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Research Article

A Community Based Program for Family Caregivers for Post Stroke Survivors in Thailand

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SUMMARY

Purpose: The purpose of this study was to evaluate the effectiveness of the post-stroke care program within the community setting in Thailand.*Methods:* This quasi-experimental study was a nonequivalent control group pre-test and post-test design. A total of 62 pairs of post-stroke patients and their family caregivers were recruited to the study (31 pairs per group). The intervention consisted of a four-week program that included distributing pertinent information, providing skill practice during post-stroke care sessions and utilizing strategies to enhance motivation and behavioral skills of family caregivers based on the information-motivation-behavioral skills model. The family caregivers' post-stroke care skills were evaluated. The patients' activities of daily living (ADLs) and complications were evaluated at baseline and immediately and 2-month post-intervention. Statistical analysis included chi-square test, Fisher's exact test, independent t-test, and two-way repeated measures' analysis of variance.*Results:* After participating in the program, family caregivers in the experimental group significantly improved their post-stroke care knowledge and skills as compared to those in the control group ($F = 585.81, p < .001$). ADLs among post-stroke patients in the experimental group significantly increased over time and were higher than those in the control group ($F = 46.01, p < .001$). Moreover, complications among patients in the experimental group were less than those in the control group.*Conclusions:* The post-stroke care program improved family caregivers' post-stroke care skills which resulted in improved functional status and decreased complications among post-stroke patients.© 2017 Korean Society of Nursing Science, Published by Elsevier Korea LLC. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Stroke is a critical public health problem worldwide. Each year, approximately 5.5 million people die from stroke, and 44 million people have lost disability-adjusted life years [1]. In Thailand, stroke is the fourth cause of death and disability and the number of stroke patients increases every year with an incidence of 352.3 per 100,000 population in 2014 [2]. Nearly 50% of post-stroke patients have moderate to severe impairment, have developed paralysis and

are not able to take care of themselves [3], or have developed other physical complications such as aspiration pneumonia, joint contracture and pressure ulcer as well as various psychological conditions such as anxiety, stress, or depression. These psychological distresses are often the result of physical disabilities [4].

Within the range of moderate to severe disability, post-stroke patients are totally dependent upon assistance. Therefore, family caregivers become the key persons to care for them. A crucial aspect in caring for patients after stroke is to promote early recovery and to prevent complications. If patients receive correct and proper care within the golden period (3–6 months), stroke recovery will be significantly improved [5,6]. Previous studies on home rehabilitation programs for stroke survivors show that post-stroke care is complicated and different from caring for patients with

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other chronic illnesses [7,8]. Family caregivers have to become knowledgeable and acquire skills about prevention of complications, activities of daily living (ADLs), mobility, rehabilitation, and emotional and stress management [9,10].

In Thailand, stroke patients are routinely admitted to a hospital for approximately one week. Prior to discharge, a hospital will prepare both the patient and caregiver as outlined in the discharge planning agenda. However, it was found that family caregivers frequently received an inadequate preparation of knowledge and skills and confessed to lacking confidence to care for patients [11,12]. These factors affected the quality of care as well as the patient's safety.

Moreover, there are problems in care implementation for patients after stroke in communities such as delay in referring patient's medical documents from a hospital to the Community Health Centers (CHCs) as well as a shortage of human resources, especially in rural areas. Many patients and family caregivers were not included in post-stroke care and follow-up at home [7], causing further health complications, particularly pressure sores, urinary tract infections (UTI), joint contraction, aspiration pneumonia, and recurrent stroke, leading to readmission [10].

In the Thai community, family caregivers need knowledge regarding how to manage and prevent complications after stroke, support a patient's ADLs, and access rehabilitation services and what community services are available [12,13]. They also require training to provide nursing care relevant to patients' problems and needs including feeding technique, aspiration prevention, pressure ulcer prevention, and wound care. Social supports such as compassion, advice, and equipment for patient care and rehabilitation from family, health care providers, and community are also needed [6,13].

Previous studies conducted in Thailand focused on emotional distress amongst family caregivers including stress, depression, and caregiving burnout, and their physical rehabilitation skills [14–16]. The studies related to community based programs for stroke patients emphasized providing knowledge and training for physical rehabilitation [6,13]. However, research studies regarding skill development and the assessment of caregivers' skills, including the assessment of patients' outcomes during the golden period of stroke recovery, are scant [7,11]. Furthermore, family caregivers' skill development and assessment concerning feeding and aspiration prevention, pressure ulcer prevention, wound care, fall prevention, mobility, and rehabilitation have not typically been integrated in post-stroke care guidelines, resulting in inadequate acquisition of the necessary post-stroke care information and skills for family caregivers.

Thus, the purpose of this study was to evaluate the post-stroke care program, which was designed based on the information-motivation-behavioral skills (IMB) theory. The IMB theory posits that there are three factors that influence behaviors of individuals: 1) information which directly translates into behavioral skills and performances; 2) motivation to act on such information and to

perform those acquired skills; and 3) behavioral skills to confidently implement the desired outcomes (Figure 1). The information provided to individuals should contain specific knowledge about disease management. Motivation is comprised of two components: personal motivation and social motivation. Personal motivation is a function of one's beliefs about the consequences of a behavior and social motivation involves receiving social support for health behavior implementation. Behavioral skill is an individual's ability to perform the skills, promoted via teaching, demonstration, and/or training followed by practice [17].

According to the IMB theory, the intervention program for family caregivers in this study focused on: 1) providing necessary information about post-stroke care; 2) motivating caregivers to perform patient care and recovery; and 3) providing skills training necessary to take care of patients. These components were presumed to improve the behaviors of family caregivers in order to correctly and consistently care for stroke survivors.

The following four hypotheses in the study were posited after participation in the intervention program: (a) family caregivers demonstrate improvement in post-stroke care skills compared to pre-intervention, (b) family caregivers show improvement in post-stroke care skills compared to those in the control group, (c) patients will enhance ability to perform ADLs and will experience reductions in complications post-intervention compared to pre-intervention, and (d) patients will enhance ability to perform ADLs and demonstrate reductions in complications compared to those in the control group.

Methods

Study design

A quasi-experimental study with a nonequivalent control group, pre-test and post-test design was conducted from November 2015 to June 2016. Post-stroke patients and family caregivers were recruited from their communities. All data were collected for three phases: before and after joining the program and within the two-month follow-up period (Figure 1).

Setting and sample

The study sample was comprised of family caregivers and post-stroke patients in Kamphaeng Phet, a province in the north of Thailand. In the research setting, there were four districts containing the highest number of stroke patients. The simple random sampling by lottery method was used to divide the four districts in two groups (experimental and control). Following that division, the participants who met the inclusion criteria were recruited in the study based on purposive sampling. The inclusion criteria for family caregivers were (a) primary caregivers of the first episode of post-stroke patient, (b) living in the same house with the patient, (c) willing to participate during the entire study period, and (d) willing

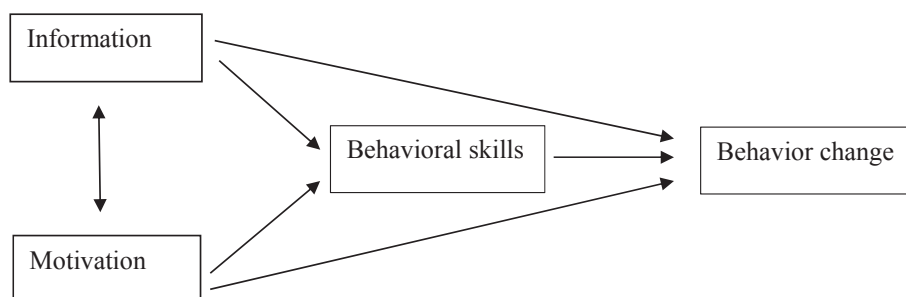


Figure 1. The information-motivation-behavioral skills model.

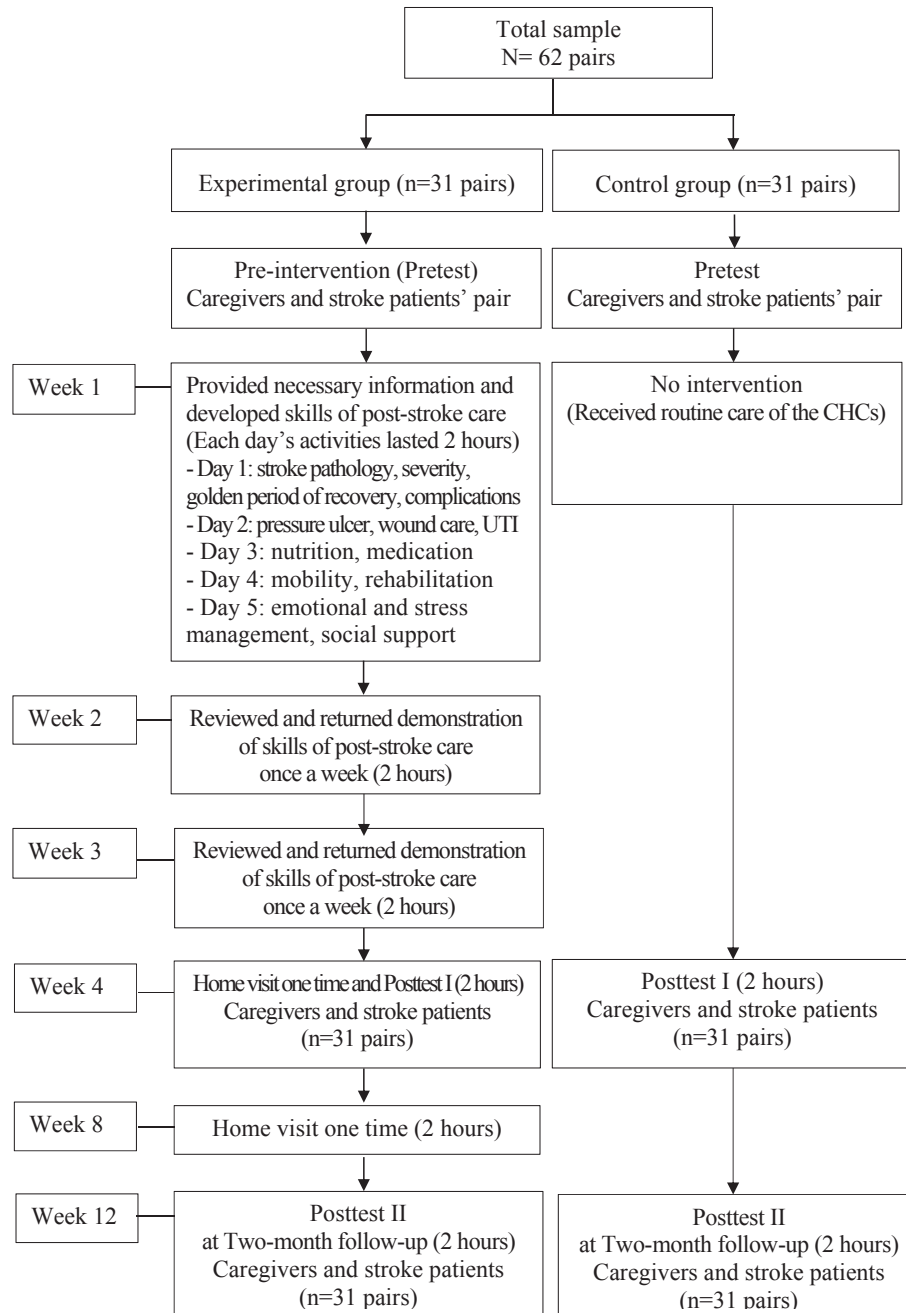


Figure 2. Study design.

to give informed consent to participate in the study. The inclusion criteria for patients were (a) first-time having a stroke, (b) discharged from the hospital within one month with moderately severe disability according to the Modified Ranking Scale [18], (c) did not have complications such as aspiration pneumonia, UTI, pressure ulcer, joint contracture, and recurrent stroke, (d) able to communicate verbally or nonverbally, and (e) willing to participate in the study.

This study examined both post-stroke patients and their family caregivers. Thus, each family caregiver was matched to each patient in the experimental group as well as in the control group. Power analysis for sample size calculation was performed using G*Power version 3 [19] with an effect size of 0.71, which was based on a previous study [10]. Power analysis results from an independent t-

test indicated a total sample size of 52 pairs of patient–family caregiver (26 in the intervention group and 26 in the control group) was needed. Thirty-one patient–family caregiver pairs in each group were recruited to account for an estimated 15% attrition rate [20], yielding a target total sample size of 62.

Ethical consideration

This study was approved by the Institutional Review Board of the Faculty of PH, MU (No. 2015-105). Participants were informed of study objectives and signed a consent form prior to data collection. They could decline to participate in the study at any time without any consequences. All information and questionnaires were stored in a locked file cabinet in the researcher's office to ensure the

protection of participants' confidentiality and anonymity. Control group participants received information, skill training, and post-stroke booklets following the two-month follow up post-intervention data collection.

Measurements

There were three instruments for this study utilized by the researcher: 1) post-stroke care skills checklist; 2) Modified Barthel Index (MBI); and (3) post-stroke patient complications checklist. Data collection occurred at baseline, post-intervention, and two-month follow-up post-intervention for both intervention and control group participants.

Post-stroke care skills checklist

The post-stroke care skills checklist was used to assess family caregivers on five critical post-stroke care skills: 1) feeding and aspiration prevention, 2) pressure ulcer prevention and wound care, 3) fall prevention, 4) mobility, and 5) rehabilitation. These skills were identified from literature review and from the results of exploring the problems and the needs of both the patients and caregivers within the research setting prior to program development. The checklist was constructed by the researcher (Pitthayapong S.) was adapted from the fundamental nursing skills checklist of the Thai Red Cross College of Nursing. The checklist consisted of 54 items on a four-point rating scale, which ranged from 0 (did not practice or did not perform the task correctly) to 3 (correctly perform). The checklist was approved content validated by five experts and subsequently applied to thirteen family caregivers. The Content Validity Index (CVI) was .88 and Cronbach's alpha was .78.

Modified Barthel Index

The Modified Barthel Index (MBI) was developed by Shah et al. [21] to evaluate the physical functional ability in patients with disabilities. This study used the MBI (Thai version) translated by Loharjun et al. [22]. The index of 10 items includes personal hygiene, bathing, feeding, toilet use, stair climbing, dressing, bowel control, bladder control, ambulation, and transfer. Each item was scored from 0 (unable to perform task) to 15 (fully independent). A score of 0–20 indicated total dependence, 21–60 severe dependence, 61–90 moderate dependence, 91–99 slight dependence, and 100 independence. A previous study reported the interrater reliability coefficient was .90 for the MBI [22].

Complications checklist

The complications checklist was developed based on a literature review assessing the five common complications of stroke patients: aspiration pneumonia [23], UTI [23], pressure ulcer [24], joint contracture [25], and recurrent stroke. Recurrent stroke was assessed by reviewing the patient's medical record from a physician's diagnosis. All five complications were measured with a dichotomous scale (yes or no). The CVI of the checklist was 0.80 and the Cronbach's alpha was .75.

Intervention group

The intervention program activities were provided to the family caregivers individually because the patients were discharged from the hospital at different times. In addition, the participants' house locations were widely dispersed.

The intervention was provided by the researcher over a four-week period (Figure 2); the start date varied depending on the hospital discharge date of the stroke survivor.

Week 1. Week 1 consisted of giving post-stroke care information and skill practice over a 5-day period (one session per day). Each

day's activities lasted two hours. Day 1 covered basic knowledge about stroke pathology, stroke consequences, and severity of stroke, golden period of stroke recovery, support for patients to perform daily routine care, and how to recognize types, symptoms and prevention of complications, such as aspiration pneumonia, pressure ulcer, wound infection, UTI, joint stiffness, and recurrent stroke. In this session, vicarious post-stroke care experiences were simulated with a video presentation. The video was made by the Anandamahidol Foundation with the cooperation of the Faculty of Medicine Siriraj Hospital. The video showcased stroke patients and family caregivers who shared their experiences with post-stroke symptoms, effects of stroke on patients and family caregivers, as well as patient care that promotes successful rehabilitation.

Day 2 focused on providing knowledge about the causes, symptoms and prevention of pressure ulcer, wound infection and UTI. Wound care and the use of equipment were demonstrated for family caregivers. They had the opportunity to practice wound care and complete a return demonstration.

Day 3 covered knowledge and skills about attending to a post-stroke patient's food and medicine; in particular, the proper types and amount of food, food preparation, feeding method, and aspiration prevention. Family caregivers learned about patients' medications and their side effects.

Day 4 covered knowledge and skills in patient mobility, fall prevention, and rehabilitation. The family caregivers were advised about how to move the patient on a bed, flip the patient from side to side every two hours, change the patient's position from sitting to lying down and transferring the patient from bed to a chair or wheelchair and preventing the patient from falling during transfer. The demonstration also included upper and lower extremity exercises and coordination and balance practice while the patient was sitting down or standing up. The family caregivers were able to practice each skill until they felt confident about their performance.

Day 5 covered emotional and stress management and social support. The researcher provided information to family caregivers about the importance of social support and its' provision to patients based on four types of social support: emotional, informational, instrumental, and appraisal. After each session, family caregivers were provided key information through participation and were allowed to ask questions. Afterwards, family caregivers gave a return demonstration and received feedback. After week 1, family caregivers received a handbook on stroke patient rehabilitation at home. The handbook covered essential knowledge and different aspects of post-stroke care; the handbook also served as a booster dose of the intervention, allowing the family caregiver to refresh their knowledge as needed.

Weeks 2 and 3. After the first week of intervention ended, the participants reviewed all topics once a week on their available schedule with the researcher during week 2 and 3. The activities in each week lasted two hours. The information review sessions focused on severity after stroke, prevention of complications, golden period of recovery, food preparation and feeding, patient mobility, fall prevention, physical rehabilitation, and social support. In addition, family caregivers were allowed to give a return demonstration of all the skills learned in the previous weeks and to ask questions regarding problems and challenges caring for the patient post-stroke at home.

Week 4. The final activity of week 4 consisted of a follow-up home visit by the researcher to assess various aspects of post-stroke patient care at home, to conduct post-test intervention evaluation, and to identify mobility needs for patient care and support such as a cane, walker or wheelchair. Patients also received further support from health care providers in the community.

Week 8. The activity in this week consisted of a home visit. The researcher inquired of the participants in the experimental group

about patient care, encouraging and advising them as related to their problems and obstacles. In addition, they were asked about their need for support in patient care that the researcher would further be able to coordinate with the CHCs for assistance.

Control group

The family caregivers and patients in the control group received only routine care from the CHCs. Regarding routine care, the public health nurse would visit post-stroke patients at least one time within the first month after hospital discharge. Activities during the home visit included assessing patient's condition and problems, providing suggestions relevant to patient's condition or risks of developing complications, and suggesting physical rehabilitation. After the first home visit, the health care providers of CHCs would consider additional home visits based upon the patients' conditions. In this study, more than 50% of post-stroke patients and family caregivers received a home visit only once from the CHC staffs. The remainder of patients and family caregivers were never visited at home, and thus did not even receive the minimum of routine care from the CHC staffs.

Data collection procedure

Kamphaeng Phet Hospital was contacted for a list of stroke patients and their location. These participants were identified and verified for recruitment according to the study's eligibility criteria. After family caregivers and patients agreed to participate in the study and signed the consent form, they were informed of the date, time, and study activities. Participants in the experimental group received the four-week, post-stroke intervention program in addition to the routine care provided by the CHCs. The control group received only the routine care provided by the CHCs. This research was a single-blind study; that is, the researcher did not inform participants to which group they had been placed. In addition, they lived in different districts which were remotely dispersed from each other; it is unlikely that experimental and control group participants communicated with each other.

Data analysis

Data were analyzed using SPSS version 18.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics, means, standard deviations, and percentages were computed on all of the variables to assess the distribution, central tendency, and dispersion of the data and to identify outliers, ceiling and floor effects. There were no missing data. Chi-square for categorical data and independent t-test for continuous data were computed to test differences in study variables between the two groups. Two-way repeated measures analysis of variance (ANOVA) was computed to analyze changes in skills of family caregivers and ADLs of post-stroke patients between the two groups and over time. A *p*-value less than .05, two-tailed, was considered statistically significant.

Results

Participant characteristics

There was no statistically significant difference in mean age between family caregivers in the experimental (Mean = 49.13; SD = 11.53) and control groups (Mean = 51.32; SD = 13.39). Most female family caregivers in the experimental group (80.6%) and those in the control group (83.9%) were patients' daughters. Most of the caregivers were married, had the elementary school education, and earned 10,000 baht or less per month. Regarding those with a

monthly income higher than the poverty line (2,000 baht per month) of population in Thailand, they were classified in the middle class.

The post-stroke patients in the experimental and control groups were older with a mean age of 64.74 years (SD = 12.09) and 69.03 years (SD = 12.83), respectively. The majorities (58.1% of the experimental group and 64.5% of the control group) were females and had the elementary school education. More than half of the patients in the experimental group were married while more than half of those in the control group were single, widowed, or divorced. Both groups lived in an extended family environment. The majority of patients had hypertension. There were no differences in sociodemographic characteristics for family caregivers and post-stroke patients between the two groups (Table 1).

Comparison of study variables between groups at baseline

At baseline, there was no statistically significant difference in post-stroke care skills between intervention group family caregivers and control group family caregivers. All of the post-stroke patients had no complications and there were no statistically significant difference in ADLs between the two groups at baseline (Table 2).

Effects of post-stroke care intervention

Changes in post-stroke care skills

The two-way repeated measures ANOVA revealed significantly different changes in family caregivers' post-stroke care skills between groups ($F = 585.81, p < .001$) and over time ($F = 616.53, p < .001$). There was a statistically significant difference of group and time interaction for family caregivers' post-stroke care skills ($F = 192.49, p < .001$). A post hoc test showed significant difference between pre-test, the end of program, and the two-month follow-up (Table 3 and Figure 3).

Changes in ADLs

Results of the two-way repeated measures ANOVA indicate statistically significant change differences in ADLs between groups ($F = 46.01, p < .001$) and over time ($F = 176.55, p < .001$). There was a statistically significant difference of group and time interaction in the stroke patients' ADLs ($F = 73.91, p < .001$) (Table 4 and Figure 4).

Changes in complications

As shown in Table 4, there was a statistically significant difference in complications between groups at the two-month follow-up ($p < .001$). No patients in the experimental group developed sudden complications at the end of the study while 6.4% ($n = 2$) of the patients in the control group had joint stiffness and pressure ulcer. During the two-month follow-up, one patient (3.2%) in the experimental group developed joint contracture while 16 patients (51.6%) in the control group developed UTI ($n = 1$), aspiration pneumonia ($n = 1$), pressure ulcer ($n = 4$), joint stiffness ($n = 15$), and recurrent stroke ($n = 2$). Whenever any complication had developed, it was also found that some patients had incurred multiple complications. One patient had UTI, pressure ulcer and joint stiffness, one had joint stiffness and recurrent stroke, one had pneumonia and recurrent stroke, and three had pressure ulcer and joint stiffness.

Discussion

This study focused on enhancing family caregivers' post-stroke care skills based on the IMB model. The results revealed that family caregivers who participated in the intervention program

Table 1 Homogeneity Test for General Characteristics (N = 62).

Characteristics	Categories	Experimental (n = 31)	Control (n = 31)	t/ χ^2	p
		n (%) or M \pm SD	n (%) or M \pm SD		
Family caregivers					
Age (yr)		49.13 \pm 11.53	51.32 \pm 13.39	0.86	.760
Gender	Male	6 (19.4)	5 (16.1)	0.11	.740
	Female	25 (80.6)	26 (83.9)		
Relationship	Child	14 (45.1)	19 (61.2)	2.23	.328
	Partners	11 (35.5)	6 (19.4)		
Marital status	Relatives	6 (19.4)	6 (19.4)	0.34	.562
	Married	24 (77.4)	22 (71.0)		
Education level	Single/Widowed/Divorced	7 (22.6)	9 (29.0)	0.09	.767
	\leq Elementary school	23 (74.2)	24 (77.4)		
Monthly income (Baht)	\geq Secondary school	8 (25.8)	7 (22.6)	0.08	.783
	\leq 10,000	21 (67.7)	22 (71.0)		
	$>$ 10,000	10 (32.3)	9 (29.0)		
Post-stroke patients					
Age (yr)		64.74 \pm 12.09	69.03 \pm 12.82	1.90	.180
Gender	Male	13 (41.9)	11 (35.5)	0.27	.602
	Female	18 (58.1)	20 (64.5)		
Marital status	Married	19 (61.3)	12 (38.7)	3.16	.075
	Single/Widowed/Divorced	12 (38.7)	19 (61.3)		
Education level	No formal education	6 (19.4)	5 (16.1)	0.11	.740
	\geq Elementary school	25 (80.6)	26 (83.9)		
Underlying diseases	No	4 (12.9)	2 (6.5)	0.73	.671
	Yes	27 (87.1)	29 (93.5)		
	HT	13 (41.9)	14 (45.2)		
	Dyslipidemia	1 (3.2)	1 (3.2)		
	HT and DM	1 (3.2)	2 (6.4)		
	HT and Dyslipidemia	10 (32.3)	10 (32.3)		
	HT, DM, and Dyslipidemia	2 (6.4)	2 (6.4)		

Note. DM = Diabetes Mellitus; HT = Hypertension.

Table 2 Comparison of Study Variables Between Groups at Baseline (N = 62).

Variables	Experimental (n = 31)	Control (n = 31)	t or χ^2 p	
	n (%) or M (SD)	n (%) or M (SD)		
Family caregivers				
Skills of post-stroke care	34.61 (11.10)	42.55 (9.93)	0.91	.345
Feeding	6.06 (1.79)	8.38 (1.78)	0.11	.746
Pressure ulcer prevention	6.35 (2.12)	7.45 (1.93)	0.06	.805
Fall prevention	8.94 (3.47)	12.32 (3.45)	0.01	.974
Mobility	4.52 (3.55)	4.45 (3.65)	0.05	.815
Rehabilitation	8.74 (4.23)	9.94 (3.99)	0.17	.683
Stroke survivors				
ADLs	31.74 (4.11)	32.48 (4.19)	0.14	.705
No complications	31 (100)	31 (100)		

significantly improved their post-stroke care skills compared to family caregivers' in the control group. Family caregivers' having knowledge and behavioral capability for post-stroke care skills were deemed necessary for the care and rehabilitation of patients after stroke, particularly for feeding and aspiration prevention, pressure ulcer prevention, wound care, fall prevention, mobility, and rehabilitation.

Table 3 Effects of Post-stroke Care Intervention (N = 62).

Outcomes	Before (1)	The end of program (2)	Two-month follow up (3)	Group		Time		Group \times Time		Post hoc
	M (SD)	M (SD)	M (SD)	F	p	F	p	F	p	
Skills of post-stroke care										
Experimental	34.61 (11.10)	121.64 (11.30)	128.93 (12.66)	585.81	<.001	616.53	<.001	192.49	<.001	3 > 2 > 1*
Control	42.55 (9.93)	35.29 (11.54)	32.81 (11.01)							
ADLs										
Experimental	31.74 (4.11)	40.13 (8.82)	73.10 (14.02)	46.01	<.001	176.55	<.001	73.91	<.001	3 > 2 > 1*
Control	32.48 (4.19)	32.19 (4.52)	40.68 (16.47)							

*p-value < .05.

The improvement of family caregivers' skills in the experimental group was the result of applying the IMB model to develop the intervention that focused on information, motivation, and skill practices on post-stroke care. First, providing the specific information about caring for the patients during recovery after stroke resulted in the enhancement of family caregivers' awareness and led to a better understanding of patient care and rehabilitation for patients who had experienced his or her first stroke. This finding supports existing literature that shows education and information regarding the nature of stroke, recovery, and secondary prevention are key components of skill development [26].

Second, family caregivers were motivated to care for patients correctly and consistently. In this study the following steps were implemented to motivate the caregivers 1) providing information about the golden recovery period (i.e. the first three to six months after stroke) raised the caregiver's awareness of the benefit of correct patient care and motivated them to provide the care while patients became hopeful and motivated to care for themselves and cooperate with the caregivers to achieve fast recovery [8]; 2) using positive role model by showing a video presentation about stroke survivors who received care from their family and had recovered well; and 3) using negative role model by giving examples of

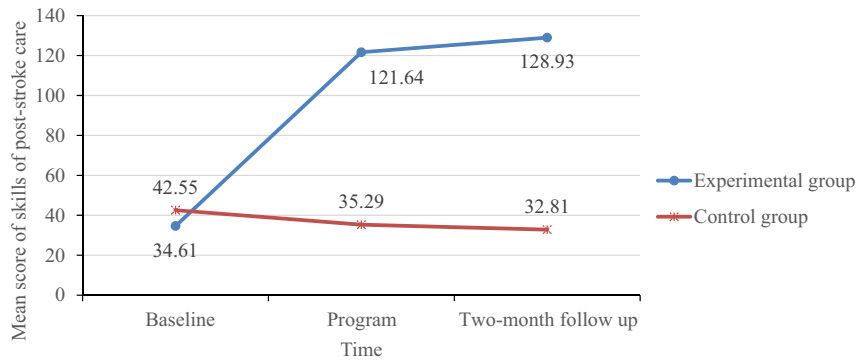


Figure 3. Mean score of skills of post-stroke care across time between the experimental and control groups.

Table 4 Change in Complications by Group and Time (N = 62).

Complications	Experimental	Control	χ^2 /Fisher's Exact test	p
	(n = 31)	(n = 31)		
	n (%)	n (%)		
The end of program				
Yes	0 (0)	2 (6.4)	2.07	.492 ^a
No	31 (100)	29 (93.6)		
Two-month follow up				
Yes	1 (3.2)	16 (51.6)	18.23	<.001
No	30 (96.8)	15 (48.4)		

^a Fisher's Exact test.

patients who failed to recover and had developed complications and permanent disability, and ultimately became bed-ridden and unable to take care of themselves [7].

Third, direct, hands-on experiences provided in the study's intervention program helped family caregivers to enhance their self-confidence and provide better and appropriate care [27]. Another study found that informal caregivers had more knowledge and improved skilled care after participating in a post-stroke education and skills program that included re-demonstration, which in turn resulted in improved functional status and less depression for patients post-stroke [30].

In terms of program effectiveness, patients in the experimental group who received care from family caregivers were not only better able to perform ADLs over time, but also performed ADLs better than patients in the control group. Only one patient in the experimental group developed complications at home whereas 16 patients in the control group developed complications at home. The level of patients' ADLs in the experimental group improved from severe dependence to moderate dependence; whereas the

independence level of ADLs in the control group remained unchanged at the severe dependence level. The improvement in ADLs in experimental group patients appear to result from receiving the correct and early continuation of upper and lower extremity physical rehabilitation from family caregivers who participated in the intervention program. This study finding is consistent with the findings of other studies [28,29]. Moreover, family caregivers in the experimental group not only performed skilled post-stroke care immediately after the intervention ended, but also were able to maintain these skills for an additional two-month. Family caregivers in the experimental group continued to sustainably perform proper skills of post-stroke care. This study also showed the better the skills of the family caregivers, the better the ADLs function with complication reduction among post-stroke patients. The caregivers' performance was a result of the recapitulation of knowledge and information provided in each session, skill practicing and return demonstration in providing different levels of care to the patients with feedback from the researcher, including home visits.

The positive outcomes for both family caregivers and post-stroke patients in this study suggest that the intervention program could be applied to family caregivers who provide care to post-stroke patients in the community. A limitation of this study was the varied pattern of routine care provided by the CHCs staffs, depending on the community location. This variation resulted in inconsistent care for patients post-stroke and their family caregivers, particularly for caregivers in the control group.

Recommendations for future research and practice include immediate implementation of a home-based patient-family caregiver post-stroke skilled care intervention program that is initiated upon a patient's discharge from the hospital in order to promote correct and proper care from family caregivers on a continual basis. The sooner

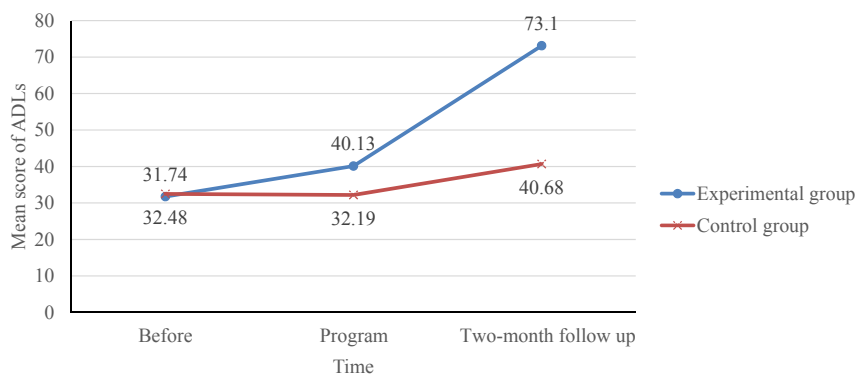


Figure 4. Mean score of ADLs over time between the experimental and control group.

patients recover, the less disease complications and family caregiving burden will occur. Healthcare providers of the CHCs should continue to support and promote a family caregiver's skills in caring for post-stroke patients and provide follow-up contact regarding a patient's condition and need for sustainable support at home for a good recovery and rehabilitation in the community.

Conclusion

This study provided evidence of the importance of family caregivers having the essential skills to care for post-stroke patients at home. The results showed that family caregivers who participated in a post-stroke care intervention program had improved post-stroke care skills, resulting in improved ability to perform ADLs and reduced complications in the post-stroke patients.

For further studies, the researcher should consider research methodology for patients with disability and should monitor the long-term effectiveness of the program to confirm the maximum concrete benefits to patients.

Conflicts of interest

The authors declare no potential conflicts of interest.

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