

Original Research Article

Quality of life among lung cancer patients undergoing treatment at a tertiary cancer institute in North India

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ABSTRACT

Background: Lung cancer patients mostly present with advanced disease. Its treatment has shown limited progress in recent decades, so we studied their quality of life (QOL) and how it is affected during treatment.

Methods: Patients ≥ 18 years of age, diagnosed/registered at our institute from 1st September 2012 through August 2013 were included in the study. QOL was assessed by means of the EORTC QLQ-C30 and QLQ-LC13. Data was analyzed using descriptive and inferential statistics

Results: Out of 91 patients included in the study, 73 (80.2%) were males and 18 (19.8%) were females. Mean age of the study population was 59.24 ± 10.53 years and median age was 60 years. A better QOL for nausea and vomiting ($P=0.011$), sleep disturbance ($p=0.021$), and coughing ($p=0.016$) was observed in female patients. There was significant worsening in symptom scales of fatigue ($p=0.000$), nausea and vomiting ($p=0.000$), sleep (0.006), appetite ($p=0.000$) and constipation ($p=0.000$). Though the mean scores of pain, dyspnoea and financial difficulties decreased, but they were not significant. According to the LC13 module, significant improvement was seen in the symptom scales of cough ($p=0.000$), haemoptysis ($p=0.000$) and pain chest ($p=0.040$).

Conclusions: Lung cancer patients undergoing treatment suffer many limitations due to an array of symptoms and disruptions in various areas of QOL, arising from both the disease process and its treatment. It should be studied at every visit for each individual patient.

Keywords: Measurements time points, Lung cancer, Treatment, Quality of life assessment

INTRODUCTION

Lung cancer is a leading cause of death worldwide.¹ Despite the introduction of new therapeutic agents and modest survival improvement, the overall prognosis of these patients remains poor. So quality of life (QOL) assessment in these patients is receiving increasing interest.² They report having a number of distinct supportive care needs, including tasks of daily living and psychological needs.³⁻⁵ Patients may benefit from methods and measures specific to assessing QOL at the end of life rather than to lung cancer as such.⁶ Even when

palliative treatment does not prolong survival in these patients, it can significantly ameliorate symptoms leading to improvements in QOL.⁷ So we studied the quality of life in this subset of patients to find out how the treatment for lung cancer affects QOL.

Aims and objectives

- To assess the quality of life in lung cancer patients receiving treatment at the regional cancer centre, Shimla, Himachal Pradesh, India.

- To find out the contribution of sociodemographic and clinical variables on the QOL.
- To know how the treatments for lung cancer affect the QOL at different points in the treatment process.

METHODS

It was a prospective study conducted at our institute, which is a tertiary care cancer centre in north India, from 1st September 2012 through August 2013, among all the newly diagnosed lung cancer patients.

Consecutive sampling was followed and all the patients ≥ 18 years of age, diagnosed/registered within the study period and willing to participate in the study were included while those were in the terminal stage of illness, were cognitively impaired or whose follow up care was not obtained at RCC were excluded from the study.

Sociodemographic variables included age, sex, occupation, level of education, rural or urban background, smoker, marital status. Clinical variables included the histological type and the treatment modality used.

QOL was assessed by means of the European Organization for Research and Treatment of Cancer (EORTC) core questionnaire, the Quality of Life Questionnaire (QLQ-C30) and the supplemental lung cancer-specific module (QLQ-LC13).

The EORTC QLQ-C30 is a 30-item cancer-specific core questionnaire that addresses various domains of QOL. It has proven to be a valid and reliable tool when used among a wide range of cancer patient populations, including lung cancer patients.⁸

It contains five function subscales (physical functioning, role functioning, emotional functioning, cognitive functioning and social functioning), three symptom subscales (fatigue, pain and nausea/vomiting), two single items assessing global health and 'overall' QOL and a number of single items addressing various symptoms and perceived financial impact.⁹

The EORTC QLQ-LC13 is a tumour-specific questionnaire supplementary to the EORTC QLQ-C30. It was identified in a review article as one of the best instruments to measure quality of life in lung cancer patients. It is a 13-item measure of lung cancer-related symptoms and treatment side effects, including the following: coughing (1 item), haemoptysis (1 item), dyspnoea (3 items), sour mouth or tongue (1 item), swallowing (1 item), tingling hands and feet (1 item), hair loss (1 item), experience of pain (3 items), and pain medication (1 item).¹⁰ The questionnaire was administered to the patients while they were waiting for chemotherapy or after they had received chemotherapy. It was given in Hindi or English, according to their preference and knowledge of the language. Some patients

who could not read or write required assistance in marking the responses.

QOL was measured at three points in time, 1st at baseline on the first day of treatment, second on the last day of the second chemotherapy cycle, to study the effects of part of the treatment and 3rd after the end of treatment, at a follow up visit.

A total of 91 new patients were registered for the study till 28th February 2013. The second and third measurements of registered patients were taken till 30th June 2013. At the time of second measurement 71 patients completed the questionnaire while 53 patients were available for the 3rd measurement. The study was cleared by the institutional ethics committee.

In accordance with procedures recommended by the EORTC, scores were linearly converted to a scale ranging from 0 and 100 for each patient. Statistical Analysis was done using MS Excel 2007 and the SPSS Windows Evaluation Version 14.0. A p-value of ≤ 0.05 was considered as statistically significant.

RESULTS

Out of 91 patients 73 (80.2%) were males and 18 (19.8%) were females. Mean age of the study population was 59.24 ± 10.53 years (males 61.49 ± 9.51 and females 52.83 ± 11.81) and the median age was 60 years with a range of 55 years. All patients received standard therapeutic regimens chemotherapy, or chemo-radiotherapy as indicated by their attending clinicians (Tables 1 and 2).

There were no significant differences in QOL by age and marital status of patients for all items. However a better QOL for nausea and vomiting ($P=0.011$), sleep disturbance ($p=0.021$), and coughing ($p=0.016$) was observed in female patients.

No statistically significant differences in the QOL were seen in the distribution of type of lung cancer (SCLC/NSCLC). In patients with lower socio-economic status, significantly lower QOL scores were observed for financial difficulties ($P=0.000$) (Table 3).

At the baseline, mean Quality of Life scores showed limitations in Global QOL, role and social functioning scales, and in symptoms of fatigue, pain, dyspnoea, cough, sleep disturbance and appetite loss. At the second and third measurements, similar limitations were seen in addition to increase in nausea and vomiting, sore mouth, peripheral neuropathy and alopecia (Tables 4 and 5). The overall scores at the three measurements, showed no significant differences in global QOL, physical, role, emotional, cognitive and social functions. Even with more toxicity these QOL scores remained almost the same. However there was significant worsening in symptom scales of fatigue ($p=0.000$), nausea and

vomiting (p=0.000), sleep (0.006), appetite (p=0.000) and constipation (p=0.000). According to the LC13 module, there were no significant differences in the symptom

scales of dyspnoea, pain in the arm or shoulder and pain in other parts of the body.

Table 1: Characteristics of the study population (n=91).

Characteristic/ Variable	No.	%	Males(%)	Females(%)
Age group				
30-44	5	5.5	2 (2.7)	3 (16.7)
45-59	36	39.5	29 (39.7)	7 (38.9)
60-74	41	45.1	35 (48.0)	6 (33.3)
>75	9	9.9	7 (9.6)	2 (11.1)
Background				
Rural	79	86.8	63(86.3)	16 (88.9)
Urban	12	13.2	10 (13.7)	2 (11.1)
Marital Status				
Married, living with spouse	75	82.4	65 (89.0)	10 (55.5)
Single/Divorced/Widowed	16	17.6	8(11.0)	8(44.5)
Smokers				
Yes	83	91.2	71(97.3)	12(66.6)
No	8	8.8	2 (2.7)	6 (33.4)
Education level				
Primary	39	42.9	25 (34.2)	14 (77.7)
Secondary	29	31.9	27 (37.0)	2(11.2)
Higher/Senior Secondary	9	9.9	8 (10.9)	1 (5.6)
Graduate	13	14.2	12 (16.5)	1 (5.6)
Post Graduate	1	1.1	1 (1.4)	0
Occupation				
Agriculture	33	36.3	25 (34.2)	8(44.5)
Business	9	9.9	9 (12.3)	0
Professional	8	8.8	8 (11.0)	0
Housewife	9	9.9	0	9 (50.0)
Employee/Pensioner/Retired	32	35.1	31 (42.5)	1 (5.5)
Socio-economic status*				
Upper High	2	2.2	2 (2.7)	0
High	11	2.1	9 (12.3)	2 (11.1)
Upper Middle	33	36.3	31 (42.5)	2 (11.1)
Lower Middle	27	29.6	20 (27.4)	7 (38.9)
Poor	14	15.4	8 (10.6)	6 (33.3)
Very Poor/BPL	4	4.4	3 (4.1)	1 (5.6)

* Modified Prasad Classification based on WPI for August 2013.

Table: 2 Clinical characteristics of the sample.

Characteristic	Number N	Percentage
Patients, measurement 1	91	100%
Patients, measurement 2	71	
Patients, measurement 3	53	
Age (Min=35: Max=90)		
Histology		
Small cell	12	13.2%
Non-Small cell	79	86.8%
Treatment		
Chemotherapy	66	72.5%
Chemo-radiotherapy	25	27.5

Table 3: Relationship between socio-demographic characteristics and quality of life* (n=91).

Area	Age**	Sex***	Marital status***	Socio-economic status**	Histology SCLC/NSCLC***
Global	0.790	0.201	0.195	0.744	0.084
Physical	0.590	0.427	0.688	0.192	0.440
Role	0.966	0.556	0.664	0.879	0.909
Emotional	0.871	0.087	0.827	0.356	0.317
Cognitive	0.409	0.627	0.052	0.729	0.278
Social	0.957	0.622	0.121	0.829	0.275
Fatigue	0.179	0.370	0.950	0.526	0.412
Naus./Vom.	0.839	0.011	0.648	0.079	0.181
Pain	0.795	0.400	0.077	0.162	0.399
Dyspnoea	0.352	0.385	0.741	0.251	0.483
Sleep disturbance	0.704	0.021	0.876	0.172	0.851
Appetite loss	0.975	0.719	0.912	0.319	0.843
Constipation	0.641	0.144	0.468	0.154	0.358
Diarrhoea	0.279	0.060	0.835	0.239	0.160
Financial impact	0.717	0.072	0.111	0.000	0.142
Dyspnoea	0.985	0.725	0.230	0.402	0.232
Coughing	0.729	0.016	0.149	0.161	0.719
Haemoptysis	0.601	0.456	0.538	0.166	0.988
Sore mouth	0.280	0.792	0.603	0.305	0.285
Dysphagia	0.272	0.718	0.819	0.741	0.505
Peripheral neuropathy	0.712	0.055	0.708	0.346	0.550
Alopecia	0.229	0.079	0.080	0.833	0.393
Pain in chest	0.877	0.591	0.396	0.845	0.749
Pain in arm or shoulder	0.970	0.341	0.350	0.805	0.066
Pain in other parts	0.266	0.962	0.312	0.400	0.644

*Numbers represent p values; **Kruskal-Wallis analysis of variance test; ***Mann-Whitney test.

Table 4: QLQ-C30 scores at the three assessments (n=53).

Areas	1 st Mean	S.D.	2 nd Mean	S.D.	3 rd Mean	S.D.
Global	30.97	8.55	31.76	9.25	31.92	10.18
Physical	46.91	13.95	46.66	11.98	46.16	11.54
Role	25.78	13.69	28.93	15.72	29.87	14.00
Emotional	69.18	14.01	71.79	12.69	68.71	11.89
Cognitive	68.23	15.76	66.98	13.66	67.61	16.48
Social	22.95	17.05	24.21	14.82	22.33	14.60
Fatigue	58.90	11.44	70.02	14.05	74.63	11.19
Naus./Vom.	6.60	12.80	28.30	14.09	29.87	18.01
Pain	65.40	17.24	62.57	15.29	61.64	17.48
Dyspnoea	60.37	19.67	54.71	20.76	55.97	19.36
Sleep disturbance	50.31	24.99	56.60	20.23	61.01	19.32
Appetite loss	38.36	25.65	60.37	18.55	68.55	22.09
Constipation	11.32	20.61	24.52	17.48	20.75	21.90
Diarrhoea	13.83	20.07	16.98	19.19	20.13	22.01
Financial impact	61.63	36.04	59.74	32.91	58.49	34.53

However, significant improvement was seen in the symptom scales of cough ($p=0.000$), haemoptysis ($p=0.000$) and pain chest ($p=0.040$) while worsening was

found in the symptom scales of sore mouth ($p=0.000$), dysphagia ($p=0.000$), peripheral neuropathy ($p=0.000$) and hair loss ($p=0.000$) (Table 6).

Table 5: QLQ-LC13 scores at the three assessments (n=53).

Areas	1 st Measurement		2 nd Measurement		3 rd Measurement	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Dyspnoea	55.76	14.69	51.78	13.77	53.25	13.67
Coughing	49.68	29.68	35.84	25.19	36.48	23.81
Haemoptysis	13.83	21.11	9.43	15.15	9.43	17.76
Sore mouth	4.40	11.39	27.67	16.96	32.08	22.61
Dysphagia	1.88	7.77	11.94	19.71	18.24	20.21
Peripheral neuropathy	3.14	9.83	44.02	17.01	54.72	17.41
Alopecia	0.68	4.57	49.68	25.83	54.72	26.23
Pain in chest	51.57	28.91	50.31	27.44	45.91	24.66
Pain in arm or shoulder	25.78	31.10	24.52	28.60	23.27	27.41
Pain in other parts	8.80	20.82	6.91	16.48	4.40	13.14

Table 6: Friedman ANOVA by ranks.

Areas (Variable)	Mean	Mean Rank	S.D.	p value	Differences between**
FA	58.90	1.35	11.44	0.000	All three measurements
FA1	70.02	2.19	14.05		
FA2	74.73	2.46	11.19		
NV	6.60	1.25	12.80	0.000	1&2, 1&3
NV1	28.30	2.36	14.09		
NV2	29.87	2.39	18.01		
SL	50.31	1.75	24.99	0.006	1&2, 1&3
SL1	56.60	2.04	20.23		
SL2	61.01	2.21	19.32		
AP	38.36	1.32	25.65	0.000	All three measurements
AP1	60.37	2.23	18.55		
AP2	68.55	2.45	22.09		
CO	11.32	1.71	20.61	0.000	1&2, 1&3
CO1	24.52	2.25	17.48		
CO2	20.75	2.05	21.90		
LCCO	49.69	2.41	29.69	0.000	1&2, 1&3
LCCO1	35.85	1.78	25.19		
LCCO2	36.48	1.81	23.81		
LCHA	13.83	2.13	21.12	0.016	1&2, 1&3
LCHA1	9.43	1.93	15.16		
LCHA2	9.43	1.93	17.76		
LCSM	4.40	1.33	11.39	0.000	1&2, 1&3
LCSM1	27.67	2.26	16.97		
LCSM2	32.08	2.41	22.61		
LCDS	1.89	1.64	7.78	0.000	All three measurements
LCDS1	11.95	2.04	19.71		
LCDS2	18.24	2.32	20.22		
LCPN	3.14	1.07	9.84	0.000	All three measurements
PCPN1	44.03	2.31	17.01		
LCPN2	54.72	2.62	17.41		
LCHR	0.63	1.11	4.58	0.000	1&2, 1&3
LCHR1	49.69	2.36	25.84		
LCHR2	54.72	2.53	26.23		
LCPC	51.57	2.13	28.91	0.040	1&3
LCPC1	50.31	1.03	27.44		
LCPC2	45.91	2.84	24.66		

Wicoxon signed rank test. Assessment points between which there are significant differences have been mentioned. **Core questionnaire: FA-fatigue, NV-nausea and vomiting, SL-sleep disturbance. **Module:** LCCO-constipation, LCHA-haemoptysis, LCSM-sore mouth, LCDS-dysphagia, LCPN-neuropathy, LCHR-hair loss, LCPC-pain chest.

DISCUSSION

The socio-demographic and clinical data of this sample are representative of lung cancer patients in our setting. No significant difference was seen in QOL within the different age groups. Similar findings were seen by Adam Svobodnik et al, Mohan A et al and Akin S, et al.¹¹⁻¹³ Contrary to this Sarna L showed significantly greater disruptions in quality of life in younger patients. Smith et al and Güner P et al showed lower overall quality of life in older patients.¹⁴⁻¹⁶

As far as gender difference is concerned, some studies show significantly lower quality of scores in women while other studies showed lower QOL in men.^{11,13,15,16} No correlation with sex was seen by Mohan A et al.¹² The present study showed no difference in Global QOL scores but saw better QOL for nausea and vomiting ($P=0.011$), sleep disturbance ($p=0.021$), and coughing ($p=0.016$) in female patients.

There was no correlation of marital status with QOL as found by Svobodnik et al and Mohan A et al.^{11,12} In the present study also no significant differences were found for the marital status variable. But Akin S, et al showed lower QOL for patients who were single/ widowed/ divorced.¹³ According to socio-economic status there was no significant difference in global QOL or any other functional or symptomatic scores, except in financial difficulties area, where it was lower for lower socio-economic status. Similarly results were also seen in various studies^{13,16,17}.

So we can see that these are mixed results and no consistent pattern has emerged with regard to the lung cancer patients' socio-demographic characteristics and their overall quality of life. More multi-centric studies may help in providing a more comprehensive evaluation of the effect of various demographic and clinical variables on QOL in this group of patients.

QLQ-C30 scores: Bergman B et al found a significant decline in the social functioning and improvement in the emotional functioning. Montazeri et al observed that patients' functioning and global quality of life had decreased while Langendijk et al saw significant decline in physical, role and social functioning.¹⁸⁻²⁰

Some studies saw no difference in the global QOL while a study in USA found a significant decline in the physical and emotional role functioning at the end of treatment.²¹⁻²³ On the contrary Aaronson K et al found a significant improvement in the global QOL, physical and role functioning.⁹ In the present study the global QOL of the patient remained almost the same.

The scores of physical, emotional, role, cognitive and social functioning also did not change significantly at follow up. The reason could be that the patients were on treatment and this may have prevented the worsening in

these areas. We also found significant worsening in the QLQ-C30 symptom scales of fatigue ($p=0.000$), nausea and vomiting ($p=0.000$), sleep ($p=0.006$), appetite ($p=0.000$) and constipation ($p=0.000$). These are consistent with various studies, which showed significant worsening of nausea and vomiting, other studies also found significant improvement in dyspnoea.^{13,22-26} Akin S and Jiancum CA found that appetite of the patients had decreased significantly after treatment.^{25,13}

LC-13 scores: Various studies found that there was significant improvement in cough, dyspnoea and pain chest whereas peripheral neuropathy, sore mouth and hair loss increased significantly.^{13,18,19,22,25,26} In another study, cough and haemoptysis did not change significantly but there was significant worsening of dyspnoea, pain chest and pain in arm or shoulder.²⁰

The present study also found that with treatment there was a significant improvement in cough ($p=0.000$), haemoptysis ($p=0.016$) and pain chest ($p=0.040$). There was worsening in sore mouth ($p=0.000$), dysphagia ($p=0.000$), peripheral neuropathy ($p=0.000$) and hair loss ($p=0.000$).

So the present study is consistent with most of the studies, which show that after treatment (chemotherapy or chemo-radiotherapy), the scores show a significant improvement in cough, pain chest, dyspnoea and haemoptysis. Besides they show a significant worsening in the areas of nausea and vomiting, sore mouth, peripheral neuropathy and hair loss, appetite and sleep, all of which are the side effects of the lung cancer treatment.

The study results clearly indicate that information on quality of life contributes to our understanding of patients' experiences of their cancer treatment. Controlling cancer-related symptoms can ameliorate the patient's limited remaining time with family and friends.

For example, if the quality of life deficit was identified to be related to patient nausea and vomiting, fatigue and emotional distress, interventions (pharmaceutical, psychosocial, etc.) could be offered to improve patient well-being. Studies also suggest that most QOL aspects remain unchanged during treatment, suggesting that palliative treatment did not negatively impact QOL.²⁷ So the health related QOL assessment should be done in routine clinical practice in lung cancer patients.²⁸

Since we measured quality of life after diagnosis, and only of those patients who had unresectable disease, the validity of our measurements can sometimes be biased by any temporary effects due to patients being informed of their diagnosis of lung cancer and possible prognosis. Also the QOL scores are gross and they don't distinguish between various treatments modalities of chemotherapy or chemo-radiotherapy. Some confounding factors may also be there.

CONCLUSION

There are surprisingly few reports of quality of life measurements in India for patients undergoing treatment for lung cancer. More such studies are recommended to provide QOL measurements and to allow a better understanding of the contribution of the socio-demographic characteristics of the patients to their pre-treatment and post treatment quality of life.

Lung cancer patients undergoing treatment suffer many limitations due to an array of symptoms and disruptions in various areas of QOL, arising from both the disease process and its treatment. So the QOL should be studied at every visit for each individual patient. This can provide an objective basis for informing decision making for individual patients, like in which area more attention is needed for a particular patient, and for making the case for allocation of appropriate resources to medical and supportive services.

People may have side effects that palliative support can help alleviate. To address all these challenges, a palliative care team can be formed which can include a doctor or nurse, a psychologist or counsellor, a pain management specialist, a social worker and a nutritionist. Spiritual support can be sought from the affiliated religious group.

It can also be interesting to study the quality of life scores in these patients with those who did not complete the protocols proposed for treatment. Family members too need to be counselled on the various aspects of patient's management and on how to take best care of the patient. QOL can also be used as a tool in the assessment of new treatments, or compare various chemotherapeutic regimens.

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