

THE STRESS AMONG CAREGIVERS OF PATIENTS WITH CHEMOTHERAPY-TREATED CANCER IN NORTHEAST, THAILAND: A CROSS-SECTIONAL STUDY

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Received: March 24, 2021; Revised: April 24, 2021; Accepted: April 25, 2021

Abstract

This study aimed to determine the proportion of caregivers of cancer patients treated with chemotherapy who suffer from stress and the stress-related factors. A cross-sectional descriptive study was carried in caregivers of cancer patients being treated with chemotherapy at Srinagarind Hospital, Khon Kaen University (N=119). Self-administered questionnaires, including the Caregiver Strain Index and stress-related factors, were used. Stress-associated factors were performed by the multiple logistic regression. The prevalence of stress among caregivers was 37.8%. The factors that significantly increased risks of stress were work-related problems (Adjusted Odds Ratio (AOR): 3.59 (95% CI: 1.23-10.53)) and self-payment (AOR: 12.47 (95% CI: 1.05-148.20)). The protective factor was sufficient income (AOR: 0.30 (95% CI: 0.11-0.83)). In conclusion, approximately a third of caregivers of cancer patients treated with chemotherapy suffer from stress, then they should be considered a risk group, especially when they have those risk factors. So that they may need a mental health counseling or services to relieve their stress while staying in the hospital.

Keywords: Caregivers, Cancer, Cross-sectional study, Mental health, Risk factors, Stress

Introduction

Cancer is a chronic disease that is highly prevalent worldwide. Each year, the incidence of new cancer in all organs cases is more than a hundred per 100,000 populations (Torre *et al.*, 2016). A survey of cancer incidence in Thailand by the National Cancer Institute Cancer Registry Program

reported uniquely high incidences of some cancers (i.e., bile duct cancer), in addition to the global incidence mentioned above (Imsamran *et al.*, 2012; Bureau of Policy and Strategy, 2017). Some patients require routine hospitalization for chemotherapeutic treatment, each course of which can take

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a considerable amount of time. These factors potentially cause a stressful environment for both patients and their caregivers.

Cancer not only affects the health of the patient but of their family as well, especially the principal caregivers (Edward and Clarke, 2004; Meecharoen, 2014). The caregivers of cancer patients usually have several crucial roles, which vary depending on the progression of the disease from diagnosis until the end of the patient's life. They must cope with any changes that occur with the patients and also bear the emotional weight of the worry and fear that comes from the unpredictability of treatment and possible loss. This makes caregivers of cancer patients a risk group for developing stress, as well as other physical and psychological problems. Thus, they should not be neglected from the possible mental health problem, and research should explore whether their psychosocial problems are preventable.

There have been few studies of stress among caregivers of patients with cancer in Thailand (Aiadsuy *et al.*, 2013; Chindapasirt *et al.*, 2014; Naksukhum *et al.*, 2017), which may yield different results from those conducted in other industrialized and developing countries (Badr *et al.*, 2014). In addition to the conditions of the patients, the unique social, cultural, and environmental conditions in a region may also be associated with the psychological problems of caregivers (Chindapasirt *et al.*, 2014). Moreover, the cost of chemotherapy can be high, especially compared to the average income of people in Thailand. Therefore, this study aims to explore the proportion of caregivers of chemotherapy-treated cancer patients who suffer from stress and to investigate any related factors that may be preventable. As caregivers are key sources of psychological support and influence the quality of life of patients, it is important to prevent psychological problems, such as stress, in this group. Better understanding of the magnitude of stress and its associated factors in this group may lead to more effective strategies for the prevention and promotion of their mental health.

Materials and Methods

Study Designs

This was a cross-sectional descriptive study.

Population, Sample and Sampling Method

The target population was caregivers of patients with cancer who met the following inclusion criteria: (1) the subject was a caregiver of a patient with cancer who was diagnosed by a physician and receiving chemotherapy at

the Chemotherapeutic Ward (IPD) or Day Chemotherapy Unit (OPD) of Srinagarind Hospital in Khon Kaen University's Faculty of Medicine and (2) the subject was at least 18 years old. Exclusion criteria were communication problems (i.e., inability to understand the questionnaire), visual or auditory disabilities, and inability to communicate in Thai language.

The sample size was calculated using WinPepi software Version 11.65 with a 95% confidence interval and 10% acceptable difference of assumed proportion. The assumed proportion was 0.7 based on previous reports (Aiadsuy *et al.*, 2013; Chindapasirt *et al.*, 2014; Naksukhum *et al.*, 2017). The target population size was calculated from the number of visiting patients within the allocated time frame of 220 cases. The expected loss was of 20%. The final sample size was 119 caregivers. The study population was randomly sampled using time frame allocation as a sampling unit (Jirawatkul, 2004).

Study tools

The self-administered questionnaire consisted of three parts: (1) caregiver's personal information, (2) Caregiver Strain Index (CSI), and (3) stress-related factors. The questionnaire was proven for validity by two independent experts and tested for reliability using Cronbach's alpha coefficient with a reliability value of 0.88. Stress was determined using the CSI (Robinson, 1983), which had been translated into Thai language by Siriphan Sasat (Sasat, 1998). The CSI consisted of 13 questions in 4 domains: physical and emotional strain, social strain, financial strain, and occupational strain. A total score of more than seven indicated that the responder was suffering from stress. The full questionnaire (Thai language) is shown in Supplementary Material S1.

Data collection

All data collectors were trained in the standardized data collection methods adopted by this study. Data were collected within the allocated time frame (January 2018) at the chemotherapeutic ward and day chemotherapy unit in Srinagarind Hospital, which is part of Khon Kaen University's Faculty of Medicine.

Databases and Data analysis

The databases were processed by independent double data entries and corrected using Epi Info software Version 3.5.1. The descriptive and analytical statistics were analyzed using IBM SPSS Statistics software Version 19. Statistical correlation between stress and various variables (caregivers' personal factors and patient-related factors) were performed by the chi-square test and independent t-

test. Stress-associated factors were performed by the multiple logistic regression. The results were considered statistically significant when $p < 0.05$.

Ethical issue

The study protocol was approved by the Khon Kaen University Ethics Committee in Human Research (HE601485) based on The Declaration of Helsinki and ICH-Good Clinical Practice Guidelines.

Results and Discussion

A total of 119 subjects were recruited in our survey, 77 were collected from females (64.7%), aged 18-75 years with the mean age of 47.4 ± 13.8 years. The majority (75.6%) of them were married. Thirty-five percent of participants had completed the primary school. The principal occupations in these participants were agriculturist (35.6%), governmental officer (26.3%), and merchandise (14.4%). The personal monthly income varied from 600-300,000 Baht. Demographic data and personal characteristics are shown in Table 1.

Proportion of caregivers who suffered from stress

Of the 119 caregivers who responded to the questionnaire, 37.8% ($n=45/119$; 95% CI: 29.1-46.5) reported that they experienced higher than the basal level of stress (CSI score > 7). The results of responding to CSI were shown in Table 2. More than half of caregivers for patients receiving treatments in the In-Patient Department (IPD) experienced most of each stress-related item of CSI, whereas the proportion of caregivers of patients in the Out-Patient Department (OPD) showed less proportion for the same stress-related experience.

The proportion of caregivers who suffered from stress was fewer than expected and differed from the results found in previous studies conducted in Thailand (Aiadsuy *et al.*, 2013; Chindaprasirt *et al.*, 2014; Naksukhum *et al.*, 2017) and in the US (Badr *et al.*, 2014). The fact that the proportion of caregivers of patients with cancer who suffer from stress in the present study differed from those found in previous reports might be due to differences in target populations. In this study, the caregivers of both OPD and IPD patients were recruited. It has been suggested in previous reports that caregivers of IPD patients are more likely to suffer from stress

Table 1. Demographic and personal data of subjects.

Demographic Variables	n	%
Age (117)		
Mean	47.4 $\pm$ 13.8	years
Maximum 75 years, Minimum 18 years		
Gender (119)		
Male	42	35.3
Female	77	64.7
Marital Status (119)		
Single	21	17.6
Married	90	75.6
Widow/Divorced	8	6.7
Education (119)		
Primary school	42	35.3
High school/Diploma	37	31.1
Bachelor degree or above	40	33.6
Current resident of Khon Kaen Province (119)		
Yes	19	16.0
No	100	84.0
Main occupation (118)		
Agriculture	42	35.6
Governmental officer	31	26.3
Merchandise	17	14.4
Self-employed or freelancer	14	11.9
Private company employee	7	5.9
Other (including student and unemployed)	7	5.9
Sufficiency of income (113)		
Sufficient	59	52.2
Insufficient	54	47.8
Underlying disease (119)		
At least one disease	46	38.7
None	73	61.3
Monthly income (105)		
Median (interquartile range)	10,000 (19,500)	Baht
Maximum 300,000 Baht, Minimum 600 Baht		

Table 2. Proportion of Caregivers of IPD and OPD patients who had experienced each item of Caregiver Strain Index (CSI).

Caregiver Strain Index (N=116)	IPD (%) N=41	OPD (%) N=75
Feeling completely overwhelmed	73.2	52.0
There have been other demands on my time	61.0	49.3
There have been work adjustments	51.2	52.0
Some behavior is upsetting	58.5	46.7
It is a financial strain	36.6	40.0
It is inconvenient	53.7	44.0
There have been family adjustments	61.0	34.7
Sleep is disturbed	58.5	33.3
It is upsetting to find patient has changed so much from his/her former self	53.7	32.0
There have been changes in personal plans	61.0	28.0
It is a physical strain	65.9	20.0
It is confining	46.3	16.0
There have been emotional adjustments	39.0	16.0

than those of OPD patients (Haun *et al.*, 2014). It is in agreement in the present study that caregivers of patients receiving treatment at OPD were likely less experienced with each item of stress situation of CSI. In addition, this study randomly collected data *via* time-frame allocation, whereas most of the previous reports used purposive sampling of caregivers of patients admitted to hospital wards (Aiadsuy *et al.*, 2013; Naksukhum *et al.*, 2017). The study tool of the present study was also different from the previous reports in which the stress in our study was more objectively evaluated by scoring systems to reduce the bias of responders and data collectors. This might be another factor influencing the different results from other previous studies. However, there are few studies available that have examined stress in caregivers of cancer patients in Thailand, making the real proportion of caregivers suffering from stress in the general population difficult to estimate. Moreover, as stress is influenced by various individual physical, mental, psycho-social, and spiritual factors, the proportion of caregivers experiencing stress in one community may not be the same in other contexts. The present study demonstrated for the first time that the proportion of caregivers of patients with cancer suffering from stress in northeastern Thailand might be different from those in other regions of the country or other countries. This may be due to unique cultural circumstances and backgrounds of people in this area.

The proportion of stress among caregivers in this study differed from that found in a report by Aiadsuy *et al.* (2013), which studied caregivers of patients with brain tumors in one tertiary care center in Thailand. They reported on the proportion of stress among 62 caregivers of patients with brain tumors awaiting neurosurgery using a purposive sampling method in the surgical ward. The proportion of stress caused by provision of care, including caregiving demands resulting from the

pathology of the brain tumors, was 72.8%, which was the highest frequency found among the causes of stress examined in their study. This suggests that the high proportion of caregivers suffering from stress in this study may be the result of the sampling method that was employed, which was to enroll caregivers of admitted patients awaiting major surgery on a vital organ. These caregivers would likely be more prone to suffer from stress than those in other circumstances. Another study, conducted by Naksukhum *et al.* (2017), demonstrated the prevalence of stress among 46 mothers of pediatric cancer patients receiving chemotherapy in a tertiary care center in Thailand. They found some of the causes of stress in these subjects had similar frequencies to those in the present study, namely (1) their children undergoing an operation such as lumbar puncture, bone marrow biopsy, or venipuncture and (2) difficulty affording food and hospital stay or follow-up treatment. However, a study conducted by Naksukhum *et al.* (2017) assessed the stress of caregivers by asking them directly about their stress. The proportion of caregivers who had stress in this study is similar to the proportion of caregiver burden (37%) in caregivers of older cancer patients studied by Chindaprasirt *et al.* (2014). Comparing with the report of Chindaprasirt, our results suggested that the age of patients may not directly associated with stress in caregivers but the patients' issue and the personal factors of caregivers seemed more matter. Moreover, the greatest proportion of stress characteristic reported by caregivers in our study is the feeling of overwhelming. This observation may suggest that a subgroup of caregivers who had developed stress in our model assessed by CSI were prone to have a caregiver burden. These caregivers were a risk group to have a negative mental health outcome if there was no appropriate prevention strategy.

A study conducted by Badr *et al.* (2014) in 49 caregivers of patients with head and neck cancer who were undergoing radiotherapy found that 77% of caregivers had significantly high stress levels. On the other hand, a study conducted by Haun *et al.* (2014) in caregivers of patients with cancer in both the OPD and IPD, which assessed stress using the Questionnaire on Distress in Cancer Patients-Short Form, reported that the proportion of stress in caregivers was 52%. The latter study also demonstrated that the caregivers of IPD patients were prone to have stress more than those of patients in the OPD (Haun *et al.*, 2014). In the present study, we included the caregivers of cancer patients from both OPD and IPD departments and found that the proportion of caregivers who were suffering from stress is slightly less than what has been reported in other countries.

Given that all aforementioned studies were conducted in a tertiary care center or medical school

affiliated hospitals, the results, thus, were comparable to the present study. These data suggested that the different proportion of stress among caregivers of cancer patients in our study and the others might not be related to the hospital setting, but likely associated with other factors that we were also investigated in the next step.

Factors associated with stress in caregivers

The caregivers' personal factors possibly related to the stress are shown in Table 3. The insufficiency of income was significantly related to the stress ($p=0.004$) as shown in Table 3. The patient factors significantly related to stress in caregivers were (1) type of visit ($p=0.003$), (2) patients requiring help in toileting ($p=0.006$), (3) having other work to do during care ($p=0.020$), (4) self-payment ($p=0.032$), and (5) work-related problems ($p=0.001$) as shown in Table 4.

Table 3. Caregivers' personal factors and their relation to stress.

Caregivers' personal factors	n (%)		p-value
	Stress	Non-stress	
Age (117)			
Mean $\pm$ SD	48.3 $\pm$ 14.2	46.8 $\pm$ 13.6	0.728
Gender (119)			
Male	17 (40.5)	25 (59.5)	0.658
Female	28 (36.4)	49 (63.6)	
Marital Status (119)			
Single	9 (42.9)	12 (57.1)	0.870
Married	33 (36.7)	57 (63.3)	
Widow/Divorced	3 (37.5)	5 (62.5)	
Education (119)			
Primary school	19 (45.2)	23 (54.8)	0.365
High school/Diploma	11 (29.7)	26 (70.3)	
Bachelor degree or above	15 (37.5)	25 (62.5)	
Current residence (119)			
Khon Kaen Province	5 (26.3)	14 (73.7)	0.259
Other Province/Other country	40 (40.0)	60 (60.0)	
Main occupation (118)			
Agriculture	18 (42.9)	24 (57.1)	0.125
Governmental officer	15 (48.4)	16 (51.6)	
Merchandise	2 (11.8)	15 (88.2)	
Self-employee or freelancer	5 (35.7)	9 (64.3)	
Private company employee	3 (42.9)	4 (57.1)	
Other (including student and unemployed)	1 (14.3)	6 (85.7)	
Sufficiency of income (113)			
Sufficient	14 (23.7)	45 (76.3)	0.004**
Insufficient	27 (50.0)	27 (50.0)	
Underlying disease[#] (119)			
At least one disease	18 (39.1)	28 (60.9)	0.814
None	27 (37.0)	46 (63.0)	

* $p<0.05$, ** $p<0.01$

[#] Underlying disease was defined as Hypertension, Type 2 Diabetes Mellitus, Allergic rhinitis, Gastritis, Any heart diseases (rheumatic heart disease, cardiomyopathy, etc.)

Hyperthyroidism, Asthma, Chronic obstructive pulmonary disease, Dyslipidemia
Gout, Hemorrhoid, Migraine, Myofascial pain syndrome, or Psoriasis.

Statistical analysis found six factors that were significantly associated with stress in caregivers ($p < 0.05$), as follows: (1) sufficient income, (2) patient being in the IPD, (3) having other work to do during caregiving, (4) having work-related

problems (e.g., having to take leave or resign from their current jobs), (5) patient dependence with regard to toileting, (6) self-payment for healthcare service. Crude odds ratios (OR) are shown in Table 5.

Table 4. The patient-related factors and their relation to stress.

The patient-related factors	n (%)		p-value
	Stress	Non-stress	
Type of visit (116)	23 (56.1)	18 (43.9)	0.003**
Inpatient Department	21 (28.0)	54 (72.0)	
Out Patient Department			
Relationship to the patient (118)			0.669
Parent	8 (38.1)	13 (61.9)	
Child	11 (37.9)	18 (62.1)	
Spouse	17 (43.6)	22 (56.4)	
Sibling	3 (42.2)	4 (57.1)	
Other relative	6 (33.3)	12 (66.7)	
Friend	0 (0)	4 (100)	
Mobility (118)	31 (33.7)	61 (66.3)	0.071
Independent	14 (53.8)	12 (46.2)	
Requires assistance			
Eating (118)	27 (42.2)	37 (57.8)	0.333
Independent	18 (29.5)	36 (59.0)	
Requires assistance			
Grooming (118)	36 (36.4)	63 (63.6)	0.380
Independent	9 (47.4)	10 (52.6)	
Requires assistance			
Toileting (118)	24 (29.6)	57 (70.4)	0.006**
Independent	21 (56.8)	16 (43.2)	
Requires assistance			
Caring for patient prior to admission (118)			0.233
Yes	37 (41.1)	53 (58.9)	
No	8 (28.6)	20 (71.4)	
Other assisting caregivers (94)			0.960
Two or more assistants	17 (41.5)	24 (58.5)	
One assistant	11 (40.7)	16 (59.3)	
None	11 (42.3)	15 (57.7)	
Duration of care prior to admission (80)			0.514
less than five months	19 (48.7)	20 (51.3)	
five months or more	17 (41.5)	24 (58.5)	
Duration of caring each day (77)			0.407
less than six hours	14 (36.8)	24 (63.2)	
six hours or more	18 (46.2)	21 (53.8)	
Having other work to do during care (117)			0.020*
Yes	20 (52.6)	18 (47.4)	
No	24 (30.4)	55 (69.6)	
Payment (118)			0.032*
Self-payment	5 (83.3)	1 (16.7)	
Health insurance (Universal Coverage, Social Security Scheme, Governmental or State Enterprise Officers)	40 (35.7)	72 (64.3)	
Work-related Problems (118)			0.001**
None	21 (26.5)	58 (73.4)	
Forced to take leave	20 (64.5)	11 (35.5)	
Forced to resign	3 (37.0)	5 (62.5)	

* $p < 0.05$, ** $p < 0.01$

Table 5. Factors associated with stress in caregivers.

Variable	Crude odds ratio	Adjusted odds ratio	95% CI	p-value
Sufficient income	0.31	0.30	0.11-0.83	0.021*
Patients being in the IPD	3.29	2.51	0.94-6.72	0.066
Having other work to do during caregiving	2.55	2.66	0.99-7.16	0.052
Having work-related problems	5.02	3.59	1.26-10.53	0.020*
Patient dependence with regard to toileting	3.12	1.09	0.36-3.32	0.880
Self-payment	9.00	12.47	1.05-148.20	0.046*

* $p < 0.05$

Only three factors were found to be significantly associated with caregiver stress according to multivariate analysis and, thus, considered as independent risk or protective factors. The risk factors were (1) work-related problems (adjusted OR 3.59, 95% CI 1.26-10.53) and (2) self-payment for healthcare service (adjusted OR 12.47, 95% CI 1.05-148.20), and the independent protective factor was having sufficient income (adjusted OR 0.30, 95% CI 0.11-0.83; Table 5).

The factors associated with stress that were found in this study are similar to those found in studies of caregivers looking after patients with other chronic diseases in Thailand. For example, it has been found that the need for assistance in everyday activities is associated with stress in caregivers of stroke patients (Prombut *et al.*, 2014; Khomkam *et al.*, 2015), insufficient income is associated with stress in caregivers of patients with chronic kidney disease (Penlap and Rungnirundorn, 2016) and having other work to do during caregiving is associated with stress in caregivers of bedridden patients and in head and neck cancer patients (Balfe *et al.*, 2016; Boonvas *et al.*, 2017). Our results were also in agreement with the others that general demographic data, i.e., gender, age, marital status, level of education, occupation, etc., of caregivers, do not associated with stress of caregivers of other chronic diseases in previously mentioned studies. The present study also explored the association between type of payment and stress of caregivers. Every Thai citizen has at least one type of basic health insurance supported by Thai government, which include (1) insurance for government or state enterprise officers, (2) social security, and (3) universal coverage; a basic type of insurance for all Thai citizens who do not possess either of the former two. Patients with any of these types of health insurance do not need to pay for healthcare services, and the hospital bills the health insurer directly. It is well known that the health insurance for government and state enterprise officers is the most comprehensive, but none of these types of insurance were associated with stress in caregivers of patients with cancer. This might be due to the fact that all of these types of insurance cover the treatment. However, there was a significant association between self-payment (in non-Thai citizens or those with excessive costs beyond the payout limits of their insurance) and stress in caregivers. The prevalence of stress in caregivers of patients who must pay out of pocket was greater than in those whose treatment was fully covered by their insurance. This factor was an independent risk for stress among caregivers of patients with cancer.

This is the first study conducted in Thailand that identifies the prevalence of stress in caregivers of patients with cancer in both the OPD and IPD using probability-based sampling. The sample size was also larger than previous studies in caregivers of patients with cancer. However, this study had some limitations, namely (1) there were different proportions of caregivers of patients in the OPD and IPD (1.8:1) and (2) Srinagarind Hospital is a tertiary care center, meaning some patients were referred from other local or regional hospitals. This latter factor may have resulted in a higher probability that caregivers would suffer from stress, due to their being forced to travel long distances and stay in an unfamiliar place. Lastly, the unavoidable limitation by nature of cross-sectional descriptive study may take in to consideration in our study. The factors showed significantly related with stress in this study could not indicate the real causative effects. The other study designs are need to confirm our findings. However, these results may suggest the need mental health promotion at each hospital or healthcare center according to the social, cultural, and economic conditions of the region.

Conclusion

Approximately one-third of caregivers of patients with cancer who received chemotherapy at Srinagarind Hospital experienced significant levels of stress. The risk factors associated with stress were (1) work-related problems and (2) self-payment. Having sufficient income was found to be a protective factor. This knowledge of risk and protective factors associated with stress should be used to identify caregivers of cancer patients who were at risk and provide them with the appropriate mental health counseling. Moreover, healthcare centers or hospitals should not neglect caregivers' mental health during admission and visits, in addition to caring for the patients, themselves. The promotion of mental health would benefit this group of people and may direct or indirectly influence the effectiveness of patients' cancer therapy.

Acknowledgments

We would like to thank Assoc. Prof. Dr. Capt. Siriphan Sasat, Faculty of Nursing, Chulalongkorn University, Bangkok, Thailand, for providing a Thai version of the CSI and Assoc. Prof. Kosin Wirasorn, M.D., Division of Medical Oncology, Department of Medicine, Faculty of Medicine, Khon Kaen University for his comments and suggestion on the

research conduction. We are grateful to the head nurses at Srinagarind Hospital's chemotherapeutic ward and day chemotherapy unit for facilitating the data collection. In addition, we would like to thank all of the subjects who participated in this study. The English in this manuscript was proofread and edited by Dr. Dylan Southard via the Khon Kaen University Faculty of Medicine Publication Clinic. CS is an awardee of Prince Mahidol Award Youth Program of the year 2018 (PMAYP-10612), from Prince Mahidol Award Foundation under the royal patronage of HM the King of Thailand and also supported by Long-term Preclinical Staff Development Program of Faculty of Medicine, Khon Kaen University.

Declaration of interest statement

All authors declare that they have no conflict of interest.

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