CHAPTER 4

FINDINGS AND DICUSSION

This chapter presents the results of data analysis and the discussion of study findings in three sections. The first section is a description of the sample and study variables. The second section are the results of model testing and research hypothesis testing, and descriptive statistics of major study variables. The last section presents the discussion of the study findings.

Description of the Sample

Demographic and Clinical Characteristics

The sample of this study was 121 adolescents with epilepsy. Thirty-four subjects were from Ramathibodi Hospital, 32 subjects were from Prasat Neurological Institute, 31 subjects were from Phramongkutklao Hospital, and 24 subjects were from King Chulalongkorn Memorial Hospital. The demographic and clinical characteristics of the sample are shown in Tables 1 and 2.

Table 1

Demographic characteristics of the sample (n = 121)

Items	Mean ± SD	Number	Percent
Gender			
Male		57	47.1
Female		64	52.9
Age (years) (Range = 14-21)	17.52 ± 2.32		
14-17		63	52.1
18-21		58	47.9
Educational background			
Primary school		3	2.5
Secondary school		78	64.5
Vocational college		21	17.3
University		19	15.7
Occupation			
Student		106	87.6
Unemployed		7	5.8
Employee		5	4.1
Merchant		3	2.5

Table 1 (continued)

Items	Mean ± SD	Number	Percent
Family income (baht per month)	30,798.68 ± 25,908.07		
Range = 3000-100,000; Median = 23,000; Q1 = 12,000; Q3 = 40,000			
Less than 10,000		26	21.5
10,001-20,000		34	28.1
20,001-30,000		24	19.8
30,001-40,000		12	9.9
40,001-50,000		7	5.8
50,001-60,000		4	3.3
60,001-70,000		3	2.5
More than 70,000		11	9.1
Living arrangement			
Living with father and/or mother		106	87.6
Living with friends (in school dormitory)		8	6.6
Living with relatives		5	4.1
Live with siblings		1	0.8
Living with husband		1	0.8

Note. Average monthly household income of Thai people in 2004 = 14,963 Baht/month. From National Statistical Office, 2005.

As for gender, 52.9% of the subjects of this study were female, while 47.1% were male. The age ranged from 14 to 21 years, with a mean of 17.52 years (SD = 2.33). Among these individuals, 52.1% were in their middle adolescence and 47.9% were in their late adolescence. The majority of the subjects (87.6%) were students, and about two-thirds (64.5%) were studying in a secondary school. As for family income, their income ranged from 3,000 to 100,000 baht/month, with a median of 23,000 baht/month and Quartile 1 (25%) = 12,000 baht/month; Quartile 3 (75%) = 40,000 baht/month. Finally, most of the subjects (87.6%) lived with their father and/or mother.

Table 2

Clinical characteristics of the sample (n = 121)

Items	Mean ± SD	Number	Percent
Seizure frequency			
Seizure free		35	28.9
Seizure free for 1 year		14	40.0
Seizure free for 2 years		9	25.7
Seizure free for 3 years		7	20.0
Seizure free for more than 3 years		5	14.3
1-5 times/year		50	41.3
6-10 times/year		9	7.4
More than 10 times/year		6	5.0
Every month in the last 6 months		21	17.4
Duration of illness (Years) (Range = 1-19)	7.3 ± 4.69		
1-5 years		43	35.5
6-10 years		48	39.7
11-15 years		19	15.7
16-20 years		11	9.1

Table 2 (continued)

Items	Mean ± SD	Number	Percent
Seizure type[a]			
Generalized seizures			
Tonic-Clonic seizures(1° and 2°)		60	49.6
Tonic		12	9.9
Myoclonic		8	6.6
Absence		1	0.8
Clonic		1	0.8
Atonic		1	0.8
Partial Seizures			
Complex partial seizures		31	25.6
Simple partial seizures		3	2.5
Secondary generalized seizure		1	0.8
Unclassified seizure		27	22.3

Table 2 (continued)

Items	Mean ± SD	Number	Percent
Number of anti-epileptic drugs (AEDs)			
A single AED		72	59.5
Dilantin		22	30.6
Tegretol		21	29.2
Depakene		19	26.4
Phenobarb		5	6.9
Trileptal		1	1.4
N.A.[b]		4	5.5
Two AEDs		32	26.4
More than two AEDs		17	14.0
Source of information about epilepsy[c]			
Physicians		111	91.7
Pamphlets		84	69.4
Parents		70	57.9
Nurses		38	31.4
Other persons with epilepsy		35	28.9
Internet		26	21.5
Books		4	3.3
No source		2	1.7

[a]One person may have more than one type. [b]Not available data. [c]One person could give more than one answer.

With regard to the clinical characteristics shown in Table 4, the largest group of the subjects (41.3%) had seizures one to five times per year. Duration of illness ranged from one to 19.4 years with the mean of 7.3 years (SD = 4.69). Moreover, nearly half of the subjects (49.6 %) had generalized tonic-clonic seizures, and approximately one-quarter (25.6%) of those had complex partial seizures. In addition, 59.5 % of the subjects received a single anti-epileptic drug. Finally, almost all subjects (91.7%) received information about epilepsy from physicians, and around one-third (31.4%) from nurses.

Model Testing

Hypothesized Model Testing

The results of hypothesized model testing are displayed in Figure 3. The standardized coefficient (β) was used as an estimate of the effect magnitude.

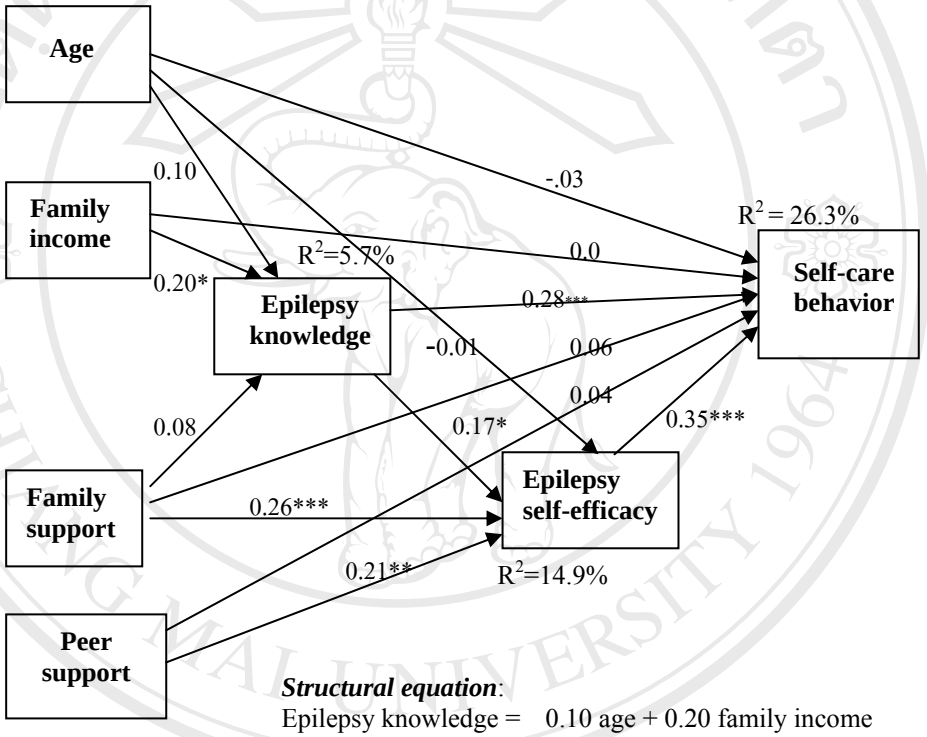

Figure 3. The hypothesized model of self-care behavior for adolescents with epilepsy

Note. Goodness of fit indexes (robust): S-B χ^2 = 37.14, df = 9, p < 0.00; NNFI = 0.23; CFI = 0.67; RMSEA = 0.16.

*p < .05. ** p < .01. *** p < .001.

The findings revealed that six paths in the initial model had statistical significance. However, the goodness of fit indices showed that the S-B χ^2 was statistically significant (χ^2 = 37.14; df = 9; p = .00002). Moreover, NNFI (0.23) and CFI (0.67) were not within the acceptable value. RMSEA (0.16) exceeded the recommended value of 0.05. These results indicated that the model definitely did not fit the data. Therefore, the initial model was modified to improve the fit.

Model Modification

Since the initial hypothesized model did not fit the data, it was modified based on Lagrange Multiplier (LM) Test for adding some free parameters and Wald Test for deleting some free parameters, together with theoretical reasoning.

The LM test suggested adding the path between family support and peer support. For adding parameters, a substantive theory is very important because the LM test can suggest model changes that are theoretically meaningless (Bentler, 1995). The literature to support the causal relationship between family support and peer support was not found. Therefore, this path was considered as a covariate, or a correlation between exogenous variables. After adding this relationship, the revised model had better fit than the initial model. The S-B χ^2 was 11.47 (df = 7) with the p-value of 0.12. NNFI and CFI were 0.84 and 0.95, respectively, while RMSEA was 0.07. The fit indices indicated the second model still did not fit the data well. A lot of modifications of the model were made to achieve the best model. The final model, which was the best model, is shown in Figure 4.

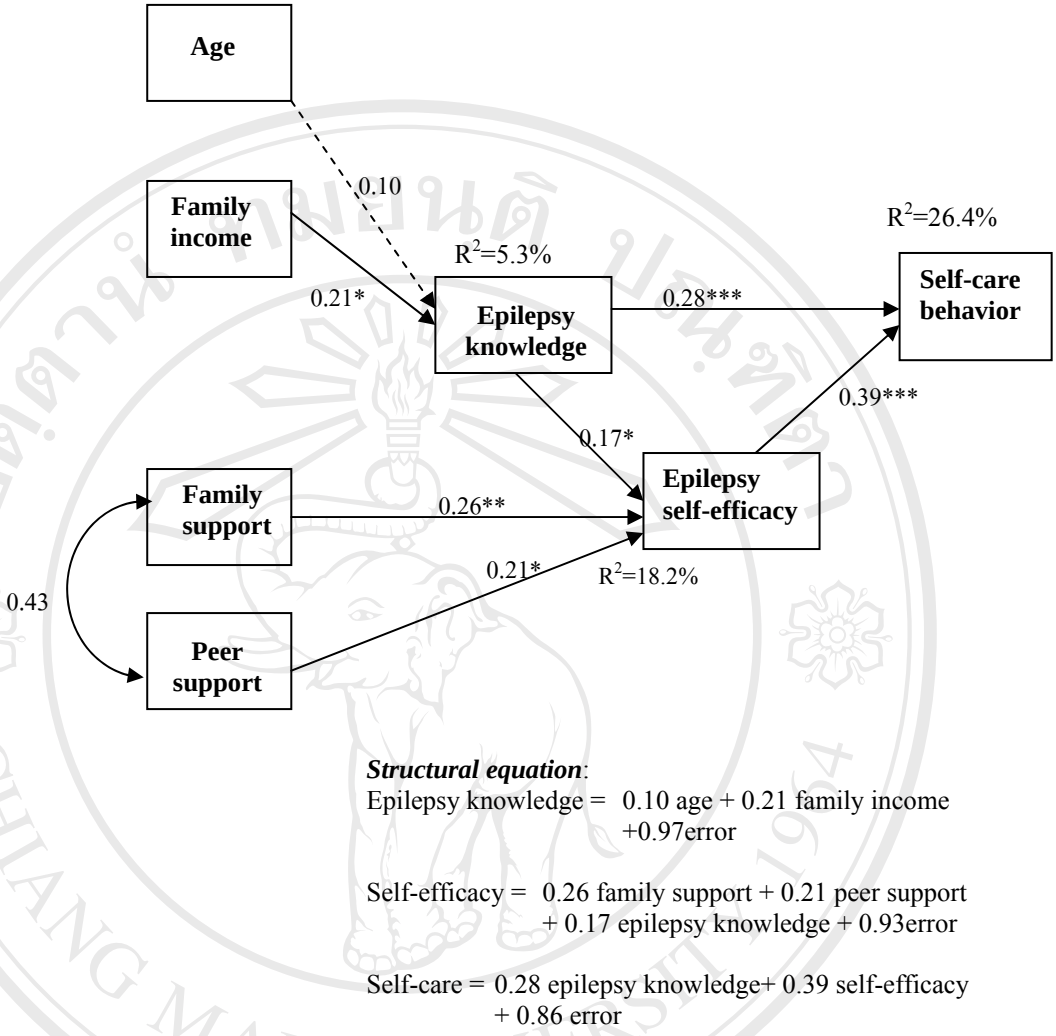

Figure 4. The final model of self-care behavior for adolescents with epilepsy

Note. Goodness of fit indexes (robust): S-B χ^2 = 13.79, df = 13, p = 0.39; NNFI = 0.99; CFI = 0.99; RMSEA = 0.02.

*p <.05. ** p < .01. *** p < .001.

The final model was comprised of five significant predictor variables (or causal variables) that affect self-care behavior. Those predictor variables were family income, family support, peer support, epilepsy knowledge, and epilepsy self-efficacy.

Six non-significant paths were dropped from the final model based on the suggestion by the Wald Test. Those non-significant paths were paths between:

(1) Age and epilepsy self-efficacy,

(2) Age and self-care behavior,

(3) Family income and epilepsy self-efficacy,

(4) Family support and epilepsy knowledge,

(5) Family support and self-care behavior, and

(6) Peer support and self-care behavior.

However, one non-significant path—the path from age to epilepsy knowledge—was retained in the model because of substantive interest and the expected direction proposed by the model. Schumacker and Lomax (1996) suggested that although a path coefficient is statistically non-significant, if it is a sufficient substantive interest it should probably remain in the model.

The six significant paths which were retained in the final model were paths between:

(1) Family income and epilepsy knowledge,

(2) Family support and epilepsy self-efficacy,

(3) Peer support and epilepsy self-efficacy,

(4) Epilepsy knowledge and epilepsy self-efficacy,

(5) Epilepsy knowledge and self-care behavior, and

(6) Epilepsy self-efficacy and self-care behavior.

The final model fits the data very well with non-significant S-B χ^2 of 13.79 (df = 13, p-value = 0.39), a NNFI value of 0.99, a CFI value of 0.99, and a RMSEA value of 0.02. Family income accounted for 5.3% of variance in epilepsy knowledge. Family support and peer support accounted for 18.2% of variance in epilepsy self-efficacy. Epilepsy knowledge and epilepsy self-efficacy accounted for 26.4% of variance in self-care behavior. The fit indices of the initial hypothesized model and the final model are compared in Table 3.

Table 3

Comparison of the goodness of fit between the initial hypothesized model and the modified model (n = 121)

Goodness of fit indices	Acceptable fit index value	Initial hypothesized model	Final modified model
Satorra-Bentler scaled Chi-square (S-B χ^2)		37.14	13.78
Degrees of freedom		9	13
P value	> 0.05	.00002	0.39
Bentler-Bonett non-normed fit index (NNFI)	> 0.90	0.23	0.99
Comparative fit index (CFI)	> 0.90	0.67	0.99
Root mean-square error of approximation (RMSEA)	< 0.05	0.16	0.02

The direct, indirect, and total effects of predictor variables on the outcome variables in the final model are displayed in Table 4.

Table 4

The direct, indirect, and total effects in the final model

Causal variable	Outcome variable								
	Epilepsy knowledge			Epilepsy self-efficacy			Self-care behavior		
	DE	IE	TE	DE	IE	TE	DE	IE	TE
Age	0.10		0.10		0.02	0.02		0.03	0.03
Family income	0.21*		0.21*		0.04	0.04		0.07*	0.07*
Family support				0.26**		0.26**		0.10**	0.10**
Peer support				0.21*		0.21*		0.08*	0.08*
Epilepsy knowledge				0.17*		0.17*	0.28***	0.07	0.35***
Epilepsy self-efficacy							0.39***		0.39***
R^2	5.3%			18.2%			26.4%		

*p <.05. ** p < .01. *** p < .001.

The Results of Hypotheses Testing

Hypothesis 1: Age Has a Positive Direct Effect on Epilepsy Knowledge

This hypothesis was not supported. The statistical analysis indicated that age had a small positive direct effect on epilepsy knowledge, but its statistical test was not significant ($\beta = 0.10$, $p > 0.05$).

Hypothesis 2: Age Has a Positive Direct Effect on Epilepsy Self-Efficacy

Hypothesis two was not supported. The findings indicated that age did not have a positive direct effect on epilepsy self-efficacy.

Hypothesis 3: Age Has a Positive Direct Effect on Self-Care Behavior

Hypothesis three was not supported. There was no statistically significant direct effect of age on self-care behavior.

Hypothesis 4: Family Income Has a Positive Direct Effect on Epilepsy Knowledge

Hypothesis four was supported. The findings revealed that family income had a positive direct effect on epilepsy knowledge ($\beta = 0.21$, $p < 0.05$). The total effect of 0.21 meant that every one unit increase in family income corresponded with a 0.21 unit increase in epilepsy knowledge.

Hypothesis 5: Family Income Has a Positive Direct Effect on Self-Care Behavior

The findings did not support this hypothesis; however, the analysis indicated that family income had a positive indirect effect on self-care behavior through epilepsy knowledge ($\beta = 0.07$, $p < 0.05$). The total effect (0.07) reflected that every one unit of change in family income produced 0.07 unit of change in self-care behavior.

Hypothesis 6: Family Support Has a Positive Direct Effect on Epilepsy Self-Knowledge

This hypothesis was not supported. Family support did not have a positive direct effect on epilepsy self-knowledge.

Hypothesis 7: Family Support Has a Positive Direct Effect on Epilepsy Self-Efficacy

This hypothesis was supported. The parameter estimated results showed that family support had a positive direct effect on epilepsy self-efficacy ($\beta = 0.26$, $p < 0.05$). The total effect of 0.26 indicated that every time family support increased by one unit, epilepsy self-efficacy increased by 0.26 units.

Hypothesis 8: Family Support Has a Positive Direct Effect on Self-Care Behavior

The findings did not support this hypothesis, but family support had an indirect effect on self-care behavior via epilepsy self-efficacy ($\beta = 0.10$, $p < 0 .01$). The total effect (0.10) meant that every one unit of change in family support was associated with a 0.10 unit of change in self-care behavior.

Hypothesis 9: Peer Support Has a Positive Direct Effect on Epilepsy Self-Efficacy

Hypothesis 9 was supported. The results showed that peer support had a positive direct effect on epilepsy self-efficacy ($\beta = 0.21$, $p < 0.05$). The total effect of 0.21 meant that every that every time peer support increased by one unit, epilepsy self-efficacy increased by 0.21 units.

Hypothesis 10: Peer Support Has a Positive Direct Effect on Self-Care Behavior

This hypothesis was not supported. A significant direct effect of peer support on self-care behavior was not found, but a significant indirect effect through epilepsy self-efficacy ($\beta = 0.08$, $p < 0.05$) was found. The total effect of 0.08 indicated that every one unit increase in peer support corresponded with a 0.08 unit increase in self-care behavior.

Hypothesis 11: Epilepsy Knowledge Has a Positive Direct Effect on Epilepsy Self-Efficacy

Hypothesis 11 was supported. The findings revealed that epilepsy knowledge had a positive direct effect on epilepsy self-efficacy ($\beta = 0.17$, $p < 0.05$). The total effect was 0.17, indicating that every one unit increase in epilepsy knowledge corresponded with a 0.17 unit increase in epilepsy self-efficacy.

Hypothesis 12: Epilepsy Knowledge Has a Positive Direct Effect on Self-Care Behavior

This hypothesis was supported. The findings showed that epilepsy knowledge had a positive direct effect on self-care behavior ($\beta = 0.28$, $p < 0.001$).

The total effect of 0.34 indicated that every one unit increase in epilepsy knowledge corresponded with a 0.34 unit increase in self-care behavior.

Hypothesis 13: Epilepsy Self-Efficacy Has a Positive Direct Effect on Self-Care Behavior

The last hypothesis was supported. The analysis showed that epilepsy self-efficacy had a positive direct effect on self-care behavior ($\beta = 0.39$, $p < 0.001$). The total effect was 0.39, suggesting that every time epilepsy self-efficacy increased by one unit, self-care behavior improved by 0.39 units.

In conclusion, from a total of 13 hypotheses, six hypotheses were supported: (1) Family income directly affects epilepsy knowledge, (2) family support directly affects epilepsy self-efficacy, (3) peer support directly affects epilepsy self-efficacy, (4) epilepsy knowledge directly affects epilepsy self-efficacy, (5) epilepsy knowledge directly affects self-care behavior, and (6) self-efficacy directly affects self-care behavior. Although the rest of hypotheses were not supported, two indirect effects were found: the indirect effect of family income on self-care behavior through epilepsy knowledge, and the indirect effect of family support and peer support on self-care behavior through epilepsy self-efficacy.

Descriptive Statistics of Four Major Study Variables

Descriptive statistics for peer support, family support, epilepsy self-efficacy, epilepsy knowledge, and self-care behavior among 121 adolescents with epilepsy are presented in Table 5.

Table 5

Descriptive statistics for family support, peer support, epilepsy self-efficacy, epilepsy knowledge, and self-care behavior (n = 121)

Variables	Possible score	Obtained score	Mean	SD
Family support	0-20	2-20	16.21	3.56
Peer support	0-20	4-20	15.67	3.56
Epilepsy self-efficacy	15-75	23-74	55.49	10.12
Epilepsy knowledge	0-20	3-20	12.00	3.10
Self-care behavior	18-90	49-87	73.03	7.73

The level of family support, peer support, epilepsy self-efficacy, epilepsy knowledge, and self-care behavior are shown in Table 6.

Table 6

Level of family support, peer support, epilepsy self-efficacy, epilepsy knowledge, and self-care behavior (n=121)

Variables	Low	Moderate	High
	N (Percent)	N (Percent)	N (Percent)
Family support	3 (2.5 %)	17 (14 %)	101 (83.5 %)
Peer support	2 (1.7 %)	28 (23.1%)	91 (75.2 %)
Epilepsy self-efficacy	4 (3.3 %)	50 (41.3 %)	67 (55.4 %)
Epilepsy knowledge	6 (5)	72 (59.5 %)	43 (35.5 %)
Self-care behavior	-	23 (19 %)	98 (81 %)

The scores of family support ranged from 2 to 20, with the mean of 16.21 (SD = 3.56). Most subjects (83.5%) had a high level of family support. Regarding peer support, the scores ranged from 4 to 20 and the mean score was 15.67 (SD = 3.39). Most subjects (75.2%) perceived a high level of peer support. As for the epilepsy self-efficacy, the scores ranged from 23-74 with the mean score of 55.49 (SD = 10.12). Fifty-five percents of subject had epilepsy self-efficacy at a high level, while 41 percents of subjects had epilepsy self-efficacy at a moderate level. The mean score of epilepsy knowledge was 12.00 (SD = 3.10) with a range of 3 to 20. Most adolescents (59.5%) had epilepsy knowledge at a moderate level. Finally, as regards

self-care behavior, the scores ranged from 49 to 87, with the mean score of 73.03 (SD = 7.73). The majority of the subjects (81%) took care of themselves well.

Discussion of Findings

Hypothesis Testing

Hypothesis One: The effect of age on epilepsy knowledge. The finding showed that age had a very weak and positive direct effect on epilepsy knowledge, but the statistical test did not reach a significant level. This implied that older adolescents did not have more knowledge than younger adolescents. The possible explanation is that both older and younger adolescents may receive the same amount of information about epilepsy. Seventy percent of adolescents in this study reported that they received information about epilepsy from pamphlets (See Table 2). Each adolescent may read the same pamphlets because almost all pamphlets in epilepsy clinic are provided by the same institute, the Epilepsy Society of Thailand. In addition, the information that was provided by physicians, pamphlets, parents or nurses for those adolescents was not complex (e.g, taking drug, avoiding precipitating factors, etc.). Older and younger adolescents with epilepsy can understand the information at the same level. Therefore, the increasing age between 14 to 21 years did not result in more knowledge.

It is worth noting that although the relationship between age and knowledge in this study was not significant, a weak positive direct effect may indicate that knowledge has a tendency to increase as the age increases.

Hypothesis Two: The effect of age on epilepsy self-efficacy. Contrary to the hypothesis, age had no direct influence on epilepsy self-efficacy. This means that adolescents with epilepsy who were of different age did not have different epilepsy self-efficacy. According to Bandura (1997), one source of self-efficacy is a successful past experience of a person. Age is not an indicator of successful experience. Even though adolescents have different age, they may not have different mastery of experience to manage seizure. Therefore, increasing age did not affect self-efficacy.

Hypothesis Three: The effect of age on self-care behavior. The results showed that age did not affect self-care behavior in adolescents with epilepsy. It means that difference in age among adolescents with epilepsy did not cause a difference in self-care behavior. This may be due to the narrow age range of the sample. According to Orem (2001), performing self-care behavior requires the ability to estimate the condition, judge a problem, and decide to select the kinds of self-care behavior. When age increases from children to adults, individuals will gained more of these abilities. However, the sample in this study are adolescents aged 14 to 21 years. With the narrow range of age group, their competencies to perform self-care behavior might be not different. Therefore, their self-care behavior was not different.

Another explanation is that some factors may have intervened with the effect of age on self-care behavior such as duration of illness and age onset of epilepsy. However, data analysis found that duration of illness and age onset of seizure did not influence self-care behavior (See Table O1).

The finding was congruent with those of a previous study by Niyomkar (2001) which revealed that age was not related to health behavior among adolescents with epilepsy. However, this result was in contrast to a study which was conducted in persons with epilepsy aged 18-67 years. In that study, age had a positive relationship with epilepsy self-management and could explain 7.2% of variance in self-management (Dilorio et al., 1994). It is noteworthy that there was a long range of age in that study which may have yielded the difference in self-care behavior.

In the presents study, age range of the sample is narrow; it cannot predict knowledge, epilepsy self-efficacy, as well as self-care behavior. To confirm the relationship of age on self-care behavior, further study should include the subjects who come from different age groups.

Hypothesis Four: The effect of family income on epilepsy knowledge. As predicted, family income had a significant positive direct effect on epilepsy knowledge. This meant that the difference in family income led to a difference in epilepsy knowledge. The positive effect indicated that the higher family income, the more epilepsy knowledge the adolescents had.

It is known that money is an important resource which can be used to gain access to information. Even though 92% of adolescents in this study received knowledge from physicians during their visits to the epilepsy clinic (See Table 2), those who had a high family income would have more chances and better networks to access information from various resources.

Hypothesis Five: The effect of family income on self-care behavior. Family income was found to have no direct effect on self-care behavior. It could be explained that the majority of the subjects (78.5%) had a family income more than

10,000 baht per month which indicated a fair economic status (See Table 1). Additionally, a current health policy of the 30-baht health insurance scheme and the reimbursement of new anti-epileptic drugs cover persons with epilepsy. This means that low-income families can now access health services and do not have to pay a lot of money for epileptic treatment. As a consequence, both adolescents with a high family income and those with a low family income did not lack anti-epileptic drugs, and they can take the drugs and visit the epilepsy clinic regularly. Therefore, financial status did not directly affect self-care behavior.

This finding was consistent with those of previous studies which found that family income was not associated with either health behavior among adolescent with epilepsy (Niyumkar, 2001) or self-care capabilities in school-aged children with epilepsy (Sooktip, 2002). In those two studies, a great number of subjects had adequate family income, and the families that had financial problems could ask a social worker for help, according to the health policy at that time.

The result of the current study was different from that of a study conducted two decades ago, which depicted a positive relationship between the economic status and self-care performance in persons with epilepsy (Maskasame, 1985). The discrepancy of the findings may possibly be due to the characteristics of population, such as economic status which was more varied and rather low in that previous study, as well as the changes in the health services available to the public.

Although family income did not directly affect self-care behavior, family income indirectly affected self-care behavior through epilepsy knowledge. That is, adolescents with epilepsy who have a high family income may have more knowledge. Consequently, they can perform better self-care behavior. This finding suggested that

knowledge is a mediator between self-care behavior and family income. Only family income alone, without knowledge, is not enough to change self-care behavior. This hypothesis supported the self-care deficit nursing theory.

Hypothesis Six: The effect of family support on epilepsy knowledge. Contrary to the expectation, family support did not influence epilepsy knowledge, although 60% of the adolescents reported that they received epilepsy information from their parents (See Table 2). It is noteworthy that if the parents have enough epilepsy knowledge and high education level, they could provide sufficient knowledge to the adolescents. However, the data about the epilepsy knowledge and the educational level of the parents were not available in this study. This suggested the need for further studies to explore this issue more in detail.

Hypotheses Seven and Eight: The effect of family support and peer support on epilepsy self-efficacy. As hypothesized, family support and peer support had a positive direct effect on epilepsy self-efficacy. It indicated that increasing family support and/or peer support would enhance epilepsy self-efficacy. This result is in agreement with that of the study conducted in older adults, which also found a positive direct impact of family support and peer support on self-efficacy for health promoting self-care (Malathum, 2001).

This finding can be explained based on the self-efficacy theory. Self-efficacy can comes from verbal persuasion, and the arousing emotional states. In this study, adolescents were satisfied with support from family and friends which include helping them when they have a problem, sharing problem solving, and accepting them. These supports yield emotional support and verbal encouragement to adolescents' self-confidence. In addition, support from family and friends such as

expressing affection and responding to adolescents' feeling and spending time together will enhances positive moods, such as self-esteem and self-worth. A positive mood will increase belief in one's ability. Hence, family support and peer support increase epilepsy self-efficacy.

The findings were supported by prior studies. Three studies have shown that social support including support from family and friends is positively correlated to self-efficacy in persons with epilepsy (Amirl et al., 1999; Dilorio et al., 1992; Dilorio et al., 1994).

It is worth noting at this point that the magnitude and direction of the path coefficient between family support and epilepsy self-efficacy ($\beta = 0.26$, $p < 0.01$) was similar to that between peer support and epilepsy self-efficacy ($\beta = 0.21$, $p < 0.05$). This indicated that the degree of family support was similar to the degree of peer support in affecting epilepsy self-efficacy. In this study, family support and peer support accounted for 18.2% of the change in epilepsy self-efficacy.

Hypotheses Nine and Ten: The Effect of family support and peer support on self-care behavior. Neither family support nor peer support directly influenced self-care behavior of adolescents with epilepsy. A possible reason is that the questionnaires using in this study measured general social support from families and friends. Both questionnaires did not measure the illness-specific support. Illness-specific support refers to support that specifically focuses on helping a child or an adolescent manage a medical treatment, a treatment regimen, or the stresses associated having a medical condition (La Greca, Bearman, & Moore, 2002). This reason was supported by Dilorio et al. (1992), which found that general social support did not predict self-management behavior in persons with epilepsy. Dilorio et al.

(1994) found that epilepsy regimen-specific support, which was support related specifically to epilepsy self-care tasks, was a better predictor of self-management behavior than general social support. Kyngäs (2000) demonstrated that support from parent, which was measured by a regimen-specific support questions, improved compliance with health regimens of adolescents with epilepsy. And also, Kyngäs and Rissanen (2001) found that support from parents and support from friends were a predictor of good compliance among adolescents with chronic disease, such as epilepsy, asthma, Rheumatoid arthritis, and diabetes. In that study, support was measured by a regimen-specific support questionnaire. Moreover, the studies in diabetic patients were reported that illness-specific supports have a stronger influence on self-care behavior than general social support (Glasgow & Toobert, 1988), and general support was not a predictor of self-care behavior, whereas diabetic-specific support was a predictor of self-care behavior (Connell, Fisher, & Houston, 1992).

Even though general family support and general peer support did not directly affect self-care behavior in this study, general family and general peer support indirectly affected self-care behavior through self-efficacy. This finding sheds some light on the mechanism of the relationship between social support and self-care behavior in persons with epilepsy. Support from family and friends will strengthen adolescents with epilepsy's belief in their efficacy, which, in turn, leads to better self-care behavior. This finding revealed the mediating role of self-efficacy in explaining the effect of family and peer support on self-care behavior.

Hypothesis Eleven: The effect of epilepsy knowledge on epilepsy self-efficacy. As expected, epilepsy knowledge was found to have a positive direct effect on epilepsy self-efficacy. That is, increasing knowledge increased self-efficacy. In

other words, adolescents with epilepsy who had a high level of knowledge about epilepsy had high self-efficacy in epilepsy management. Since there is no study about the effect of knowledge on self-efficacy in adolescents with epilepsy, this result was compared with studies conducted with other groups of population. This finding was congruent with the studies which reported that knowledge of condom use positively directly affected self-efficacy for condom use (Lindberg, 2000), and that knowledge regarding osteoporosis prevention had a positive direct influence on self-efficacy for osteoporosis prevention (Piasue et al., 2002). Furthermore, there were three studies which demonstrated that health education increased self-efficacy in diabetic patients (Anderson et al., 1995; Phumleng, 2002; Plodnaimuang, 1999).

The self-efficacy theory did not posit knowledge as one source of self-efficacy, but knowledge is used in the process of judgment of one's abilities. As Bandura (1986) pointed out, behavior is mediated by a process of cognitive appraisal by which individuals integrate knowledge, outcome expectations, emotional states, social influence, and past experience to form a judgment of their abilities.

Hypothesis Twelve: The effect of epilepsy knowledge on self-care behavior. Knowledge had a positive direct effect on self-care behavior, as was hypothesized. This means that adolescents with epilepsy who had more knowledge had better self-care behavior.

The finding in this study was congruent with the integrative review and meta-analysis of self-care research, which revealed that knowledge was positively related to capabilities to perform self-care with moderate to high effect sizes (Hanucharuernkul et al., 2001). This finding was also in agreement with the study in ambulatory peritoneal dialysis patients, which showed that knowledge had a positive

relationship with self-care behavior (Duang-Pang, 1988). Additionally, this yielded support to the studies in chronic renal failure patients (Chantapet, 1993) and post cardiac valvular replacement patients (Watanasin, 1991), which reported that knowledge had a negative relationship with the deficit of self-care.

However, this study finding was inconsistent with a previous study by Hobinsen (1993), which found that epilepsy knowledge was not related to health practice among persons with epilepsy. Despite contradictory findings, it is worth noting here that Hobinsen's study had a serious limitation of involving a small sample size (40 subjects). This may have contributed to low power of statistical analysis.

According to Orem (2001), "specific knowledge and skills that have a base in medical science and technology are required for health deviation self-care" (p. 276). Knowledge regarding epilepsy helps adolescents with epilepsy understand the disease and know the means to care for self. They can use the knowledge to estimate the situations, make judgment and decision about suitable action, and then perform self-care behavior. The findings of this study have suggested that knowledge is an important factor for self-care behavior.

Hypothesis Thirteen: The effect of self-efficacy on self-care behavior. As predicted, self-efficacy had a positive, direct influence on self-care behavior. This finding was similar to previous studies, which found that self-efficacy in epilepsy had a positive direct effect on self-management in persons with epilepsy (Dilorio et al., 1992; Dilorio et al., 1994). Similar findings can be found in Niyomkar's study (2001) which reported that self-efficacy could predict health promoting behavior of adolescents with epilepsy and could explain 27.8% of the variance of heath promoting behavior. In addition, several studies have displayed a positive correlation between

self-efficacy and self-care behavior in patients with other chronic diseases (Charoenwongwiwat, 1995; Homnan, 1996; Wongsonton, 2000). Similarly, the direct effect of self-efficacy on self-care behavior was found in young adults with diabetes (Johnston et al., 2002) and Thai young women (Piasue et al., 2002).

According to Bandura (1997), self-efficacy is concerned with judgment of individuals' capabilities. It is the belief of the individuals in their capability to organize and execute the particular course of action. If individuals believe they have power to produce action, they will attempt to act. Therefore, adolescents with epilepsy who have a high level of self-efficacy will be more engaged in self-care behavior. This finding demonstrated the linkage between concept of self-efficacy from Bendura' self-efficacy theory and concept of self-care behavior from Orem' self-care deficit nursing theory.

When the magnitudes of paths between variables in the model were compared, the magnitude of the path between epilepsy self-efficacy and self-care behavior was the largest. This finding indicated that epilepsy self-efficacy was the strongest predictor of self-care behavior among adolescents with epilepsy. Therefore, epilepsy self-efficacy is the most important variable for prompting self-care behavior among adolescents with epilepsy.

In this study, only self-efficacy and epilepsy knowledge had direct effect on self-care behavior. Both variables could explain 26.4% of the variance in self-care behavior. That is, the rest, or 73.6%, of change in self-care behavior could be explained by other variables which were not included in the model. Further study should take more predictor variables into account.

Additional Data Analysis

In an attempt to gain more predictive power of the model, the researcher examined personal variables which were expected to have relationship with self-care behavior of adolescents with epilepsy, including brain lesion, seizure type, seizure frequency, age onset of epilepsy, duration of illness, and number of antiepileptic drugs. If those variable had relationship with self-care behavior, they could be incorporated into the model and tested for their effect on self-care behavior.

Brain lesion. It is a fact that lesion in the brain affects behaviors of persons with epilepsy; however, information about brain lesion of the adolescents in this study was not available.

Seizure type. The relationship between seizure type and self-care behavior was investigated with Eta. Of 121 adolescents, 47 adolescents were excluded because 20 adolescents had more than one type of seizure and 27 adolescents were not classified type of their seizure. The remaining 74 adolescents (See Table 7) who had only one type of seizure were used for data analysis.

Table 7

The number and percentage of adolescents who had only one type of seizure (n=74).

Seizure type	Number	Percent
Tonic-Clonic	45	60.8
Complex partial	15	20.2
Tonic	8	10.8
Myoclonic	4	5.4
Absence	1	1.4
Atonic	1	1.4

The results found that seizure type did not relate to self-care behavior of adolescents with epilepsy (Eta = 0.27, $p > 0.05$). In addition, adolescents who had different seizure types did not have different self-care behavior (ANOVA, $F = 1.06$, $df = 5, 68$, $p > .05$). The non-significant relationship may be due to the homogeneity of seizure type in this study. As shown in Table 7, most of seizure type was tonic-clonic seizure, whereas another type had a few number. This suggested further study should confirm this relationship by recruiting equal number of seizure type.

Seizure frequency, age onset of epilepsy, duration of illness, and number of antiepileptic drugs. The relationship among self-care behavior of adolescents with epilepsy, frequency of seizure, age onset of epilepsy, duration of illness, and number of epileptic drugs was investigated with Pearson's correlation coefficient. The results found that self-care behavior did not have correlation with frequency of seizure ($r = 0.13$, $p > 0.05$), age onset of epilepsy ($r = 0.11$, $p > 0.05$), duration of illness

($r = -0.11$, $p > 0.05$), or number of antiepileptic drugs ($r = 0.29$, $p > 0.05$). Therefore, these variables were not added into the model in this study.

In summary, the model of self-care behavior for adolescents with epilepsy was tested. Six out of a total of 13 hypotheses were supported. Only epilepsy self-efficacy and epilepsy knowledge directly affected self-care behavior and accounted for 26.4% of variance in self-care behavior. Family income, family support, peer support indirectly affect self-care behavior. These finding partially supported the self-care deficit nursing theory and supported the self-efficacy theory. The findings of this study have been discussed based on theoretical and methodological aspects as well as a thorough review of previous related research.