

ปัจจัยที่มีอิทธิพลต่อการดูแลของญาติผู้ดูแลผู้ป่วยโรคหลอดเลือดสมอง ในเมืองเหวินโจว ประเทศจีน

Factors Influencing Caregiver Burden among Family Caregivers of Post-stroke Persons in Wenzhou, China

นิพนธ์ฉบับ

Original Article

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วารสารไทยเภสัชศาสตร์และวิทยาการสุขภาพ 2567;19(1):81-88.

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาภาระการดูแลของญาติผู้ดูแลผู้ป่วยหลังโรคหลอดเลือดสมองภายหลังจำหน่ายจากโรงพยาบาลในระยะ 3 เดือนแรก และศึกษาอิทธิพลของภาวะสุขภาพของญาติผู้ดูแล ปริมาณการดูแล และความสัมพันธ์ต่าง ๆ เกี่ยวกับภาระการดูแลของญาติผู้ดูแล **วิธีการศึกษา:** การศึกษาเพื่อทำนายปัจจัยที่มีอิทธิพลต่อการดูแลมีตัวอย่างเป็นญาติผู้ดูแลผู้ป่วยโรคหลอดเลือดสมองที่มาตรวจติดตามภาวะสุขภาพภายหลังจำหน่ายออกจากโรงพยาบาลในระยะ 3 เดือนแรก ที่แผนกผู้ป่วยนอก The First Affiliated Hospital of Wenzhou Medical University in China จำนวน 101 คน ที่มีคุณสมบัติตามเกณฑ์ที่กำหนดและสุ่มอย่างง่าย รวบรวมข้อมูลระหว่างกรกฎาคมถึงกันยายน พ.ศ. 2564 รวบรวมข้อมูลโดยใช้แบบสอบถาม 1) ข้อมูลส่วนบุคคล 2) แบบวัดภาวะสุขภาพของผู้ดูแล 3) แบบวัดปริมาณการดูแล 4) แบบวัดความสัมพันธ์ต่าง ๆ เกี่ยวกับดูแล และ 5) แบบวัดภาระการดูแลของผู้ดูแล วิเคราะห์ข้อมูลด้วยการวิเคราะห์ถดถอยพหุคูณ ผลการศึกษา: ตัวอย่างมีคะแนนภาระการดูแลในการดูแลในระดับน้อยถึงปานกลาง (mean = 18.29 ± 4.9) พบว่าภาวะสุขภาพของผู้ดูแล ($\beta = -0.33$) ปริมาณการดูแล ($\beta = 0.39$) ความสัมพันธ์ต่าง ๆ เกี่ยวกับดูแล ($\beta = -0.36$) โดย P-value < 0.001 ทั้งหมด โดยสามารถรวมทำนายภาระการดูแลของญาติผู้ดูแลผู้ป่วยโรคหลอดเลือดสมองได้ร้อยละ 70 ($R^2 = 0.70$, P-value < 0.001) **สรุป:** ภาระการดูแลของญาติผู้ดูแลผู้ป่วยหลังโรคหลอดเลือดสมองภายหลังจำหน่ายจากโรงพยาบาลในระยะ 3 เดือนแรกอยู่ระดับน้อยถึงปานกลางและอธิบายได้ด้วยภาวะสุขภาพของผู้ดูแล ปริมาณการดูแล และความสัมพันธ์ต่าง ๆ เกี่ยวกับดูแล

คำสำคัญ: ญาติผู้ดูแล; ผู้ป่วยหลังโรคหลอดเลือดสมอง; ภาวะสุขภาพของญาติผู้ดูแล; ปริมาณการดูแล; ความสัมพันธ์ต่าง ๆ เกี่ยวกับดูแล; ภาระการดูแลของญาติผู้ดูแล

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Abstract

Objective: To examine the caregiver burden of family caregivers providing care for post-stroke persons 3 months after discharge, and the prediction of the caregiver burden by caregiver health status, caregiver amount of caregiving activities, and caregiver mutuality. **Methodology:** A predictive research was conducted among 101 family caregivers of people with stroke three months after being discharged from hospital at the outpatient department of the First Affiliated Hospital of Wenzhou Medical University in China. Five validated instruments were used to collect caregiver data: a demographic questionnaire, SF-12 Health Survey Version 2, Caregiving Activities Scale, Mutuality Scale, and 12-item Zarit Burden Interview. Data were analyzed using multiple linear regression. **Results:** Family caregiver burden was at a mild-to-moderate level (mean = 18.29 ± 4.9). It was found that caregiver health ($\beta = -0.33$), caregiver amount of caregiving activities ($\beta = 0.39$), caregiver mutuality ($\beta = -0.36$) could predict caregiver burden (P-value < 0.001 for all) with 70% of the variance explained ($R^2 = 0.70$, P-value < 0.001). **Conclusion:** Caregiver burden of family caregivers of people with stroke three months after being discharged was at a mild-to-moderate level and could be predicted by caregiver health, caregiver amount of caregiving activities, and caregiver mutuality.

Keywords: family caregiver; post-stroke persons; caregiver health; amount of caregiving activities; mutuality; caregiver burden

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Introduction

Stroke is one of the common chronic diseases and it is considered the third leading cause of disability worldwide.¹ With a population of 1.4 billion in China, 7.5 million stroke survivors are currently reported, with an increase of 2.5 million new stroke cases annually.² Studies have shown that golden period of the stroke healing is during the first six months³, and this is the first period that they need help from someone to provide daily care at home.

In China, after discharge from the hospital, family caregivers are often the first to assume the role of caregiver. Family caregivers play a very important role in providing care and support for activities of daily living [ADLs] for post-stroke persons at home.⁴ In addition, a change in the service provision system of all public hospitals promotes turn-over rates of hospital beds. This results in a shortened hospital stay for post-stroke persons, and the post-stroke persons need to rehabilitation at home with their own family caregivers.⁵

However, many family members are not prepared to take on the required tasks of giving care.^{6,7}

The post-stroke persons are in transitions as it is the golden period of the stroke rehabilitation during the first six months, and this is the first period that they need more assistance with daily activities from family caregivers.⁸ Family is also in transitions because this is the first time they take the caregiver role. Caregivers who take the role well and feel less burdened can help post-stroke person's recovery well. However, if not, post-stroke persons may slow their recovery. In this first period, family caregivers have to deal with difficulty caused by helping the post-stroke persons with their daily living activity, taking the post-stroke persons to see the doctors, encouraging rehabilitation, preventing accidents, and constantly observing for signs and symptoms.^{9,10} Furthermore, family caregivers have to cope with the post-stroke persons' emotional change and their troublesome behaviors such as being easily irritable, throwing things, using rude words, or constantly whining if caregivers stay away from them.² All of these can be seen as additional roles to the family caregivers. Such role transitions may lead to physical, psychological, and social impacts. Evidence reports that there is a higher prevalence of psychological impacts such as depression and anxiety reported by family caregivers of post-stroke persons than among the general population. Also, family caregivers often experience poor physical health and reduced energy including sleeping difficulties, weight loss, fatigue, and increased risk of chronic diseases.² Along with these mentioned impacts may result caregiver burden.

Regarding caregiver burden, a review of existing research on the caregiver burden of family caregivers of post-stroke persons has revealed that most of the family caregivers develop caregiver burden during their caregiving duties.¹¹ Moreover, during the first six months after the onset of the disease, the conditions of the post-stroke persons are not stable, and the risk of recurrence is high.¹² Furthermore, in this period, post-stroke persons require a high-level of caregiving, while family caregivers may lack of knowledge, capability, skills, and experience in providing care for post-stroke persons. Thus, family caregivers need to continuously adjust themselves to deal with providing care to post-stroke persons.¹³ Therefore, caregiver burden remains a serious problem during caregiving at first three months.

Caregiver health status plays a major role as transition conditions in caregiver burden. During caregiving at the first

time, since family caregivers taking on new caregiving roles, they need to do a lot of extra caregiving activities they haven't done before. This makes caregivers provide more time and energy, therefore it can lead to adverse health effects of caregivers including sleep disturbance, fatigue, frequent headaches, and weight gain or loss and some health problems such as depression or social isolation for the caregiver.^{14,15} Empirical evidence demonstrated that there were strong negative correlations between caregiver burden and health status of caregivers of stroke survivors ($r = -0.839$, $P\text{-value} < 0.01$).¹⁶ Similarly, a study found that the low health status of family caregivers was associated with a high caregiver burden.⁴

Caregiver burden is also influenced by caregiver's amount of caregiving activities. For the first period of stroke, most post-stroke persons cannot eat, walk, or take care of themselves. They need caregiver amount of caregiving activities as high.¹¹ Greater involvement in caregiving activities was related to high levels of caregiver burden.¹⁷ Also, the level of caregiver burden is influenced by the number of caregiving tasks the family caregivers perform for their post-stroke persons.¹⁸

Caregiver mutuality acts transition conditions in caregiver burden. In Chinese culture, after being discharged from the hospital, most strokes are living with the family, since family caregivers had a close relationship with sick relatives and the family caregiver is responsible for taking care of them.⁴ Family caregivers of post-stroke persons who have high mutuality have lower levels of caregiver burden.¹⁹ Similarly, the family caregivers who had a good relationship with post-stroke persons experienced a lower caregiver burden.¹⁸

In Chinese culture, sick persons are respected and usually cared for by family members, such as spouse or their children. As a result, the family caregivers try to spend more time for taking care of post-stroke persons in daily activities.⁵ From literature reviews, there are studies about the relationship between caregiver burden and the caregiver amount of caregiving activities, caregiver health status and caregiver mutuality in all the period, not in the first period of caregiving. These areas were still understudied among Chinese family caregivers of post-stroke persons, especially at three months after providing care, which is the fluctuation of all caregiving situations. Moreover, the appropriate time for evaluation that how caregiver respond to their role. Furthermore, early

evaluation for caregiver burden is very important to help caregivers coping with their role.

Conceptually, this study was guided by Meleis's Transitions Theory²⁰ and literature review. This theory consists of three main concepts. First, the nature of transitions, it includes types of transitions, patterns of transitions, and properties of transitions. Secondly, transitions conditions include personal, community, and societal conditions that may be either facilitators or inhibitors of transition situation. Finally, patterns of response include progress indicators and outcome indicators.

Based on the Transitions Theory, the process of caring for post-stroke persons is a transitional process from one stable state to a new stable state.²⁰ Becoming family caregivers three months after providing care for post-stroke persons is regarded as a new transition family caregiver have to face. Many family caregivers experience burdens as a result of caregiving impact.⁵ Caregiver burden during this period is a pattern of response of unsuccessfully patterns of response in caregiver role. The level of caregiver amount of caregiving activities, caregiver mutuality, and caregiver health status as transition conditions. These factors can be facilitator or inhibitors to influence patterns of response. If caregivers can effectively deal with a new process of transition and conditions they face, these conditions may facilitate successful patterns of response. If not, these conditions can be inhibitors, the caregivers can suffer from unhealthy and ineffective patterns of response, which may result in caregiver burden.

Methods

A predictive correlational research design was applied to examine the caregiver burden and whether caregiver health status, caregiver amount of caregiving activities, caregiver mutuality could predict caregiver burden at three months after providing care for post-stroke persons. The study population was Chinese family caregivers who took care of the post-stroke persons to the OPD of the First Affiliated Hospital of Wenzhou Medical University in China. The family caregivers had to provide continuous care for post-stroke person during the three months after discharge from the hospital. The data were collected from July to September 2021. Participants were recruited using a simple random sampling technique.

To be eligible, family caregivers had to 1) be 18 years old or older, 2) be primary caregivers who lived with patients and

had continuously provided care to patients during three months after discharge from the hospital, 3) have direct relationship with the patients (i.e., parent, spouse or children), 4) provide care regarding at least three aspects of basic activities of daily living, 5) have a good orientation to date, time, place, and person, and 6) be able to speak and understand Chinese or Mandarin. For post-stroke persons, they had to 1) be 18 years old or older, 2) be diagnosed with the first-ever stroke (either cerebral hemorrhage or cerebral ischemia) and was in rehabilitation phase during the first six months, 3) be discharged from hospital and lived with their family, and 4) remain disabled (i.e., with the Modified Barthel Index [MBI-C] score of 40 - 60 points).

The sample size was calculated by using a power analysis with G*Power 3.1.9.2 program. From literature review, effect size of correction about caregiver burden ranges from 0.13⁷ to 0.25.²¹ In this study, with an effect size estimate of 0.15, a type I error of 5%, a standard power of 0.90, and 3 predictors, at least 99 participants were needed. With a 10% compensation for incomplete questionnaire, 108 participants were needed. However, a total of 101 participants were recruited in this study.

Research instruments

Data were collected using self-administered questionnaires. A demographic questionnaire was used to gather demographic of the family caregivers and the post-stroke persons.

The SF-12 Health Survey Version 2 was used to measure the health status of the family caregivers of post-stroke persons. This scale was developed by Ware²² and was translated into Chinese to fit the Chinese culture by Lam and colleagues.²³ This scale contained 12 items with eight aspects including physical functioning, role-physical, role-emotional, bodily pain, general health, mental health, social function, and vitality.^{22,24} The total scores ranged from 0 to 100, with high scores indicating a good health status of caregivers of post-stroke persons. In this study, a high internal consistency reliability was found with Cronbach's alpha coefficient of 0.86.

The next part used the Caregiving Activities Scale to measure the number and type of caregiving activities that the family caregivers provide for the post-stroke persons. It was developed by Archbold and Stewart.²⁵ and translated into Chinese by Yang and colleagues.²⁶ It consisted of 87 items and each item was rated by whether the caregiver performs

the task (0 = no; 1 = yes). The total score was calculated by summing all items performed; the higher the score, the greater the number of tasks performed. In this study, a high internal consistency reliability was found with Cronbach's alpha coefficient of 0.89.

The Mutuality Scale was used to measure the mutuality between the family caregiver and post-stroke persons. This scale was developed by Archbold and Stewart²⁵ and translated to Chinese by Yang and colleagues.²⁶ The scale consisted of 15 items which were divided into four dimensions including love and affection, shared pleasurable activities, shared values, and reciprocity. The items were scored on a 5-point rating scale ranging from 0 (not at all) to 4 (a great deal). Family caregivers of post-stroke persons who had higher scores reflected a high level of mutuality, characterized by a great deal of love, shared pleasurable activities, shared values, and reciprocity. In this study, a high internal consistency reliability was found with Cronbach's alpha coefficient of 0.91.

The 12-Item Zarit Burden Interview was used to measure caregiver burden. It developed by Ballesteros and colleagues²⁷ and translated into Chinese by Lin and colleagues.²⁸ Each question was scored in five-point Likert-type rating scale from 0 to 4 (never to almost always). Higher score represented higher perceived burden. With the total score of 0 – 48 points, the burden was categorized as no to mild burden, mild to moderate burden, and high burden (0 – 10, 11 – 20, and 21 – 48 points, respectively). In this study, a high internal consistency reliability was found with Cronbach's alpha coefficient of 0.91.

Participant ethical protection

The research proposal got approval from IRB in BUU (G-HS047/2564) and IRB in the First Affiliated Hospital of Wenzhou Medical University (2021-072). The participants were informed about objectives, process, and voluntary and confidentiality nature of the study. Written informed consent was obtained. No participation or withdrawal from the study at any time could be done without negative consequences on the care they received.

Data collection procedures

While family caregivers and post-stroke persons were being registered at the OPDs for follow-up, the registered nurse in charge inquired about the caregiver initial interest to

participate in the research study, then introduced tentative participants to the researcher. After identifying the eligible criteria and completing the process of obtaining consents, the researcher interviewed the participants with the questionnaires in a private room for 40 - 50 minutes while their post-stroke persons were taken care of by nurses in another room. After the interview was done, the researcher gave a small gift to participants to appreciate their contribution.

Data analysis

Descriptive statistics including frequency, percentage, mean (M) and standard deviation (SD) were used to describe demographic characteristics, independent and dependent variables. Standard multiple regression applying enter method was used to examine the predicting factors of caregiver burden among family caregivers. Statistical significance was set at a type I error of 5%. All statistical analyses were performed using the software program SPSS 26.

Results

Of the 101 family caregivers, their age ranged from 28 to 72 years with a mean age of 48.76 (Table 1). Most of them were female (67.4 %), and married (67.8%), with Buddhism (85.1 %), and 64.4% lived with 2 members in the same household. More than half (56.7%) were employed. The mean duration time for taking care of stroke person was 8.11 hours per day. 50.5% of family caregivers reported their monthly family income of 2,000 - 4,500 Yuan/ month (\$314 - \$707). 87.5% took care of post-stroke persons at the time of the patients' admission and 82.8% had secondary family caregivers. Before they took the caregiver role, 69.3% did not receive stroke caregiving information and 76.2 % did not receive caregiving training from health care professional or others (Table 1).

For all post-stroke persons, their age ranged from 38 to 90 years old with a mean of 65.06 years. The majority of them were male (63.4%), married (69.9%), with medical insurances for healthcare payment (88.9%), diagnosed with ischemic stroke (86.1%), and with co-morbidities (80.6%) including hypertension, heart disease, and diabetes mellitus (Table 2).

Family caregivers had a burden with a mean score of 18.29 (SD = 4.9) indicating that family caregivers had mild to moderate burden. The majority of them had a mild-to-moderate burden (54.5%), followed by high level (36.6%) and no-to-mild level burden (8.9%) (Table 3).

Table 1 Demographic characteristics of family caregivers

(N = 101).

Characteristics	N	%
Gender		
Female	68	67.4
Male	33	32.6
Age (M = 48.76, SD = 10.42, min = 28, max = 72)		
28- 40	19	18.9
41-60	67	66.7
61-72	15	14.4
Religion		
Buddhism	86	85.1
Christian	14	13.8
No religion	1	1.1
Relationship with stroke patient		
Wife	36	35.6
Daughter	28	27.8
Husband	8	7.9
Son	19	18.9
Others: mother, elder sister, younger sister	10	9.8
Marital status		
Single	11	11.1
Married	69	67.8
Divorced/ separated	13	13.3
Widowed	8	7.8
Occupation		
Employed	57	56.7
Unemployed	32	32.2
Retired	12	11.1
Family member		
1	18	17.8
2	65	64.4
≥ 3	18	17.8
Monthly income of family (Yuan/ month)		
< 2,000	9	8.9
2,000 - 4,500	51	50.5
4,500 - 6,000	19	18.8
6,000 - 8,000	13	13.1
> 8,000	9	8.7
Total hours per day for taking care patient (M = 8.11, SD = 2.55, min = 4, max = 16)		
1-5	11	11.1
6-10	72	71.1
11-15	16	15.6
16-20	2	2.2
Secondary caregiver		
Yes	84	82.8
No	17	17.2
Take care of post-stroke persons at admission period		
Yes	88	87.5
No	13	12.5
Source of information received before took caregiver role		
No	70	69.3
Yes*	31	30.7
Doctor	11	5.4
Nurse	12	5.6
Friend	19	9.4
Website	21	10.3
Source of care-giving skill training received before took caregiver role		
No	77	76.2
Yes*	24	23.8
Doctor	11	5.8
Nurse	15	8.0
Friend	19	10.0

* Each family caregiver can answer more than 1 item.

Table 2 Demographic characteristics of post-stroke

persons (N = 101).

Characteristics	N	%
Gender		
Female	37	36.6
Male	64	63.4
Age (M = 65.06, SD = 12.03, min = 38, max = 90)		
38 - 40 (adult)	1	1.1
41 - 60 (middle age)	36	35.5
≥ 60 (elderly)	64	63.4
Religion		
Buddhism	88	87.2
Christian	12	11.7
No Religion	1	1.1
Marital status		
Single	2	2.2
Married	71	69.9
Divorced/separated	16	15.6
Widowed	12	12.3
Stroke type		
Ischemic stroke	87	86.1
Hemorrhagic stroke	12	11.9
Ischemic & Hemorrhagic stroke	2	2.0
Source of payment		
Self-paid	11	11.1
Medical insurance	90	88.9
Co-morbidity		
No	20	19.4
Yes*	81	80.6
Hypertension	52	39.9
Diabetes mellitus	21	15.7
Heart disease	15	11.2
Allergy	4	3.0
Kidney	3	2.2
Skin diseases	3	2.2
Dementia	2	1.4
Hyperlipidemia	2	1.4
Gout	2	1.4

* Each post-stroke persons had more than 1 co-morbidity.

Table 3 Level of family caregiver burden (N = 101).

Score of caregiver burden	N	%	Level of caregiver burden
7 - 10	9	8.9	No to mild burden
11 - 20	55	54.5	Mild to moderate
21 - 26	37	36.6	High

Possible score: 0 – 48; Actual score: 7 – 26; mean = 18.29, SD = 4.9

Table 4 Scores of health status, amount of activities and mutuality of the family caregivers (N = 101).

Variables	Range		Mean	SD
	Possible score	Actual score		
Caregiver health status	0 - 100	23.38 - 81.25	43.1	12.0
Caregiver amount of caregiving activities	0 - 87	34 - 73	50.7	10.1
Caregiver mutuality	0 - 60	34 - 59	47.7	6.1

Table 5 Correlation matrix among the variables (N = 101).

	Health status	Amount of activities	Mutuality	Burden
1. Caregiver health status	1			
2. Caregiver amount of caregiving activities	-0.44**	1		
3. Caregiver mutuality	0.39**	-0.37**	1	
4. Caregiver burden	-0.65**	0.67**	-0.64**	1

* P-value < 0.01.

Among individual aspects of caregiver burden, the highest mean score was the amount of activities (50.7 ± 10.1 points), followed by mutuality (47.7 points), and health status (43.1 points) (Table 4).

Caregiver burden was significantly, positively correlated with caregiver amount of caregiving activities ($r = 0.67$) and was significantly negatively correlated with caregiver mutuality

($r = -0.64$) and caregiver health status ($r = -0.65$) (P-value < 0.01 for all) (Table 5).

It was found that caregiver health status, caregiver amount of caregiving activities, caregiver mutuality explained 70% of variance in caregiver burden among family caregiver ($F = 71.64$, P-value < 0.001). Among the three factors, caregiver amount of caregiving activities ($\beta = 0.39$) was the best predictor, followed by caregiver mutuality ($\beta = -0.36$) and caregiver health status ($\beta = -0.33$) (P-value < 0.001 for all) (Table 6).

Table 6 Influencing factors of caregiver burden among the participants (N = 101).

Predicting variables	B	SE	β	t	P-value
Caregiver health status	-0.02	0.003	-0.33	-5.29	< .001
Caregiver amount of caregiving activities	0.19	0.030	0.39	6.30	< .001
Caregiver mutuality	-0.29	0.04	-0.36	-6.10	< .001

Constant = 28.62, $F = 71.64$, P-value < 0.001, $R^2 = 0.71$, R^2 (adj) = 0.70.

Discussions and Conclusion

The findings of the study indicate that the family caregivers perceived caregiving as a mild to moderate level of burden. The reasons for these findings can be enumerated in terms of demographic characteristics of the family caregivers, post-stroke persons and Chinese culture.

Family caregivers provided care to post-stroke persons who had a Modified Barthel Index [MBI-C] 40-60, it meant that the stroke patients could partially perform their daily activities and family caregivers needed to support ADLs for post-stroke persons, and this is the first period of time caregivers take the caregiving role.

In this study, all post-stroke persons remained disabled which made them unable to fully take care of themselves. With the Modified Barthel Index scores of 40 – 60 points, it means that they need partial assistance in daily life activities. Family caregivers therefore need to support the persons. Providing care for these persons could make family caregivers being stressful, and can lead to burden.²⁹ Furthermore, the majority of caregivers in this study was female which is weak in physical activities and more likely to suffer from physical impact from caring.³⁰ All of these could contribute to the family caregiver burden. Lack of caregiving-related information or training from healthcare system before taking caregiver role can cause caregiver burden. More than half of family caregivers did not have caregiving related information or training before taking the caregiving role, so family caregivers

need to continuously adjust themselves to deal with providing care to post-stroke persons, they may suffer caregiver burden.^{26,31} Moreover, 50.5% of family caregivers reported low monthly income, about 2,000 - 4,500 Yuan/ month (or \$314 - \$707) and 56.7% of the family caregivers were employed. All of these economic statuses force them to dedicate extra energy, time, and money to improve the post-stroke persons' conditions, and may create caregiver burden.

However, in Chinese culture, sick persons are respectful and are looked after at home.⁴ Families had a close relationship with sick persons and knowing their sick relatives well. Family caregivers may also get some support from secondary caregivers.¹⁹ This may lead to perceive mild to moderate caregiver burden.

The findings of the study revealed that caregiver burden was predicted by caregiver health status ($\beta = -0.33$, P-value < 0.001), caregiver amount of caregiving activities ($\beta = 0.39$, P-value < 0.001) and caregiver mutuality ($\beta = -0.36$, P-value < 0.001). All the variables explained 70% of the variance in caregiver burden.

Caregiver health status significantly predicted caregiver burden. According to transitions theory, caregiver general health status is considered a transitions condition affecting patterns of response of family caregivers. Possession of good general health status is regarded as a successful transitions condition and could result in lower caregiver burden; while poor health status could be an inhibitor which could lead to unhealthy and ineffective patterns of response, including caregiver burden.

In this study, family caregivers did not have good health status with a mean score of 43.1 (SD = 12.0) which led them to a greater perceived caregiver burden. This was because the stressful task of taking care may lead caregivers to be unable to cope with the new transition situation by themselves. This could make them more stressed and therefore affect their health status and bring the caregiver burden. This research finding is in congruence with the previous studies which found that the low general health status of family caregivers was strongly associated with a high caregiver burden ($r = -0.839$, P-value < 0.01).²⁸ Similarly, another study found negative correlation was observed between burden and general health status ($r = -0.394$, P-value = 0.031).¹¹ Moreover, a study also found that providing care for stroke patients may negatively affect caregivers' health and make them burdened, especially when they did not feel healthy.²¹

Theoretically, the amount of caregiving activities is considered as transition condition factors affecting transitions response of family caregivers. In this study, caregiver amount of caregiving activities was at moderate to a high level. When providing care, if caregiver amount of caregiving activities spends more time and energy, it will reduce family caregivers' personal daily activities for themselves. Caregivers' life may be affected more when they have to spend less time for daily activities for providing more care. This could inhibit the family caregiver's ability to successfully transition and lead them to increased caregiver burden.

Similarly, a study demonstrates that the burden is more on family caregivers who are providing more caregiving activities for post-stroke persons.²⁷ Moreover, the level of caregiver burden is influenced by the number of caregiving activities the family caregivers perform for their post-stroke persons. The more caregiver amount of caregiving activities performed, the more caregiver burden of those family caregivers of post-stroke persons feels.¹⁶

Caregiver mutuality is one of the factors which is reported as a potent predictor of caregiver burden in this study. According to transitions theory, caregiver mutuality acts as transitions condition factors affecting patterns of response of family caregivers. In Chinese culture, after being discharged from the hospital, most of the post-stroke persons live with their family. Family caregivers had a close relationship with post-stroke persons and the family caregiver is responsible for taking care of them. Family caregivers try to make the best of their abilities in providing care and positively cope with the new transition.² Although caring for post-stroke persons may lead to caregiver burden, mutuality acts as positive transition condition and facilitate successful transition resulting in healthy and effective patterns of response. This could result in a mild to moderate level of caregiver burden in our study.

A study showed that family caregivers who have high mutuality have lower levels of caregiver burden.¹⁶ Likewise, other studies showed that lower family relationship was associated with a higher caregiver burden.^{31,32} In addition, another study found that the family caregiver's mutuality between the family caregiver and post-stroke persons was significantly associated with caregiver burden ($\beta = -1.10$; 95% CI = -1.47 to -0.72; P-value < 0.001).³³

Based on our findings and study conduct, intervention research to reduce caregiver burden at the first three months of caring are suggested. Moreover, longitudinal studies to

access caregiver burden at three months, six months and one year should be conducted.

In conclusion, our present study revealed that the caregiver burden of family caregivers at three months after providing care for post-stroke persons was at a mild to moderate level. Additionally, caregiver health status, caregiver amount of caregiving activities, and caregiver mutuality can predict caregiver burden. So, nurse and other health care providers should be concerned about the caregiving situation in this transition phase and need to assess caregiver burden. Moreover, this research result provided the basis information for developing an appropriate nursing intervention to reduce caregiver burden of family caregivers by targeting caregiver health status, caregiver amount of caregiving activities, and caregiver mutuality.

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