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Original Article

Social support can alleviate the fear of cancer recurrence in postoperative patients with lung carcinoma

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Abstract: Objective: To explore the status and influencing factors of the fear of cancer recurrence (FCR) in postoperative patients with lung carcinoma (LC). Methods: The survey results of 219 LC patients who underwent surgical treatment in a tertiary grade A cancer hospital in Beijing from January 2020 to September 2021 were retrospectively analyzed by using the general information questionnaire, Social Support Rating Scale (SSRS), and the Fear of Progression Questionnaire-Short Form (FoP-Q-SF). Results: The score of the FoP-Q-SF was (25.68±3.15 points) in postoperative LC patients, and education level and per capita monthly household income were identified as the independent risk factors affecting FCR. There was an inverse correlation between FCR and social support in postoperative LC patients ($P<0.05$). Conclusions: Postoperative LC patients experience a moderate-level of FCR, especially females and those with a low family income. Social support plays an essential role in alleviating FCR. Nursing suggestions should be given according to individual differences of patients, and social health service resources should be effectively utilized to reduce FCR.

Keywords: Lung carcinoma, fear of cancer recurrence, social support, influencing factor

Introduction

Internationally, lung carcinoma (LC) is one of the most common malignancies, ranking 2nd in prevalence and 1st in mortality among all cancers [1]. In addition, the mortality rate of LC exceeds 25%, with approximately 1.5 million people dying from the disease every year, ranking first worldwide [2]. Histologically, non-small cell lung cancer (NSCLC) is the main type of LC, accounting for about 85% [3]. In recent years, the incidence rate of NSCLC is on the rise [4]. From the perspective of a country's economic development level, there is no difference in LC mortality among men between industrialized countries and developing countries, but the LC mortality of women in industrialized countries is higher. Among women in developing countries, the number of deaths from LC is second only to that caused by breast cancer [1]. At present, surgery-based comprehensive treatment is still the main treatment for NSCLC [5]. Moreover, molecular targeted therapy and immunotherapy have become feasible choices for patients with sensitive gene mutations and advanced stages after operation, which is helpful to prolong the survival time of patients and reduce the rate of metastasis and recurrence [6-8]. With the extension of the survival time of cancer patients, an emerging problem we see is patients' fear of cancer recurrence (FCR) [9].

FCR, literally, refers to cancer patients' fear of cancer relapse, progression or metastasis in the primary site [10]. FCR is one of the most common psychological burdens experienced by cancer patients and survivors for which they seek professional help or support [11]. Statistically, the prevalence of FCR ranges from 39% to 97% [9], which seriously compromises their life quality and mental health [12]. The expression of fear ranges from normal responses to

cancer to pathological reactions associated with behavioral dysfunction, depressive syndrome and psychosocial distress [13, 14]. Severe FCR can lead to significantly reduced quality of life, dysfunction, and increased health care use and costs [15, 16]. Previous studies of multiple cancer survivors have found that a high level of FCR is associated with demographic, medical, and psychological characteristics. However, these findings are not always consistent [17-19]. Accordingly, this study discusses the related factors of FCR in postoperative LC patients, aiming at providing reference for formulating intervention measures for FCR in this patient population.

Participants and methods

Research participants

By convenient sampling, 219 perioperative patients who underwent LC surgery in a tertiary A cancer hospital in Beijing from September 2020 to September 2021 were selected as research participants. Inclusion criteria: (1) Patients with definite diagnosis of LC through intraoperative frozen section examination and those who intended to undergo lobectomy; (2) Age ≥18; (3) Good communication skills and cognitive skills; (4) Ability to complete the questionnaires; (5) Willingness to participate in the study with informed consent form provided; (6) No history of other cancers. Exclusion criteria: (1) Presence of tumour relapse or metastasis; (2) Severe diseases of vital organs such as the heart and brain; (3) Cognitive impairment and low- or non-compliance with research; (4) Loss to follow-ups. This study was approved by the Ethics Committee for Research Involving Cancer Hospital Chinese Academy of Medical Sciences.

Research methods

(1) General information: A self-compiled general information questionnaire was used to collect patients' information such as age, gender, marital status, education level, average monthly family income, and disease history.

(2) Social Support Rating Scale (SSRS) [20]: This instrument includes three dimensions, namely, utilization of social support (4 items), subjective support (4 items) and objective support (2 items), with each item scored on a four-point scale and an overall score of 40 points. The higher the score, the stronger the social support. A score of <20, 20-30, and >30 indicates low, medium and high social support, respectively. The Cronbach's α coefficient of this scale is 0.98.

(3) FCR scale: The Fear of Progression Questionnaire-Short Form (FoP-Q-SF), a-12 item single-dimensional instrument developed by Mehnert [21] on the basis of FOP-Q, was used. Based on the 5-point Likert scoring system, patients can choose answers from "no" (1 point) to "always" (5 points), with the lowest score of 12 and the highest score of 60. The higher the score, the stronger the FCR. Wu Qiyun [22] adapeted the scale for Chinese culture and used it to evaluate 678 patients with liver cancer. The results showed that each item after being made more equitable for the Chinese population was highly correlated with the original item (R value rang: 0. 87-0.712), with the Cronbach's α coefficient of 0.886 and the Guttman's split-half coefficient of 0.855. The Cronbach's α coefficients of the two common factors extracted were 0.836 and 0.804, respectively, and the Guttman's split-half coefficients were 0.806 and 0.828, showing good content consistency.

Data collection

Data were collected through questionnaires given between September 2020 and September 2021. Before data collection, researchers obtained signed informed consent from patients. The researchers explained the purpose, significance and filling out method, and asked patients to fill out the questionnaires within 10 minutes. For patients with dyslexia or visual impairment, the researchers read the questions for them one by one in non-suggestive language and filled them in on behalf of the patients after they understood and gave oral answers. The questionnaires were distributed and collected on the spot. The number of questionnaires issued in this study was 8-10 times the total number of scale questions. A total of 230 questionnaires were issued, and 219 valid questionnaires were recovered with an effective recovery rate of 95.2%.

Statistical processing

Data analysis and processing were performed by SPSS 18.0. Measurement data were presented as mean ± standard deviation and the

Table 1. General information of 219 postoperative patients with lung carcinoma

Variable	Grouping	Average FoP-Q-SF score	t/F	P
Gender	Male	2.14±0.74	0.130	0.897
	Female	2.12±0.67		
Age (years)	<60	2.19±0.79	1.466	0.144
	≥60	2.05±0.60		
Marital status	Married	2.14±0.72	0.316	0.729
	Single	2.09±0.70		
	Divorced/widowed	2.25±0.88		
Place of residence	Urban	2.13±0.74	-0.222	0.825
	Rural	2.17±0.63		
Education level	Primary school	2.35±0.71	3.153	0.026
	Junior high school	2.18±0.91		
	senior high school	2.05±0.69		
	Graduate and above	1.92±0.40		
Payment mode of medical expenses	Medical insurance	2.17±0.94	0.617	0.651
	Free medical service	2.16±0.82		
	Rural cooperative medical service	2.25±0.45		
	Commercial insurance	1.99±0.53		
	Out-of-pocket payment	2.06±0.47		
Average monthly household income (CNY)	<2000	2.37±0.99	3.658	0.007
	2000-4000	2.27±0.82		
	4001-7000	1.95±0.33		
	7001-10000	1.92±0.61		
	≥10001	2.12±0.47		
Diabetes mellitus	With	2.13±0.74	-0.308	0.758
	Without	2.18±0.66		
Hypertension	With	2.09±0.67	-1.584	0.115
	Without	2.27±0.85		
Hyperlipidemia	With	2.12±0.73	-0.905	0.366
	Without	2.24±0.70		

Note: FoP-Q-SF: Fear of Progression Questionnaire-Short Form.

independent samples t-test was applied for the comparison between two groups. One-way ANOVA was used for the comparison among multiple groups followed by Bonferroni post hoc test. Pearson correlation analysis was performed to explore the relationships between different scale scores. Multivariate logistic regression was used to identify independent predictors of high FCR. The significance level was set at $P<0.05$.

Results

General information

The results of ANOVA and independent samples t-test showed that there were statistical differences in FoP-Q-SF scores among postoperative LC patients with different education levels and average monthly household income ($P<0.05$; **Table 1**).

Comparison of SSRS scores of postoperative LC patients

The comparison revealed statistically significant differences in SSRS scores among postoperative LC patients with different education levels and average monthly household income ($P<0.05$; **Table 2**).

Correlation analysis between social support and FCR in postoperative LC patients

There was a significant inverse connection between total FoP-Q-SF score and total SSRS in postoperative LC patients ($r=-0.416$, $P<0.00$;

Table 2. Comparison of SSRS scores of postoperative patients with lung carcinoma

Variable	Grouping	Total SSRS score	t/F	P
Gender	Male	42.42±6.76	0.456	0.649
	Female	41.82±5.44		
Age (years)	<60	42.39±7.03	0.141	0.888
	≥60	42.26±5.84		
Marital status	Married	42.26±6.88	0.199	0.820
	Single	42.90±6.51		
	Divorced/widowed	42.20±6.27		
Place of residence	Urban	42.40±6.72	0.355	0.723
	Rural	41.91±5.69		
Education level	Primary school	40.39±6.43	25.150	0.000
	Junior high school	46.56±5.05		
	High school	47.62±1.61		
	Graduate and above	47.32±6.46		
Payment mode of medical expenses	Medical insurance	42.01±7.14	0.872	0.482
	Free medical service	43.41±6.66		
	Rural cooperative medical treatment	44.22±1.89		
	Commercial insurance	42.13±6.19		
	Out-of-pocket payment	42.28±6.92		
Average monthly household income (CNY)	<2000	42.09±7.41	29.310	0.000
	2000-4000	41.26±6.06		
	4001-7000	51.25±2.91		
	7001-10000	43.37±6.26		
	≥10001	42.14±6.04		
Diabetes mellitus	With	42.03±7.12	0.269	0.788
	Without	42.39±6.53		
Hypertension	With	43.26±9.26	1.223	0.223
	Without	42.02±5.35		
Hyperlipidemia	With	41.44±7.08	0.603	0.547
	Without	42.42±6.56		

Note: SSRS: Social Support Rating Scale.

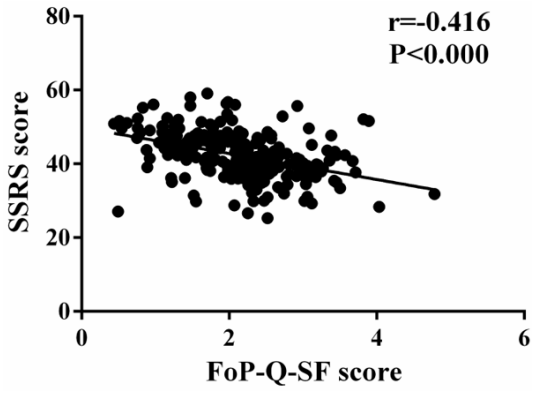

Figure 1. Correlation analysis between total social support score and fear of cancer recurrence in postoperative patients with lung carcinoma. Note: FoP-Q-SF: Fear of Progression Questionnaire-Short Form.

Figure 1). The total FoP-Q-SF score was negatively correlated with SSRS subjective support score and support utilization score (P<0.05; **Figure 2B**, **2C**), but not significantly associated with SSRS objective support score (P>0.05; **Figure 2A**).

Correlation analysis between different dimensions of social support scores in postoperative LC patients

The correlation between each dimension of social support scores was analyzed. The results showed that SSRS subjective and SSRS objective support scores were positively correlated with SSRS support utilization score and SSRS total score, and SSRS support utilization

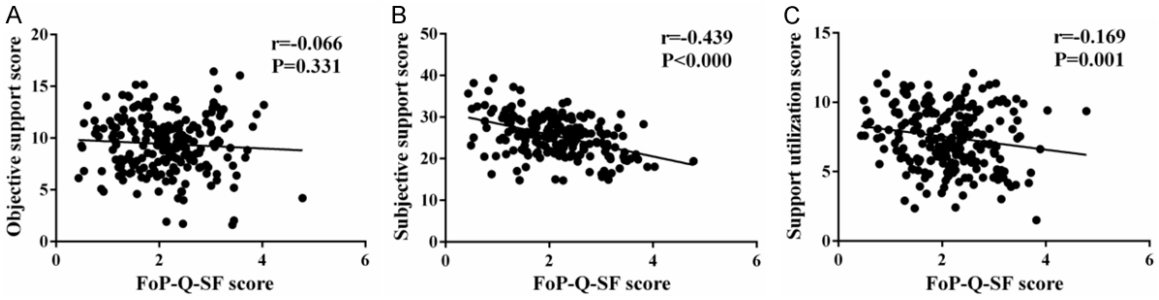

Figure 2. Correlation analysis between each social support score and fear of cancer recurrence in postoperative patients with lung carcinoma. (A: Correlation between SSRS objective support score and FoP-Q-SF score; B: Correlation between SSRS subjective support score and FoP-Q-SF score; C: Correlation between SSRS support utilization score and FoP-Q-SF score. SSRS: Social Support Rating Scale).

Table 3. Correlation analysis between each dimensionality of social support scores

Pearson correlation coefficient	SSRS objective support score	SSRS subjective support score	SSRS support utilization score	SSRS total score
SSRS objective support score	1.000	-0.020	0.152*	0.467**
SSRS subjective support score	-0.020	1.000	0.206**	0.816**
SSRS support utilization score	0.152*	0.206**	1.000	0.551**
SSRS total score	0.467**	0.816**	0.551**	1.000

Note: SSRS: Social Support Rating Scale. *P<0.05, **P<0.01.

Table 4. Results of multivariate logistic regression analysis

Variable	B	Standard error	β	t	*P*-value	F	R2
(constant)	4.081	0.294		13.890	<0.001	18.269*	0.203
SSRS objective support score	-0.017	0.016	-0.063	-1.027	0.305		
SSRS subjective support score	-0.063	0.009	-0.425	-6.828	<0.001		
SSRS support utilization score	-0.025	0.022	-0.072	-1.144	0.254		
(constant)	4.374	0.279		15.654	<0.001	19.627*	0.357
SSRS objective support score	-0.017	0.015	-0.066	-1.178	0.240		
SSRS subjective support score	-0.064	0.009	-0.433	-7.335	<0.001		
SSRS support utilization score	-0.029	0.020	-0.083	-1.439	0.152		
Education level	-0.125	0.041	-0.182	-3.057	0.003		
Per capita monthly household income	-0.004	0.035	-0.007	-0.116	0.908		

Note: SSRS: Social Support Rating Scale. *P<0.05.

score was positively correlated with SSRS total score in LC patients (P<0.05). However, there was no correlation between SSRS objective support score and SSRS subjective support score (P>0.05), **Table 3**.

Influencing factors of FCR in postoperative LC patients

The results of hierarchical linear regression analysis (**Table 4**) revealed that the SSRS subjective support score had a negative effect on the dependent variable FoP-Q-SF score, independent of control variables (P<0.05). However, SSRS objective support score and support utilization score had no statistical significance on the dependent variable FoP-Q-SF score, whether or not the control variable was added (P<0.05).

Discussion

Influence of different monthly household income on FCR in postoperative LC patients

This study showed that the average monthly household income was negatively related to the degree of FCR in postoperative LC patients

($P<0.05$), that is, the lower the average monthly household income, the more severe the FCR, which is similar to the research results of Shay LA [23], Li Huniu [24] and Luo X [25]. The reasons are analyzed as follows: I) Patients may receive chemotherapy and radiotherapy after LC surgery, which is a long and costly treatment process [26]. II) There are many young women suffering from LC, who need long-term postoperative rehabilitation, resulting in their inability to return to society in time to shoulder the burden of their families. All these will increase patients' financial burden [27]. III) If the cancer recurs, the duration of the disease will be prolonged, and the treatment cost will continue to accumulate, increasing the economic pressure of patients with lower monthly household income [28]. IV) Postoperative LC patients are prone to feel guilty for bringing economic burden to their families, resulting in FCR.

Influence of different education levels on FCR in postoperative LC patients

A negative correlation between the education level and the severity of FCR in postoperative LC patients was determined in this study, namely, the lower the education level, the more serious the FCR, which is consistent with the studies of Shay LA [23] and Hu Zewei [29]. With limited access to disease-related knowledge and poor acquisition ability, patients with low education levels can only acquire one-sided related knowledge and can't comprehensively consider and judge whether it is true or not. In contrast, highly educated patients have better independent judgment and communication skills, and can obtain more authentic and reliable disease-related information [23]. Besides, patients with high education levels have more stable jobs and a relatively superior working and living environment, which enables them to view and deal with diseases more rationally and positively. Therefore, medical workers should strengthen communication with cancer patients, especially those with low education levels. Importantly, different ways and means should be adopted to promote their effective understanding, such as increasing the frequency of communication, slowing down the speed of speech when explaining disease knowledge, choosing simple and easy to understand words, and holding small lectures on disease knowledge regularly to meet the knowledge needs of patients [29]. In addition, a positive atmosphere to face the disease should be created.

FCR is negatively correlated with the level of social support of postoperative LC patients

The severity of FCR is inversely correlated with the social support of postoperative LC patients, which is consistent with the research results of Thewes B [30] and Ye Chunli [31]. Social support, one of the most important factors affecting individual mental health, is particularly important for cancer patients. The social support for postoperative LC patients mainly comes from medical staff, friends, colleagues and relatives (subjective support dimension). The higher the score of social support, the more kind behaviors such as consideration, understanding and help the patients receive [32]. Moreover, the acts of kindness from others help to improve personal subjective well-being and life satisfaction of patients, which helps them maintain a positive attitude and reduce FCR while turning to pursue more meaningful goals. Medical personnel also play a vital role in social support for LC patients [1]. Medical staff can provide patients with necessary psychological support and practical social support or social group information, which can improve patients' psychosocial adaptation level and emotional health [33]. In addition, before patients are discharged from hospital, medical staff can make a good link between patients and the local community and provide patients with whole-process care in case management to reduce patients' anxiety and FCR.

Conclusion

A positive attitude is beneficial for postoperative LC patients to seek and accept social support, help to reduce their FCR and relieve their psychological pressure; otherwise, the psychological stress reaction of patients will be aggravated and the negative emotional experience will be enhanced, affecting patients' psychological status. Therefore, we should actively communicate with patients, guide them to face their inner fears correctly to actively express negative emotions such as anxiety, depression and fear. In addition, we should encourage patients to actively express their expectations and seek support from families, friends and

medical staff, so as to alleviate their FCR. This study still has room for improvement. The study was limited by the fact that all of the participants were from an Asian ethic group. In addition, considering that this is a single-center study, a multi-center study with larger sample size can be conducted in the future to provide a basis for the formulation of nursing plans to relieve FCR.

Disclosure of conflict of interest

None.

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