Fear of cancer recurrence and hope level in patients receiving surgery for non-small cell lung cancer : A study on the mediation role of social support

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Research Article

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Abstract

Purpose: To study the level of fear of cancer recurrence (FCR) in patients receiving surgery for non-small cell lung cancer (NSCLC) and explore related factors, so as to improve the hope level in this population, help enhance the confidence to defeat the disease and thereby increase the quality of life.

Methods: A total of 327 postoperative NSCLC patients from the National Cancer Center/National Clinical Research Center for Cancer/Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College were enrolled. All participants filled in General Questionnaire, Fear of Progression Questionnaire-Short Form (FoP-Q-SF), Herth Hope Index (HHI) Scale, and Social Support Rating Scale (SSRS).

Results: The mean FoP-Q-SF score was (30.3 ± 9.48) points in postoperative NSCLC patients, and that ≥ 34 points was reported by 188 patients (57.5%). Patient gender and family income were independent risk factors for FCR (both $p<0.05$). Correlation analysis revealed a negative association between FCR and hope level ($p<0.05$) while a positive association between hope level and social support ($p<0.05$). Notably, the social support played a mediation role between FCR and hope level in patients receiving surgery for NSCLC (contribution effect: 30.24%).

Conclusion: Postoperative NSCLC patients experience a moderate-level of FCR, especially the females and those with a low family income. Social support plays a partial mediation role between the FCR and hope level in this population. In that way, increase in the level of social support can elevate the hope level in patients, thereby decreasing the level of FCR and advancing recovery.

Introduction

Lung cancer is one of the most prevalent malignancies on a global scale. Statistically, lung cancer affected approximately 2.20 million people worldwide in 2020, making it the second most common malignant tumor[1]. Besides, the mortality of lung cancer exceeds 25% with around 1.50 million related deaths annually, which keeps the first all the year round[1]. Histologically, lung cancer mainly presents as non-small cell lung cancer (NSCLC) at a high rate of around 85%[2]. Recent years have witnessed an increasing incidence of NSCLC[2]. Currently, surgery-based comprehensive therapy remains the mainstay in treatment of NSCLC. By the march of surgical techniques in recent years, the 5-year survival rate of lung cancer after surgery has increased from 71.7–85.4%[3]. Molecular target therapy and immunotherapy have been emerging as viable options in patients with sensitive gene mutations after surgery and those at an advanced stage, with contributions to prolong survival and decrease the rate of metastasis and recurrence[4–6]. Nevertheless, 50% of the patients remain at a high risk of recurrence and metastasis after surgery, which makes the patients bear a heavy psychological burden[7–8].

Fear of cancer recurrence (FCR) represents concerns about return, progression or metastasis of cancer. It is a common mental status in patients suffering from disease progression or after aggressive treatment[9–10]. Besides, it can occur at the time of diagnosis and exist throughout the whole treatment and survivorship

trajectory. With such fear, the survival time and quality of life in these patients can be severely affected. Research revealed that FCR of varying degrees exists in around 49% cancer patients, and living long-term in fear may result in decline of treatment compliance and severely affect the quality of life and clinical outcome[11].

Hope theory, first put forward by Snyder[29], points out that hope represents the major concept of positive psychology, with maximum opportunity to mine potentials in individuals based on their positive psychological capital and power[12]. In that way, the individuals will be more capable of dealing with negative stimuli and thereby gain more expectations, confidence and beliefs about the future[13]. Previous research demonstrated the association between FCR and hope level in patients with NSCLC[14] and reported that high hope levels are beneficial for patient mental health and physical recovery. By now, studies on how the FCR affects hope level in this patient population are lacking. Qian et al. [15] reported that certain social support could increase the hope level and advance mental health in patients, which in turn could improve the ability of disease resistance.

The current study focused on following two tasks: 1) discuss the influencing factors of FCR in postoperative NSCLC patients and explore potential associations of FCR with hope level and social support; 2) based on the assume that social support plays a mediation role between patient hope level and FCR, discuss whether higher levels of social support can elevate the hope level in patients to decrease FCR, thereby making patients gain more confidence against illness and enjoy higher quality of life.

1. Patients And Methods

1.1 Patients

With the convenience sampling method, 327 NSCLC patients who were admitted for surgical treatment in the National Cancer Center/National Clinical Research Center for Cancer/Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, between January and December 2021 were included. Inclusion criteria: 1) age ≥18 years old; 2) intraoperative frozen section examination and definitive pathology indicative of NSCLC; 3) patients offering informed consent and willing to participate in this project. Exclusion criteria: 1) comorbidities of other severe limb or psychological diseases; 2) cognitive disorder; 3) disorders of communication or language comprehension.

1.2 Research methods

1.2.1 Survey tools

1.2.1.1 General Questionnaire:

A self-designed General Questionnaire was used with following contents: age, gender, education level, occupation, marital status, family income, medical expenses protection, smoking history, surgical procedure, and number of children.

1.2.1.2 Fear of Progression Questionnaire-Short Form (FoP-Q-SF):

An unidimensional scale FoP-Q-SF (Chinese version), which was originally developed by Mehnert et al. [16] and translated by Wu et al. [17], was used. There are 12 items scored on a 5-point Likert scale from 1 (not at all) to 5 (extremely), with the resulting sum score ranging from 12 to 60 points. A score ≥34 represents psychological dysfunction. A score ≥4 reported in at least 50% items represents moderate-level FCR and that reported in at least 75% items represent high-level FCR. The correlation coefficient for the Chinese and original versions ranged 0.578-0.712 and the Cronbach's α was 0.883, suggesting the good reliability and validity of the FoP-Q-SF.

1.2.1.3 Herth Hope Index (HHI) Scale:

The HHI scale was originally developed by Herth[18] and then translated and revised by Zhao[19]. The scale contains 12 items divided by 3 sub-dimensions, including positive attitudes toward the reality and future (n=4), active actions (n=4) and intimate relationships with others (n=4). All items are scored on a 4-point Likert scale with scores ranging from 1 (strongly disagree) to 4 (strongly agree). The resulting sum score ranges from 12 to 48 points, and a higher score indicates a higher hope level. A score of (12-23) represents low hope level, (24-35) represents moderate hope level, and (36-48) represents high hope level. The revised HHI scale has test-retest reliability = 0.92, Cronbach's α = 0.87 and construct validity = 0.85, indicative of good reliability, validity and feasibility.

1.2.1.4 Social Support Rating Scale (SSRS):

The SSRS originally developed by Xiao et al. [20] comprises 10 items divided by 3 dimensions, including subjective support (n=3), objective support (n=4) and support availability (n=3). Except for items 6 and 7, all items are scored on a 4-point scale and a higher score indicates a higher level of social support. The SSRS has test-retest reliability = 0.92 and the consistence of each item ranges from 0.89 to 0.91, which shows good reliability and validity of the scale.

1.2.2 Survey methods

All participants were instructed to fill in electronic questionnaires according to their actual conditions after they were fully informed of the research purpose and significance and gave informed consent. A total of 330 questionnaires were distributed and 327 were returned, with the recovery rate of 99.1%. Clinical data were checked and supplemented if needed by two workers based on the information documented in the Hospital Information System (HIS).

1.2.3 Statistical analysis

Missing data were handled with Excel and data analysis was completed with SPSS 24.0. Measurement data were reported as mean ± standard deviation. Enumeration data were assessed by x2 test. Comparison of means from two data sets was done using t test if the data were independent, normally distributed and conforming to homogeneity of variance, otherwise, test was applied. Comparison of means from multiple data sets was done using one-way analysis of variance (ANOVA) if the data were independent, normally distributed and conforming to homogeneity of variance, otherwise, rank sum test was adopted. Pearson correlation analysis was performed to explore the relationships between FCR, hope level and social support. Multiple-linear regression analysis was conducted to analyze the mediation role of social support between FCR and hope level in patients. $P<0.05$ was considered as statistically significant.

2. Results

2.1 FoP-Q-SF score in patients with different demographic features

The mean FoP-Q-SF score was (30.3 ± 9.48) points in postoperative NSCLC patients, and score ≥ 34 points was reported by 188 patients (57.5%). There were statistical differences regarding the FoP-Q-SF score in NSCLC patients varied by gender, nationality, religious belief, and family income (all $p < 0.05$) (Table 1).

Table 1
FoP-Q-SF score in postoperative NSCLC patients stratified by different demographic features(n = 372)

Project		Case	FoP-Q-SF score	x^2 /t/F	*p*
Gender	Male	141	28.62 ± 10.74	7.900	**0.005**
	Female	186	31.57 ± 8.21		
Number of attacks	Primary	319	30.22 ± 0.39	1.008	0.316
	Recurrence	8	33.63 ± 13.02		
Number of foci	Single	190	29.79 ± 9.47	1.287	0.257
	Multiple	137	31.00 ± 0.49		
Operative procedure	Thoracoscopy	313	30.14 ± 9.28	2.064	0.152
	Thoracotomy	14	33.86 ± 13.13		
Smoking	Yes	57	28.29 ± 12.52	3.094	0.080
	No	270	30.72 ± 8.67		
Smoke quitting	Yes	52	28.61 ± 12.07	1.878	0.154
	No	5	25 ± 17.98		
	Uninvolved	270	30.72 ± 8.67		
Education level	Primary or below	25	30.96 ± 13.74	0.252	0.908
	Junior high	51	29.23 ± 10.21		
	Senior high and Middle special	74	30.24 ± 9.15		
	College and Undergraduate	152	30.42 ± 8.96		
	Graduate and above	25	31.2 ± 8.08		
Nationality	Han	304	30.14 ± 9.34	4.182	**0.003**
	Korean	2	18.5 ± 0.70		
	Manchu	17	32.42 ± 9.19		
	Hui	2	53.00 ± 7.07		
	Moggol	2	25.00 ± 5.65		

Project		Case	FoP-Q-SF score	x^2 /t/F	*p*
Religious belief	Yes	15	35.2 ± 13.12	4.238	**0.040**
	No	312	30.06 ± 9.23		
Residence	Rural	25	31.32 ± 12.36	0.877	0.453
	Town	10	29.5 ± 9.82		
	City	65	31.8 ± 10.13		
	Urban	227	29.79 ± 8.91		
Occupation	Technician	33	30.12 ± 8.01	0.611	0.768
	Administrative staff	63	31.58 ± 8.49		
	Medical staff	16	28.87 ± 7.95		
	Retired	104	29.22 ± 9.31		
	Farmer	30	31.4 ± 12.76		
	Unemployed/Job-waiting	7	33.42 ± 5.76		
	Worker	31	30.77 ± 10.72		
	Businessman/Individual contributor	20	31.45 ± 11.48		
	Other	23	28.86 ± 8.48		
Family income	< 3,000 RMB	57	32.17 ± 11.06	3.757	**0.011**
	3,000–5,000 RMB	114	31.75 ± 9.11		
	5,000–10,000 RMB	104	29.50 ± 8.84		
	> 10,000 RMB	52	28.07 ± 8.87		
Medical expenses protection	Public expense	37	28.56 ± 8.83	1.477	0.221
	Health/Commercial insurance	223	29.99 ± 9.23		
	NCMS	45	32.2 ± 10.57		
	Own expense	22	32.45 ± 10.41		
Marital status	Unmarried	6	33.5 ± 10.05	0.286	0.836
	Married	301	30.28 ± 9.47		

Project		Case	FoP-Q-SF score	x^2 /t/F	*p*
	Divorced	8	29 ± 12.37		
	Widowed	12	29.83 ± 8.26		
Whether have a child	Yes	316	30.24 ± 9.51	0.327	0.568
	No	11	31.90 ± 8.47		
Whether the children are adult	Adult	251	29.96 ± 9.73	0.466	0.706
	Partial adult	15	31.66 ± 10.45		
	Under age	45	31.28 ± 7.97		
	No	16	31.56 ± 8.89		
Whether lives alone	Yes	87	31.12 ± 9.36	0.900	0.343
	No	240	30.00 ± 9.52		
Comorbidities	Yes	131	30.01 ± 9.91	0.196	0.658
	No	196	30.48 ± 9.20		
Chemotherapy	Yes	30	33.06 ± 8.53	2.827	0.094
	No	297	30.02 ± 9.45		
Radiotherapy	Yes	10	32.8 ± 7.94	0.716	0.398
	No	317	30.22 ± 9.52		
FoP-Q-SF sum score			30.3 ± 9.48		

2.2 Multiple-linear regression analysis for influencing factors of FCR in postoperative NSCLC patients

With the FoP-Q-SF score as an dependent variable and gender, nationality, religious belief and family income as independent variables, multiple-linear regression analysis was performed. The result showed that gender and family income were independent influencing factors of FCR in NSCLC patients (both $p<0.05$) (Table 2).

Table 2

Multiple-linear regression analysis for influencing factors of FCR in postoperative NSCLC patients (n=327)

Variable	*B*	*β*	*SE*	*t*	*p*
FoP-Q-SF score	35.769	-	5.577	6.413	0.000
Gender	2.540	0.133	1.046	2.249	**0.016**
Nationality	1.172	0.073	0.883	1.327	0.185
Religious belief	-3.974	-0.088	2.482	-1.601	0.110
Family income	-1.235	-0.125	0.542	-2.279	**0.023**

F=4.580 P=0.001 R2=0.054 Adjusted R^2=0.042

2.3 Associations of FCR with hope level and social support

Pearson correlation analysis demonstrated that the FCR level in postoperative NSCLC patients was negatively associated with the hope level (r=-0.146, p<0.01) and social support (r=-0.255, p<0.01), while there was a positive association between the hope level and social support (r=0.199, p<0.01) (Table 3).

Table 3

Associations of FCR with hope level and social support in postoperative NSCLC patients(n=372)

Project	FCR	Hope	Social support
FCR	1		
Hope	-.146**	1	
Social support	-.255**	.199**	1

**, P<0.01

2.4 Social support plays a mediation role between FCR and hope level in postoperative NSCLC patients

The mediation effect of social support was tested by SPSS online tool after adjustment for gender, nationality, religious belief and family income. It was noted that 0 was not included in all 95% CI determined by Bootstrap, suggesting the partial mediation effect of social support between FCR and hope level in patients with NSCLC (contribution rate = 30.24%) (Table 4-5).

Table 4

Analysis of mediation effect of social support between FCR and hope level in postoperative NSCLC patients (n=327)

	Hope level			Social support			Hope level		
	B	β	p	B	β	p	B	β	p
Constant	35.301**	-	0.000	47.133**	-	0.000	30.994**	-	0.000
Gender	0.837*	0.122	0.026	-0.615	-0.040	0.448	0.893*	0.130	0.016
Nationality	0.299	0.036	0.507	0.293	0.016	0.764	0.272	0.033	0.538
Religious belief	1.291	0.08	0.149	5.287**	0.146	0.007	0.808	0.05	0.363
Family income	0.098	0.03	0.580	-0.094	-0.013	0.807	0.107	0.033	0.54
FCR	-0.071**	-0.199	0.000	-0.236**	-0.295	0.000	-0.050*	-0.138	0.014
Social support							0.091**	0.204	0.000
R^2	0.056			0.106			0.093		
Adjusted R^2	0.042			0.092			0.076		
F value	F (5,321)=3.832, p=0.002			F (5,321)=7.644, p=0.000			F (6,320)=5.494, p=0.000		

B, unstandardized regression coefficient; β, standardized regression coefficient; * p<0.05, ** p<0.01.

Table 5

Test for the mediation effect of social support between FCR and hope level in postoperative NSCLC patients

Project	Total effect	a	b	a*b Mediation effect	Direct effect
FCR => social support => hope level	-0.071**	-0.236**	0.091**	0.022-0.022	-0.050*

* p<0.05, ** p<0.01.

3. Discussion

3.1 Current status of FCR in postoperative NSCLC patients

The current study found that the included NSCLC patients experienced a moderate-level of FCR (mean FoP-Q-SF score: 30.3 ± 9.48) and over a half of them (57.5%) were scored ≥34 points, consistent with the study

by Zhang et al. [21] Given the large portion of patients suffering from FCR, more attention should be paid in medical staff. We reasoned that this might be due to the characteristics of cancer diseases (recurrence and metastasis), a risk of recurrence after surgery and the insufficient understanding of cancer in some patients. In this context, individualized measures should be formulated to meet the demand of patients, which can be achieved by observation and inquiry. In that way, the incidence of patient FCR, anxiety and depression can be decreased. Furthermore, efforts can be made to encourage the patients to be active in facing illness and instruct the family to provide good social support.

3.2 Influencing factors of FCR in postoperative NSCLC patients

3.2.1 Gender The current study demonstrated that gender was an independent risk factor for FCR in postoperative NSCLC patients. It was noting that female patients were more prone to develop FCR than male patients with a higher FoP-Q-SF score, which is in agreement with the study of Zhang et al.[22] This can be attributed to multiple aspects such as the psychology, physiology and society. Nowadays, females are exposed to multiple stressors (such as family care while working) and they are more vulnerable to psychological and emotional alterations and are poorer at handling accidental events than males. In addition, females may have a nervous breakdown at the time of diagnosis with cancer and they may be afraid that they cannot well take on the family responsibilities due to the risk of decreased work capability after treatment. Therefore, a good nurse-patient relationship is in demand, which requires the nurses to know about the patient personality traits and formulate individualized scientific care measures. For example, nurses can encourage female patients from a child perspective (for instance, your child needs his/her mother, or be an example yourself for your child), so as to increase the patient confidence to defeat the disease.

3.2.2 Family income

Family income was also noted as an independent risk factor for FCR in postoperative NSCLC patients. Patients with a high family income may bear relatively small economic burden posed by disease and have a low psychological stress toward prognosis and following treatment. In contrast, patients with a low family income may suffer from a high level of FCR, bear a greater portion of their health care costs and experience more concerns about cancer recurrence that may further increase the family's economic burden and affect the normal life, and then feel guilty about every related issues. More attention should be paid in patients with a low economic level. In the meantime, more economic supports should be sought either from the family or the society according to the actual conditions so as to decrease the medical costs covered by patient themselves and lower the family's economic burden. By this way, this patient population can experience a decreased level of FCR and thereby enjoy a higher quality of life.

3.3 Associations of FCR with hope level and social support in postoperative NSCLC patients

In the present study, a negative association between FCR and hope level in postoperative NSCLC patients was demonstrated. This indicates that a higher level of FCR predicts a lower hope level and decreased confidence and capability to defeat the disease. Additionally, the hope level was reduced during disease treatment and management, consistent with the previous literature[23]. As defined by Snyder, "Hope" as a positive motivational status is a kind of individual thought, behavioral tendency and cognitive characteristic[24]. The negative psychological distress such as anxiety induced by concerns about disease progression could reduce the positive motivation of patients and thereby impair the cognitive function[25]. The current study also noted a negative correlation between FCR and social support in these patients, showing that a higher level of FCR was suggestive of a lower level of social support. The concern toward disease recurrence will make the patients feel fear and lonely. However, the patients will regain hope under the instruction, encouragement and help from the family, friends, social organizations and medical staff. Research reported that high levels of social support and more support and understanding given in the process of communication can increase the patient confidence to defeat disease, alleviate negative emotions and eventually reduce the FCR level[26].

3.4 Mediation role of social support between FCR and hope level in postoperative NSCLC patients

Based on correlation analysis, we further found that social support played a partial mediation effect between FCR and hope level in postoperative NSCLC patients, with the contribution rate of 30.24%. Social support is a generalized concept that can be either subjective or objective. Subjective support refers to the visible or real support, while objective support is the perceived social respect, support and understanding[27]. Patients will experience less stress when they perceive support from their family, friends and medical staff, and then they will gain more hope to defeat disease[28]. According to the “Hope theory” put forward by Snyder[29], individuals at a high level of hope tend to take adaptive, positive emotions in face of difficulties, that is, this group of people can be more positive in presence of disease as they are more skilled in adjusting their mindsets. On this basis, social support can result in higher hope levels, thereby to increase the confidence against disease, decrease fear and establish healthier and more positive psychological attitudes, leading to higher quality of life. Furthermore, social support also serves as an important factor that promotes the capability of dealing with one’s own psychology and behaviors. In face of illness, patients receiving a high level of social support are more capable of psychological regulation and they can change their coping strategies and behaviors to decrease their FCR[30]. Medial staff as an important source of social support should pay more attention to the inner psychological requirement and desire of patients at different treatment stages. Meanwhile, they should offer sufficient help and guidance to patients via proper manners or pathways while helping them perceive the support from their family and friends. The main purpose is to meet their rational demands and make them correctly understand the disease, thereby

decreasing their concerns and fear and increasing their confidence and hope in face of illness. Furthermore, medical staff should keep noticed for the patients at a high level of FCR and then provide proper interventions (such as targeted psychological counseling, health education) or experience-based plans, and look for more social supports.

4. Summary

To conclude, the current study revealed that NSCLC patients after surgery are at a moderate level of FCR, which can be independently affected by the gender and family income. Social support plays a partial role in mediating FCR and hope level in postoperative NSCLC patients, and increase the level of social support can elevate the hope level and thereby decrease the FCR level. Medical staff should pay more attention to the fear conditioning in postoperative NSCLC patients, especially the females and those with a low family income. According to the specific conditions, they should instruct the patients to be more active and intentionally perceive the positive emotions. Meanwhile, they are encouraged to mobilize more social supports, so as to advance the physical and psychological recovery, improve quality of life and long-term survival in these patients. The single-center design is one of the limitations of the current study. In the future, multi-center, large-scale sample survey can be performed to increase the representativity of the samples and decrease bias. Furthermore, this is a cross-sectional study, which fails to clarify the causal relationship between variables, requiring further longitudinal research to validate the mediation effect of social support.

Declarations

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Author contribution

All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by Ting Li,Feng Yan Ma and Shuoning Zhan. The frst draft of the manuscript was written by Man Liu and Lu Liu, and all authors commented on previous versions of the manuscript. All authors read and approved the fnal manuscript.

Data availability

The data that support the fndings of this study are available from the corresponding author upon reasonable request.

Code availability

Not applicable.

Declarations

The study protocol was approved by the ethics committee of National Cancer Center/Cancer Hospital,Chinese Academy of Medical Sciences and Peking Union Medical College (22/055-3256);and made in accordance with the ethical standards laid down in the declaration of Helsinki.

Consent to participate

Informed consent was obtained from all individual participants included in the study.

Consent for publication

All individual participants provided informed consent for publication of the data.

Conflict of interest

The authors declare no competing interests.

References

1. W Guo, Huai Q, Zhang G, et al. Elevated Heterogeneous Nuclear Ribonucleoprotein C Expression Correlates With Poor Prognosis in Patients With Surgically Resected Lung Adenocarcinoma[J]. Front Oncol, 2020, 10598437.
2. C Gridelli, Rossi A, Carbone D-P, et al. Non-small-cell lung cancer[J]. Nat Rev Dis Primers, 2015, 115009.
3. J-E Yoo, Han K, Shin D-W, et al. Conditional relative survival and competing mortality i n patients who underwent surgery for lung cancer: A nationwide cohort study[J]. Int J Cancer, 2021, 148(3): 626-636.
4. T-V Denisenko, Budkevich I-N, Zhivotovsky B. Cell death-based treatment of lung adenocarcinoma[J]. Cell Death Dis, 2018, 9(2): 117.
5. F Skoulidis, Byers L-A, Diao L, et al. Co-occurring genomic alterations define major subs ets of KRAS-mutant lung adenocarcinoma with distinct biology, immune profiles, and ther apeutic vulnerabilities[J]. Cancer Discov, 2015, 5(8): 860-877.
6. J Cao, Yuan P, Wang Y, et al. Survival Rates After Lobectomy, Segmentectomy, and Wedge Resection for Non-Small Cell Lung Cancer[J]. Ann Thorac Surg, 2018, 105(5): 1483-1491.
7. S-M Jones, Ziebell R, Walker R, et al. Association of worry about cancer to benefit finding and functioning in long-term cancer survivors[J]. Support Care Cancer, 2017, 25(5): 1417-1422.
8. S Gowing, Baker L, Tran A, et al. Correction to: Postoperative Adverse Events are Associated with Oncologic Recurrence Following Curativeintent Resection for Lung Cancer[J]. Lung, 2020, 198(6): 983.
9. S Simard, Thewes B, Humphris G, et al. Fear of cancer recurrence in adult cancer survivors: a systematic review of quantitative studies[J]. J Cancer Surviv, 2013, 7(3): 300-322.

10. B Mutsaers, Jones G, Rutkowski N, et al. When fear of cancer recurrence becomes a clinical issue: a qualitative analysis of features associated with clinical fear of cancer recurrence[J]. Support Care Cancer, 2016, 24(10): 4207-4218.
11. SU Ting,LIU Huaxia,TIAN Jing,et al. Investigation on the current situation of cancer recurrence fear in cancer patients and its influencing factors[J]. Chinese Journal of Practical Nursing, 2018, 34: 926-930.
12. LIU Sai-sai ,YANG Hui ZHANG Lin et al . Analysis of the status of hope level and its influencing factors in young lung cancer patients[J]. Guangdong Medical Journal, 2020, 41: 1754-1757.
13. H-W Hense. Screening for Lung Cancer: Balancing Hope With Doubt About Applicability[J]. Dtsch Arztebl Int, 2015, 112(38): 635-636.
14. LI Qiufang,ZHAO Maoni,WU Qiuge,et al. Correlation between fear of cancer recurrence and hope level in lung cancer patients[J]. Chinese Journal of Gerontology, 2019, 39: 1490-1492.
15. Qian Aiyun,Xu Feifan,Fan Wei. Association between spiritual health and hope level social support and immune function in patients with lung cancer chemotherapy[J]. Anhui Medical Journal, 2022, 43: 88-93.
16. A Mehnert, Herschbach P, Berg P, et al. [Fear of progression in breast cancer patients--validation of the short form of the Fear of Progression Questionnaire (FoP-Q-SF)][J]. Z Psychosom Med Psychother, 2006, 52(3): 274-288.
17. WU Qiyun,YE Zhixia,LI Li,et al. Sinicization and Reliability And Validity Analysis of Simplified Scale of Disease Progression in Cancer Patients[J]. Chinese Journal of Nursing, 2015, 50: 1515-1519.
18. K Herth. Enhancing hope in people with a first recurrence of cancer.[J]. Journal of advanced nursing, 2000, 32(6).
19. GAO Yun,ZHOU Ying,WANG Xin,et al. Correlation between hope level and symptom distress, social support, and coping style in maintenance hemodialysis patients[J]. Modern Preventive Medicine, 2013, 40: 295-298.
20. Xiao Shuiyuan. Theoretical basis and research application of "Social Support Assessment Scale"[J]. Journal of Clinical Psychiatry, 1994: 98-100.
21. ZHANG Qi,SHEN Wenjun,HUANG Hao. Investigation and analysis of the level of fear disease progression and its psychologically related factors in patients with postoperative lung cancer[J]. PLA Journal of Preventive Medicine, 2019, 37: 148-149.
22. ZHANG Chengbin. Analysis of Fear of Cancer Recurrence and Related Factors in Lung Cancer Patients[J]. General Nursing, 2019, 17: 2018-2020.
23. A Bedaso, Adams J, Peng W, et al. The mediational role of social support in the relationship between stress and antenatal anxiety and depressive symptoms among Australian women: a mediational analysis[J]. Reprod Health, 2021, 18(1): 250.
24. A Gum, Snyder C-R. Coping with terminal illness: the role of hopeful thinking[J]. J Palliat Med, 2002, 5(6): 883-894.
25. P Herschbach, Dinkel A. Fear of progression[J]. Recent Results Cancer Res, 2014, 19711-29.

26. LI Shunshun,CHEN Yang,WANG Lili. Analysis of fear of cancer recurrence and social support status in patients with non-small cell lung cancer[J]. China Medical Herald, 2021, 18: 106-109.
27. S-L Syme. Coronary artery disease: a sociocultural perspective[J]. Circulation, 1987, 76(1 Pt 2): I112-I116.
28. Y Liang, Wang H, Niu M, et al. Longitudinal Analysis of the Relationships Between Social Support and Health-Related Quality of Life in Hematopoietic Stem Cell Transplant Recipients[J]. Cancer Nurs, 2019, 42(3): 251-257.
29. SHI Yu,HE Jing,DENG Junna,et al. Progress in the application of hope theory in nursing psychology[J]. Chinese Journal of Modern Nursing, 2015, 21: 2471-2472.
30. L Niu, Liang Y, Niu M. Factors influencing fear of cancer recurrence in patients with breast cancer: Evidence from a survey in Yancheng, China[J]. J Obstet Gynaecol Res, 2019, 45(7): 1319-1327.