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Quality of Life Status and Its Influencing Factors Among Lung Cancer Chemotherapy Patients in China: A Cross-Sectional Study

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Background: Improving the quality of life (QOL) of lung cancer patients undergoing chemotherapy is an indispensable part of cancer treatment, as it not only pertains to their physical health but also to their psychological and social well-being. Previous research has primarily focused on investigating health-related quality of life, while studies specifically addressing the QOL of lung cancer patients remain underrepresented and under researched.

Purpose: The study aims to investigate the current status of QOL among lung cancer patients and identify the predictive factors associated with QOL.

Patients and Methods: From January 2024 to June 2024, lung cancer patients undergoing chemotherapy will be recruited from the outpatient clinics or wards of a tertiary A-level hospital in Deyang City as research subjects. They will be surveyed using the general information questionnaire, the Self-rating Depression Scale (SDS), the Multidimensional Scale of Perceived Social Support (MSPSS), and the Functional Assessment of Cancer Therapy-Lung (FACT-L) scale. Multiple linear regression analysis will be employed to determine the variables associated with QOL.

Results: A total of 390 lung cancer patients undergoing chemotherapy were recruited for this study, with a male predominance accounting for 72.31%. The mean age was (59.11±11.37) years. The overall QOL score was (66.43±23.67). Age, family monthly income per capita, cancer clinical stage, depression, and perceived social support (PSS) were identified as independent factors influencing the QOL of lung cancer patients, accounting for 19.4% of the total variance.

Conclusion: There is still considerable room for improvement in the overall QOL of lung cancer patients undergoing chemotherapy. Based on the analysis of influencing factors, targeted and personalized intervention measures should be implemented to enhance the QOL for these patients.

Keywords: lung cancer, depression, perceived social support, quality of life, influencing factors, chemotherapy

Introduction

According to global cancer statistics, there were approximately 2.48 million new cases of lung cancer in 2022, accounting for 12.4% of all cancer incidence, making it the cancer with the highest incidence worldwide.[1] The asymptomatic onset of lung cancer and the lack of effective screening methods result in most patients being diagnosed at an advanced stage, which increases the difficulty of treatment and leads to poor prognosis.[2] Furthermore, the age-standardized 5-year relative/net survival rate for lung cancer is typically low, ranging from 10% to 20% in most regions.[3] Chemotherapy is currently one of the widely used treatments for lung cancer in clinical practice,[4] which can extend patient survival to some extent and effectively control the recurrence and metastasis of lung cancer. However, long-term chemotherapy may trigger a series of adverse reactions, causing patients to endure continuous physical and mental suffering, which in turn leads to negative emotions and severely affects their recovery, prognosis, and quality of life (QOL).[5,6]

The World Health Organization (WHO) defines QOL as an individual's perception of their position in life within the context of the culture and value systems they inhabit, and in relation to their goals, expectations, standards, and concerns. It reflects an individual's experience of their physical condition, psychological function, social abilities, and overall personal circumstances.[7] A good QOL is of utmost importance for lung cancer patients undergoing chemotherapy, as it not only affects their tolerance to

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treatment and reduces chemotherapy-induced side effects such as nausea, vomiting, loss of appetite, and fatigue, but also enhances their motivation and adherence to treatment.[8] Moreover, an improvement in QOL is closely linked to patients' emotional states, reducing anxiety and depression, and enhancing their psychological resilience.[9] Furthermore, there is a significant correlation between QOL and survival rates in lung cancer patients, with those having a higher QOL experiencing longer survival post-treatment.[10] Therefore, improving the QOL of lung cancer patients undergoing chemotherapy is crucial for their overall treatment plan and prognosis.

The main manifestations of depressive symptoms include persistent low mood, reduced interest in daily activities, lack of energy, and difficulty concentrating.[11] Data indicates that the incidence of depression among lung cancer patients ranges from 31.0% to 58.1%.[12–15] Without sufficient attention and timely intervention, it may lead to multifaceted impairments in patients' physical, emotional, and social functioning, subsequently affecting treatment outcomes and prognosis, and comprehensively reducing patients' QOL.[16–18] Studies have shown that depression is considered a major factor contributing to the decreased QOL in elderly patients hospitalized with pneumoconiosis.[19] Surveys targeting Chinese elderly individuals also confirm that depression has a significant negative impact on their QOL.[20]

Perceived social support(PSS) refers to the degree of support that an individual perceives from family, friends, and others, emphasizing the individual's subjective perception and understanding of social support.[21,22] The main effect model of social support suggests that social support has a universal beneficial effect, enhancing an individual's physical and mental health, independent of the actual support the individual currently receives.[23] A survey study involving 150 patients with cardiovascular diseases revealed that PSS is one of the important strategies for improving patients' QOL and coping with their illness.[24] Additionally, another study on patients with migraine also found a positive correlation between PSS and patients' QOL.[25] These studies collectively highlight the crucial role of PSS in enhancing individual health and QOL.

In recent years, there has been a gradual increase in research on the QOL (QOL) of cancer patients both domestically and internationally, including observational studies and interventional studies. However, most of these studies have focused on health-related QOL,[26–29] with relatively little research on the QOL of lung cancer patients. This remains an underestimated and under-researched topic. Therefore, the current study aimed to: (1) understand the current status of QOL in lung cancer patients undergoing chemotherapy; and (2) explore the related factors that affect the QOL of these patients, such as depression and PSS.

Material and Methods

Participants

From January 2024 to June 2024, lung cancer patients undergoing chemotherapy were recruited from the outpatient clinics or wards of a tertiary hospital in Deyang City as the study subjects. Participants were surveyed using the general information questionnaire, the Self-rating Depression Scale (SDS), the Multidimensional Scale of Perceived Social Support (MSPSS), and the Functional Assessment of Cancer Therapy-Lung (FACT-L) scale. The study included participants who met the following inclusion criteria: (1) patients diagnosed with primary bronchogenic lung cancer through histopathological examination and admitted for chemotherapy; (2) conscious and able to communicate without language barriers; (3) aged 18 years or older; (4) expected survival time of 6 months or longer; and (5) voluntary participation. Exclusion criteria included: (1) patients planned for surgery after diagnosis; (2) patients with mental or cognitive impairments; (3) patients unaware of their cancer diagnosis due to protective medical measures; and (4) patients with severe diseases of important organs such as the heart, liver, or kidneys.

In this study, G*Power 3.1 was used to calculate the sample size for multiple regression analysis.[30] Select "Multiple Regression using Effect Size", set Power to 0.90, α=0.05, and according to Cohen's criterion,[31] assume that the effect size f^2 =0.15 (medium effect size) and the number of independent variables is 13. Based on these parameters, G*Power calculated the required sample size to be 189, and after considering a 10% deleterious rate, the required sample size was 218. 390 cases were actually included in this study.

Research Tools

General Information Questionnaire

Including age, gender, number of children, marital status, education level, religious belief, occupational status, Per capita monthly household income, place of residence, clinical stage of cancer, and Comorbidity with other diseases.

Measurement of QOL

The Functional Assessment of Cancer Therapy-Lung Cancer (FACT-L) scale, developed by Cella,[32] and later translated and adapted into Chinese by Wan,[33] has been validated for assessing the QOL (QOL) of Chinese lung cancer patients.[34] This scale comprises 36 items across five dimensions: Physical Well-being (PWB), Social/Family Well-being (SWB), Emotional Well-being (EWB), Functional Well-being (FWB), and Lung Cancer Subscale (LCS). It employs a Likert 5-point scoring system, where each item is scored from 0 to 4, with reverse scoring applied to negatively worded items. The total score ranges from 0 to 144, with higher scores indicating better QOL for lung cancer patients. In this study, the overall Cronbach's α coefficient for this scale was 0.926.

Measurement of Depression

The Self-rating Depression Scale (SDS), developed by Zung in 1965,[35] is used to assess the level of depression in individuals. The scale consists of 20 items across four dimensions: Psychotic Affective Symptoms(PAS), Somatic Disorders(SD), Psychomotor Disorders(PD), and Depressive Mental Disorders(DMD). It employs a Likert 4-point scoring system, where each item is scored from 1 to 4, representing "none or rare", "sometimes", "most of the time", and "almost always" respectively. Among them, 15 items are scored positively, while items 5, 9, 13, 17, and 19 are scored negatively. The total score ranges from 20 to 80, with higher scores indicating a more severe level of depression in the patient. In this study, the overall Cronbach's α coefficient for this scale was 0.867.

Measurement of PSS

The Multidimensional Scale of Perceived Social Support (MSPSS), developed by Zimet,[21] and translated and revised by Jiang,[36] is used to measure the level of social support that individuals perceive from family members and significant others. The scale is divided into three dimensions: Family Support(FAS), Friend Support(FRS), and Significant Others Support(SOS), with a total of 12 items. It employs a Likert 7-point scoring system, assigning scores from 1 to 7 for responses ranging from "strongly disagree" to "strongly agree". The total score ranges from 12 to 84, with higher scores indicating a greater level of PSS experienced by the individual. In this study, the Cronbach's α coefficient for this scale was 0.924.

Data Collection Process and Ethical Approval

A total of 400 questionnaires were distributed, and 390 valid questionnaires were collected, with an effective questionnaire recovery rate of 97.5%. Before the survey, trained investigators explained the purpose, significance, and filling instructions of the study to the patients. After obtaining written informed consent from the patients, paper questionnaires were distributed for them to fill out anonymously, ensuring the confidentiality of the collected information. For patients who were unable to fill out the questionnaires themselves, the researchers explained each item one by one to enable them to make independent choices. The questionnaire-filling time ranged from 20 to 30 minutes, and questionnaires that were completed in less than 5 minutes or had obvious patterns were considered invalid. This study has been approved by the Ethics Committee of Deyang People's Hospital (202204058K01).

Statistical Methods

Statistical analysis was conducted using SPSS 26.0. The data were tested for approximate normal distribution using PP plots and histograms. Measurement data were expressed as mean ± standard deviation, while count data were described using frequency and proportion. Differences in QOL among categorical groups were tested using *t*-tests and one-way analysis of variance (ANOVA). Pearson correlation analysis was used to explore the correlation between depression, PSS, and QOL. Correlation heatmaps were plotted using Graph Prism 9. The Harman one-way test was used to explore the issue of common method bias, and the variance explained by the first 1st common factor was 19.949%, which was much lower than the critical value of 40%, indicating that there was no serious common method bias among the question items; multiple linear regression analyses were used to explore the factors influencing the QOL of chemotherapy patients with lung cancer, and a difference of $P < 0.05$ was considered statistically significant. A post-hoc power analysis was performed using G*Power 3.1 to assess the statistical power achieved by the multiple regression model,[30] with a sample

size of N = 390, an effect size f2 of 0.15 (medium effect size), α = 0.05, and a number of variables of 6. Calculations showed a statistical power was higher than the conventional threshold value of 0.80, suggesting that the present study was sufficiently sensitive for detecting the expected effect.

Results

Demographic Characteristics of Participants

The patients had an average age of 59.11 years (SD=11.37; range 28–83). Among them, 72.31% were male, 47.18% were aged 60 or older, 65.38% had one child, 83.59% were married, 38.72% had an educational background of junior high school or technical secondary school, 94.1% had no religious beliefs, 43.33% were retired, 59.49% had a per capita monthly household income of less than 3000 yuan, 56.67% lived in urban areas, 46.92% had cancer at clinical stage III, and 55.9% had comorbidities.

QOL and Other Outcomes in Lung Cancer Patients Undergoing Chemotherapy

The total score for QOL among lung cancer patients undergoing chemotherapy was (66.43±23.67), the total score for depression was (39.79±11.63), and the total score for PSS was (68.96±13.09), as shown in Table 1.

Univariate Analysis of the QOL of Lung Cancer Patients Undergoing Chemotherapy with Different Demographic Characteristics

The results of univariate analysis showed that there were significant differences in QOL among patients with different ages, per capita monthly household income, and clinical stages of cancer (P<0.05), as shown in Table 2.

Correlation Analysis of Depression, PSS and QOL in Lung Cancer Chemotherapy Patients

Depression in lung cancer chemotherapy patients was negatively correlated with PSS (r=0.484, P<0.01), negatively correlated with QOL (r=−0.319, P<0.01), and positively correlated with active coping and QOL (r=0. 349, P<0.01), as shown in Table 3 and Figure 1.

Table 1 QOL and Other Outcomes in Lung Cancer Patients Undergoing Chemotherapy (n=390)

Variables	Number of Items	Theoretical Score Range	Actual Score Range	Scores	Average Score of Entries
FACT-L	36	0–144	7–130	66.43±23.67	1.85±0.66
PWB	7	0–28	0–28	13.08±6.23	1.87±0.89
SWB	7	0–28	1–28	11.32±5.59	1.62±0.80
EWB	6	0–24	0–24	10.20±5.43	1.70±0.90
FWB	7	0–24	0–24	13.91±5.22	1.99±0.75
LCS	9	0–36	0–36	17.92±7.17	1.99±0.80
SDS	20	20–80	20–74	39.79±11.63	1.99±0.58
PAS	2	2–8	2–8	3.19±1.54	1.95±0.77
SD	8	8–32	8–32	15.91±4.39	1.99±0.55
PD	2	2–8	2–8	4.10±1.43	2.05±0.72
DMD	8	8–32	8–30	16.59±6.69	2.07±0.84
MSPSS	12	12–84	16–84	68.96±13.09	5.75±1.09
FAS	4	4–28	4–28	23.56±4.38	5.89±1.10
FRS	4	4–28	4–28	22.42±5.16	5.61±1.29
SOS	4	4–28	4–28	22.98±4.96	5.74±1.24

Abbreviations: FACT-L, Functional Assessment of Cancer Therapy-Lung; PWB, Physical Well-being; SWB, Social/Family Well-being; EWB, Emotional Well-being; FWB, Functional Well-being; LCS, Lung Cancer Subscale; SDS, Self-rating Depression Scale; PAS, Psychotic Affective Symptoms; SD, Somatic Disorders; PD, Psychomotor Disorders; DMD, Depressive Mental Disorders; MSPSS, Multidimensional Scale of Perceived Social Support; FAS, Family Support; FRS, Friend Support; SOS, Significant Others Support.

Table 2 Univariate Analysis of QOL in Patients Treated with Chemotherapy for Lung Cancer (n=390)

Characteristics		n (%)	QOL (Mean ± SD)
Gender	Male	282(72.31)	65.72±24.16
	Female	108(27.69)	68.31±22.34
	t		−0.966
	p		0.334
Age (Year)	18~44	23(5.90)	77.13±23.34
	45~59	183(46.92)	67.86±23.15
	≥60	184(47.18)	63.67±23.85
	t		3.992
	p		**0.019**
Number of children	0	4(1.03)	68.50±25.44
	1	255(65.38)	66.98±23.02
	2	95(24.36)	64.18±24.41
	≥3	36(9.23)	68.25±26.61
	F		0.412
	p		0.744
Marital status	Married	326(83.59)	66.44±23.22
	Single	28(7.18)	66.32±29.40
	t		0.026
	p		0.989
Education level	Primary and below	152(38.97)	65.26±26.33
	Middle school	199(51.03)	66.12±22.06
	College and above	39(10)	72.62±20.05
	F		1.539
	p		0.216
Religion	Yes	23(5.9)	66.00±19.95
	No	367(94.1)	66.46±23.91
	t		−0.09
	p		0.928
Occupational status	Employed	57(14.62)	63.42±24.80
	Retired	169(43.33)	68.94±22.55
	Unemployed	164(42.05)	64.90±24.29
	F		1.762
	p		0.173
Per capita monthly household income (Yuan)	<3000	232(59.49)	64.38±23.23
	3000–4999	85(21.79)	65.02±24.06
	5000–9999	54(13.85)	71.02±20.21
	≥10,000	19(4.87)	84.79±28.33
	F		5.338
	p		**0.001**
Place of residence	City	221(56.67)	67.78±23.62
	Townships	48(12.31)	66.65±24.85
	Villages	121(31.03)	63.88±23.29
	F		1.063
	p		0.347
Clinical stage of cancer	I	25(6.41)	76.24±29.32
	II	85(21.79)	71.20±26.40
	III	177(45.38)	66.28±21.03
	IV	103(26.41)	60.38±22.77
	F		4.975
	p		**0.002**

(*Continued*)

Table 2 (Continued).

Characteristics		n (%)	QOL (Mean ± SD)
Comorbidity with other diseases	Yes	218(55.90)	64.85±21.64
	No	172(44.10)	68.44±25.95
	t		1.459
	p		0.145

Notes: *t*, Independent samples *t*-test; F, one-way analysis of variance (ANOVA). Boldface indicates statistically significant differences ($p < 0.05$).
Abbreviations: QOL, quality of life; SD, standard deviation.

Table 3 Correlation Analysis of Depression, PSS and QOL in Lung Cancer Chemotherapy Patients (r-Value)

Variables	Depression	PSS	QOL
Depression	1		
PSS	−0.484**	1	
QOL	−0.319**	0.349**	1

Notes: **$P<0.001$.
Abbreviations: QOL, quality of life; PSS, perceived social support.

Multifactorial Linear Regression Analysis Affecting the QOL of Lung Cancer Chemotherapy Patients

The statistically significant variables in the univariate analysis as well as depression and PSS were set as independent variables, and the total QOL score was set as the dependent variable for multiple linear regression, and the independent variables were assigned in the manner shown in Table 4. The results showed that age (β=−0.116, P=0.012), per capita monthly household income (β=0.134, P=0.004), clinical stage of cancer (β=−0.144, P=0.002), depression (β=−0.177, P=0.001), and PSS (β=0.232, $P<0.001$) were the factors affecting the chemotherapeutic treatment of lung cancer patients' QOL and were able to explain 19.4% of the total variance (Table 5 and Figure 2).

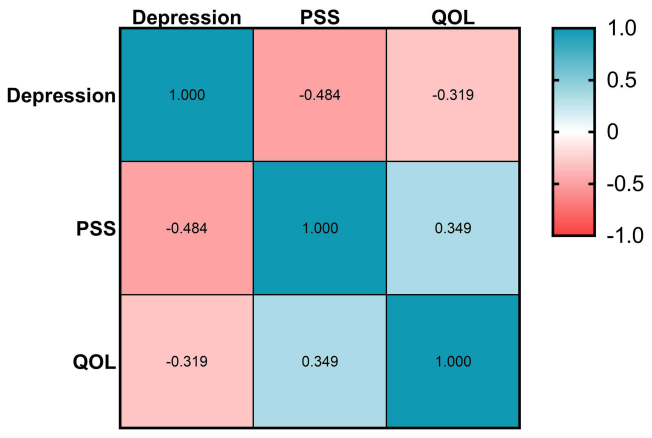

Figure 1 Correlation Analysis Heatmap.
Abbreviations: QOL, quality of life; PSS, perceived social support.

Table 4 Assignment of Independent Variables

Independent Variable	Assignment of Values
Age	18~44 years=1; 45–60 years=2; ≥60 years=3
Per capita monthly household income	<3000 yuan=1; 3000–4999 yuan=2; 5000–9999 yuan =3; ≥10000 yuan =4
Clinical stage of cancer	I=1, II=2, III=3, IV=4
Depression	Substitute the original value
PSS	Substitute the original value

Abbreviation: PSS, perceived social support.

Table 5 Results of Multivariate Linear Regression Analysis in Patients Treated with Chemotherapy for Lung Cancer (N= 390)

	β	SE	Standard *β*	t	p	95% CI
Constant	68.663	10.892		6.304	<0.001	(47.248, 90.078)
Age	−4.579	1.810	−0.116	−2.529	0.012	(−8.138, −1.019)
Per capita monthly household income	3.549	1.218	0.134	2.913	0.004	(1.153, 5.945)
Clinical stage of cancer	−3.982	1.269	−0.144	−3.137	0.002	(−6.478, −1.486)
Depression	−0.359	0.106	−0.177	−3.384	0.001	(−0.568, −0.151)
PSS	0.419	0.095	0.232	4.432	<0.001	(0.233, 0.605)

Notes: R^2 =0.204, Adjusted R^2 =0.194, F=19.682, P<0.001.

Discussion

The QOL score of the lung cancer chemotherapy patients in this study was (66.43 ± 23.67), which was lower than that of a study in China of lung cancer patients receiving immunotherapy (79.90 ± 15.84),[37] this discrepancy may stem from differences in treatment toxicity profiles, symptom burden, and regional healthcare resource allocation. For instance, chemotherapy-induced symptoms such as fatigue, nausea, and appetite loss (reported in over 90% of patients) directly impair physical and emotional functioning.[38,39] Immunotherapy, while associated with fewer acute toxicities, may better preserve QoL by reducing symptom clusters like "fatigue-depression" cycles 1. Additionally, socioeconomic disparities in access to advanced therapies (eg targeted drugs) in lower-income regions exacerbate QoL gaps.[40] Also, the QOL scores of chemotherapy patients with lung cancer in this study were lower than those in a study of drug-treated patients with advanced lung cancer in France and Germany [(73.1 ± 21.5) scores and (70.4 ± 17.2)].[41] This may be due to the fact that demographics such as age, gender, socioeconomic status and comorbidities of the study population may affect the QOL scores, and therefore QOL scores may not be comparable across countries and regions.However, one conclusion we can draw is that there is still much room for improvement in the QOL level of lung cancer patients during chemotherapy.

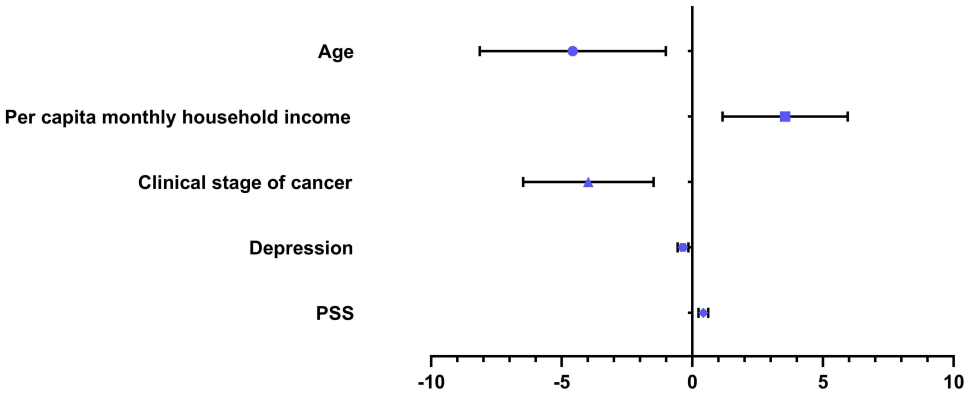

Figure 2 Multiple regression analysis forest plot.
Abbreviation: PSS, perceived social support.

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In view of the fact that QOL, as one of the important indicators for evaluating the effectiveness of cancer treatment and patients' prognosis, has a profound impact on the recovery process of lung cancer chemotherapy patients, it is necessary to explore in depth the QOL of lung cancer chemotherapy patients and its influencing factors, so as to formulate targeted intervention strategies at an early stage, with a view to maximally improving the QOL of the patients and facilitating their full recovery.

Multiple linear regression analysis showed that age had a negative impact on the QOL of patients undergoing chemotherapy for lung cancer, and the older the patient, the worse the QOL, which is consistent with the results of previous studies.[42] At the physiological level, as age increases, the physiological functions of lung cancer patients gradually decline, with lower tolerance to treatment, longer recovery time, and greater susceptibility to treatment-related side effects. At the psychological level, older patients face challenges such as retirement, loneliness, and social role changes, making it more difficult to adapt to the life changes brought about by the disease, and predisposing them to mental health problems such as depression and anxiety, which can further reduce their QOL.

This study found that per capita monthly household income had a positive impact on the QOL of lung cancer chemotherapy patients. Previous studies on cancer patients have also found that economic status is a protective factor for the QOL of cancer patients.[43,44] According to the WHO's Social Determinants of Health (SDOH) framework, economic stability can mitigate "downstream" health inequalities.[45] Economic advantage, as a key material support, can reduce symptom severity through As a key material support, it can reduce the severity of symptoms through adequate supportive care (eg, antiemetic medication, nutritional supplements), etc. While financial constraints in low-income groups not only imply a lower standard of living and limited coping capacity, but also lead to more barriers in terms of medical costs, nutritional support, and rehabilitative services, which limits access to quality healthcare resources, and patients may not be able to receive the treatment they deserve, which inevitably increases the physical and mental burden on patients and their QOL and results in a higher level of health inequalities. Inevitably, this will increase the physical and mental burden of patients and cause a decline in their QOL. In contrast, economic income, as an important social capital, can enhance self-efficacy and health literacy, help patients actively cope with the challenges of illness,[46,47] reduce psychological and social pressure, and play an important role in alleviating the negative impacts of traumatic stressful events, such as illness, and thus improve the QOL of patients.

This study found that cancer clinical stage has a negative impact on QOL. Previous studies have also pointed out that cancer clinical stage correlates with the extent of the patient's disease, with the higher the patient's symptom burden, the worse the QOL.[48] Clinical stage, as a key indicator for assessing the extent of cancer progression, is early or late and directly correlates with the symptomatic challenges and degree of functional impairment faced by the patient. The earlier the clinical stage, the milder the cancer is, and the milder the symptoms are, the less the impact on the patient's ability to care for themselves, their social situation and their psychological state, which helps to maintain the patient's level of QOL; whereas, with the progression of the cancer's clinical stage, the disease progressively worsens, and the symptomatic burden faced by the patient increases significantly, and the patient is often subjected to severe pain, fatigue, respiratory distress and other serious adverse symptoms, which seriously affect the patient's physical body and its functioning leading to a decline in their QOL.[49]

Depression has a negative impact on QOL, which is consistent with the results of previous studies.[50,51] Chemotherapy is one of the main treatments for lung cancer, and relevant studies have pointed out that the psychological state and physiological state have the characteristics of interaction, and a positive and optimistic psychological state can enhance the immune ability of the organism to a certain extent, improve the coordination and compensatory ability of the organism, and create favorable conditions for the recovery of lung cancer, while a negative and pessimistic psychologicalstate will have a negative impact on patients' recovery, causing them to fall into an emotional depression, reducing their confidence and motivation to cope with the challenges of the disease, and thus hindering the recovery process.[52–54] In addition, depression may reduce the QOL of patients by decreasing their adherence to chemotherapy. Studies have shown that depression reduces patients' treatment adherence and compliance behavior,[55] patients show resistance to treatment regimens and non-cooperation with treatment, which affects patients' clinical efficacy and prognosis,[56] and leads to a decrease in patients' QOL.

PSS has a positive effect on QOL, consistent with Vivek's findings that the higher the level of PSS, the better the QOL of the individual accordingly.[57] Studies have shown that PSS and a supportive social climate help patients to successfully deal with the difficulties of the disease process and the cognitive adaptation process,[58] in which they are able to cope more

effectively with the psychological and emotional stress of the disease, thus contributing to the QOL. Meanwhile, because humans are inherently social and need a safe social environment to survive, and illness seriously threatens patients' positive social interactions and confidence in their own abilities.[59,60] PSS can improve patients' health and QOL by helping them to improve self-care, increase treatment adherence, change their lifestyle, and increase their knowledge about the illness.[61,62] Social cognitive theory(SCT) also provides theoretical support for the effects of PSS on QOL, which can improve patients' QOL by increasing their self-efficacy, decreasing their avoidance of illness, better coping with illness, and reducing adverse physiological responses associated with illness.[63,64]

Limitations

The cross-sectional research design used in this study does not allow for the establishment of a temporal order of change among the variables, which does not allow for the inference of causality; secondly, due to the limitation of human and material resources, this study focuses only on a single hospital's population of patients undergoing chemotherapy for lung cancer as a sample, which leads to uncertainty about the generalizability of the results and external validity of the findings, ie, it remains to be verified whether the results can be broadly applied to other patient populations; In addition, other factors related to the QOL of chemotherapy patients with lung cancer, such as smoking history, treatment modalities, and associated complications, were not included in the regression model, which may have led to the limited explanatory power of this regression model; Finally, self-report was used in this study to assess indicators of depression, PSS, and QOL in lung cancer patients, which may lead to recall bias and social approbability bias.

Therefore, future research needs to be deepened and expanded in the following aspects: first, the coverage of research subjects should be expanded, and multi-center and cross-regional studies should be conducted to enhance the representativeness of the samples and the generalizability of the results. Second, a methodological framework combining quantitative and qualitative research should be adopted to not only quantitatively analyze the relationship between variables, but also to deeply understand the subjective experience and psychological dynamics of patients by means of in-depth interviews and case studies, thus enriching the dimension and depth of the study. In addition, potential variables that may affect QOL such as smoking history, type of treatment, laboratory findings such as hemoglobin, liver and kidney function indices, and objective indicators such as pulmonary function tests, can be added in the future to enhance the scientific validity of the study. Finally, the longitudinal study design is promoted to clarify the time-series relationship between variables by tracking and observing the changes of the same group at different time points, providing an empirical basis for the construction of a causal model, and a research basis for the development of a clinical intervention program targeting the QOL of patients undergoing chemotherapy for lung cancer.

Conclusion

Our findings show that there is still much room for improvement in the QOL level of patients undergoing chemotherapy for lung cancer, and that age, per capita monthly household income, clinical stage of cancer, depression and PSS are factors that influence the QOL of patients undergoing chemotherapy for lung cancer. Based on this, we propose the following targeted recommendations with a view to optimizing comprehensive care and QOL for lung cancer chemotherapy patients:

First, for old patients, a specialized risk-benefit assessment form for old patients can be developed, taking into account the patient's age, underlying disease, physical function, psychological status, social support and other factors, embedded in the electronic medical record system, and the assessment can be completed within 72 hours prior to chemotherapy, which will provide a basis for chemotherapy decision-making; At the same time, clinical monitoring is strengthened during the treatment period, increasing the frequency of nurses' rounds for elderly patients, and monitoring vital signs and adverse reactions in real time to ensure the safety and effectiveness of treatment.

Secondly, hospital management needs to be committed to optimizing the cancer diagnosis and treatment process, and curbing excessive medical care, such as overuse of medication, non-essential examinations and treatments, through standardized medical service pathways and stringent cost control measures, so as to alleviate the financial burden of patients. At the same time, for groups of patients with financial constraints, a special charitable assistance office has been set up, which is responsible for docking with caring social organizations (such as fund-raising platforms, the Red Cross, public welfare funds, etc). to provide patients with the necessary financial assistance and pharmaceutical assistance.

Furthermore, medical workers should pay great attention to the mental health status of lung cancer chemotherapy patients, especially the identification and intervention of depressed mood.

Professional scales (eg Patient Health Questionnaire-9) can be used to regularly screen patients for depression; and for patients with depression, timely intervention by psychologists can be arranged, including psychological counseling and cognitive-behavioral therapy, etc. In addition, medical institutions can regularly hold "anti-cancer refueling station" workshops, which contain skills on how to deal with side effects (eg hair loss care) and encourage patients to participate, and establish patient mutual support strategies. In addition, medical institutions can organize "anti-cancer refueling station" workshops on a regular basis, which include emotion management skills, side effects (eg, alopecia care), doctor-patient communication strategies, etc., and establish patient support groups to promote experience sharing and emotional support to enhance patients' knowledge of the disease and confidence in fighting it.

Finally, families and healthcare professionals should work together to build a collaborative family-hospital support network. While meeting the basic physiological needs of patients, they should provide the necessary emotional comfort and psychological support to meet their spiritual needs. At the same time, hospitals or families should organize patients to participate in various social activities, such as outdoor excursions, cultural performances, volunteer activities, etc., to broaden the social support network of patients, so as to alleviate the psychological pressure caused by the challenges of disease adaptation and side effects of treatment, and then improve the negative emotions and psychological cognition of the patients, so as to comprehensively improve their QOL.

Data Sharing Statement

Data is available on reasonable request. The data supporting the study's conclusions are accessible from the corresponding author upon reasonable request.

Ethics Approval and Consent to Participate

This study has been approved by the Ethics Committee of Deyang People's Hospital (202204058K01).All participants participated voluntarily and provided written informed consent in accordance with the Declaration of Helsinki. Respondents were assured of confidentiality and anonymity.

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Disclosure

The authors confirm that they have no personal, financial, commercial, or academic conflicts of interest with regard to this work.

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