Original Research

Fatigue Influence Factors and Coping Strategies among Cancer Patients' Spouses: A Quantitative Study in China

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The objective of this study aimed to: 1) identify how demographic variables, coping style, and psychological symptoms affect fatigue in Cancer Patients' Spouses, and 2) explore the relationship between fatigue and coping style in cancer patients' spouses. The methods used in this study include cross-sectional study design. 314 cancer patients' spouses were recruited from the northeast part of China. Participants completed a socio-demographic form, Symptom Checklist-90, Trait Coping Style Questionnaire, and Fatigue Scale-14. Multiple linear stepwise regression analyses were used to test fatigue affect factors.

Summarily, the demographics information show that the majority of the participants were middle age, most of whom (64%) age range 41-60. Cancer type include lung (30.3%), colorectal (13.7%), stomach (12.4%), breast (27.4%), etc. Significant predictors for fatigue are financial burden (β = -0.30, *P* < 0.001), current poor health (β = -0.22, *P* < 0.001), care-giving time (β = 0.12, *P* = 0.031), age (β = 0.12, *P* = 0.042), obsessive-compulsive (β = 0.34, *P* = 0.014), somatization (β = 0.37, *P* = 0.004), hostility (β = -0.25, *P* = 0.005), negative coping (β = 0.25, *P* < 0.001), positive coping (β = -0.14, *P* = 0.005), and positive coping is the predictor for lower fatigue (β = 0.20, *P* = 0.008).

The conclusion of this study is that the fatigue experienced by cancer patients' spouses is related to factors such as demographic variables, coping style, and psychological health; positive coping may be a mediator between mental fatigue and psychological symptoms.

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INTRODUCTION

A cancer diagnosis and subsequent treatment are extremely stressful for both patients and their family members. Spouses often serve as the primary caregivers for cancer patients, and fatigue is prevalent among them.[1] A long-term care system for cancer patients has not been well-established in China. In addition, because of a nurse shortage in China, family members, in particular the patients' spouses, usually assume the major caregiving responsibility during both the acute and home care stages of the patients' illness. In addition to spouses' care-giving responsibilities, spouses may also need to deal with their own health problems. Thus, cancer could have severe impacts on both patients' and their spouse caregivers' lives, often resulting in an increase in tension, pressures, and psychological diseases, and a decline in personal welfare and well-being.[2] Caregivers experience fatigue, insomnia, anxiety, anorexia, and depression, previous finding reports that caregivers of cancer patients face significant fatigue burden.[3]

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Recent reviews on the impacts of caregiving have also identified fatigue, sleep disturbances, and less physical strength as common physical problems among caregivers;[4] fatigue in caregivers of patients with cancer is also common but is not as well understood.

Because of the magnitude of the sacrifices made and services provided by the family caregivers, the psychological health of cancer patients' spouses has been recognized as a serious public health concern.[5] In fact, patients consider their family members not only the most valued source of support but also the greatest source of concern.[6] In the course of cancer survivorship, patients and spouse caregivers participate in treatment regimens, health maintenance, self care, management of symptoms, and follow-up with the healthcare team, and deal with the fear and uncertainty of long-term illness.[7] Caregivers are vulnerable to clinical levels of depression, sleep disturbances, and fatigue, which may negatively affect their ability to provide care and support [8] and exacerbate patient distress.[9] Positive behavioral and psychological relationship between wives and husbands, and recommended that coping style should be further explored in the caregivers of cancer patients, coping style in this group of

caregivers is different from people with no cancer. Research has shown that positive or negative coping of the caregiver influences, in parallel, the functional status of the person with cancer as well as the caregivers' depression and perceptions of social support.[10]

The aim of this current study was to identify how selected personal characteristics, including coping style and psychological symptoms, affect fatigue in cancer patients' spouses, and explore the relationship between fatigue and coping style in cancer patients' spouses.

The following hypotheses were tested in this study:

1. Selected personal characteristics (e.g., gender, financial, educational level), coping style, and psychological symptoms would be the significant predictors for fatigue in cancer patients' spouses.

2. Cancer patients' spouses who used positive coping less frequently also experienced higher mental fatigue severity and more psychological symptoms.

METHODS

This was a cross-sectional, descriptive, comparative study using multiple self-reported questionnaires to test the above hypotheses regarding the cancer patients' spouses. Multiple linear regression analysis was used in this present study. Fatigue has been divided into three dimensions (total, physical, and mental fatigue), which is quantitative data and normal distribution. Adopt the method of stepwise regression analysis to determine which personal characteristics (gender, financial, educational), coping style (positive or negative), and psychological symptoms predicted for fatigue among the cancer patients' spouses.

Theoretical Framework

Lazarus and Folkman theoretical model [11] was used as a guide for this study. According to this model, stress results from an imbalance between an individual and their environment. Personal appraisal of an event or situation elicits coping and use of support resources, and these responses mediate the occurrence of a stress response. More specifically, stress will occur when there is a perceived discrepancy between the demands of the situation and there are sources available to deal with the stressor. The caregivers' use of coping strategies will be influenced by their cultural values and their own health outcomes. As it relates to this analysis, the Lazarus and Folkman model suggests that cancer as a stressor in the family will influence the physical and psychosocial well-being of cancer patients' spouses. More importantly, coping styles that involve personal and social resources will act as a buffer between fatigue and psychological symptoms.

Study Participants

A total of 314 cancer patients' spouses were recruited from Da Qing Oilfield General Hospital from November 2015 to May 2016. The inclusion criteria were: (1) had a spouse with cancer; (2) could read and write Chinese; and (3) voluntarily consented to participate. Participants were excluded if they had experienced a serious medical condition (e.g., heart, brain, lung, kidney, or other major diseases), were uncooperative, or who had a history of any mental illness.

Procedures

The study sample included spouse caregivers of cancer patients. The questionnaires were distributed to 330 spouses of cancer patients. Twelve participants dropped out because of reluctance to participate and four were excluded because the total missing data exceeded 10%.

Instruments

A researcher-developed demographic form and three psychological soundness instruments (described below) were used in this study. The demographic form was used to collect personal and family information, including gender, age (31-40, 41-50, 51-60, ≥ 61), education level (Primary school, Junior school, High school, University), family income (1000-2000 yuan, 2000-3000 yuan, 3000-4000 yuan, ≥ 4000 yuan), current health status (Good, Poor), care giving time in a day (3h, 5h, 8h, 10h), and financial burden (Very large, Larger, Smaller, None), cancer treatment (Surgery, Chemotherapy, Surgery + Chemotherapy/Radiation), patient's cancer diagnosis (Lung, Colorectal, Stomach, Breast, Others: Liver, Kidney, Ovarian).

Fatigue Scale (FS)

The Fatigue Scale-14 (FS-14) [12] was used to measure the study participants' fatigue severity in the past week. This is a 14-item dichotomized survey, and each question is a fatigue-related problem that requires participants to answer 'Yes' or 'No'. Two components, physical fatigue and mental fatigue, have been identified through factor analysis. Higher scores indicate higher fatigue severity. Its validity and reliability were tested in a Chinese population and reported by Xu;[13] the Cronbach's alpha for the subscale is 0.77. In the present study, the Cronbach's alphas for the spouses of cancer patients were 0.75.

Symptom Checklist

The Symptom Checklist-90 (SCL-90) [14] is a multidimensional self-report symptom inventory that is composed of 90 items from 1 (not at all) to 5 (extremely) and used to measure the symptoms the study participants experienced in the past 7days. Psychological symptoms are measured in terms of ten clinical subscales: Sleep, Psychoticism (PSY), Obsessive-Compulsive (OBS), Hostility, Interpersonal Sensitivity (INT), Anxiety, Phobic Anxiety (PHO), Depression, Paranoid Ideation (PAR), and Somatization. SCL-90 is a multidimensional self-report symptom inventory originally designed for use in medical, clinical, and non-clinical samples and based on the Hopkins Symptom Checklist. In present study Cronbach's alphas were 0.97 in cancer patients' spouses.

Trait Coping Style Questionnaire (TCSQ)

The TCSQ [15] is a 5-point Likert-type scale that consists of 20 items ranging from 1 (certainly) to 5 (certainly not). Construct validity confirmed two factors in the TCSQ: negative coping (NC) and positive coping (PC). NC and PC validity and reliability were tested in a Chinese population and reported by

Jiang,[16] with an α coefficient of 0.69 and 0.70, respectively. In the present study, the NC Cronbach's alphas for the cancer patients' spouses and the general population group were 0.74 and 0.76, respectively; the PC Cronbach's alphas for the cancer patients' spouses were 0.78.

Ethics Statement

This study was approved by the Medical Ethics Committee of Harbin Medical University. Researchers recruited the potential study participants from the research site as described in the previous section. All subjects were provided with written informed consent.

Methodology and Statistical Analysis

The Statistical Package for Social Sciences (SPSS), version 18.0, was used [17] for data analysis. Data were cleaned and examined for normality. Nonparametric data were converted to dummy codes. Statistics were computed for all demographic characteristics of the study participants. Mean scores and standard deviations were calculated for each scale and its subscales. Multiple linear regression analysis was used to determine which selected predictors significantly account for fatigue in the cancer patients' spouses. Descriptive data are presented as means and standard deviations. Two researchers were involved in data analysis to enhance the validity of data interpretation.

Table 1. Demographic Characteristics of cancer patients' spouses.

Variable	n (%)	Variable	n (%)
Gender		Education	
Men	159 (50.6%)	Primary school	39 (12.4%)
Women	155 (49.4%)	Junior school	94 (29.9%)
Age, y		High school	106 (33.8%)
31-40	54 (17.2%)	University	75 (23.9%)
41-50	106 (33.8%)	Caregiving time	
51-60	106 (33.8%)	3h	31 (9.9%)
≥ 61	48 (15.3%)	5h	38 (12.1%)
Family income		8h	54 (17.2%)
1000-2000,yuan	89(28.3%)	10h	191 (60.8%)
2000-3000,yuan	155 (49.4%)	Financial burden	
3000-4000,yuan	57 (18.2%)	Very large	123 (39.2%)
≥4000,yuan	13 (4.1%)	Larger	144 (45.9%)
Occupation		Smaller	30 (9.2%)
Worker	53(16.9%)	None	17 (5.4%)
Farmer	31(9.9%)	Patient's cancer diagnosis	
Civil servant	54(17.2%)	Lung	95 (30.3%)
Technologist	39(12.4%)	Colorectal	43 (13.7%)
Service people	38(12.1%)	Stomach	39 (12.4%)
Retired	70(22.3%)	Breast	86 (27.4%)
Other	29(9.2%)	Others (Liver, Kidney, Ovarian)	51 (16.2%)
Cancer treatment		Support by family members	
Surgery	32(10.2%)	Very good	256 (85.4%)
Chemotherapy	62(19.3%)	So good	35 (11.1%)
Surgery+Chemotherapy/Radiation	220(70.1%)	General	11 (3.5%)
Current health			
Good	220 (70.1%)		
Poor	94 (29.9%)		

Table 2. Correlation between Fatigue, Coping, and Psychological Symptoms in cancer patients' spouses.

Index	Depression	Anxiety	Hostility	Sleep	SOM	OBS	INT	PHO	PAR	PSY	PC	NC
Physical fatigue	0.26[b]	0.21[b]	0.10	0.26[b]	0.36[b]	0.29[b]	0.23[b]	0.15[b]	0.14[a]	0.22[b]	-0.26[b]	0.26[b]
Mental fatigue	0.34[b]	0.30[b]	0.18[b]	0.24[b]	0.29[b]	0.39[b]	0.20[b]	0.15[b]	0.15[b]	0.25[b]	-0.06	0.29[b]
Total fatigue	0.37[b]	0.31[b]	0.17[b]	0.32[b]	0.42[b]	0.41[b]	0.28[b]	0.19[b]	0.18[b]	0.29[b]	-0.22[b]	0.35[b]

Abbreviations: SOM, Somatization; OBS, Obsessive-Compulsive; INT, Interpersonal Sensitivity; PHO, Phobic Anxiety; PAR, Paranoid Ideation; PSY, Psychoticism; PC, Positive coping; NC, Negative coping.
Note: a: $P < .05$, b: $P < .01$

Table 3. Multiple Stepwise Regression on Demographic Variables Influencing the Total Fatigue, Physical Fatigue, and Mental Fatigue of the cancer patients' spouses.

Variables	B	SE	β	*t*	*p*
Total Fatigue					
Financial burden	-1.18	0.24	-0.30	-4.99[c]	< 0.001
Current health	-1.59	0.40	-0.22	-4.00[c]	< 0.001
Caregiver-time	0.39	0.18	0.12	2.17[a]	0.031
Physical Fatigue					
Financial burden	-1.01	0.18	-0.34	-5.69[c]	< 0.001
Current health	-1.26	0.30	-0.24	-4.23[c]	< 0.001
Support	0.61	0.28	0.12	2.18[a]	0.029
Mental Fatigue					
Family income	-0.28	0.14	-0.13	-2.03[a]	0.044
Caregiver-time	0.20	0.10	0.12	2.08[a]	0.038
Occupation	-0.11	0.05	-0.13	-2.28[a]	0.023

Note: c: $P < 0.001$ (compare with pre-rehabilitation value).

RESULTS

Sample Characteristics

The demographic information of the sample population shows that the majority of the participants were middle age, most of whom (78%) spent more than 8 hours each day taking care of their spouses, and of these participants (**Table 1**).

The correlation between fatigue and coping styles and psychological symptoms is detailed in **Table 2**. Positive coping is associated with less total fatigue, as well as less physical and mental fatigue. Psychological symptoms (e.g., Sleep, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Hostility, Psychoticism, Phobic Anxiety, Anxiety, Paranoid Ideation, and Somatization) are associated with higher total fatigue as well as higher physical and mental fatigue. Positive coping is associated with low mental fatigue.

Predictors for Fatigue Severity among the Spouse Caregivers of Cancer Patients

In our previous studies, we found total fatigue, physical fatigue, and mental fatigue severity with means of 8.11 (SD = 3.25), 4.99 (SD = 2.43), and 3.12 (SD = 1.66), respectively.[18] Multiple linear regression analysis was used in this present study. According to the scale, fatigue has been divided into three dimensions (total, physical, and mental fatigue). Variable fatigue is quantitative data and normal distribution. Hypothesis 1 was tested by stepwise regression analysis to determine which personal characteristics (gender, financial, educational), coping style (positive or negative), and psychological symptoms predicted for fatigue (total, physical, and mental fatigue) among the cancer patients' spouses. A more negative coping style of the caregivers of cancer patients was significantly associated with higher fatigue severity. Fatigue severity was also linked with greater psychological symptoms. Positive coping was unrelated to mental fatigue (**Table 3**).

The Stepwise Regression Analysis Results of the Demographic Variables That Influence Fatigue

Total Fatigue: We explored the relationship between total fatigue and the impact of healthcare costs. The greater the feeling of economic burden the greater the total fatigue in cancer patients' spouses. Current health was also entered into a regression equation. The poorer the health of the cancer patients' spouses the greater the total fatigue. Caregiving time was found to be another factor that influences total fatigue, more caregiving time per day predicted greater total fatigue in cancer patients' spouses.

Physical Fatigue: We explored the relationship between physical fatigue and the impact of healthcare costs. The greater the feeling of economic burden, the greater the physical fatigue in cancer patients' spouses. Current health was then entered into a regression equation. The poorer the health of the cancer patients' spouses the greater the physical fatigue. Support from family members was found to be another factor that influences physical fatigue, less support from other family members greater physical fatigue in cancer patients' spouses.

Mental Fatigue: Family income was entered into a regression equation. The lower the family income, the higher the mental fatigue in cancer patients' spouses. Caregiving time was also entered into a regression equation, more caregiving time per day predicted greater mental fatigue in cancer patients' spouses. Occupation was then entered into a regression equation. Cancer patients' spouses of worker with means of 3.63(SD = 1.42) had greater mental fatigue than other occupations.

The Stepwise Regression Analysis Results of the Psychological Symptoms and Coping Style Variables That Influence Fatigue

The following summarizes the results of the multiple regressions performed. The influence factors of total fatigue include: obsessive-compulsive ($\beta = 0.34$, $P = 0.014$), somatization ($\beta = 0.37$, $P = 0.004$), hostility ($\beta = -0.25$, $P = 0.005$), negative coping ($\beta = 0.25$, $P < 0.001$), positive coping ($\beta = -0.14$, $P = 0.005$).

The influence factors of physical fatigue include: somatization ($\beta = 0.47$, $P < 0.001$), hostility ($\beta = -0.23$, $P = 0.015$), positive

coping (β = -0.20, P < 0.001), and negative coping (β = 0.20, P < 0.001).

The influence factors of mental fatigue include: obsessive-compulsive (β = 0.31, P = 0.035), interpersonal sensitivity (β = -0.35, P = 0.009), hostility (β = -0.20, P = 0.040), and negative coping (β = 0.19, P = 0.001) (**Table 4**).

The Regulation Effect Analysis Results of the Psychological Symptoms Coping Style and Fatigue in Cancer Patients' Spouses

For the purpose of detecting the coping style's mediating effect between fatigue and psychological health. Multiple Stepwise Regression Analysis has been used. The socio-demographic variable has been controlled. The sum of psychological symptom as dependent variable, physical fatigue, mental fatigue, positive coping, negative coping, physical fatigue×positive coping, physical fatigue×negative coping, mental fatigue×positive coping, mental fatigue×negative coping as independent variables. The influence factors of psychological health include: negative coping (β = 0.29, P < 0.001) positive coping (β = -0.22, P < 0.001), mental fatigue (β = 0.20, P < 0.001), and mental fatigue×positive coping (β = -0.14, P = 0.008). Positive coping is a mediator between mental fatigue and psychological symptoms (**Table 5**).

In summary, for cancer patients' spouses, positive coping style resulted in the median standard (Md = -0.0186). The median standard was used as a cut-off to classify the study participants into the high- and low-positive coping style groups. The effect of mental fatigue on the psychological health of the low-positive coping style group is illustrated by the non-standardized regression equation y = 0.275 + 0.379x (t = 2.853, P < 0.01). The effect of mental fatigue on the psychological health of the high-positive coping style group is illustrated by the non-standardized regression equation y = -0.278 + 0.181x (t = -5.684, P < 0.001). Cancer patients' spouses who used low-positive coping also experienced higher fatigue severity and more psychological symptoms.

Table 4. Multiple Stepwise Regressions on Psychological Symptom Factors Influencing Total Fatigue, Physical Fatigue, and Mental Fatigue of the cancer patients' spouses.

Variable	B	SE	β	*t*	*p*
Total Fatigue					
Obsessive-compulsive	0.19	0.08	0.34	2.47[a]	0.014
Somatization	0.16	0.06	0.37	2.89[b]	0.004
Hostility	-0.26	0.09	-0.25	-2.83[b]	0.005
Negative coping	0.11	0.02	0.25	4.74[c]	< 0.001
Positive coping	-0.06	0.02	-0.14	-2.81[b]	0.005
Physical Fatigue					
Somatization	0.15	0.05	0.47	3.35[c]	< 0.001
Hostility	-0.18	0.07	-0.23	-2.45[c]	0.015
Positive coping	-0.07	0.02	-0.20	-3.87[c]	< 0.001
Negative coping	0.06	0.02	0.20	3.70[c]	< 0.001
Mental Fatigue					
Obsessive-compulsive	0.09	0.04	0.31	2.12[a]	0.035
Interpersonal sensitivity	-0.13	0.05	-0.35	-2.62[b]	0.009
Hostility	-0.10	0.05	-0.20	-2.07[a]	0.040
Negative coping	0.04	0.01	0.19	3 .45[c]	0.001

Table 5. Multiple Stepwise Regressions of detective the coping style's meditation effect between fatigue and psychological health of the cancer patients' spouses.

Variable	R	R^2	ΔR^2	ΔF	B	SE	β	*t*	*p*
Socio-demographic[a]	0.33	0.11	0.08	41.93					
Negative coping	0.45	0.21	0.17	39.68	1.63	0.31	0.29	5.32	< 0.001
Positive coping	0.50	0.25	0.22	38.63	-1.28	0.30	-0.22	-4.25	< 0.001
Mental Fatigue	0.53	0.28	0.25	37.82	5.20	1.44	0.20	3.61	< 0.001
MF×PC	0.55	0.31	0.26	37.43	-6.19	2.33	0.20	3.61	0.008

Note: a: (Gender, Age, Education, Occupation, Caregiving time, Support, Current health, Diagnosis, Cancer treatment, Financial burden, Family income); MF: Mental Fatigue; PC: Positive Coping

DISCUSSION

In our previous studies, we found total fatigue, physical fatigue, and mental fatigue severity with means of 8.11 (SD = 3.25), 4.99 (SD = 2.43), and 3.12 (SD = 1.66), respectively. Symptoms in caregivers of cancer patients suggested that fatigue is a commonplace problem in caregivers.[18] Caregivers of cancer patients have reported unmet needs during active or completed treatment to deal with the caregiving burden.[19-21] Notably, reported fatigue exceeded that reported in the general population and in caregivers of persons living with other chronic illness.[22] In addition, the most important implication of the previous study is that positive coping as a mediator of the relationship between fatigue and psychological symptoms provides a clearly definable and specific target for clinical interventions.

Personal Characteristics as Predictors for Fatigue Severity among the Spouse Caregivers of Cancer Patients

This study found that financial stress is a predictor for total fatigue, physical fatigue, and mental fatigue. The majority of cancer patients undergo surgery, radiotherapy, chemotherapy, and other treatment processes, and these patients accumulate medical expenses that result in financial hardship. Financial hardship leads to a long-term increase of psychological symptoms, which could lead to fatigue. Because of the high cost of cancer care or loss of employment for either the patient or the caregiver, economic stressors are common after active treatment,[23] and this loss of family income could lead to fatigue. It has been reported elsewhere that being a caregiver for a patient with cancer is associated with fatigue,[24] impaired quality of life, impact on work, and economic burden. Economic burden was calculated from the accumulated value of out-of-pocket expenditures, caregiver's time providing care, and value of lost employment.[25]

The current study shows that workers were significantly higher than other occupation in mental fatigue. In China, workers living in city have lower education level and less income relatively. Goldzweig and colleagues found that there was a negative correlation between education level and psychological distress.[26] The reasons may be that higher education levels allow a greater understanding of and more knowledge of the patient's disease, a stronger ability to handle emergency events, and a more accurate understanding of cancer and death. At the same time, the level of education, to some extent, represents the level of social status and the family economic situation. Modern workers not only bear certain social responsibilities, such as taking care of their children and managing the family, but cancer patients' spouses also face the spouse's negative life event (cancer), often making them feel powerless and producing a sense of fatigue. However, according to one study,[27] fatigue has no significant relationship with occupation.

This study found that support is a predictor for physical fatigue. Increased number of individuals diagnosed with cancer and prolonged survival of patients owing to advances in diagnostic and therapeutic methods have resulted in participation of family members to the caregiving process more actively and/or taking on more responsibility in the care of the patient.[28] A strong correlation between psychological and social well being is supported in the literature which shows that social support is both beneficial and essential for the cancer caregiver's psychological well-being.[29] Support received from friends or someone special can provide a more comforting effect. It is of no question that family support plays a vital role in helping individuals cope with stressful or worrisome situations.[30] Barber in his study determined that social support of friends has a positive effect in enhancing motivation of caregivers providing service to patients with cancer.[31]

This study found that for cancer patients' spouses who are long-term caregivers of cancer patients the sense of fatigue is relatively heavier. The cancer patients' spouses experience the same psychological stress as the cancer patients in the diagnosis of the disease and the course of treatment, and combined with long-term care and the lack of knowledge of the disease, results in long-term psychological symptoms and in fatigue. At present in China, home-care for cancer patients that is undertaken by a spouse results in a greater psychosocial incidence of fatigue in the spouses than in the cancer patients. One study showed that cancer caregiving, especially if financial resources are limited, is burdensome for families and impacts their quality of life.[25] We found that the time spent in the caregiving role exacted a significant burden on caregivers. Also, spouse caregivers of cancer patients with long-term stress experienced decreased body resistance exacerbated by fatigue.

Caregiving time is another factor influencing total fatigue. Family members involved in caregiving often report fatigue and exhaustion. Caregiver fatigue demonstrated a relationship to the caregiver's schedule, when the burden is higher, the fatigue is greater. When the demands on a caregiver exceeded the caregiver's ability to cope, this led to burnout, which was frequently manifested as fatigue. The profound physical, psychological, and social impacts of caregiving are well documented in the literature.[32] For example, as reported by Xiaoshi, the most obvious symptoms of caregiving stress are often psychological problems, such as anxiety, worry, depression, and loneliness.[5] Having had their lives disrupted, daily schedules changed, and family lives altered,[33] it stands to reason that caregivers would have little time, energy, or interest to devote to group activities, resulting in low levels of participation in these activities. Additionally, the devotion of caregivers to caring for the sick patient may limit opportunities and resources for self-development. Caregivers' lives often dramatically change as they address the illness and as their daily activities become hectic and demanding.

Psychological Symptom Factors That Influence the Fatigue of the Spouses of Cancer Patients

The current study found that cancer patients' spouses have somatization, obsessive-compulsive, and interpersonal sensitivity symptoms. Caregivers of patients with cancer needed help processing the emotions surrounding and continual uncertainty about patients' practical needs,

emotional needs, functional decline, and physical symptoms.[34] They are worried about the patient's condition and the outcome of the treatment effects, thereby suffering long-term fatigue. As a result, cancer patients' spouses have physical, emotional, and psychological signs and symptoms, such as headaches, muscle tension, back pain, sleep disturbances, and dyspnea. Some spouses of cancer patients behave as paranoid, blame others, and do not trust others. Some patients' spouses have interpersonal sensitivity and vulnerable feelings, demand perfection of others, do not understand others, and are too sensitive. A physical and mental state of exhaustion and apathy, and ultimately escape behavior or a patient's stoppage of treatment, is more common in cancer patients' spouses who experience a longer duration of caregiving.

Previous research reported fatigue as a major concern of caregivers.[35] The cancer patients' spouses experience sadness, feel powerless because of negative emotions toward the process of death, and are prone to feelings of despair and helplessness. Caregivers experience negative sequelae including unpreparedness for physical care, emotional demands, insufficient knowledge, and limited resources,[36] thereby increasing the sense of fatigue.

The difference in frequency of fatigue between groups was only marginally significant. However, based on the significant correlations between somatic symptoms and fatigue, it is a reasonable assumption that some caregivers appear to be at risk for developing stress-related symptoms. These cancer patients' spouses seem to experience elevated levels of fatigue, frustration, emotional burden, and confusion.

The Regulation of Coping Style between Mental Fatigue and Psychological Health

Coping style affects patients' and caregivers' psychological adjustment to cancer. The theoretical framework of Lazarus and Folkman defines coping as efforts to manage adaptational demands and associated emotions.[11]

Findings from the literature on coping research demonstrate that coping style is associated with psychological functioning. In this study, negative life events experienced by cancer patients' spouses generate a sense of fatigue. Coping style is considered to be a set of volitional behaviors, thoughts, and feelings a person uses or experiences in relation to stressors,[11] and is affected by the personality characteristics of the individual. Differences in coping styles are important factors in the impact of individual environmental adaptability and psychological health.[37] In the present study, coping style influences total, physical, and mental fatigue ($P < 0.01$). Positive coping and negative coping play a joint role in different coping styles that can reduce or increase the level of stress response. Particular coping strategies, as described in,[38] offer more or less adaptive ways of managing stressors, and thus affect the relationship between stress and mood disorders. Studies have found active adjustment to be more often associated with positive coping styles, whereas more emotion-focused or negative coping styles are more often associated with higher anxiety and depression at different times during treatment of the cancer patient.[39] Different coping styles will affect an individual's emotional state, thereby affecting their level of psychological health. As shown in [40] and corroborated in the present study, there are positive coping styles to help ease the psychological pressure of cancer patients' spouses; thus, positive coping styles play a role in the protection of psychological health and reduce fatigue and psychological symptoms. Thus, future interventions to reduce fatigue should focus on the coping strategies used by the caregivers themselves.

CONCLUSION

In summary, caregivers are largely invisible to the healthcare team, despite the high expectations the healthcare team has for caregivers to provide complex cancer care. Chinese cancer patients' spouses experienced higher levels of fatigue symptoms that were associated with considerable caregiving-related factors, such as medical expenses, education level, family income, support from other family members, care-giving time, and coping styles. Healthcare providers need to view the cancer patients' spouses as the main provider of care and offer more information and support to caregivers so they can provide high-quality care to patients as well as maintain their own health and well-being. Finally, an examination of factors that influence spouse caregivers' fatigue is warranted so that more individualized and targeted interventions can be provided to these caregivers.

Limitations

The first limitation of this study is that findings may not be applicable in non-Western countries because this study was conducted in the northeast part of China. Second, the level of severity of cancer in study-associated patients (such as stage, daily activity level) should be provided, because fatigue of cancer patients' spouses might be associated with patient care requirements, such as changing tubes, feeding, changing position, and wound care.

CONFLICT OF INTEREST

The authors have declared no conflict of interest.

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