

Effect of Self-Efficacy Enhancing Education Program on Family Caregivers' Competencies in Caring for Patients with mild Traumatic Brain Injury in Yogyakarta, Indonesia

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Purpose: This study was conducted to examine the effect of a self-efficacy enhancing education program on family caregivers' competencies regarding perceived confidence and performance in caring for patients with mild TBI in Yogyakarta, Indonesia.

Methods: The quasi-experimental study, two groups pre-test and post-test design was conducted. Fifty family caregivers and patients with mild TBI who met the inclusion criteria were recruited. The first 25 control group received the routine care were, while another 25 subjects in the experimental group received a self-efficacy enhancing education program developed by the researchers. The program was constructed using Bandura's four sources of self-efficacy. The family caregivers' perceived confidence and performance were measured by using the Perceived Confidence Questionnaire (PCQ) and the Performance Questionnaire (PQ). The data were analyzed using paired t-test, independent t-test, Wilcoxon Signed Rank test, and Mann-Whitney U test.

Results: The findings showed that the family caregivers who participated in the program had a higher in perceived confidence ($t = 8.30, p < .05$) and performance ($U = .00, p < .05$) in caring for patients with mild TBI upon the completion of the program.

Conclusion: This study suggests the program may have contributed in improving the family caregivers' competencies regarding perceived confidence and also influencing their performance in caring for patients with mild TBI. Therefore, this program is recommended for nurses to extend this knowledge for nursing practices and improve family caregivers' competencies in caring for patients with mild TBI before and after discharge.

Keywords: self-efficacy, education program, family caregivers, mild traumatic brain injury

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Introduction

Traumatic brain injury (TBI) is one of the leading causes of death and disability in the United States of America (USA) (Faul, Xu, Wald, & Coronado, 2010). According to the Health Department of Indonesia as cited in Ayu (2010), TBI was the seventh leading cause of death in Indonesia in 2007. In Yogyakarta, Indonesia, TBI was the second cause of death with an annual mortality rate of 12% (Daerah Istimewa Yogyakarta [DIY], 2010). Mild TBI had the highest incidence, as reported by Cassidy, et al. (2004), 70%-90%, of all treated brain injuries. Meanwhile, the cases of mild TBI in Yogyakarta, Indonesia in 2007 accounted for 60% of all treated brain injuries (Kurniawan, 2009).

Many people who sustain a mild TBI have symptoms that include cognitive, physical, and emotional symptoms. The symptoms occur in 38% to 80% of the patients (Rao & Lyketsos as cited in Hall, Hall, & Chapman, 2005). The common symptoms experienced after a mild TBI are headache, dizziness, fatigue, and memory difficulties (Lannsjo, Geijerstam, Johansson, Bring, & Borg, 2009; Yang, Tu, Hua, & Huang, 2007). Symptoms may occur alone or in combination and may emerge immediately or within days to up to three months after the injury. The symptoms occur in approximately 59% to 91% of patients in one month after the injury (Paniak et al., 2002), 45% within two months (Yang, et al., 2007), 41.8% to 58% within three months (Dischinger, Ryb, Kufera, & Auman, 2009; Kashluba et al., 2004; Lundin, De Boussard, Edman, & Borg, 2006), and more than three months at around 21% to 62% (Hou et al., 2011; Roe, Sveen, Alvsaker, & Bautz-Holter, 2009). Symptoms are usually resolved within days, weeks (Emanuelson, Andersson, Bjorklund, & Stalhammar, 2003), or within three months (Lannsjo et al., 2009), but several patients continue exhibiting symptoms for more than three months (Emanuelson et al., 2003).

Mild TBI is usually not life threatening, consequently a patient with a mild TBI is treated and released from an emergency department, with no hospital admission and receives

medication only (Faul et al., 2010). However, the admission criteria for mild TBI may differ as shown in Indonesia. According to the guideline of treatment for patients with mild TBI in Indonesia, patients need to be hospitalized for observation within three days of their injury (Siswanto & Wahyu, 2012). Therefore in short periods of hospitalization, and consequently after discharge, mild TBI patients need to be monitored. A prospective study of patients with mild TBI found a negative computed tomography scan developed intracranial injuries in 1.4% of patients after being discharged and 0.8% patients had died at home six months after their discharge (Fabbri et al., 2004). Moreover, mild TBI patients have difficulties in activities of daily living, returning to pre-injury work status and heightened emotional distress (Bay & Bergman, 2006). Therefore, family caregivers are the key persons who are needed in providing care for patients with mild TBI after discharge.

Family caregivers carry the primary responsibility for post acute rehabilitation. The family caregivers can help prevent the development of mild TBI symptoms and/or reduce their duration, number and severity (Department of Veterans Affairs & Department of Defense [DVA/DoD], 2009) by symptoms assessment, symptoms management, and symptoms evaluation after provided management symptoms. However, those who caring for patient with mild TBI discharged earlier often felt incompetent due to lack of confidence about their caregiving, because they do not have the adequate knowledge and skills (Utami, 2012). Moreover, before their patients discharge from hospital, most family caregivers reported that they received limited and inconsistent information (Lefebvre, Pelchat, Swaine, Gelinas, & Levert, 2005). Therefore, improving the family caregivers' competencies in caring for patients with mild TBI is important.

Several factors may influence the family caregivers' competencies in caring for patients, and one of these factors is self-efficacy (Kouri, Ducharme, & Giroux, 2011; Utami, 2012). Self-efficacy is one's self judgments of her or his personal capabilities to initiate and

successfully perform a specified task (Bandura, 1997). Based on Bandura's theory self-efficacy operates as a key factor in individual competency which is constructed from four sources including enactive mastery experiences, vicarious experiences, verbal persuasion, and physiological and affective status. People who have high self efficacy will positively affect performance and would be more successful in completing those tasks (Bandura, 1997).

Family caregivers' competencies can be improved by a number of intervention strategies. Based on review from ten studies, have shown that education/teaching program is one of the most common interventions. An education program often has focused on the family caregiver because in the early stages of post injury, the patient still has difficulties in receiving some information, concentrating, remembering discharge instructions (Bazarian et al., 2005), and making decisions or finding solutions to manage their symptoms (Bell et al., 2008; Sayegh, Stanford, & Carson, 2010). Moreover, it was found that providing only education to the patients in the early phase showed no significant difference in the patient's outcome including an improvement of symptoms after a mild TBI (Elgmark, Emanuelson, Bjorklund, & Stalhammar, 2007; Heskestad et al., 2010). Educational programs could increase the family caregivers' knowledge (Shocker, 2008) and skill (Kouri et al., 2011), and reduce the family caregivers' stress and anxiety (Kreutzer et al., 2010). Moreover, it may increase family caregivers' competencies in terms of self-efficacy (Srijumnong, 2010; Utami, 2012). According to (Bandura, 1997), self-efficacy is one's self-judgment of one's personal capabilities to initiate and successfully perform a specified task at designated levels, one expends greater effort, and perseveres in the face of adversity.

Although education has been shown an effective in improving family self efficacy, its generalizability remains questionable in terms of family performance in caring for patient at home. One quasi experimental study in Indonesia was conducted by Utami (2012) who provided an education program for family caregivers to improve their self-efficacy in caring

for patients with mild TBI. The family caregivers' self-efficacy in term of perceived confidence was measured before and after the intervention given in the emergency department. The contents being given were information of mild TBI that included warning signs, post concussion symptom, diet, activity, and medication. The result showed that this education program improved family caregivers' self-efficacy in terms of perceived confidence. However, it was not constructed based on Bandura's self-efficacy theory and did not measure the family caregivers' performance while they were caring for patients with mild TBI at home. Therefore, this study aims to examine a self-efficacy enhancing education program on the family caregivers' competencies including perceived confidence and performance in caring for patients with mild TBI beyond the emergency department and including follow-up after discharge.

Method

Research design

The two group pre-test and post-test design, control group design was used in this study.

Sample

The sample consisted of family caregivers of age over 17 to 70 years, who identified by patients as primary responsibility in providing care and lived together with mild TBI patient after discharge, literate and communicate in the Indonesian language as well as able to access to telephone contact. Those were excluded if they had a history of psychiatric disorder and hearing problem. Moreover, the recruited patients were adult persons with mild TBI who were diagnosed by the doctor. The sample size was 25 family caregivers in the experimental group and 25 family caregivers in the control group completed the study.

Procedure

This study was approved from the Institutional Review Board (IRB) of the Faculty of Nursing, prince of Songkla University, Thailand. Each potential subject was given the written or verbal informed consent with the explanation of the study purpose and procedure, potential risk and benefit and assured confidentiality and anonymity would be maintained. After agreeing to participate, 25 subjects was initially approach and assigned to be in the control group and another 25 were assigned in the experiment group. The self-efficacy enhancing education program was held at hospital and followed up at home by telephone calls. Subjects in the experimental group continued to receive care as usual.

Research Instruments

Data were collected through 3 instruments which included 1) Demographic Data Questionnaire (DDQ), 2) The Rivermead Postconcussion Symptom Questionnaire (RPSQ), 3) Perceived confidence questionnaire (PCQ), and Performance questionnaire (PQ). The DDQ was used to collect family's demographic data such as age, educational level. The RPSQ was developed by (26) used to assess the number of symptoms of patients who sustain a concussion/mild TBI. It includes physical, cognitive, and emotional symptoms and is composed of 15 items list of symptoms, using yes/no answers. A higher score implies the number of patient's symptoms. The PCQ is a 23 items, self-report questionnaire developed by the researcher to measure the family caregivers' confidence regarding care for patient with mild TBI regarding their ability to assessing and managing of warning signs and four most common symptoms following mild TBI, and evaluating the four symptoms after management. Each item is assessed on a Likert-like scale from 1 to 4; where no confidence = 1, to high confidence = 4. The total perceived confidence score ranged from 23 to 92. In addition, the PQ was developed parallel to PCQ by the researcher to measure the family caregivers' performance regarding care for patient with mild TBI. This questionnaire consists of 19

statements on a Likert like scale from 1 to 5; where never = 1, to regular = 5. The total performance score ranged from 19 to 95. A higher score of performance regarding care for patients with mild TBI indicates high family caregiver's performance.

Validity and Reliability of the instruments

The content validity including intervention program, the Perceived Confidence Questionnaire, the Performance Questionnaire, teaching plan, and booklet were validated by three experts, namely neurosurgeon, APN of neurosurgical intensive care and a lecturer who was expert in TBI, Thailand. The recommendations from all experts were used to modify the instruments. All of the instruments had a good content validity.

The test retest reliability for the RPCSQ assessed with Kappa coefficient was five symptoms in a very good level (noisy, restless, frustrated, and difficulty in thinking), six symptoms in a good level (poor concentration, difficulty in remembering, sleep disturbance, fatigue, and light sensitivity), two symptoms in a moderate level (blurred vision and double vision), two symptoms in a slight level (headache and nausea), and one symptom (anger) could not be tested because of no value ability. The reliability coefficient of the PCQ and PQ were .96 and .68 which was considered as reliable for a newly developed instrument (25).

Intervention

This program consisted of two phases, over two weeks. Phase 1, education session took a few days before discharge to improve their competencies in caring for patient with mild TBI. Various methods of education were used after 1) exploring feeling; 2) teaching about definition of mild TBI, warning sign and symptoms, symptom assessment, symptom management, and symptom evaluation; 3) demonstration and re-demonstration the assessment of symptom using symptom checklist; 4) watching video for managing symptoms: neck stretching, sleep position, and vestibular exercise; 5) providing mild TBI booklet. This session will take time about 60 minutes. Then follow the other steps by 6) assessing the

perceived confidence and performance in caring for patient with mild TBI, 7) providing information related to family caregivers' concern, 8) giving reinforcement for any successful of family caregiver 9) evaluating the family caregivers' performance related to symptom assessment, symptom management, and symptom evaluation using the PCQ (on discharge) and PQ (after discharge), with 10) giving a support to increase family caregivers' performance in caring for patients with mild TBI. Phase 2, support caring by follow up in the second week after discharge, in this session, steps 6-10 were repeated by phone.

Data Analysis

Descriptive statistics, Chi-squares, Fisher's exact test, independent t-test were used to analyze the data based on the assumptions of each statistic. The dependent t-test was used to test the mean score differences of perceived confidence within group, while the independent t-test was used to test the mean differences of perceived confidence between groups. The performance in caring for patients with mild TBI of both the control group and the experimental group did not meet the assumptions, thus Wilcoxon Signed Rank test was used to compare the difference of performance scores within the experimental group, while Mann-Whitney U test was used to compare the difference between groups.

Results

Demographic Characteristics of Family Caregivers

There were no statistical differences in the demographic characteristics between the two groups (table 1). patient's demographic data in both the experimental and control group demonstrated no statistical differences in terms of age, gender, education, occupation including patients' clinical characteristics.

Table 1 Frequencies and Percentages of Family Caregivers' Characteristics of the Control and the Experimental Group (N =50)

Characteristics	Control Group (n = 25)		Experimental Group (n = 25)		Total		Statistics	p
	n	%	n	%	n	%		
Age (Min-Max = 20-69)	MD (SD)		MD (SD)				2.95 ^a	.23
	38.76 (10.30)		43.96 (14.27)					
20-40	15	60	9	36	24	48		
41-60	9	36	14	56	23	46		
>60	1	4	2	8	3	6		
Gender							0.33 ^b	.56
Female	16	64	14	56	30	60		
Male	9	36	11	44	20	40		
Marital Status							2.11 ^a	.35
Married	22	88	19	76	41	82		
Single	3	12	5	20	8	16		
Widowed			1	4	1	2		
Religion							1.02 ^c	1.00
Moslem	25	100	24	96	49	98		
Christian			1	4	1	2		
Education Level							9.26 ^a	.10
Primary School	9	36	12	48	21	42		
Secondary School	13	52	8	32	21	42		
College/university	3	12	5	20	8	16		
Occupation							3.62 ^a	.46
No occupation	7	28	9	36	16	32		
Had occupation	18	72	16	64	34	68		
- Government officer								
- Laborer	1	4	3	12	4	8		
- Farmer	10	40	8	32	18	36		
	7	28	5	20	12	24		
Relationship							8.64 ^a	.20
Spouse	9	36	11	44	20	40		
Parent	3	12	7	28	10	20		
Child	7	28	4	16	11	22		
Other relative	6	24	3	12	9	18		

Note. ^a = Likelihood ratio test, ^b = Chi-square test, ^c = Fisher's exact test.

Table 2 shows that the causes of injury in both groups were mainly from motorcycle accidents. Almost all subjects had a GCS on admission at 15. With regards to the CT scan, subjects predominantly had a cerebral edema. More than half of the subjects in both groups were hospitalized from 4 days up to 6 days. Regarding the patients' symptoms at discharge, the majority of the subjects in both groups had symptoms (92%) especially with headache. There were no statistical differences in the clinical characteristics between the two groups.

Table 2 *Frequencies and Percentages of Patients' Clinical Characteristics of the Control Group and the Experimental Group (N = 50)*

Characteristics	Control Group (n = 25)		Experimental Group (n = 25)		Total		Statistics	p
	n	%	n	%	n	%		
Cause of injury							4.86 ^a	.18
Bicycle accident	1	4	2	8	3	6		
Motorcycle accident	24	96	20	80	44	88		
Falling injury			2	8	2	4		
Other			1	4	1	2		
GCS Score							2.87 ^a	.24
13	1	4			1	2		
14	1	4			1	2		
15	23	92	25	100	48	96		
CT Scan							1.62 ^a	.66
Normal	11	44	10	40	21	42		
Cerebral edema	12	48	10	40	22	44		
SDH/EDH	1	4	3	12	4	8		
Extracranial hematoma								
Other injuries	1	4	2	8	3	6		
Yes							.00 ^b	1.00
No	4	16	4	16	8	16		
Hospitalization (min-max 3 – 14 days)	21	84	21	84	42	84	1.06 ^a	.59
1-3 days								
4-6 days	4	16	2	8	6	12		
≥7 days	13	52	16	64	29	58		
Symptoms at discharge	8	32	7	28	15	30		
No symptom							.61 ^b	.31
Had symptom	1	4	3	12	4	8		
	24	96	22	88	46	92		

Note. ^a= Likelihood ratio test, ^b= Fisher's exact test; SDH = subdural hematoma, EDH = epidural hematoma.

Effect of a Self-Efficacy Enhancing Education Program

Family caregivers' perceived confidence in caring for patients between groups.

At baseline, no significant difference of perceived confidence between the control group and the experimental group was found (Table 3). After receiving a self-efficacy enhancing education program, the mean score of perceived confidence in the experimental group was significantly higher than that of the control group ($t = 8.30, p < .05$).

Table 3 Comparison of the Perceived Confidence Scores in Caring for Patients with Mild TBI between Two Groups before Intervention (N = 50)

Variable	Control Group (n = 25)		Experimental Group (n = 25)		t	p
	M	SD	M	SD		
Perceived confidence						
Baseline	51.24	10.76	57.60	16.62	1.61	.12
Post-test	52.96	13.60	80.68	9.67	8.30	.00

Family caregivers' performance in caring for patients with mild TBI between groups.

Mann-Whitney U test was used to examine the difference of performance between groups. It was found that the performance in the experimental group was higher than that in the control group ($U = .00, p < .05$).

Table 4 Comparison of the Performance Scores in Caring for Patients with Mild TBI in the Second Week between Two Groups (N = 50)

Performance	Control Group (n = 25)		Experimental Group (n = 25)		U	p
	MR (SR)	MR (SR)	MR (SR)	MR (SR)		
Second week	13.00 (325.00)	38.00 (950.00)			0.00	0.00

Note. MR = mean rank, SR = sum of rank.

Regarding to the patient's symptoms before discharge, it was shown that the majority of patients' symptoms in both groups were headaches. Three symptoms remained after discharge during the first week and the second week in the control group, namely headache, dizziness, and fatigue. However, only one case reported of headache (4%) after discharge in the first week and was disappeared in the second week.

Table 5 Frequencies and Percentages of Patients' Symptoms at Different Time Points (Before Discharge, in the First Week and the Second Week after Discharge) in the Control and the Experimental Group (N = 50)

Symptoms	Control Group (n = 25)		Experimental Group (n = 25)	
	n	%	n	%
Before discharge				
Mild TBI symptoms*				
No symptom	5	20	10	40
Headache	18	72	13	52
Dizziness	17	68	13	52
Fatigue	8	32	4	16
First week after discharge				
Mild TBI symptoms*				
- No symptom	7	28	24	96
- Headache	14	56	1	4

- Dizziness	11	44	-	-
- Fatigue	8	32	-	-
Second week after discharge*				
Mild TBI symptoms*				
- No symptom	8	32	25	100
- Headache	12	48	-	-
- Dizziness	9	36	-	-
- Fatigue	4	16	-	-

Note. * = one patient had more than one symptom.

Discussion

Results suggest the self-efficacy enhancing education program may have contributed to a change in the family's competencies in terms of perceived confidence and performance. The experimental group demonstrated a significant improvement of competency scores after participating in the self-efficacy enhancing education program. There are several strategies included based on four sources of self-efficacy (Bandura, 1997)) which include enactive mastery experiences, vicarious experience, verbal persuasion, and physiological states

The educational session with individual approach can help family caregivers more focused and they felt to more confident. This is similar to a previous study (Utami, 2012) conducted an individualized education program for family caregivers caring for mild TBI patients in the emergency department. Additionally, this program was provided earlier or the day before discharged patients from hospital. It was a sufficient time to prepare family caregivers to be ready in caring for patients before discharge (Utami, 2012). Moreover, the content of this educational session focused on the definition of mild TBI, following symptoms of mild TBI, symptoms assessment, symptoms management, and symptoms evaluation which were also included in the booklet. These contents provided the basic knowledge to the family caregivers related to the mild TBI. This is congruent with the prior findings that knowledge is one factor that can strengthen of self-efficacy (Glanz, Rimer, & Vismanath, 2008). The booklet was very helpful for caregivers to understand about caring for patients with TBI and it helped to alleviate some of the anxiety experienced in the early stages of head injury (Morris,

2001).

The follow up telephone calls after discharge could help family caregivers to feel more competent. This activity aimed to encourage and remind the family caregivers about caring for patients with mild TBI. It encouraged the family caregivers to talk about success in their practice, and asked the family caregivers to report and repeat what they learned at hospital about caring for patients with mild TBI. In addition, it gave an opportunity for them to express their feelings and felt more confident in caring for mild TBI patients. Moreover, the family caregivers were provided time for consultation related to their worries or concerns. As their confidence increased, subjects became more competence in practice which reflected by their performance in caring for mild TBI patients after discharge.

In the second follow-up, some family caregivers had problems related to their caring for patients such as they were busy with their work and sometime forgot to care for the patients. It is partly because patients had no symptom and was unnecessary to perform. However, they were encouraged to monitor patients and providing information related to significant of symptom recognition and management. Under the Bandura's theory, verbal persuasion may be another source of continued self-efficacy development. Hence, a follow-up activity is one way to help family caregivers to enhance their confidence in caring for their patients (Srijumnong, 2010) and to monitor and help family caregivers in their performance directly to the patients (Kouri et al., 2011). As a result, they could be successful in their performance.

However, the family caregivers' performance was measured using telephone calls, which could make the response bias because the performance in caring for patients with mild TBI was reported verbally by family caregivers and it was not observed directly. This limitation could influence the findings. Therefore, the researcher followed-up twice to monitor the family caregivers' performance in caring for patients with mild TBI at home and

encouraged caring activities during the follow-up as mentioned above. According to Bandura (1997), self-efficacy is fundamental to competent performance. Therefore, people with high self-efficacy will positively affect performance (Bandura, 1982; Kouri et al., 2011).

Although family caregivers' performance in the experimental group was increased after discharge at the first week, the result found that the performance at the second week was decreased as compared to the first week except some domains of caring were remained in terms of assessing warning signs and managing headaches. Moreover, family caregivers still performed activities in caring for patients but performed less. This is partly due to most symptoms were disappeared and unrecognized to detect or required further management. According to the previous study, it was reported that the number of patients' symptoms was related to the amount of care (Anderson, Parmenter, & Mok, 2002). In addition, daily assessment and monitoring would allow them to perform after phone calls. Due to more than half of family caregivers in this study (64%) were employed, family caregivers who had working may influence in their caregiving roles (Wang, Shyu, Chen, & Yang, 2010). Moreover, family caregivers with mild and moderate brain injury were more likely to work outside and needed less supervision (Sheedy, Harvey, Faux, Geffen, & Shores, 2009).

Conclusions

In conclusion, a self-efficacy enhancing education program could be an effective intervention for improving the family caregivers' perceived confidence and performance in caring for patients with mild TBI. Although, the family caregivers' performance score within the experimental group was decrease in the second week, these performance scores were significantly higher than those in the control group. The results of this study did not only offer benefits to family caregivers, but also gave benefits to the mild TBI patients through their

active participation in caregiving. Therefore, a self-efficacy enhancing education program could be used as part of discharge preparedness to enhance family caregivers in providing care for patients with mild TBI. However, this study has limitations which need to be addressed. The sample was small if compared to the mild TBI population in Indonesia, recruited from only two referral hospitals at Yogyakarta province. The results may not be generalized to those who were not admitted and lived in other areas. Another limitation was about lack of random assignment which could threaten the internal validity. The follow-up using telephone calls only may not reflect the real action due to lack of observation and it could make the measurement bias. Further research is needed to use random assignment to minimize the selection bias. Additionally, it is required to develop an alternative education program within a shorter time period (less than one hour), in group education instead individualized education, and use other interactive media in the education program. Subsequently, perceived confidence must be continuously measured with performance in the following week after discharge to ensure the effectiveness of the program.

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