

Investigation of quality of life in patients with lung cancer by the EORTC QLQ-C30 (V3.0) Chinese version*

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Abstract

Objective To explore quality of life (QOL) and its influencing factors in patients with lung cancer.

Methods A QOL questionnaire (European Organization for Research and Treatment of Cancer [EORTC] Quality of Life Questionnaire-Core 30 [QLQ-C30] Chinese version) was used with 138 patients with lung cancer participating in the study. A statistical description of the general characteristics of the patients with lung cancer was performed. The patients' QLQ-C30 scores were compared with the reference value for each dimension. To analyze the influence of QOL in different genders, age groups, and cancer stages, *t*-tests and rank sum tests were used to compare the differences in QOL using a 5% significance level.

Results The QLQ-C30 function scores in PF (physical functioning), EF (emotional functioning), SF (social functioning), and GH (global functioning), and symptom scales in NV (nausea and vomiting), DY (dyspnea), SL (insomnia), and FI (financial difficulties) were significantly different ($P < 0.05$) in comparison to the reference values. Female patients were worse than males ($P < 0.05$) in EF, NV, and DI (diarrhea). The later the stage of lung cancer, the worse the quality of life became; the functional scales in RF (role functioning), EF, CF, SF, and GH, and symptom scales in PA (pain), AP (appetite), and SL differences were statistically significant ($P < 0.05$).

Conclusion This study aids understanding of the status of the quality of life of Chinese patients with cancer and might be useful for clinical work, theory research, and health policymakers.

Key words: quality of life; lung cancer; EORTC QLQ-C30; influential factors

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Lung cancer is the most common type of cancer in the world. In 2008, the number of new patients with lung cancer was 1.6 million globally, and 1.37 million deaths related to lung cancer, which accounted for 18.2% of all cancer-related deaths [1]. In China, about 75% of lung cancers were at late stages when first diagnosed with little hope of cure [2]. Treatment is not only focused on prolonging patients' survival but also on improving patients' quality of life, which is equally important. As the biopsychosocial model has been established, people pay increasing attention to the evaluation of quality of life, which has already become a clinical treatment outcome. The present research is to explore the quality of life of pa-

tients with lung cancer and other influential factors with the Quality of Life Questionnaire-Core 30 (QLQ-C30) questionnaire developed by the European Organization for Research and Treatment of Cancer (EORTC).

Patients and methods

Patients

The patients were admitted to Tongji Hospital from April to August of 2014. Inclusion criteria included (1) cytologically or histologically confirmed primary lung cancer; (2) no other combined cancers (3) age \geq 18 years old; (4) clear consciousness without cognitive or commu-

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Table 1 Demographic data ($n = 138$)

	No. of patients	%
Gender		
Male	103	74.64
Female	35	25.36
Age ($\chi \pm s = 55.05 \pm 10.05$; years)		
Range	25–87	
< 45	19	13.77
45–59	70	50.72
60–69	41	29.71
≥ 70	8	5.80
Staging		
I	7	5.07
II	22	15.94
III	37	26.81
IV	72	52.17
Pathological type		
SCLC	18	13.04
NSCLC		
SCC	33	23.91
Adenocarcinoma	81	58.70
Combined	6	4.35
Treatment		
Chemotherapy	62	44.93
Radiotherapy	17	12.32
Surgery	19	13.77
Comprehensive	40	28.99

nicative disability; and (5) patients provided consent to this research.

Tool of exploration

The EORTC QLQ-C30 questionnaire was used to investigate patients' quality of life. This questionnaire has already been applied and verified in many countries including China [3–7] and has been widely used in clinical research on patients with cancer because of its good reliability, validity, and sensitivity. The questionnaire is a self-appraisal report which includes a global health status sub-scale, five multi-item functional scales (physical functioning [PF], role functioning [RF], emotional functioning [EF], cognitive functioning [CF], and social activity [SA]), three multi-item symptom scales (fatigue [FA], nausea and vomiting [NV], and pain [PA]) and six single items (dyspnea [DY], insomnia [SL], appetite loss [AL], constipation [CO], diarrhea [DI], and financial difficulties [FD]). Scores were averaged for each scale and transformed to a 0–100 scale with a specific EORTC formula; higher scores indicated better quality of life on global health status and functional scales and worse quality of life on symptom scales and single items.

Statistical analysis

After data review and verification, SPSS 19.0 was adopted to analyze the data. Median and standard deviations

Table 2 General QLQ-C30 scores of patients with lung cancer, symptom occurrence rate, and comparisons with reference values ($n = 138$)

Item	Scores of life quality	Reference value	<i>P</i> value
Functional scale			
PF	70.05 \pm 22.00	63.7	< 0.001
RF	67.63 \pm 28.67	65.8	0.454
EF	79.89 \pm 16.60	68.3	< 0.001
CF	80.68 \pm 17.81	82.1	0.349
SF	61.47 \pm 25.77	73	< 0.001
GH	54.35 \pm 22.96	60.7	< 0.05
Symptom scale			
FA	39.05 \pm 21.15	41.8	0.129
NV	16.91 \pm 22.51	10.3	< 0.001
PA	29.71 \pm 26.16	29.4	0.889
DY	28.99 \pm 25.10	42.2	< 0.001
SL	25.36 \pm 21.89	35	< 0.001
AP	31.88 \pm 29.83	32.7	0.748
CO	17.87 \pm 24.21	20.8	0.158
DI	4.11 \pm 11.00	5.8	0.073
FI	47.10 \pm 32.15	12	< 0.001

PF, physical functioning; RF, role functioning; EF, emotional functioning; CF, cognitive functioning; SF, social functioning; GH, global functioning; FA, fatigue; NV, nausea and vomiting; PA, pain; DY, dyspnea; SL, insomnia; AP, appetite; CO, constipation; DI, diarrhea; FI, financial difficulties

Table 3 Occurrence rates of QLQ-C30 symptom scales

Symptom scale	Occurrence (%)
FA	95.65
NV	50.00
PA	73.91
DY	67.39
SL	63.77
AP	65.22
CO	42.03
DI	12.32
FI	82.61

FA, fatigue; NV, nausea and vomiting; PA, pain; DY, dyspnea; SL, insomnia; AP, appetite; CO, constipation; DI, diarrhea; FI, financial difficulties

were used to statistically describe the data. To compare each scale score with its reference value and to analyze the differences and influences of gender, age, and cancer stage on quality of life, *t*-tests and rank-sum tests were adopted; $P < 0.05$ was a significant difference.

Results

Demographic data

The present study administered a total of 142 questionnaires, out of which 139 were returned (response rate of 97.9%). There were 138 completed questionnaires with a completion rate of 97.2%. The average time for the patients to answer questionnaires was 10 minutes. Patients'

Table 4 Gender influences on quality of life (n = 138)

	Male (n = 103)	Female (n = 35)	t	P
PF	70.10 ± 22.69	69.93 ± 20.15	0.045	0.965
RF	68.93 ± 29.33	63.81 ± 26.66	0.912	0.363
EF	81.72 ± 15.70	74.52 ± 18.18	2.247	0.026
CF	81.07 ± 18.68	79.52 ± 15.17	0.442	0.659
SF	60.52 ± 26.09	64.28 ± 24.96	-0.746	0.457
GH	55.26 ± 23.10	51.67 ± 22.67	0.798	0.426
FA	37.86 ± 22.69	42.53 ± 19.34	-1.131	0.26
NV	14.89 ± 20.60	22.86 ± 26.83	-1.25	0.041
PA	28.96 ± 27.51	30.90 ± 21.90	-0.573	0.568
DY	28.16 ± 24.59	31.43 ± 26.74	-0.665	0.507
SL	25.56 ± 21.99	25.76 ± 21.91	0.187	0.852
AP	31.72 ± 30.02	32.38 ± 29.69	-0.114	0.910
CO	18.12 ± 25.47	17.14 ± 20.40	0.206	0.837
DI	2.91 ± 9.46	7.62 ± 14.20	-2.219	0.028
FI	47.25 ± 32.85	46.47 ± 30.46	0.092	0.927

PF, physical functioning; RF, role functioning; EF, emotional functioning; CF, cognitive functioning; SF, social functioning; GH, global functioning; FA, fatigue; NV, nausea and vomiting; PA, pain; DY, dyspnea; SL, insomnia; AP, appetite; CO, constipation; DI, diarrhea; FI, financial difficulties

data and frequency analysis is reported in Table 1.

QLQ-C30 scores of all scales and occurrence of all symptoms in symptom sub-scale: comparison of patients with lung cancer's general scores with reference values

As displayed in Table 2, the general QLQ-C30 scores of all admitted patients with lung cancer were described by medians and standard errors; there were significant differences (P < 0.05) between PF, EF, SF, GH, and their reference values. There were also significant differences (P < 0.05) between NV, DY, SL, DI, FI, FA, and reference

values on symptom scales.

Symptom occurrence rates were reported in Table 3. The top three were FA (95.65%), FI (82.61%), and PA (73.91%).

Influences of age, gender, and stage on quality of life

Gender influence on quality of life (Table 4).

Except SF, all female scores were lower than male on all functional items. On the symptom scales, all female scores were higher than male scores except CO and FI. The differences in EF, NV, and DI were significant (P < 0.05).

Stage influence on quality of life (Table 5)

On the functional scales, the differences on RF, EF, CF, SF, and GH between the four stage groups were significant; the differences on PA, AP, and SL in the symptom scales were as well (P < 0.05); The later the stage, the lower scores on functional scales and the higher scores on symptom scales were.

Age influence on quality of life (Table 6)

Only the differences of PF and DY between different age groups are statistically significant (P < 0.05).

Discussion

The present study is a descriptive cross-sectional study; different factors usually change and thereby influence patients' evaluations of their own quality of life. Hopwood [8] *et al* indicated that severe cancer status and negative depression were the main factors that were related with lung cancer life quality. Sterzi [9] *et al* and some domestic studies [10-11] showed the factors related to patients with

Table 5 Stage influences on quality of life (n = 138)

Item	Stage				χ ²	P
	I (n = 7)	II (n = 22)	III (n = 37)	IV (n = 72)		
PF	74.29 ± 17.82	74.24 ± 18.89	76.22 ± 18.50	65.19 ± 24.03	6.567	0.087
RF	66.67 ± 19.25	81.82 ± 23.52	74.32 ± 24.40	59.95 ± 30.73	12.106	0.007
EF	84.52 ± 16.27	84.09 ± 15.83	84.91 ± 13.87	75.58 ± 17.26	11.216	0.011
CF	83.33 ± 19.25	90.15 ± 14.23	80.18 ± 15.63	77.78 ± 18.97	8.796	0.032
SF	76.19 ± 31.71	74.24 ± 21.66	68.92 ± 23.95	52.31 ± 24.11	17.657	0.001
GH	69.05 ± 21.36	72.35 ± 16.94	57.88 ± 21.24	45.60 ± 21.44	28.238	0.000
FA	34.92 ± 17.48	34.85 ± 20.66	33.33 ± 23.57	43.67 ± 19.59	7.455	0.059
NV	11.90 ± 31.50	9.85 ± 12.24	17.12 ± 24.69	19.44 ± 22.73	4.952	0.175
PA	23.81 ± 16.26	18.94 ± 20.76	24.77 ± 22.09	36.11 ± 28.80	8.403	0.038
DY	28.57 ± 29.99	22.73 ± 23.87	30.63 ± 22.74	30.09 ± 26.34	2.140	0.544
SL	23.81 ± 31.71	10.61 ± 15.89	25.23 ± 22.78	30.09 ± 20.29	14.354	0.002
AP	19.05 ± 37.80	21.21 ± 30.07	27.03 ± 29.23	38.89 ± 27.97	12.829	0.005
CO	4.76 ± 12.60	15.15 ± 19.86	15.32 ± 21.65	21.30 ± 27.01	3.711	0.294
DI	0.00 ± 0.00	1.52 ± 7.11	5.41 ± 12.46	4.63 ± 11.61	2.878	0.411
FI	28.57 ± 35.63	40.91 ± 32.42	45.95 ± 25.28	51.39 ± 34.46	4.638	0.200

PF, physical functioning; RF, role functioning; EF, emotional functioning; CF, cognitive functioning; SF, social functioning; GH, global functioning; FA, fatigue; NV, nausea and vomiting; PA, pain; DY, dyspnea; SL, insomnia; AP, appetite; CO, constipation; DI, diarrhea; FI, financial difficulties

Table 6 Age influences on quality of life ($n = 138$)

Item	Age (years)			χ^2	P value
	< 45 ($n = 19$)	45–60 ($n = 70$)	≥ 60 ($n = 49$)		
PF	72.98 ± 15.31	73.52 ± 22.95	63.95 ± 21.85	7.728	0.021
RF	71.93 ± 23.60	66.67 ± 30.95	67.35 ± 27.42	0.215	0.898
EF	78.95 ± 14.80	80.12 ± 19.05	79.93 ± 13.49	0.818	0.664
CF	86.84 ± 16.27	81.90 ± 16.96	76.53 ± 18.92	5.108	0.078
SF	52.63 ± 23.08	64.05 ± 26.26	61.22 ± 25.77	2.674	0.263
GH	53.95 ± 23.63	55.95 ± 21.34	52.21 ± 25.16	0.875	0.646
FA	35.09 ± 16.26	36.98 ± 22.04	43.54 ± 21.14	3.964	0.138
NV	18.42 ± 22.84	16.90 ± 23.65	16.33 ± 21.11	0.246	0.884
PA	28.95 ± 18.29	30.95 ± 28.42	28.23 ± 25.73	0.268	0.874
DY	35.09 ± 23.50	22.86 ± 23.08	35.37 ± 26.71	8.706	0.013
SL	29.82 ± 18.90	22.86 ± 21.64	27.21 ± 23.25	2.234	0.327
AP	29.82 ± 26.98	28.57 ± 30.18	37.41 ± 30.15	3.144	0.208
CO	8.77 ± 18.73	19.52 ± 25.69	19.05 ± 23.57	3.720	0.156
DI	5.26 ± 12.49	4.29 ± 11.24	3.40 ± 10.19	0.430	0.806
FI	54.39 ± 33.72	46.19 ± 33.23	45.58 ± 30.20	0.972	0.615

PF, physical functioning; RF, role functioning; EF, emotional functioning; CF, cognitive functioning; SF, social functioning; GH, global functioning; FA, fatigue; NV, nausea and vomiting; PA, pain; DY, dyspnea; SL, insomnia; AP, appetite; CO, constipation; DI, diarrhea; FI, financial difficulties

lung cancer's quality of life included gender, age, marital status, education, pathology type and stage, etc.

Comparison of the QLQ-C30 scores of lung cancer patients admitted in this research with the reference value measured by EORTC: The difference between EF, SF, SF, and reference values on functional scales and global health status were statistically significant ($P < 0.05$); global health and social functioning were lower than the reference values. The following factors may be connected: (1) The percentage of stage IV patients in the group was 52.17% and the percentage of those answering questionnaires during chemotherapy were 31.61% (45/138). Severe symptoms at late stage lung cancer and during chemotherapy influence patients' quality of life and social functioning. (2) Differences in social functioning may be due to the differences in patients' understanding of lung cancer; these differences may be a result of different regional, cultural, and ethnic backgrounds. Low social functioning will usually cause low quality of life. In the symptom scales, symptom occurrence of FA was the highest (95.65%), followed by FI (82.61%) and PA (73.91%); fatigue caused by cancer has been the single most influential symptom for patients with cancer^[12–13], which is identical to other studies. NV, DY, SL, and FI were significantly different from the reference values ($P < 0.05$); FI was almost four times higher than the reference value. Because most of the multi-center, large sample EORTC QLQ-C30 research were completed in European countries with prosperous economies and good social security systems, the significant difference in the present research reflects the influence of socioeconomic differences between developed

and developing countries on quality of life.

Influence of demographic statistical factors on quality of life. In gender influences on quality of life, females were worse than males in terms of EF, NV, and DI, which is identical to clinical practice and other research. Reports indicate that female scores on functional scales and the global health scale are lower than male scores, while higher than male scores on symptom scales. In stage influence on quality of life, there were significant differences between groups in terms of CF, SF, GH, PA, and SL. The later the patient's stage of cancer, the poorer the quality of life; this is closely related to negative psychological status, decreasing social status, and severe symptoms caused by poor body function and cancer treatment. Age only influenced significant BF and DY differences on symptom scales, but no GH difference. It is generally believed that age is a factor that influences quality of life^[14, 15]. In the present research, the difference between different age groups was not significant, which was probably connected with sample choice and size.

As indicated in the present research, the quality of life of Chinese patients with lung cancer is comparatively poor, especially for older, female, late stage patients with financial difficulties. Therefore, it is very important and meaningful to focus on and help those patients, provide economical individualized treatment regimens and effective psychological direction, and thereby to improve their quality of life in clinical practice.

Conflicts of interest

The authors indicated no potential conflicts of interest.

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