

Effects of Pressure Sore Prevention Program on Knowledge and Self-Efficacy of Family Caregivers in Decreasing Pressure Sore Risk of Persons with Cerebrovascular Disease

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Abstract

OBJECTIVES: This quasi-experimental research design was aimed to determine effects of pressure sore (PS) prevention program on knowledge and self-efficacy of family caregivers in decreasing PS risk of persons with cerebrovascular disease (CVD).

MATERIAL AND METHODS: Study participants were family caregivers of persons with CVD and these were randomly selected and placed into two groups: an experimental group with 27 participants receiving the PS prevention program for 8 weeks and a control group with 26 participants receiving routine nursing care at home. Data were collected using demographics questionnaire, CVD knowledge, self-efficacy of PS prevention, and Braden scale for PU risk assessment. Data were analyzed using descriptive statistics, Chi-square test, paired t-test, Wilcoxon signed ranks test, ANCOVA and Mann Whitney U test.

RESULTS: After participating in the program, family caregivers in the experimental group had a significantly mean score of CVD knowledge and self-efficacy of PS program higher than before receiving the program ($p < 0.001$) and the control group ($p < 0.001$, $p < 0.05$, respectively). Participants in the experimental group had a significantly mean score of PS risk higher than before receiving the program ($p < 0.001$). However, there was no significant difference between the groups.

CONCLUSION: The PS prevention program should be applied to family caregivers in order to reduce PS risk of persons with CVD

Keywords: knowledge, self-efficacy, pressure sore (PS), cerebrovascular disease (CVD), family caregivers, bed sore, bedridden

Cerebrovascular disease (CVD) is the second cause of death for the global population at 5.8 million deaths in 2016.¹ Similarly in Thailand, stroke mortality rate rose from 31.7 per 100,000 population in 2012 to 48.7 per 100,000 population in 2016.² Likewise, Nakhon Sri Thammarat's Health Service Area XI in Nakhon Sri Thammarat Province had the highest number of persons with CVD equal to 3,462 in 2017 and Maharaj Nakhon Si Thammarat Hospital also showed that the number of stroke patients rose from 1,923 in 2013 to 1,938 in 2015³. This resulted in a higher risk of PS due to patient disabilities⁴ and the need for care from their respective family caregivers in order to take part in activities of daily life.⁵ Thus, patients with CVD might encounter many complications especially PS leading them to be afraid and anxious of wounds with a foul smelling odor.⁴ Furthermore, patients were concerned with body image, low level of satisfaction and an increase in medical costs. In the United Kingdom, these costs were 1.25 times⁵ more approximately ranging from £1,214 (Pressure score Stage 1) to £14,108 (Pressure score Stage 4). In Thailand, costs were approximately 30,000 Bath/a wound/⁷ (equal to 938 US) or more depending on length of stay in hospital⁵ and PS severity.⁶ Thus, prevention of PS is essential and should be continuously performed at home by family caregivers in order to reduce readmission rate from PS. This was shown to be approximately 12 % in a study in Thailand⁸ because of unchanged patient position.⁹

A study indicated that family caregivers of persons with CVD had moderate competency in preventing complications because caring for CVD persons is complex and needs more skills and expertise.⁹ Thus, numerous studies have been applied to many activities in intervention programs during the initial hospital discharge period of approximately 4-12 weeks.¹⁰⁻¹² The intervention programs help to prevent complications and include CVD knowledge, caring skills, consultation,^{10,11} home visits and telephone follow-ups¹² resulting in a significant increase in knowledge and skills of family caregivers¹¹⁻¹² and lower PS incidence of patients.^{10,12} Therefore, continuing care by family caregivers at home is essential to prevent PS because of patients' immobility. A study conducted in the community used a family caregiver group discussion training program to provide knowledge, skills, and home visits resulting in significant improved knowledge, attitude and practices.¹³ Some studies abroad used smartphone applications such as Line, and these proved to be more beneficial as they not only acted as a telephone resource but were also used to share knowledge and best practice with massage techniques, videos, pictures and so on.¹² This method was useful in order to continually monitor, to care for solving health problems¹⁴ and to improve rehabilitation. This in turn resulted in lower complications, a decrease in fatigue among family caregivers¹⁵ and reduced expenses and workloads of health care teams.¹⁴ Therefore, integrating the Line application in PS prevention program is highly recommended and should be more examined especially to study PS prevention outcome of persons with CVD.

Maharaj Nakhon Si Thammarat Hospital in Nakhon Sri Thammarat Province, serves rural-urban communities in the southern part of Thailand. The hospital has reported an increasing incidence of persons with CVD needing more care from family caregivers to prevent complications especially PS. Therefore, it is important to draw from Bandura's self-efficacy Theory¹⁶ emphasizing family participation with the belief that family caregivers can provide worthy support and can expect to be successful in preventing PS for their patients, and they do provide appropriate care. Perception of self-efficacy can be developed from four resources namely: 1) Enactive mastery experience, 2) Vicarious experience, 3) Verbal persuasion, 4) Physiological and affective stages

Thus, this program should be applied to family caregivers in order to enhance knowledge and skills to implement PS prevention measures for their patients. Therefore, researchers are interested in studying the effects of the PS prevention program on knowledge and self-efficacy of family caregivers in decreasing PS risk of persons with CVD.

Materials and Methods

A quasi-experiment research design, two group pretest-posttest design, was used for this study. Population was family caregivers taking care of persons with CVD. Sample was family caregivers taking care of persons with CVD

residing in the area under the responsibility of the Sub-district Health Promoting Hospital, Muang District, Nakhon Si Thammarat Province from June-December 2017.

Persons who passed inclusion criteria, included:

1. Family caregivers without any benefit in taking care of patients with CVD ≤ 5 years with aged ≥ 20 years old and score of Barthel Activities of Daily Living ≤ 60 point.
2. Having a score of Short Portable Mental Status Questionnaire > 8 if age > 60 years old.
3. Being able to use LINE application or telephone to communicate in Thai.
4. Willing to give informed consent to participate in the study.

Participants meeting all four criteria were recruited into the study. All participants were randomly divided into two groups by geographic area: Western zone as an experimental group and Eastern zone as a control group. The sample size was calculated using power analysis G*Power software¹⁷ based on the findings of two studies^{18, 19} having an effect with a size equal to 2.18. Finally, we enrolled 30 family caregivers taking care of persons with CVD to obtain sufficient statistical power (80%) in predicting the study outcomes with a statistically significant result of $p < 0.05$.

Instruments

The instruments used in the present study consisted of the PS prevention program with Bandura's Self-Efficacy Theory¹⁶ for 8 weeks, routine nursing care and instruments for data collection. The intervention program developed by the researchers was based on a review of literature and Bandura's Self-Efficacy Theory (Figure 1). The program given to the experimental group consisted of two home visits (at week 1&2) to impart knowledge of the PS program and an assessment was made using videos, a demonstration²⁰ by tablet and an adapted handbook of the PS program in CVD persons,²¹ a return demonstration, and Line application or telephone calls twice a week at week 4, 6 and 8 to ask questions and to solve caring problems as well as giving encouragement. The content of the program was validated by three experts of PS care in the fields of nursing and surgery. The Content Validity Index (CVI) was demonstrated as 0.81.

The routine nursing care given to the control group involved home visits once a month for health assessment, suggestions for health problems and giving reinforcement. The evaluation questionnaires for data collection were divided into several parts as follows.

The family caregivers' demographic data questionnaire consisted of gender, age, marital status, religion, education, occupation, family income, chronic diseases, relationships, care duration, caring experience, training for care and needs.

The CVD knowledge questionnaire was developed by researchers based on the literature review with true-false answers for 30 questions. The CVI was shown as 1 and

Kuder-Richardson (KR-20) demonstrated an acceptable reliability of 0.77, and 0.67 for the main study. The perceived self-efficacy in the PS program questionnaire was developed by the researcher with 17 questions. Each item was assessed on a Likert scale from 1-4, where: “1 = not confident”, and “4 = most confident”. The CVI was demonstrated as 1 and Cronbach’s Alpha Coefficient showed an acceptable reliability of 0.91, and 0.86 for the main study.

Persons with CVD’s demographic data questionnaire consisted of age, gender, marital status, religion, education, occupation, other chronic diseases, health insurance and length of illness.

The Braden Scale for Predicting PS risk was developed by Braden and Bergstrom in 1988, and was translated into Thai by Raksanan Kwanmuang²² with 6 questions. In this study, the Braden Scale was used with permission. Each item was assessed on a rating scale from 1-4. A score of less than 12

indicated high PS risk. The Cronbach’s Alpha Coefficient was calculated at 0.69 and 0.70 for the main study.

Data Collection

The study commenced after receiving approval from the Institutional Review Board, Faculty of Medicine, Ramathibodi Hospital, Mahidol University (ID No. 12-59-58). All potential participants signed an informed consent form, data were collected by the researcher in the procedure set out below. At baseline, an assessment was conducted in the first week, and all participants were asked to provide demographic characteristics, CVD knowledge, perceived self-efficacy in the PS program through answering questionnaires. The Braden Scale was used to predict PS risk and to assess the participant’s patient. Then, the participants received the program for 8 weeks. Data were obtained after finishing the program at the ninth week as at the baseline as shown in Figure 1.

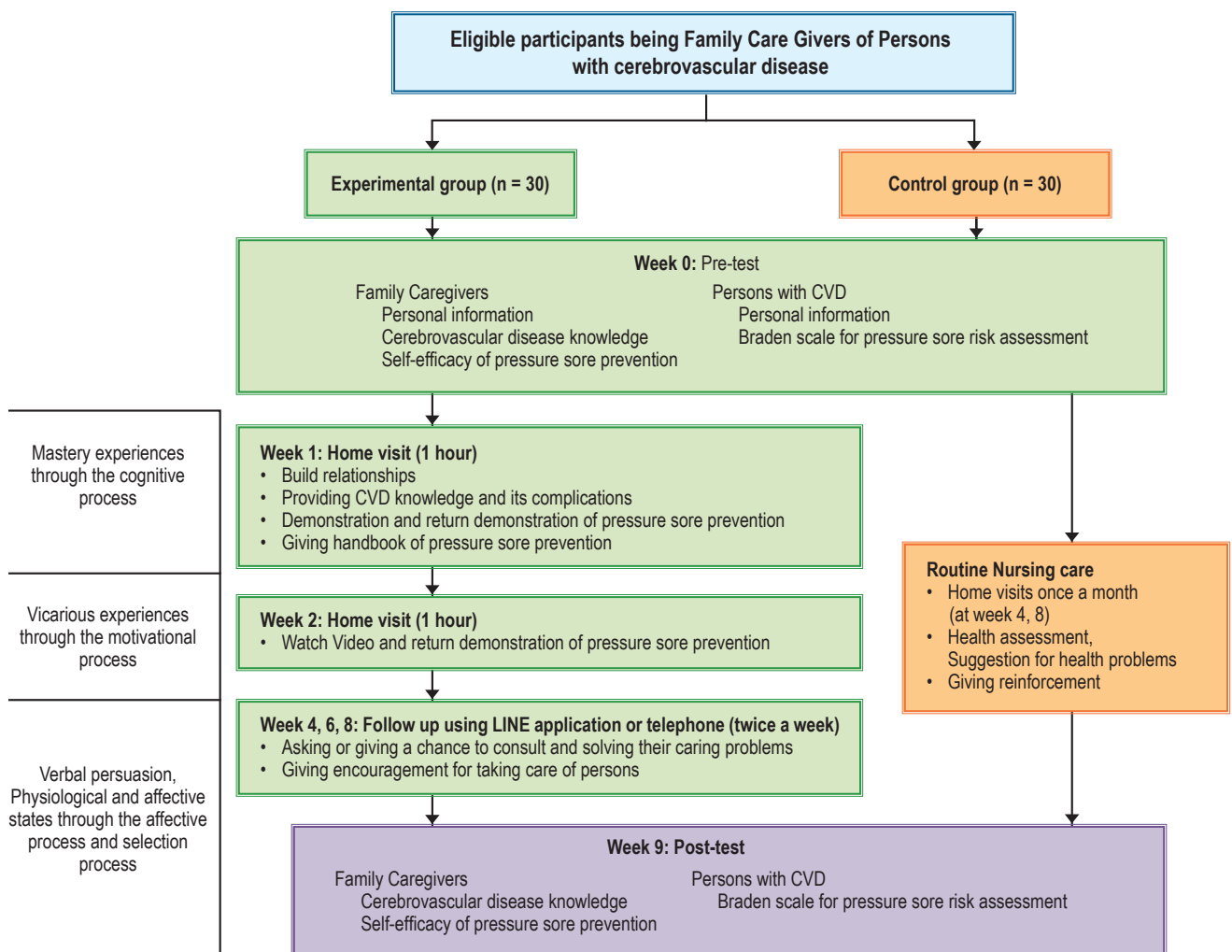


Figure 1: Research Process

Data Analysis

A computer software program was used to analyze data using descriptive statistics for demographic characteristics and dependent variables including score of CVD knowledge, perceived self-efficacy in the PS program and the Braden Scale for predicting PS risk. Paired t-test and Wilcoxon signed ranks test were used to compare scores of CVD knowledge, perceived self-efficacy in the PS program within groups, meanwhile ANCOVA and Mann Whitney U test was used to test between groups. Wilcoxon signed ranks test and Mann Whitney U test were used to compare scores of the Braden scale for predicting PS risk within groups and between groups.

Results

Twenty-seven participants in the experimental group and twenty-six participants in the control group remained in the study (due to hospital admission in the hospital, death and moving to other provinces). Most family caregivers in the experimental and control groups were females (74.1% and 80.8%) with mean ages of 51.04 years (SD = 15.90) and 54.73 years (SD = 15.94), respectively. Two-thirds of participants were either uneducated or educated at the elementary level (63.0% and 61.5%), respectively. Over half of the participants continued to work while caring for patients (59.3% and 65.4%, respectively). Two-thirds of the experimental group had enough money without debts (73.1%) and the control group equal to 96.2%. Two-thirds of the participants had no chronic diseases (70.4% and 69.2%). Two-thirds of the participants were sons/daughters, siblings or parents while the others were husband or wife (40.7% and 30.8%, respectively). Almost half of the experimental group and over half of the control group had assistance. Both groups had no prior experience of care giving (88.9% and 84.6%, respectively) and needed help for giving care at home (77.8% & 55.4%, respectively). Mean monthly family income was 7,796.30 baht (SD = 7,005.96) and 8,269.23 baht (SD = 6,094.18); and participants provided

care approximately 21 hours a day, almost seven days a week with a duration equal to 29.67 months (SD = 16.72) and 34.23 months (SD=16.72), respectively. All the participants' demographic data showed no significant difference between groups, using the Chi-square test, except family financial status ($p < 0.05$).

The characteristics of persons with CVD, the experimental and control groups had a similar proportion of male (55.6% and 50%) with a mean age of 77.44 years (SD = 13.07) and 73.50 years (SD = 14.54). Both groups were uneducated and educated at the elementary level (85.2%, and 76.9%) and worked before illness (88.9% and 69.2%, respectively). Mean score of activities in daily living indicated low level (M = 33.89, SD = 16.95; M = 38.08, SD = 21.96, respectively). There was no statistical difference between groups except health insurance ($p < 0.05$).

Before testing hypotheses, all study variables were tested for normality and it was found that a mean score of CVD knowledge and a mean score of PS risk did not show normal distribution. After receiving the PS prevention program, family caregivers in the experimental group had a higher mean score of CVD knowledge and perceived self-efficacy in the PS prevention program than before the program with a statistical significance ($p < 0.001$) as shown in Table 1.

Before comparing the groups of family caregivers, the results showed that only the mean score of perceived self-efficacy in PS program was significantly different. After receiving the program, the mean score of CVD knowledge in the experimental group was significantly higher than the control group ($Z = -3.61, p < 0.001$) as shown in Table 2. Using Analysis of Covariance (ANCOVA), the experimental group had a significantly higher mean score of perceived self-efficacy in the PS program score than the control group ($F = 6.51, p < 0.05$) as shown in Table 3.

Table 1: Comparison of mean score of CVD knowledge and perceived self-efficacy in PS program among family caregivers pre-test and post-test the experiment in the experimental group using the Wilcoxon signed ranks test and paired t-test (n = 27)

Studied Variables	Pre-test			Post-test			Z	t	p
	Mean	SD	range	Mean	SD	range			
- CVD knowledge	23.67	2.27	18 - 27	26.62	1.42	22 - 29	-4.22	-	0.000*
- Perceived Self-efficacy in PS prevention	55.48	5.75	39 - 64	60.04	4.28	50 - 66	-	-4.96	0.000*

* $p < 0.001$

Table 2: Comparison of mean score of CVD knowledge between the experimental and control groups after receiving the PS prevention program using the Mann-Whitney U test (n = 53)

Studied Variables	Experimental Group (n = 27)			Control Group (n = 26)			Z(a)	p
	Mean	SD	range	Mean	SD	range		
CVD knowledge	26.62	1.42	22-29	23.62	3.19	14 - 28	-3.61	0.000**

$p < 0.001$

Table 3: Comparison of mean score of perceived self-efficacy in PS program between the Experimental Group (n = 27) and the Control Group (n = 26) after receiving the PS prevention program using ANCOVA statistics

Fluctuation Source	SS	df	MS	F	p
Group	277.178	1	113.067	6.51	0.014*
Pre-test	113.067	1	277.178	15.95	0.000***
Fluctuation	868.746	50	17.375		
Total	1622.528	52			

* $p < 0.05$

Table 4: Comparison of mean score of PS risk in the Experimental Group (n = 27) and the Control Group (n = 26) pre-test and post-test the program using the Wilcoxon signed ranks test

Group	Pressure Sore Risk Score						Z	p
	Pre-test			Post-test				
	Mean	SD	range	Mean	SD	range		
Experimental Group	14.78	2.14	9 - 17	16.00	2.04	12 - 19	-4.11	0.000***
Control Group	14.69	2.48	10 - 19	15.08	2.19	11 - 19	-2.33	0.020*

* $p < 0.05$, *** $p < 0.001$

Table 5: Comparison of mean pressure sore risk scores between the Experimental Group who received the PS prevention program and the Control Group who received routine care using the Mann-Whitney test (n = 53)

Studied Variables	Experimental Group (n = 27)				Control Group (n = 26)				Z	p
	Mean	SD	Mean Rank	Sum of Ranks	Mean	SD	Mean Rank	Sum of Ranks		
Pressure Sore Risk	16.0	2.04	30.31	818.50	15.08	2.19	23.56	612.50	-1.61	0.107

The Wilcoxon signed ranks test was applied because of the non-normal distribution of the mean score of PS risk of persons with CVD in the experimental group who had received the program as this had a significantly higher mean score of PS risk than before receiving the program ($p < 0.001$). This indicated the experimental group with high scores had lower PS risks as shown in Table 4. However, the mean score of PS risk was not different when compared with the control group using Mann-Whitney Test ($Z = -1.61$; $p > 0.05$) as shown in Table 5.

Discussion

After receiving the PS prevention program, the experimental group had a significantly higher mean CVD knowledge score and a PS program perceived self-efficacy score when compared with before receiving the program and the control group ($p < 0.001$, $p < 0.05$) because family caregivers in the experimental group received the PS prevention program based on Bandura's Self-Efficacy Theory.¹⁶ This is defined as : vicarious experiences through the cognitive process by providing CVD knowledge and PS program during home visits; Enactive mastery experiences through the motivational process by demonstration and return demonstration of PS program;

Verbal persuasion and preparation of physiological and affective states through the affective process with two-way communication to listen problems, obstacles, participatory problem-solving and giving encouragement via LINE application or telephone follow-up. These processes lead to increased knowledge and capabilities in the prevention of PS risk for persons with cerebrovascular conditions. The findings concurred with previous studies revealing that family caregivers of persons with CVD showed improved knowledge and care skills after receiving a discharge plan program more than before receiving the program^{21,23-24} as well as improved knowledge in preventing complications.²³

Moreover, persons with CVD in the experimental group who received the program had a significantly higher mean score of PS risk than before the program ($p < 0.001$) because of an increase in CVD knowledge and the PS program of perceived self-efficacy score of family caregivers who were trained in the program. However, mean PS risk scores of the experimental group (16 ± 2.04) was higher than the control group (15.08 ± 2.19) but this was not a significant difference. This might be because the control group (mean 34.23 months) had more experience to provide care for persons with CVD than the experiment group (mean 29.67 months).

In addition, the control group had more assistance (61.5%) than the experimental group (44.4%). Furthermore, the experimental group had more financial problems (25.9%) than the control group (3.8%). This finding differed from a study revealing that the experimental group had significantly lower bedsores complications than the control group.¹⁹

Conclusion

The PS prevention program should be applied to family caregivers in order to enhance CVD knowledge and self-efficacy to take care of persons with CVD. This enables caregivers to take better care of their patients resulting in preventing PS risk. Therefore, the PS prevention program should be useful for other family caregivers of persons with CVD to prevent PS and further research should be conducted at the one year follow-up point for further PS risk prevention.

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