac.th/rsh/file/journal/0000000608.pdf

Olafsdottir, S. A., Hjaltadottir, I., Galvin, R., Hafsteinsdottir, T. B., Jonsdottir, H., & Arnadottir, S. A. (2022). Age differences in functioning and contextual factors in community-dwelling stroke survivors: A national cross-sectional survey. *PLOS ONE, 17*(8), e0273644. https://doi.org/10.1371/journal.pone.0273644

Pakdeewongse, R., Saneha, C., Koositamongkol, S., & Nilanont, Y. (2024). ปัจจัยที่มีอิทธิพลต่อความสามารถในการปฏิบัติกิจวัตรประจำวันของผู้ป่วยโรคหลอดเลือดสมองตีบหรืออุดตันระยะเฉียบพลัน: การศึกษาย้อนหลัง [Factors influencing activities of daily living in patients with acute ischemic stroke: A retrospective study]. *Royal Thai Navy Medical Journal, 51*(1), 94-109.

Petrizzo, A., Lyons, K. S., Bartoli, D., Simeone, S., Alvaro, R., Lee, C. S., Vellone, E., & Pucciarelli, G. (2023). The moderating role of caregiver preparedness on the relationship between depression and stroke-specific quality of life in stroke dyads: A longitudinal study. *European Journal of Cardiovascular Nursing, 22*(1), 53–63. https://doi.org/10.1093/eurjcn/zvac037

Prombut, P., Piaseu, N., & Sakulhongsopon, S. (2014). ปัจจัยทำนายความเครียดในญาติผู้ดูแลผู้ป่วยโรคหลอดเลือดสมองในชุมชนที่เลือกสรร [Factors related to stress of family caregiver of patients with stroke at home]. *Ramathibodi Nursing Journal, 20*(1), 82-96. https://www.rama.mahidol.ac.th/ramanursej/RNJ-V20-N01-JAN-APR-2014

Sornarkas, A., Deoisres, W., & Wacharasin, C. (2015). ปัจจัยที่มีอิทธิพลต่อพฤติกรรมการฟื้นฟูสมรรถภาพผู้ป่วยโรคหลอดเลือดสมอง ของสมาชิกครอบครัวผู้ดูแล [Factors influencing family caregivers' rehabilitation behavior for stroke patients]. *Journal of Health Science Research, 9*(2), 86-93. https://he01.tci-thaijo.org/index.php/JHR/article/view/56682/47174

Suanpan, N., Terathongkum, S., & Sakunhongsophon S. (2019). ปัจจัยทานายความเครียดในญาติผู้ดูแลผู้ป่วยโรคหลอดเลือดสมองในชุมชนที่เลือกสรร [Factors predicting stress on family caregivers of stroke survivors in selected community]. *Boromarajonani College of Nursing, Uttaradit Journal, 11*(2), 133-147. https://he01.tci-thaijo.org/index.php/unc/article/view/164332/157450

Supphasri, K., Vineekarn Kongsuwan, V., & Nukaew, O. (2024). ผลของโปรแกรมการสร้างความมั่นคงภายในจิตใจต่อความวิตกกังวลในผู้สูงอายุโรควิตกกังวลทั่วไป. [The effect of stabilization-based program on anxiety in elderly patients with generalized anxiety disorder]. *Journal of Phrapokklao Nursing College, Chanthaburi, 35*(1), 96-111. https://he01.tci-thaijo.org/index.php/pnc/article/view/268135/182327

Tubklay, I., Siramaneerat, I., & Bhumkittipich, P. (2025). Analysis of behavioral and economic factors affecting activities of daily living among older adults in Thailand. *The Open Public Health Journal, 18,* e18749445383873. http://dx.doi.org/10.2174/0118749445383873250804042644

Tyagi, S., Luo, N., Tan, C. S., Tan, K. B., Tan, B. Y., Menon, E., Venketasubramanian, N., Loh, W. C., Fan, S. H., Yang, K. L. T., Chan, A. S. L., Farwin, A., Lukman, Z. B., & Koh, G. C. (2021). Support system diversity among family caregivers of stroke survivors: A qualitative study exploring Asian perspectives. *BMC Geriatrics, 21*, 594. https://doi.org/10.1186/s12877-021-02557-4

Uttaradit Provincial Health Office. (2023). ผลการดำเนินงานสาธารณสุขจังหวัดอุตรดิตถ์ ปีงบประมาณ 2565 [Performance results of public health in Uttaradit Province, fiscal year 2022]. https://utoapp3.moph.go.th/app2/inspector/views/uploads/63fd6d0a82e88-bddb5a07f11d3558802342972 66ce1c3-12.pdf

Wurzinger, H.E., Abzhandadze, T., Rafsten, L., & Sunnerhagen, K. S. (2021). Dependency in activities of daily living during the first year after stroke. *Frontiers in Neurology, 12*, 736684. https://doi.org/10.3389/fneur.2021.736684