CHAPTER 4

RESULTS AND DISCUSSION

This chapter concludes the research study results and findings discussion. There are four sections: the demographic characteristics of both caregivers and persons with spinal cord injury, the descriptions of all variables in the model, the hypothesized model testing and the research hypothesis testing, and the discussion of the study findings.

The Samples Demographic Characteristics

There were 205 pairs of caregivers and persons with spinal cord injury in this study. They were recruited from five tertiary care hospitals, namely Maharaj Nakorn Chiang Mai, Lampang, Nakornping, Khon Kaen and Srinagarind hospitals. The demographic characteristics of both caregivers and persons with spinal cord injury are presented as follows.

Demographic Characteristics of Caregivers

The caregivers' ages ranged from 18 to 60 years (M = 43.93, SD = 10.71). The majority of them were between 41 to 60 years of age (63.90%) with 83.41% female and 16.59% male. The biggest group completed elementary school (59.51%), followed by high school (20.48%). The majority were Buddhists (96.59%) and 85.37% were married.

One-third of the caregivers (33.17%) were employees, followed by merchants (22.93%), and agriculturalists (19.02%). Particularly, 9.76% of those caregivers resigned their jobs to be caregivers. Their monthly income ranged from 0 to 40,000 baht (mode = 3,000.00). Most of them (75.61%) had a monthly incomes less than the national average income per capita of 7,340 baht (National Statistical Office, 2011).

Their family incomes were widely varied (range = 0-100,000 baht, mode = 10,000.00). However, 89.27% of their monthly family incomes were less than the national average income per household (the national average income per household = 23,236 baht; National Statistical Office, 2011). Most of them (40.98%) had a sufficient income but without savings. The details are illustrated in Table 5.

Table 5

Demographic Characteristics of Caregivers (n=205)

Demographic characteristics	Frequency	Percentage
Age (years)		
(Range = 18-60, $\overline{X}$ = 43.93, SD =10.71)		
18 - 20	1	0.49
21 - 40	73	35.61
41 - 60	131	63.90
Gender		
Male	34	16.59
Female	171	83.41
Education		
Not attending school	5	2.42
Elementary school	122	59.51
High school	42	20.48
Diploma/vocational	10	4.88
Bachelor degree	25	12.20
Master degree	1	0.49
Religions		
Buddhist	198	96.59
Christian	7	3.41
Islam	-	-
Marital status		
Married	175	85.37
Single	21	10.24
Widowhood/Divorced/Separated	9	4.39
Occupation		
Employee	68	33.17
Merchant	47	22.93
Agriculturalist	39	19.02
Government officer/Public enterprise employee	14	6.83
Housewife	11	5.37
Student	1	0.49
Resigned to take care of patients full time	20	9.76
Pensioned government official	5	2.44

Table 5 (continued)

Demographic characteristics	Frequency	Percentage
Monthly income per capita (Range=0-40,000 baht, mode = 3,000.00, SD = 7,125.32; the national average income per capita = 7,340 baht)		
Less than the national average income	155	75.61
More than the national average income	50	24.39
Monthly income per household (Range = 0-100,000 baht, mode = 10,000.00, SD = 11,868.43; the national average income per household = 23,236 baht)		
Less than the national average income	183	89.27
More than the national average income	22	10.73
Sufficient Income		
Sufficient income with saving money	16	7.80
Sufficient income without saving money	84	40.98
Insufficient income without debt	24	11.71
Insufficient income with debt	81	39.51

Demographic Characteristics Related to the Caregiver Role

The most common relationship between the caregivers and the care recipients were spouses (44.88%), followed by the parents (23.90%) and then children (14.63%). Moreover, 46.83% had to take care of other family members and 20.49% had health problems. Almost half of them (41.46%) did not have a caregiver assistant to support their caregiving.

The caregiving duration ranged from 3 weeks to 20.50 years (M = 3.44 years, SD = 209.20). In addition, the largest group of them (28.29%) spent 6 to 10 hours per day in caregiving (SD = 6.57). The details are illustrated in Table 6.

Table 6

Demographic Characteristics Related to the Caregiver Role (n=205)

Demographic characteristics	Frequency	Percentage
Relationships with SCI patients		
Spouse	92	44.88
Parents	49	23.90
Child	30	14.63
Sibling	27	13.17
Relative	7	3.41
Having caring responsibility for other in family		
No	109	53.17
Yes	96	46.83
Health problem		
No	163	79.51
Yes	42	20.49
Having care assistant		
No	85	41.46
Yes	120	58.54
Duration of caregiving (Range = 3 wks.-20.50 yr., $\overline{X}$ = 3.44 yr., SD = 209.20)		
< 3 years	147	71.71
4 - 6 years	22	10.73
7 - 9 years	15	7.32
10 - 12 years	11	5.37
> 12 years	10	4.88
Time spent in caregiving (hrs/day) (Range = 1-24, $\overline{X}$ = 14.88, SD = 6.57)		
< 5 hrs.	12	5.85
6 - 10 hrs.	58	28.29
11 - 15 hrs.	40	19.51
16 - 20 hrs.	41	20.00
21 - 24 hrs.	54	26.34

Demographic Characteristics of Patients

Demographic characteristics of persons with spinal cord injury receiving care are presented in Table 7.

The age of patients ranged from 18 to 60 years (M = 42.50, SD = 12.96). The major group (57.56%) was between 41 to 60 years old, and 82.93% were males. Most of them had an elementary school education (48.29%). Almost all of the samples (98.05%) were Buddhists, only 1.95% were Christians. Over half of them (56.59%) were married. Most of the patients (84.88%) were unemployed. Their occupations showed that 5.85% were merchants and 2.93% were government officials.

The major cause of spinal cord injury was motor vehicle accidents (63.41%). The types of the injury illustrated were tetraplegia with incomplete cord lesion (43.41%), tetraplegia with complete cord lesion (31.22%), paraplegia with complete cord lesion (17.57%) and paraplegia with incomplete cord lesion (7.80%). The illness duration ranged from 3 weeks to 20.50 years (M = 3.50 years, SD = 209.15). Regarding the types of medical payment, most of the patients received total reimbursement (96.59%). Pain was the major complication (74.63%) followed by spasticity (60.49%).

Table 7

Demographic Characteristics of Patient (n=205)

Demographic characteristics	Frequency	Percentage
Age (years)		
(Range = 18-60, $\bar{X}$ = 42.50, SD =12.96)		
18 - 20	10	4.88
21 - 40	77	37.56
41 - 60	118	57.56
Gender		
Male	170	82.93
Female	35	17.07
Education		
Not attending school	12	5.85
Elementary school	99	48.29
High school	61	29.76
Diploma/vocational	12	5.85
Bachelor degree	21	10.24
Religions		
Buddhist	201	98.05
Christian	4	1.95
Islam	-	-
Marital status		
Married	116	56.59
Single	65	31.71
Widowhood/Divorced/Separated	24	11.71
Occupation		
No occupation	174	84.88
Merchant	12	5.85
Government officer	6	2.93
Employee	4	1.95
Agriculturalist	1	0.49
Other	8	3.90
Cause of injury		
Motor vehicle accidents	130	63.41
Falls	61	29.76
Assault	8	3.90
other	6	2.93

Table 7 (continued)

Demographic characteristics	Frequency	Percentage
Diagnosis		
Tetraplegia	153	74.63
Complete spinal cord injury	64	31.22
Incomplete spinal cord injury	89	43.41
Paraplegia	52	25.37
Complete spinal cord injury	36	17.57
Incomplete spinal cord injury	16	7.80
Duration of illness (Range = 3 wks.-20.50 yr., $\bar{X}$ = 3.50 yr., SD = 209.15)		
< 3 years	145	70.73
4 - 6 years	23	11.22
7 - 9 years	16	7.80
10 - 12 years	11	5.37
> 12 years	10	4.88
Medical Payment		
Total reimbursement	198	96.59
Partial reimbursement	4	1.95
Pay by installment with social work	-	-
Self-support	3	1.46
Physical complication (Subjects can choose more than one choice)		
Pain	153	74.63
Spasticity	124	60.49
Urinary tract infection	65	31.71
Pressure ulcer	58	28.29
Joint contracture	46	22.44
Profuse sweating	38	18.54
Swelling	33	16.10
Respiratory tract infection	4	1.95
Others (i.e., postural hypotension, flatulent and autonomic dysreflexia)	5	2.44
No complications	7	3.41

Descriptions of All Variables in the Model

The study variables consisted of well-being, rewards of caregiving, social support, caregiving hours, functional ability of persons with spinal cord injury and caregiving burden. The characteristics of those variables are presented in the following section. The possible range, actual range, mean, and standard deviations of the study variables are shown in Table 8. The level of study variables is shown in Table 9 and 10.

The mean score for well-being of caregivers was 12.17, with an actual range of 1 to 23 and standard deviation of 4.45. The findings revealed that most caregivers (68.29%) had a moderate level of well-being.

For rewards of caregiving, the mean total scores was 44.86 (SD = 8.41) with a range from 13 to 60. Most caregivers (82.93%) perceived a moderate level of rewards of caregiving.

The main group of participants (69.76%) rated their social support at a moderate level with the total score ranging from 6 to 138 (M = 72.92, SD = 21.40). In 5 sub-groups of social support, the support from the family was the rated highest (M = 19.94, SD = 5.64), followed by health care providers (M = 17.16, SD = 6.15). The least support was from the providers in the community (M = 8.49, SD = 5.77)

The mean scores of caregiving hours variable was 15.07, with an actual range of 1 to 24 (SD = 6.58). The findings indicated that the largest group of caregivers (41.46%) had a moderate hour level per day of their caregiving. Moreover, fifty-two patients (25.4%) had 24 caregiving hours (mode = 24).

The scores of the patient's functional ability, which were reported by the caregiver participants, ranged from 0 to 20 (M = 7.53, SD = 6.02). The largest group of caregivers (42.44%) perceived the functional ability of persons with spinal cord injury at the level of total dependency. The mean score of ten sub-dimensions caregivers' reports indicated transfer was the highest (M = 1.40, SD = 1.07), followed by the feeding (M = 1.25, SD = 0.76). The lowest mean score was going up and down stairs (M = .32, SD = .63). Moreover, six patients (2.93%) had the functional ability score of 20, and 26 patients (12.68%) had the functional ability score of 0 (mode = 0).

Finally, the mean score of caregiving burden variable was 43.19, with an actual range of 18 to 67 (SD = 10.57). Most caregivers (63.41%) had a moderate level of burden in giving care. Both of the two subscale scores, the demands of caregiving and the difficulty of caregiving, were also at a moderate level.

Table 8

Range, Mean, Standard Deviation of Study Variables (n = 205)

Variables	Actual Range	Possible Range	Mean	SD	Level
Well-being	1 - 23	0 - 25	12.17	4.45	Moderate
Rewards of caregiving	13- 60	0 - 60	44.86	8.41	Moderate
Social support	6 - 138	0 - 140	72.92	21.40	Moderate
Family support	0 - 28	0 - 28	19.94	5.64	High
Relatives support	0 - 28	0 - 28	15.85	6.39	Moderate
Friends support	0 - 28	0 - 28	11.48	6.15	Moderate
Providers in the community support	0 - 26	0 - 28	8.49	5.77	Low
Health care providers support	0 - 28	0 - 28	17.16	6.15	Moderate
Caregiving hours	1 - 24	0 - 24	15.07	6.58	Moderate
Functional ability	0 - 20	0 - 20	7.53	6.02	Low
Feeding	0 - 2	0 - 2	1.25	0.76	Moderate
Grooming	0 - 1	0 - 1	0.51	0.50	Moderate
Transfer	0 - 3	0 - 3	1.41	1.07	Moderate
Toilet use	0 - 2	0 - 2	0.69	0.82	Low
Mobility	0 - 3	0 - 3	0.93	0.94	Low
Dressing	0 - 2	0 - 2	0.86	0.82	Moderate
Going up and down stairs	0 - 2	0 - 2	0.32	0.63	Low
Bathing	0 - 1	0 - 1	0.40	0.49	Moderate
Continence of bowel	0 - 2	0 - 2	0.56	0.74	Low
Bladder control	0 - 2	0 - 2	0.59	0.84	Low
Caregiving burden	18 - 67	15 - 75	43.19	10.57	Moderate
Demands of caregiving	18 - 67	15 - 75	45.55	10.29	Moderate
Difficulty of caregiving	17 – 73	15 - 75	42.10	11.85	Moderate

Table 9

Level of Functional Ability of Persons With Spinal Cord Injury (n = 205)

Dependent level	Frequency	Percentage
Total dependency	87	42.44
Severe dependency	30	14.63
Moderate dependency	23	11.22
Mild dependency	65	31.71

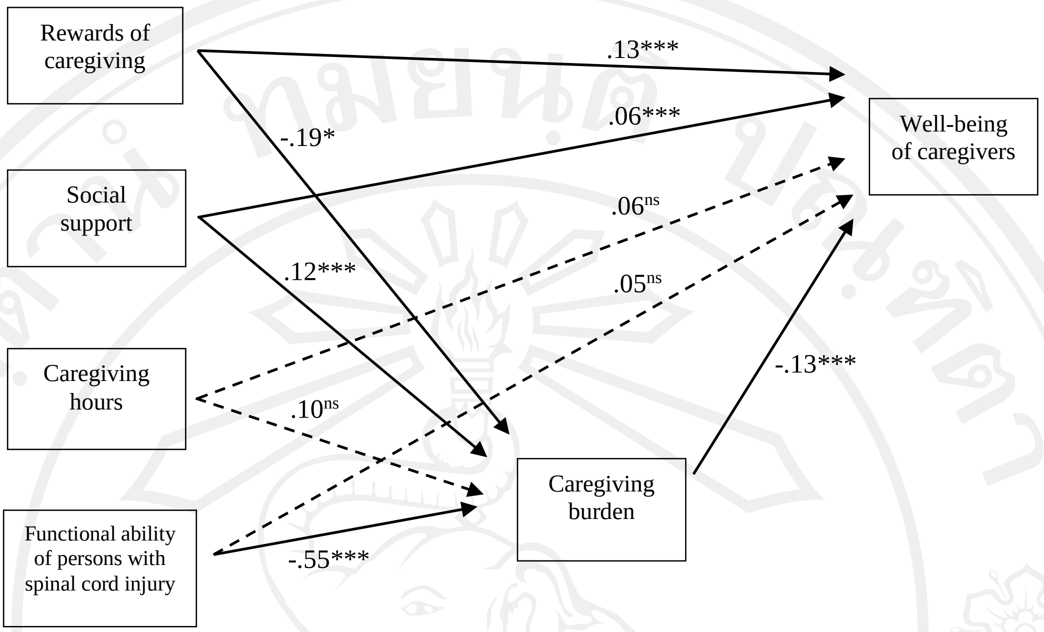
Table 10

Level of Well-Being, Rewards of Caregiving, Social Support, Caregiving Hours, and Caregiving Burden (n = 205)

Variables	Low	Moderate	High
	N (Percent)	N (Percent)	N (Percent)
Well-being	32 (15.61%)	140 (68.29%)	33 (16.10%)
Rewards of caregiving	35 (17.07%)	170 (82.93%)	-
Social support	26 (12.68%)	143 (69.76%)	36 (17.56%)
Caregiving hours	53 (25.85%)	85 (41.46%)	67 (32.68%)
Caregiving burden	49 (23.90%)	130 (63.41%)	26 (12.68%)

Hypothesized Model Testing

The hypothesized model testing and the resulting path coefficients are displayed in Figure 2. The results of the model testing showed the fit indices, which demonstrated that the χ^2 was .00, the degree of freedom was 0, χ^2/df ratio was 0, p-value was 1.00, and Root Mean Square Error of Approximation (RMSEA) was .00. The other goodness of fit indices were not reported. All of fit indices were in an unacceptable level which indicated that the initial model did not fit the actual data. Moreover, the result indicated that the model was a perfect fit. These results reflected this model was a just identified model. A just identified model is the number of parameters to be estimated which equal to the number of equations in the covariance matrix. A value for each free parameter can be obtained through one manipulation of the observed data, then there is one unique solution or one correct answer. Thus, a just identified model cannot be tested for goodness of fit because it always provide a perfect fit to the empirical data. Such a model result was not interpretable. The most desirable type of identification is the over identified model. An over identified model has more equations than unknown parameters to be estimated. A value for free parameters can be obtained in multiple ways to estimate the specified parameters, then there are a number of possible solutions and the task is to select the one that comes closest to explaining the observed data. A just identified model becomes an over identified model when reducing the number of parameters to be estimated by eliminating the causal path from the model (Shumacker & Lomax, 2004). Therefore, the hypothesized model was modified to achieve the best-fitted in the next step.



$^{ns}p > .05$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Direct effect ⟶

Non-significant effect - - -►

Chi-square = .00, *df* = .00, *p*-value = 1.00, RMSEA = .00

Figure 2. The initial model for predicting well-being among caregivers of persons with spinal cord injury

Model Modification

In this step, the paths with non-significant (t-value < 1.96) were dropped. Three paths, from caregiving hours to well-being of caregivers ($\beta = .06$, $p > .05$), functional ability of patients to well-being ($\beta = .05$, $p > .05$), and caregiving hours to caregiving burden ($\beta = .10$, $p > .05$) were non-significant. The path from caregiving hours to caregiving burden had the lowest of the t-value score of the variable relationship in the model when compared the other two paths which had no statistical significance. This means the path of this variable relationship had most of the research hypothesis rejection. Therefore, in the first modification, this path was deleted with the result that the path model became over identified. Then the model was tested for goodness of fit. The model testing results showed an improvement of the fit indices, which demonstrated χ^2 was .81, degree of freedom was 1, χ^2/df ratio was .81, p-value was .37, RMSEA was .00, Goodness of Fit Index (GFI) was 1, and CFI was 1. These results explained that Fit Index Statistics of the first modified model were in the acceptable range which indicated this model fit the empirical data. However, the two paths from caregiving hours to well-being of caregivers ($\beta = .06$, $p > .05$) and functional ability of patients to well-being ($\beta = .05$, $p > .05$) still were non-significant.

Even though the revised model obtained acceptable indices, further improvement was needed. The modifications were continued until all paths in the model were significant. A second modification was performed by eliminating a non-significant path, which was the path from functional ability of patients to well-being. The output showed that χ^2 was 1.82, degree of freedom was 2, χ^2/df ratio was .91, p-value was .40, RMSEA was .00, GFI was 1, and CFI was 1. All indices for goodness-of-fit were at acceptable level which indicated this model fit the data. However, the path included the path from caregiving hours to well-being of caregivers ($\beta = .10$, $p > .05$) still was non-significant.

Further, the model was modified by deleting the non-significant path from caregiving hours to well-being of caregivers. The output showed that χ^2 was .23, degree of freedom was 1, χ^2/df ratio was .23, p-value was .63, RMSEA was .00, GFI was 1, and Comparative Fit Index (CFI) was 1. After deletion, the final modified model showed that all path coefficients of free parameters were significant and the model fit the empirical data very well. The fit indices of the initial hypothesized model and final modified model are compared in Table 11.

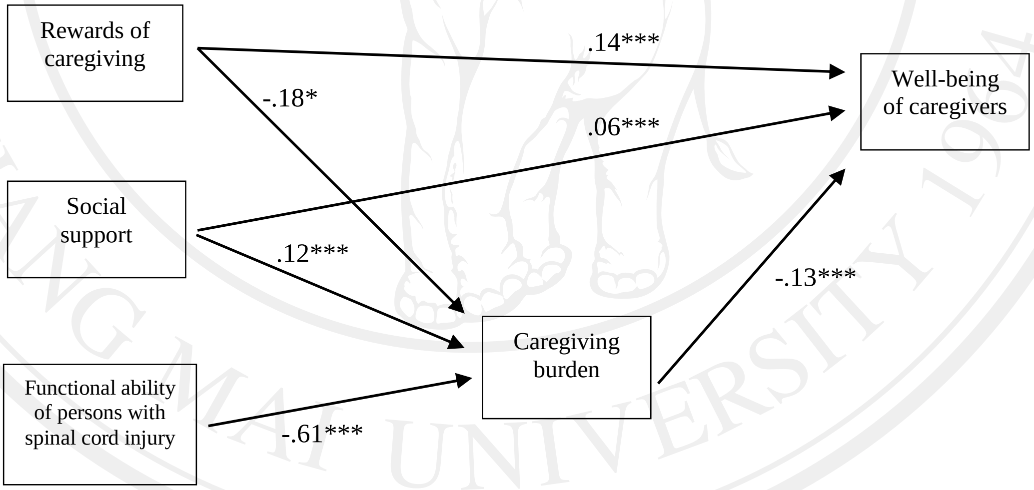
Table 11

The goodness of fit of the initial hypothesized model and the final modified model (n = 205)

Goodness of fit indices	Acceptable fit index value	Initial hypothesized model	Final modified model
Chi-square statistics (x^2)		0.00	0.23
Degrees of freedom (*df*)		0.00	1.00
x^2 and *df* ratio (x^2/df)	< 2	0.00	0.23
p-values	> 0.05	1.00	0.63
Root Mean Square Error of Approximation (RMSEA)	< 0.05	0.00	0.00
Goodness of Fit Index (GFI)	> 0.90	-	1.00
Comparative Fit Index (CFI)	> 0.90	-	1.00

In the final model, the standardized coefficient (β) was used as an estimate of the effect magnitude. The result showed that all of the path coefficients in the hypothesized model were significant at statistic p-value of .05 and had the right direction according to the literature review. The path analysis results suggested that the level of well-being of caregivers was directly influenced by the level of rewards of caregiving, social support and caregiving burden. These variables explained 31% of the variance of well-being score. Inspection of the beta weights suggested the rewards of caregiving (β = .14, p < .001) was the most important predictor of well-being of caregivers followed by caregiving burden (β = -.13, p < .001) while social support was the least significant predictor (β = .06, p < .001). In addition, rewards of caregiving, social support and functional ability of patients had an indirect effect on the well-being of caregivers through caregiving burden.

Rewards of caregiving, social support and functional ability of patients were the predictors of caregiving burden. These three variables were accounted for 18% of caregiving burden variance. Functional ability of patients was the strongest significant predictor of caregiving burden (β = -.61, p < .001), followed by rewards of caregiving and social support (β = -.18, p < .05; β = .12, p < .01 respectively). The proposed relationship between the variables is depicted in the final model:



^{ns}p > .05, *p < .05, **p < .01, ***p < .001

Chi-square = .88, df = 2, p-value = .64, RMSEA = .00

Figure 3. The final modified model for predicting well-being among caregivers of persons with spinal cord injury

Hypothesis Testing Results

The influence effects analysis of all variables in the model led to the five research hypotheses being answered. There were three components of direct, indirect, and total effects. The results of all influence effects of predictor variables on outcome variables in the final model are presented in Table 12.

Table 12

Direct, Indirect and Total Effects in the Final Model (n=205)

Predictor Variables	Outcome Variables					
	Caregiving burden			Well-being of caregivers		
	DE	IE	TE	DE	IE	TE
Rewards of caregiving	-0.18*	-	-0.18*	0.14***	0.02*	0.16***
Social support	0.12***	-	0.12***	0.06***	-0.02**	0.05***
Functional ability of patients	-0.61***	-	-0.61***	-	0.08***	0.08***
Caregiving burden	-	-	-	-0.13***	-	-0.13***
		R^2 = 0.18			R^2 = 0.31	

Note. DE = Direct effect, IE = Indirect effect, TE = Total effect.

The following describes statistical data analyses by research hypotheses.

Hypothesis 1: Rewards of caregiving, social support, and functional ability of persons with spinal cord injury have a positive direct effect on the well-being of caregivers.

The statistical analysis showed that rewards of caregiving and social support had a positive direct effect on the well-being of caregivers (β = .14, p < .001; β = .06, p < .001 respectively). Unexpectedly, the functional ability of persons with spinal cord injury had no statistically significant direct effect on well-being of caregivers ($\beta = .05$, $p > .05$). The first hypothesis therefore, was partially supported.

Hypothesis 2: Caregiving hours and caregiving burden have a negative direct effect on well-being of caregivers.

The results demonstrated that caregiving burden had a negative direct effect on well-being of caregivers ($\beta = -.13$, $p < .001$). Additionally, the analysis results indicated that caregiving hours had no statistically significant direct effect on well-being of caregivers ($\beta = .06$, $p > .05$). Therefore, the second hypothesis was partially supported.

Hypothesis 3: Rewards of caregiving, social support, caregiving hours, and functional ability of persons with spinal cord injury have an indirect effect on well-being of caregivers, as mediated by caregiving burden.

Rewards of caregiving, social support and functional ability of persons with spinal cord injury had a significant indirect effect on well-being through caregiving burden ($\beta = .02$, $p < .05$; $\beta = -.02$, $p < .01$; $\beta = .08$, $p < .001$ respectively). However, caregiving hours had no statistically significant indirect effect on well-being through caregiving burden. Accordingly, the third hypothesis was partially supported.

Hypothesis 4: Caregiving hours have a positive direct effect on caregiving burden.

The analysis outcome revealed that caregiving hours had no statistically significant direct effect on caregiving burden ($\beta = .10$, $p > .05$). Therefore, the fourth hypothesis was not supported.

Hypothesis 5: Rewards of caregiving, social support, and functional ability of persons with spinal cord injury have a negative direct effects on caregiving burden.

The outcome illustrated that rewards of caregiving and functional ability of persons with spinal cord injury had negative direct effects on caregiving burden (β = -.18, $p < .05$; β = -.61, $p < .001$ respectively). Additionally, the results analysis indicated that social support had a positive direct effect on caregiving burden (β = .12, $p > .001$). Therefore, the fifth hypothesis was partially supported.

Summary of Results in the Study

This chapter reported the demographic characteristics of both caregivers and persons with spinal cord injury. Descriptive statistics of six study variables were also reported. The LISREL software program was employed to test and modify the hypothesized model. Among the predictors in the proposed model, the caregiving hours did not affect their well-being of caregivers. Four predictors had direct and/or indirect effects on the well-being of caregivers which included rewards of caregiving and social support with both of direct and indirect effects on well-being of caregivers. The functional ability of patients had only indirect effect on well-being. Rewards of caregiving and social support had positive effects on well-being. In contrast, caregiving burden had a negative effect on well-being. Four predictors in the model explained 31% of the total variance in well-being of caregivers. Finally, hypotheses testing was employed. The results revealed that four hypotheses were partially supported and one hypothesis was not supported in this study.

Discussion

Discussion of the research finding includes two sections. The first section discusses the model testing. The second section discusses the hypotheses testing including effects of exogenous variables on the endogenous variable and effects of the mediating variable on the endogenous variable.

Discussion of the Model Testing

Since there is no previous study about the causal model of well-being among caregivers of persons with spinal cord injury, the results of the present study were compared with a model of well-being in Western caregivers of elderly parents suffering from Alzheimer's disease or dementia or other serious memory loss problem (Chappell & Read, 2002). Three main points were presented as follows:

Firstly, in both studies, three predictor variables including activities of daily living, perceived social support, and burden were included in the model. Interestingly, a similarity in both studies found that the activities of daily living did not affect well-being of caregivers. Moreover, both studies found that perceived social support and burden directly affected well-being of caregivers. It should be noted that there is a need to involve these two predictors when developing interventions to promote well-being of caregivers.

Secondly, another interesting point, Chappell and Read's study found that the hours of care were directly associated with well-being of caregivers, while this study did not.

Finally, in this study, a conceptual framework was developed based on empirical evidence from a literature review, while the conceptual framework in the model of Chappell and Read (2002) was developed based on the model of Yates et al. (1999). The Chappell and Read's study explained 38% the variance in caregivers' well-being which means the model had more predictive power than this study. Therefore, to develop a model for predicting well-being of caregivers, it is necessary to use theory based together with evidence from a literature review. This will strengthen and increase the model's predictive power for the causal relationship.

Discussion of the Hypotheses Testing

This section discuss the hypothesized relationships between the exogenous variables (rewards of caregiving, social support, caregiving hours, and functional ability of persons with spinal cord injury), the mediating variable (caregiving burden), and the outcome variable (well-being of caregiver). The discussion order will follow the final model in which variables are schematically portrayed from the left (exogenous variables) to the right (endogenous variables). The arrangement presentation is also consistent with the sequence of the five proposed research hypotheses.

Effects of Exogenous Variables on Endogenous Variable

Effects of rewards of caregiving on caregiving burden. As hypothesized, rewards of caregiving negatively influenced caregiving burden. These findings suggest that caregivers who received more rewards of caregiving had a lower level of caregiving burden. This result was consistent with the study of Lawton et al. (1991). They examined the well-being of 285 spouse caregivers and 224 adult child caregivers with Alzheimer's disease parents. The result showed the caregiving satisfaction and caregiving burden had a negative relationship ($r = -.33$, $p < .05$), and caregiving satisfaction directly negative influences the caregiving burden ($\beta = -.27$, $p < .05$). Moreover, the findings of this study are consistent with results of Rodakowski and colleagues' study (Rodakowski, Skidmore, Rogers, & Schulz, 2012), which demonstrated that rewards of caregiving had a direct effect on caregiving burden.

Caregivers in this study perceived a moderate level of rewards of caregiving. This means that spinal cord injury caregivers had positive feelings during caregiving. The plausible explanation would be the rewards of caregiving are a positive factor of caregivers' motivation that encouraged them to continue caring for their relatives. In this study, most of patient-caregiver relationships were relatives (55.11%). Caregivers who provide care with love, affection, commitment, and reciprocity would have a high level of caregiving rewards. The rewards of caregiving establish the caregivers' feelings to reduce the negative energy given out from the caregivers (Kramer, 1997; Noonan & Tennstedt, 1997). In addition, in the Thai context, the spiritual rewards are one of the factors of caregiving rewards that have a very strong influence on the burden. They feel that they have been doing a good thing and have been performing the concept of "Receiving merit" (Changsuwan, 2005). This feeling motivates the caregivers to continue caregiving for the spinal cord injury patients even though they are faced with burdens. As a result, a high level of rewards of caregiving contributes to a low level of caregiving burden.

Effects of rewards of caregiving on well-being of caregivers. As hypothesized, rewards of caregiving had a positive direct and indirect effect on well-being through caregiving burden. This means the high level of rewards of caregiving contributed to a perception of a high level of well-being, as well as it contributed to low caregiving burden, and that low level of caregiving burden affected the perception of high level of well-being. This result was consistent with the study of Cameron et al. (2006) which found that rewards of caregiving, mastery, and social support accounted for 43% of the variance in caregivers' well-being. Similarly, Lawton et al. (1991) found a positive relationship between caregiving satisfaction and well-being ($r = .32$, $p < .05$) and the caregiving satisfaction positive influence directs to the well-being ($\beta = .45$, $p < .05$). Moreover, Lawton et al. (1991)'s study also found caregiving satisfaction had indirect effects on well-being through caregiving burden. This incidence clearly supported the hypothesis that rewards of caregiving are a predictor of well-being of caregivers.

These results could be interpreted as 1) the caregivers receive compliments from others that make them feel they are doing a good thing. They feel proud of themselves that they are able to look after the patients. Especially, they are an important person for the patients. Thus, the feeling of their self-esteem is established and they feel positively about being a caregiver (Chinsuwan, 2006; Puenchompoo, 1997; Srinim, 2002). 2) It is a chance of giving care to the love ones that enables the caregivers to perform their love and dedicate themselves. Also, it encourages their feelings of giving care (Changsuwan, 2005). 3) Being a caregiver is one way to give some good things back to the person, specifically the spouses (Srinim, 2002). In this study, most of caregivers were spouse (44.88%). 4) The caregivers perceive that their caregiving aids the patients to get better. 5) Giving care creates a relationship between the caregivers and the patients (Chinsuwan, 2006). 6) Because 96.59% of the participants are Buddhists, they believe about merit and karma. When they help someone, they will accumulate their merit for a good return in the future (Changsuwan, 2005; Srinim, 2002). All of these positive feelings contribute to their well-being.

Effects of social support on caregiving burden. In an unexpected finding, social support positively influenced caregiving burden. This means that caregivers who had a high social support perception also perceive a high level of caregiving burden. This finding was not supported by previous studies, which presented negative relationships between social support and caregiving burden (Chiou et al., 2009; Dyck et al., 1999; Edwards & Scheetz, 2002; Kenchaiwong, 1996; Son et al., 2003; Sukkheo, 2000). However, social support positively influenced caregiving burden is consistent with the results of Chiou et al. (2009). The results explained that the use of formal instrumental support had a significant positive relationship with the caregiver burden ($r = .16, p < .01$) which suggested that the more formal instrumental support caregivers used, the higher the level of caregiver burden they had. It also found a significant correlation between having an alternative helper and caregiver burden ($p < .001$). Moreover, the finding of this study was similar to Harwood et al. (2000) where perceived emotional support was positively related to caregiving burden ($r = .33, p < .001$) and also a significant predictor of caregiving burden ($\beta = .22, p < .05$).

The explanations are described as follows. 1) Social support from health professionals focus on the primary needs of the patients and provide the services for caregivers such as an opportunity for the caregiver to discuss and learn about caregiving activities. This support is unable to decrease the patients' dependence or reduce the caregiving burden. Although they receive more social support from health care providers, their feelings of caregiving burden still remain. 2) In spite of the other family members being able to give care for these patients, the caregivers still do not trust family members to give care for patients with the complications (Puenchompoo, 1997). In this study, 58.54% of caregivers had the other assisting caregiving activities and the support from family was rated at the highest score. 3) The other family members only gave facilitation to the patients, while the caregivers had to work for earning income. However, when they are back home from work, they will take complete care by themselves without the family members support (Chinsuwan, 2006). Thus, even though the caregivers receive support from their family members they still have a major burden. 4) The caregivers' neighborhoods can give support only for visiting, talking and giving some advice. However, they do not perform caregiving activities. Hence, the caregivers' burden still remains (Changsuwan, 2005). 5) Social support can have either a positive or negative influence depending on the perception of caregiver individually. Several studies suggest that ineffective support increases negative outcomes in caregivers (Bolger & Amarel, 2007; Bolger et al., 2000; Scholz et al., 2012). In this study, caregivers may perceive that health care providers do their job as it is their duties to service the customers. However, they do not acknowledge that health care providers give them a lot of support. In addition, they might have a disagreement with their family members. Thus, the support from the health care providers and the family members can not release their burden. Moreover, social support that they receive may not the support what they actually want. These events create a negative feeling of social supports and create more caregiving burden. 6) To consider the content of the Caregiving Burden Questionnaire, most of details present that the caregiving activities that require knowledge and skills have to be trained by health care providers. Furthermore, to consider the content of the Social Support

Questionnaire, most of the details present that they are receiving emotional support and positive feelings from persons in the society. It does not focus on difficulty or time spent of caregiving reduction for the caregivers who take care of the patients. As those results show, it can be seen that although the caregivers receive much social support, they have a high caregiving burden.

Effects of social support on well-being of caregivers. As hypothesized, social support had a positive direct effect on well-being and a negative indirect effect on well-being through caregiving burden. That is, the higher the social support the caregiver perceived, the higher the level of well-being was reported. Also higher social support contributed to a higher caregiving burden; and the higher level of caregiving burden affected lower well-being. The finding was similar to the studies by Love et al. (2005), Daonophakao (2004), and Chappell and Reid (2002). These studies found that social support contributed to the well-being of caregivers. Moreover, the findings of this study are consistent with results of Harwood and colleagues' study (2000), which demonstrated that social support had an indirect effect on well-being through burden.

An explanation for these findings is that during giving care, the caregivers get some help from others. Caregivers in this study perceived that the largest source of support came from family members. Most of the subjects were married and were aged of around 44 years old. At this age, they have support from their children. In Thai culture, children have the responsibility to support their parents, who were caregivers, and make them feel better. Also, family support allows them to have their own time to do their own life activities (Changsuwan, 2005). Caregivers perceived that support from health care providers was at a moderate level. All five of the research settings provided holistic care programs for patients and their caregivers as well as four hospitals had home visiting. This support can help caregivers gain more confidence to care and decrease the caregivers' stress (Srinim, 2002). Caregivers also received support from their relatives and neighbors. All of subjects lived in the rural area in Thailand. In rural society, the relatives and neighbors pay attention to one another, and they respect and regard one another as their own family members. This support creates positive feelings that they have someone else to give some help (Changsuwan, 2005; Srinim, 2002). All of these social supports can assist the caregivers to manage the unexpected situation of caregiving with their strength (Cobb, 1976). Finally, social support contributes to the well-being of caregivers. The result of this study confirms the classical notion that social support is a significant predictor of well-being.

Effects of caregiving hours on caregiving burden. Contrary to the hypothesis, caregiving hours did not affect caregiving burden. The findings indicated that the difference of caregiving hours among caregiver was not the cause of caregiving burden level. Caregiving hours did not predict caregiving burden in the present study, which contrasted with findings from Chappell and Reid (2002), Harris (2009), and Van Puymbroeck et al. (2008) as it influenced caregiving burden. However, this is consistent with findings from previous research that caregiving hours was not a significant predictor of caregiving burden (Goldsworthy & Knowles, 2008; Iecovich, 2011).

This might be explained that the patients who participated in this study have a good relationship with the caregivers. All caregivers in this study had a close relationship with patients as spouses, parents, children, siblings, or relatives. This relationship creates feelings of generosity and good wishes in the caregivers which did not affect their burden although they provided care for an average 14.88 hours a day. In addition, the caregivers continue caregiving for an average of 3.44 years, which is a long time taken for the caregiver role. This makes caregivers able to accept their responsibilities and successfully integrate this role into their daily lives. Also, they could manage their caregiving as a system and have time for themselves (Changsuwan, 2005). Most of caregivers (58.54%) had a secondary caregiver to support their caregiving that could reduce the amount of care activities. Therefore, caregiving hours had no affect on the caregiving burden.

According to the literature review, caregiving hours and caregiving burden have very low level of relationship (r = .16 to .24, β = .17 to .30) which illustrates the rejected tendency of relationships between those two variables. The previous studies used the instruments such as the Zarit Caregiver Burden Inventory (Zarit et al., 1980) and the Sense of Competence Questionnaire (Vernooij-Dassen, Persoon, & Felling, 1996) to investigate the caregiving burden which is different from the instrument that was applied for this study. Therefore, the results of current and previous studies are not relevant. Furthermore, the participants in previous study were stroke, dementia, and Alzheimer. They had differences of pathological conditions, demands of caregiving and caregiving activities. Hence, they perceived the caregiving burden differently and brought different results.

Effects of caregiving hours on well-being of caregivers. Contrary to what was hypothesized, caregiving hours did not affect the well-being of caregivers. This means that caregivers who had different amounts of caregiving hours did not have different levels of well-being. This finding is contrary to results from previous studies that caregiving hours had a significant direct and indirect effect on well-being (Chappell & Reid, 2002; Harris, 2009). However, this is consistent with findings from previous research with caregivers of older persons (Egbert, Dellmann-Jenkins, Smith, Coeling, & Johnson, 2008) and with caregivers of stroke patients (Daonophakao, 2004) that caregiving hours was not a significant predictor of caregivers' well-being.

A possible explanation of these findings was Thai contextual belief that to support or assist anybody is a good thing to do. Moreover, all of the participants were adults who had the ability to learn and adapt themselves with the unexpected events (Cheatchaovalit, 2000). In this study, 17.57% of participants had no job and 41.95% were agriculturalists and merchants. These careers did not affect the role of being a caregiver. Caregivers who do not work can perform caregiving full time. The sellers can do both duties at the same time, whereas the farmers can spend their free time to look after the patients. Even the laborers can work as a caregiver after they finish their part time job. Therefore, the time spent in giving care is not an important issue for Thai caregivers and causes no trouble with caregivers' well-being.

According to the literature review, caregiving hours and well-being of caregivers have very low level of relationship (r = -.14, β = -.24 to .36) which point out that the rejected tendency relationships between these two variables. The previous studies used the instruments such as Life Satisfaction Scale (Michalos, 1985) and Well-being Scale (National Alliance for Caregiving & the American Association of Retired Persons, 2004) to measure well-being of caregivers. These instruments are different from the instruments that were used in this study. Therefore, their results are different as well. Also the participants who joined the pervious studies were dementia and elderly illness who have different needs of caring from the patients with spinal cord injury. Also the caregiving plan cannot be set up in advance whereas the plan of caregiving for the patient with spinal cord injury can. Thus, the caregivers in this study have well-being different from the previous studies and the whole results are different as well. Moreover, The WHO instrument of 5 items is applied from the WHO of 10 items for evaluating the patient in clinic as it is convenient and not complicated. This 5 item WHO instrument might not be appropriate for data collection in research because it is not sensitive enough to measure the entire well-being definitions which affect the validity of this research study.

Effects of functional ability of patient on caregiving burden. As hypothesized, functional ability was one of the negative predictors of caregiving burden in the present study. This reflects the low functional ability of patient contributing to the high level of caregiving burden. The finding was congruent with a previous study by Edwards and Scheetz (2002) which revealed that the amount of assistance needed with activities of daily living of patients with Parkinson's disease was a significant predictor of burden ($\beta = -.44$, $p < .01$). This result was also consistent with the study of Lawton et al. (1991) which found that the severity of disabled Alzheimer patient's symptoms directly influences the caregiving burden ($\beta = .22$, $p < .05$). Moreover, the finding is consistent with previous studies conducted by Bull (1990), Harwood et al. (2000), and Son et al. (2003).

Patients who had a high level of the pathology of spinal cord injury were severely impaired and highly dependent on caregivers for a living. Caregivers have to take all responsibilities in caring for the patient's physical, psychological, social, and financial demands. The caregiving tasks might exceed the caregiver's capacity to perform tasks, therefore, the feeling of burden occurs. Moreover, the caregivers still have to do their own life activities such as their jobs or a being housewife (44.88%). Their role was being a caregiver and a housewife as well as a person who earns an income. These female caregivers felt that they had to do all of those duties based on the Thai cultural expectation. If they ignore their caregiving duty, they would get blamed as guilty persons (Chinsuwan, 2006). Living with many duties for the long term can create tiredness and burden. Thus, the caregivers who take care of the patient with a high dependency in daily life activities have a high level of caregiving burden (Sanford, Johnson, & Townsend-Rocchiccioli, 2005).

Effects of functional ability of patient on well-being of caregivers. Contrary to the hypothesis, functional ability had no direct effect on well-being but it had a significant positive indirect effect on well-being through the caregiving burden, indicating that the caregiving burden is a mediator between functional ability and the well-being of the caregiver. This implied that patients with a low level of functional ability contributed to the perception of a high level of caregiving burden, and that high level of caregiving burden affected the perception of low level of well-being. This finding did not support previous studies, which report relationships between functional ability and well-being (Early et al., 2002; Lawton et al., 1991; Pinquart & Sorensen, 2004). Similar findings to this study were found in the literature including Daonophakao (2004), and Chappell and Reid (2002) who reported that functional ability had no relationship with well-being. Moreover, the findings of this study are consistent with results of Harwood et al. (2000) and Lawton colleagues' study (Lawton et al., 1991), which demonstrated that the functional ability of patients presented an indirect effect on the well-being of caregivers through the caregiving burden.

A possible reason that functional ability had no direct effect on well-being is that the caregivers had a rather long average duration of caregiving experience of 3.44 years. Therefore, the benefits of the support resources, problem solving, and caregiving skills improvement were developed over the period of caregiving time. Another explanation is that during collection of the data, some of patients passed away. Those patients who died might have had more severe physical conditions than those included in this study. Moreover, it was found that 57.56% of the patients were able to do partial daily life activities so they were not total dependent on caregivers. Hence, there was no direct effect on the caregivers' well-being but there was an indirect effect on the caregivers' well-being through the caregiving burden.

From the literature reviews, functional ability of patients and well-being of caregivers had a low level of relationship (r = .06 to .17, β = .17 to .21) which represents the rejected tendency of relationships between these two variables. The research instruments of those studies used the Affect Balance Scale (Bradburn, 1969) to measure well-being of caregivers which are different from the current study. Thus, the directions of the results are different. The participants in previous study were dementia, Alzheimer, elderly with chronic diseases, and children with emotional disorders. Their needs of caregiving were dissimilar to the patients with spinal cord injury. Also the caregiving plan cannot be set up in advance whereas the plan of caregiving for the patient with spinal cord injury can. Hence, well-being of caregivers in the current study is not similar to the previous studies.

Effects of Mediating Variable on Endogenous Variable

Effects of caregiving burden on well-being of caregivers. As hypothesized, the caregiving burden had a negative direct effect on the well-being of caregivers. This reflects that a high caregiving burden contributes to a low level of well-being. This finding is consistent with the research outcome of Chaoum (1994), who identified that caregiving burden was a significant predictor and accounted for 16% of variance in well-being ($p < .001$). This is similar to the findings of Rammohan et al. (2002), Chappell and Reid (2002) as well as Patrick and Hayden (1999), all showing that caregiving burden was negatively related to well-being and also a significant predictor of well-being.

The plausible explanation that the caregiving burden predicted well-being was that many caregivers had a job before became a caregiver. They had more responsibility after becoming a caregiver. Their life style changed with less time of work and low income. It was found that 46.83% of them had to look after other family members during the caregiver role and 41.46% of caregivers did not have a caregiving assistant. There were several duties for those female caregivers. As a consequence of those duties, they had a difficult time to manage these responsibilities (Changsuwan, 2005). Furthermore, they had to earn some money for the education fee for their children, the cost of medication for the husband, the expenses of changing the proper accommodation for the husband, and transportation fees. Also, nearly 10% of them had to leave their job and become a full time caregiver. Almost 40% held debts which developed financial burdens and chronic stress situations. Another explanation is that long term care can cause tiredness, muscle pain, lack of relaxation and disease recurrence (Srinim, 2002). Some caregivers (20.49%) had their own disease which might limit their physical performance and cause difficulty in giving care. The caregivers might feel exhausted and overloaded. All of caregivers were adults who had to join social activities. However, because of being a caregiver, they were unable to join those activities and they could no longer contribute to their own society (Srinim, 2002). These situations create their feeling of burdens and contribute to the low level of well-being.

In summary, the model for predicting well-being among caregivers of persons with spinal cord injury was tested. Rewards of caregiving, social support, and caregiving burden directly affected the well-being of caregivers. Rewards of caregiving, social support, and functional ability of patient indirectly affected well-being of caregivers. Regarding caregiving hours, it did not predict well-being either directly and indirectly. All four predictors in the modified model explained 31% of variance in well-being of caregivers. The findings of this study have been discussed based on methodological aspects and review of previous related studies.