



The Relationship Between Facilitation of Patient Involvement and Self-Perceived Burden in Postoperative Lung Cancer Patients: The Mediating Role of Social Support

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Aim: Patients with lung cancer often experience a high level of self-perceived burden, which significantly affects their quality of life and psychological health. Social support is closely related to the self-perceived burden, yet there is scant research on the relationship between social support, facilitation of patient involvement, and self-perceived burden. This study aims to understand the current situation of self-perceived burden in postoperative lung cancer patients and to explore the mediating role of social support between facilitation of patient involvement and self-perceived burden.

Methods: A cross-sectional design was used in this study. Using a convenience sampling method, a total of 331 lung cancer patients who were hospitalized for surgical treatment at a tertiary cancer hospital in Beijing, China, from August 2022 to May 2023, were selected to participate in this survey. The survey included a self-designed sociodemographic questionnaire, the Facilitation of Patient Involvement Scale (FPIS), the Perceived Social Support Scale (PSSS), and the Self-Perceived Burden Scale (SPBS). Data were analyzed using SPSS 24.0 for statistical description and Pearson correlation analysis, while AMOS 24.0 was utilized to construct a structural equation model to examine the mediation effect.

Results: The score of self-perceived burden in lung cancer patients was 26.42 ± 8.23 points. Both facilitation of patient involvement and social support was negatively correlated with self-perceived burden ($r = -0.313$, $r = -0.332$, $P < 0.001$). Social support plays a partially mediated role in the relationship between facilitation of patient involvement and self-perceived burden, accounting for 44.3% of the total effect.

Conclusion: The self-perceived burden of patients after lung cancer surgery was at a moderate level, and social support partially mediates the relationship between facilitation of patient involvement and self-perceived burden. Medical staff should encourage patient participation in their own treatment decisions and alleviate the burden associated with lung cancer and surgical treatment by enhancing their social support.

Keywords: facilitation of patient involvement, self-perceived burden, social support, mediation analysis, lung cancer

Background

Cancer is a leading cause of death worldwide and a significant barrier to increasing life expectancy.¹ Lung cancer is the second most common malignant tumour globally and has the highest mortality rate.² In China, it ranks first in terms of incidence and mortality rates.³ In 2015, there were approximately 787,000 lung cancer cases in China, with over 2,100 new diagnoses every day, accounting for about 20% of all cancer diagnoses.⁴ With increased awareness of health and advancements in diagnostic technology, more lung cancer cases are being detected at early stages. Surgery is the primary

treatment for early-stage non-small cell lung cancer,⁵ but there is still a risk of recurrence and metastasis after surgery. The uncertainty of cancer itself and the treatment process will bring adverse effects on the physiological function, psychological state and quality of life of patients.^{6,7} Along the arduous journey of fighting cancer, the support and care provided by family and friends as caregivers can help patients gain courage, confidence, and an optimistic mindset to overcome lung cancer. However, while being accompanied and cared for by loved ones and friends, patients may also experience concerns, guilt, and frustration due to excessive reliance on caregivers. These worries include concerns about burdening caregivers due to their illness and the negative impact of their financial, physical, and psychological changes after being diagnosed with cancer, known as a self-perceived burden (SPB).^{8,9}

Previous studies on SPB have mostly focused on patients undergoing hemodialysis, breast cancer, cervical cancer, stroke, and coronary heart disease, and the degree of SPB in patients with different diseases was different. There are relatively few reports of SPB in patients undergoing surgery for early-stage lung cancer. In China, family members or friends usually accompany patients to medical treatment. When patients are unable to work due to illness, they often see their family members without work. Prone to feelings of guilt and burden. A study has shown that 97.98% of lung cancer patients have varying degrees of SPB.¹⁰ SPB complicates the relationship between patients and caregivers,⁹ and may lead to negative emotions such as anxiety, depression, and self-blame in patients, reducing their involvement in treatment decisions, treatment compliance, and even leading to suicidal or self-harming behaviors,^{11–13} thus adversely impacting treatment outcomes and quality of life. Therefore, actively exploring protective factors in the development of SPB in early-stage lung cancer surgery patients is of great significance for improving their physical and mental health.

Facilitation of patient involvement refers to the perception of support from healthcare providers in the clinical diagnosis and treatment process, assisting patients in participating in clinical treatment decisions.¹⁴ Studies have shown that the more comprehensive the treatment and recovery information perceived by patients, the more it promotes their consideration and understanding of their own condition and treatment methods, encouraging active participation in treatment decisions and the ability to choose the most suitable treatment plan based on their current physical and economic situation.¹⁴ Facilitation of patient involvement in shared decision-making helps promote mutual respect and understanding between patients and doctors,¹⁵ alleviates negative emotions such as anxiety and depression in patients,¹⁶ reduces medical expenses,¹⁷ improves patient satisfaction with medical care,¹⁸ and enhances quality of life.¹⁹ Therefore, we hypothesize that facilitation of patient involvement may alleviate the SPB in patients.

Social support refers to spiritual and material support and assistance from family, friends, colleagues, and others,²⁰ including dimensions such as family support, friend support, and other support. In China, experiencing cancer is often not just an individual matter but also a family issue. When patients receive medical care accompanied by family members, they may often feel guilty and self-blame for causing time and financial burdens on their families due to their illness. Research has shown that caregivers providing positive guidance and support to patients during their diagnosis and treatment process can alleviate the patient's negative emotions and reduce their financial burden, helping patients build a positive mindset to cope with the disease and alleviate their SPB.^{21,22} Previous studies have taken facilitation of patient involvement as the criterion for judging medical support to patients,²³ therefore facilitation of patient involvement may have a beneficial impact on a patient's social support system.

In summary, facilitation of patient involvement and social support have a certain impact on the self-perceived burden of lung cancer patients. However, existing research on patients' perceived burden mainly focuses on status surveys and analysis of influencing factors, lacking studies on the relationship between facilitation of patient involvement, social support, and the self-perceived burden of patients. Therefore, We hypothesized that self-perceived burden is the dependent variable, facilitation of patient involvement is the independent variable, and social support is the mediating variable, so as to explore the relationship between facilitation of patient involvement and self-perceived burden, and determine whether social support is the mediating factor of this relationship, so as to provide reference for improving patients' psychological burden, physical and mental health and quality of life. We propose the following hypothesis: (1) Facilitation of patient involvement is negatively correlated with SPB; (2) Social support is negatively correlated with SPB; (3) Social support plays a mediating role between facilitation of patient involvement and SPB. **Figure 1** illustrates the conceptual framework of the study.

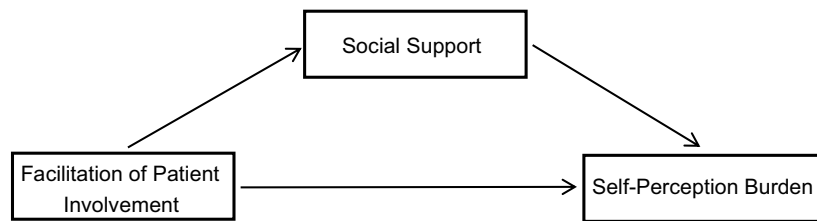


Figure 1 Conceptual Model Illustrating the Relationships Among the Study Variables.

Methods

Study Design

A cross-sectional design was used.

Participants and Settings

From August 2022 to May 2023, 331 patients undergoing surgery for lung cancer in a cancer hospital in Beijing, China were selected by convenient sampling method to participate in this investigation. Inclusion criteria: ① Patients with early-stage NSCLC undergoing surgical treatment; ② Know your illness; ③ Informed consent and voluntary participation in this study. Exclusion criteria: ① There is a language communication disorder, hearing impairment and cognitive impairment; ② Uncooperative patients; ③ Patients with severe damage to other vital organs (such as liver and kidney). Clinical nurses approached eligible patients during their postoperative hospital stay. Patients were informed about the purpose, procedures, and potential risks and benefits of the study. Interested patients were provided with a questionnaire and given the opportunity to ask questions. Written informed consent was obtained from each participant before any data collection, ensuring that they fully understood the study and voluntarily agreed to participate. This process adhered to ethical standards, ensuring that patient confidentiality and autonomy were maintained throughout.

This study refers to the sample size estimation method proposed by Kendall,²⁴ which selects 5 to 10 times variables to determine the sample size. There were 14 independent variables in this study, with a sample size of at least 70 to 140 patients. To ensure sufficient sample size, the questionnaire turnover rate was estimated at 20%, and the estimated sample size ranged from 84 to 168 cases. In this study, a total of 360 questionnaires were sent out, 342 questionnaires were recovered, and 331 valid questionnaires were obtained after 11 were excluded, with an effective recovery rate of 91.94%.

Instrumentation

Four tools were used to collect data and analyze the variables of this study:

Demographic Information

Based on a review of the existing literature, a general demographic questionnaire was designed to include variables such as gender, age, education, annual income, payment method, frequency of illness, and times of hospitalization.

Self-Perceived Burden Scale (SPBS)

This scale was compiled by Cousineau et al⁸ and modified by Wu et al²⁵ in 2003 for assessing the SPB in patients with chronic diseases. This scale, which we applied to measure the SPB in postoperative lung cancer patients, comprises 10 items distributed across three dimensions: physical factors, emotional factors, and economic factors. Responses are recorded on a 5-point Likert scale, ranging from “never” (1 point) to “always” (5 points). The total score of the SPBS ranges from 10 to 50 points, with higher scores indicating a greater level of the SPB. Specifically, scores of 10 to 25 signify a low level of the SPB, 26 to 33 indicate a moderate level, and 34 to 50 reflect a high level.²⁵ In this study, Cronbach’s α was 0.894.

Perceived Social Support Scale (PSSS)

Using the perceived social support scale designed by Zimet et al,²⁶ Jiang²⁷ revised Sinicization in combination with Chinese culture, including 3 dimensions and a total of 12 items. It includes 4 entries in the family support dimension, 4 entries in the friend support dimension and 4 entries in other support dimensions. Using a 7-level scoring method, the specific classification from strongly agree, strongly disagree, slightly disagree, neutral, slightly agree, strongly agree, strongly agree. The score ranges from 12 to 84, with higher scores indicating higher levels of perceived social support. In this study, Cronbach's α is 0.947.

Facilitation of Patient Involvement Scale (FPIS)

This scale was developed by Martin Equals²⁸ in 2002 to measure the extent to which patients perceive that medical staff encourage or facilitate their participation in treatment decisions. The content of the scale includes sharing disease and treatment information, carefully listening to patients' questions, providing patients with opportunities to ask questions, and allowing patients to participate in decision-making. The scale is a single-dimension scale with 9 items. Using the Likert 6-level scoring method, select "never", "almost never", "occasionally", "sometimes", "often", "always" to get 1, 2, 3, 4, 5, and 6 points respectively. Items 1, 3, 5 and 6 are scored in the forward direction, and the remaining items are scored in the reverse direction. The Chinese version was revised by Wu²³ with good reliability and validity, with content validity of 0.931 and Cronbach's α coefficient of 0.885. In this study, Cronbach's α coefficient was 0.874.

Data Collection

In this study, convenience sampling method was adopted to collect data by issuing QR codes of electronic questionnaires face-to-face. All participants were fully informed of the purpose of the study and the rights of patients before participating in the survey. At the same time, the survey was conducted anonymously, and the data collected was only used for academic research. Before conducting a formal investigation, we obtained oral or written informed consent from all participants and conducted a pre-investigation. Before filling in the questionnaire, the trained members of the research team used unified guidance to introduce the survey subjects, and the patients themselves and their caregivers filled in according to the actual situation of the patients. After the questionnaire is collected, the clinical data are checked and supplemented by the medical records in the HIS information system of the hospital to ensure the accuracy of the information.

Data Analysis

IBM SPSS24.0 was used to analyze the data. The measurement data were described by $M \pm SD$ deviation after the normal distribution test, and the counting data were described by frequency and component ratio. The bias of common methods was tested by the Harman single-factor test. Pearson correlation analysis was used to examine the correlation between patients' SPB, facilitation of patient involvement, and social support. The SEM was constructed with AMOS 24.0 software, and the mediation effect was tested. The maximum likelihood ratio method was used to fit the data and modify the model. Bootstrap was performed using 5000 bootstrap samples and 95% deviation-corrected confidence intervals (*CI*) to test the significance of direct and indirect effects. Test level $\alpha = 0.05$, $P < 0.05$ was considered a statistically significant difference.

Moral Consideration

The study was conducted in strict accordance with the provisions of the Declaration of Helsinki. The study was approved by the Approval Letter of Ethics Committee of National Cancer /Cancer Hospital, Chinese Academy of Medical Sciences, and Peking Union Medical College (No. 22/081/3282). We ask respondents to agree before filling out the questionnaire, and they can change their minds at any time. The participants' identities are not collected and their privacy is strictly protected.

Result

Demographic Information About the Participants

Table 1 shows that of the 331 lung cancer surgery patients surveyed, 204 (61.6%) were female and 192 (58.0%) were aged between 41 and 64 years. 185 (55.9%) had a bachelor's degree and 152 (45.9%) had an annual income between 1,000 and 5,000 RMB. 292 cases (88.2%) were paid by general health insurance, 323 cases (97.6%) were found for the first time, and 239 cases (72.2%) were visited more than once.

Common Method Bias and Confirmatory Factor Analysis

Harman single-factor test was used for the common method bias test, and exploratory factor analysis was performed for all variables. The results show that there are 6 factors with feature roots greater than 1, and the first factor explains 37.34% of the variance, which is less than 40%, indicating that there is no serious general method bias in this study.

Correlation Analysis of SPB, Facilitation of Patient Involvement and Social Support

As shown in Table 2, the mean scores for SPB, facilitation of patient involvement, and social support were (26.42±8.23), (42.11±9.43) and (67.53±12.61), respectively. The SPB was at a moderate level and needed to be improved, while the scores of facilitation of patient involvement and understanding social support were at a high level. The correlation results showed that SPB was negatively correlated with the facilitation of patient involvement and understanding of social support ($r = -0.313$, $P < 0.001$; $r = -0.332$, $P < 0.001$). There was a positive correlation between facilitation of patient involvement and understanding social support ($r = 0.629$, $P < 0.001$).

Regression Analysis of SPB

As shown in Table 3, the SPBS scale score was used as the dependent variable. Two of the relevant variables were statistically significant (facilitation of patient involvement and social support scale scores) and covariates (gender, age, education, annual income, payment method, incidence of disease and Times of hospitalization) were the independent

Table 1 Demographic Information About the Participants (n=331)

Characteristics	Categories	n (%)
Gender	Male	127(38.4)
	Female	204(61.6)
Age (years)	≤40	44(13.3)
	41–64	192(58.0)
	≥65	95(28.7)
Education	Junior college	63(19.0)
	Faculty-to-undergraduate	61(18.4)
	Undergraduate	185(55.9)
	≥Postgraduate	22(6.6)
	≥Deputy chief nurse	51(3.2)
Annual income (RMB)	1,000–5,000	152(45.9)
	5,000–10,000	83(25.1)
	10,000–50,000	79(23.9)
	>50,000	17(5.1)
Payment method	Medical insurance	292(88.2)
	Commercial insurance	12(3.6)
	Self-paying	27(8.2)
Frequency of incidence	First	323(97.6)
	Recurrence	8(2.4)
Times of hospitalization	I	92(27.8)
	>I	239(72.2)

Table 2 The Mean Values and Correlations of Patients' SPB, Facilitation of Patient Involvement and Social Support

Variables	M ± SD	1 r(P)	2 r(P)	3 r(P)
1. SPB	26.42±8.23	1		
2. FPIS	42.11±9.43	-0.313**	1	
3. PSSS	67.53±12.61	-0.332**	0.629**	1

Note: **P < 0.001 (two-tailed test).

Abbreviations: M, mean; SD, standard deviation; r, values of correlation analysis; SPB, Self-perceived burden; FPIS, Facilitation of patient involvement scale; PSSS, Perceived social support scale.

Table 3 Multiple Linear Regression Analysis of Factors Influencing SPB

Variable	B	SE	β	t	P
(Constant)	36.172	4.739	–	7.633	< 0.001
Gender	0.909	0.880	0.054	1.033	0.302
Age (years)	0.461	0.682	0.035	0.676	0.500
Education	0.263	0.515	0.028	0.511	0.610
Annual income (RMB)	0.648	0.481	0.074	1.346	0.179
Payment method	-0.958	0.760	-0.066	-1.261	0.208
Frequency of incidence	2.116	2.763	0.040	0.766	0.444
Times of hospitalization	1.447	0.967	0.079	1.496	0.136
PSSS	-0.159	0.044	-0.244	-3.658	< 0.001
FPIS	-0.163	0.058	-0.186	-2.802	0.005

Note: R²=0.153, adj R²=0.129, F=6.431, P<0.001.

Abbreviations: FPIS, Facilitation of patient involvement scale; PSSS, Perceived social support scale.

variable, and the adjusted R² was 0.129, among which there was no significant difference in control variables (P > 0.05). Social support and facilitation of patient involvement accounted for 12.9% of the variation in self-perceived burden.

The Mediating Role of Social Support in the Facilitation of Patient Involvement and SPB

AMOS 24.0 software was used to build the structural equation model and test the hypothesis model with the maximum likelihood estimation method. The input of each analysis is the covariance matrix of the project. Absolute and relative indices were used to evaluate the goodness of fit of the model. The absolute index includes χ^2/df and root-mean-square approximation error (RMSEA). If χ^2/df is < 3, the model will be considered a good fit. If it is between 3 and 5, the model will be considered an acceptable fit. In addition, if the RMSEA value is < 0.05, the model will be considered a good fit, and if the value is < 0.08, the model will be considered a reasonable fit. Relative indices include the Comparative fit Index (CFI), and Goodness of Fit Index (GFI). If the values of CFI, GFI, IFI are >0.90, it indicates that the model achieves a good fit.²⁹ The results of this study were as follows: χ^2/df = 1.15, GFI = 0.99, CFI = 1.00, IFI = 1.00, RMSEA = 0.02, indicating a good fit of the revised model (Figure 2).

The mediation effect was studied by the Bootstrap sampling test method with 5000 sampling times. The results showed that the 95% CI results of the direct and indirect effects of facilitation of patient involvement on patients' perceived burden did not contain 0, indicating that the mediating effect model of social support has been established. The results of the mediation effect analysis showed that the indirect effect of facilitation of patient involvement in social

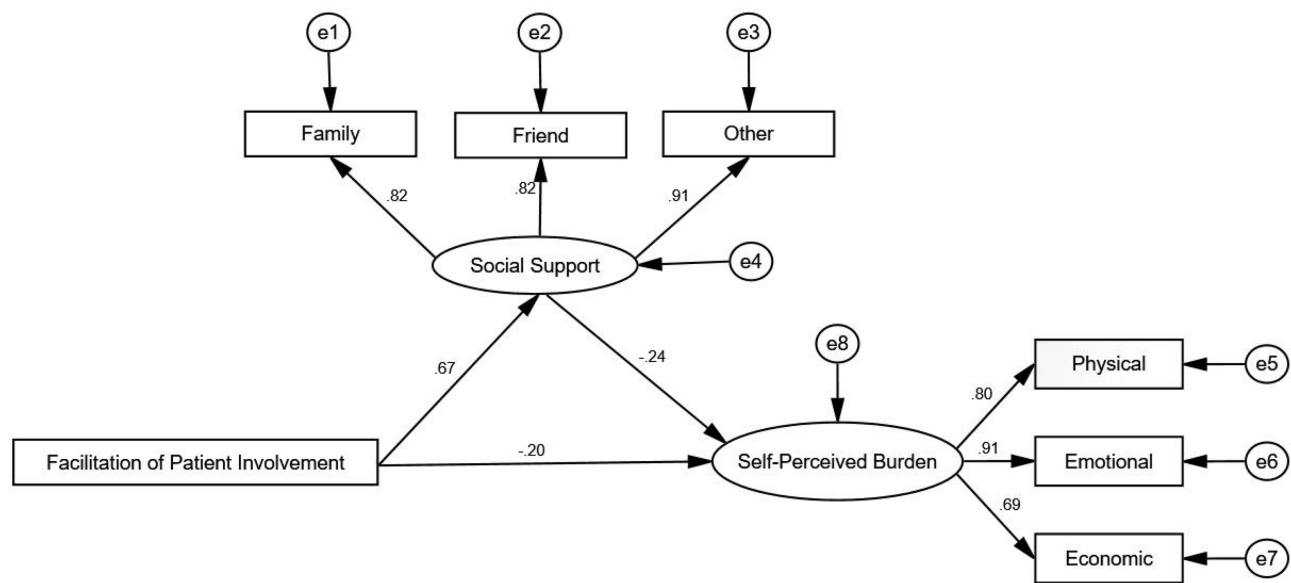


Figure 2 The mediating role of social support in facilitation of patient involvement and self-perceived burden.

support on SPB was -0.075 , and the mediation effect accounted for 44.3% of the total effect (Table 4). Therefore, social support is an important way for lung cancer surgery patients to facilitation of patient involvement and influence SPB.

Discussion

This study aims to explore the relationship between facilitation of patient involvement, social support, and SPB in patients with lung cancer after surgery. The research results have verified our hypotheses, indicating that facilitation of patient involvement and social support can alleviate SPB. Additionally, social support partially mediates the relationship between facilitation of patient involvement and self-perceived burden.

The SPB occurs frequently in cancer patients.³⁰ Studies have shown that the incidence of SPB in cancer patients in China is 87.5–97.98%.^{10,31,32} The SPB can cause patients to experience negative emotions such as sadness and depression, which can affect their quality of life.¹¹ In this study, 97.58% of postoperative lung cancer patients had SPB, with an average SPB score of (26.42 ± 8.23) , indicating a moderate level. This is consistent with a survey conducted by Wu et al on cancer patients,²⁵ but lower than the scores of post-radiation therapy patients with esophageal cancer,³³ breast cancer surgery patients,³⁴ and female stroke patients.³⁵ The analysis of the reasons may be related to the different study populations. In this study, the included population consists of postoperative lung cancer patients who are in the early stage of disease treatment compared to post-radiation therapy patients with esophageal cancer. They have fewer symptoms and less economic and psychological burdens. They may feel relatively less guilt towards family members due to cancer. Breast cancer patients, after undergoing surgical treatment, may experience high SPB scores due to changes in their physical appearance and feelings of shame, worrying about the impact of breast removal on their identity as a wife and mother, leading to guilt towards their family. Stroke patients often have varying degrees of

Table 4 Breakdown of Total Effects, Direct Effects, and Mediation Effects (n=331)

Effects	Structural Paths	Impact	SE	P	95% CI	%
Direct effects	FPIS → SPB	-0.060	0.031	0.022	-0.133~-0.011	55.7
Mediating effects	FPIS → PSSS → SPB	-0.075	0.021	0.001	-0.106~-0.023	44.3
Total effects	FPIS → SPB	-0.135	0.019	<0.001	-0.174~-0.099	

Abbreviations: SPB, Self-perceived burden scale; FPIS, Facilitation of patient involvement scale; PSSS, Perceived social support scale.

physical, language, and cognitive impairments,³⁵ with lower ability for self-care in daily life. They may struggle to fulfil their pre-illness roles and even rely on family members for care, resulting in a greater sense of burden on their family. These findings indicate that although SPB in postoperative lung cancer patients is at a moderate level, healthcare professionals should still pay attention to it in their daily work. Prospective psychological counselling can be implemented to actively communicate with patients and assess their psychological condition in real-time, providing effective psychological guidance. Encouraging patients to engage in peer support and conversation can help them share their treatment experiences and vent negative emotions. Online interactions, educational videos, and informative articles can provide patients with more behavioral and cognitive resources, enhancing their disease awareness and coping skills. This can redirect their focus from self-blame and burden towards family members to actively cooperating with healthcare professionals, thereby improving their SPB and quality of life.

This study validated hypothesis 1 and demonstrated for the first time the promoting effect of facilitation of patient involvement on SPB. Specifically, the higher the level of patient-perceived involvement in treatment decision-making by healthcare providers, the lower their sense of guilt and self-blame towards their family due to cancer. In this study, postoperative lung cancer patients had a high level of facilitation of patient involvement. This may be related to the implementation of shared decision-making. Shared decision-making involves healthcare providers and patients sharing the best available evidence and supporting patients in considering their choices when facing treatment decisions.³⁶ Medical staff providers actively took measures to explain and introduce relevant knowledge and treatment options for lung cancer to patients, making them feel valued and respected, leading to higher levels of treatment cooperation. This, in turn, allows patients to promptly address their symptoms and achieve better treatment outcomes, reducing the burden of disease-related symptoms and economic pressures. Moreover, patients with good physical condition experience less guilt towards their family members. Medical staff should establish a trusting relationship with patients, correctly assess their willingness and concerns to participate in treatment decisions, carry out targeted lung cancer treatment knowledge education according to different patients, guide patients to face the disease, cooperate with treatment, and encourage them to actively participate in treatment and nursing decisions, to reduce their SPB.

Previous studies have shown that the involvement of family members in caregiving can alleviate patients' SPB.^{37,38} This study validated hypothesis 2, demonstrating the positive effect of social support on SPB in postoperative lung cancer patients, consistent with several research findings.^{39,40} Social support is an important resource for physical recovery and can provide individuals with the necessary information and economic support.⁴¹ Lung cancer patients with higher levels of social support can gain more disease-related knowledge, and support from family, friends, and the community can make patients feel cared for and attended to, thus improving their psychological resilience⁴² and stress levels,⁴³ buffering the adverse effects of stressful events on themselves, and facilitating the adoption of positive coping strategies to improve the SPB. Medical staff should attach importance to the promotion effect of social support on SPB of lung cancer patients, adopt various forms of social support intervention modes for different patients, actively carry out peer support treatment, and use telephone and WeChat for information communication, health education and emotional support, and strive to provide a strong support system for patients. Guide patients to actively seek outside assistance and mobilize effective social resources. To reduce the patient's sense of self-blame and burden on the caregiver.

In addition, we confirm hypothesis 3 concerning the relationship between facilitation of patient involvement, social support and SPB. In other words, the facilitation of patient involvement can not only directly affect SPB, but also indirectly affect SPB through the mediating role of social support. Medical staff's encouragement of lung cancer patients' participation in decision-making can promote patients' participation in clinical decision-making, make patients more cooperative with treatment, improve treatment results, help them have a better physical and mental state, and reduce the pressure of caregivers and their burden on caregivers. At the same time, facilitation of patient involvement can also make lung cancer patients feel the help and attention of medical staff, improve the level of social support, so that they have more courage and self-confidence in the face of cancer, actively cooperate with the treatment plan, and then have better treatment effect and healthier physical and mental state, SPB is reduced. This suggests that medical staff can take targeted measures in their work to encourage lung cancer patients to participate in treatment decisions and improve the level of patient participation. At the same time, caregivers should also be guided to accompany patients in daily life, so as

to improve the level of social support of patients, reduce their SPB, and improve their physical and mental health and quality of life.

Limitations

There are some limitations in this study. Firstly, it is a cross-sectional survey, which does not allow for testing of causal mechanisms between facilitation of patient involvement, social support, and the SPB. Secondly, participants were recruited only from a specialized cancer hospital in Beijing, which may limit the representativeness of lung cancer postoperative patients from other cities in China and internationally. In future research, the authors plan to conduct a multi-centre longitudinal study to enhance the representativeness and generalizability of the study conclusions.

Conclusion

To our knowledge, this study is the first to examine the intrinsic relationship between facilitation of patient involvement, social support, and SPB. This study showed that the facilitation of patient involvement and social support of patients after lung cancer surgery was at a high level, and the patient's SPB was at a moderate level. The structural equation model shows that social support plays an intermediary role in the facilitation of patient involvement and SPB after lung cancer surgery. On one hand, medical staff should actively take measures to establish a trusting relationship with patients, correctly assess their willingness and concerns to participate in treatment decisions, carry out targeted guidance on lung cancer treatment knowledge, establish and improve the mechanism of patient participation, improve patient participation ability, guide patients to face the disease and actively join in their own treatment decisions. On the other hand, it is also necessary to pay attention to the positive role of social support and adopt various forms of social support intervention models for different patients. Actively carry out peer support treatment, use telephone, wechat and other information communication, health education and emotional support, and strive to provide a strong support system for patients. Family members and friends are encouraged to accompany patients and give emotional support. Guide patients to participate in group activities, increase the sense of integration, actively seek outside assistance, and obtain more social support, to reduce the burden of guilt and self-blame on caregivers because of lung cancer.

Data Sharing Statement

The datasets analyzed during the current study are available from the corresponding author upon reasonable request.

Ethics Declarations

The study was conducted in strict accordance with the provisions of the Declaration of Helsinki. The study was approved by the Approval Letter of Ethics Committee of National Cancer /Cancer Hospital, Chinese Academy of Medical Sciences, and Peking Union Medical College (No. 22/081/3282). We ask respondents to agree before filling out the questionnaire, and they can change their minds at any time. The participants' identities are not collected and their privacy is strictly protected.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors report no conflicts of interest in this work.

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