

IMPACT OF VARIOUS TREATMENTS AND PATIENT EDUCATION ON QUALITY OF LIFE OF LUNG CANCER PATIENTS IN MALABAR REGION OF KERALA, SOUTH INDIA

Muhas C^{1*}, PR Anand Vijaya Kumar²

¹ Professor & Head, Department of Pharmacy Practice, Moulana College of Pharmacy, Perintalmanna, Kerala, India, 679321

² Department of Pharmacology 2, JSS Academy of Higher Education and Research, JSS College of Pharmacy, Ooty - 643001, Tamil Nadu, India.

Corresponding Author:

Dr Muhas C

Professor & Head

Department of Pharmacy Practice

Moulana College of Pharmacy

Angadippuram, Perintalmanna

Kerala, India, 679321

drmuhasc@gmail.com

ABSTRACT

Objectives: Lung cancer is the most common malignant neoplasm worldwide. It is usually diagnosed by late stages, and the vast majority of patients with lung cancer die within a year and thus, quality of life in lung carcinoma patients is a supreme treatment outcome in addition to length of survival. The main objectives of this study to find the impact of various treatment modalities on quality of life of lung cancer patients and also to assess the effect of patient education on quality of life.

Methodology: This is a prospective observational analysis of 238 histopathologically proven cases of lung cancer in Malappuram district of Kerala during the period of 2024 - 2025. A well-structured patient data collection form was developed and used for the study. In case of quality of life assessment studies, three type questionnaires were used, EQ-5D-5L and the EORTC QLQ C-30 and its lung carcinoma supplementary questionnaire EORTC QLQ-LC-13.

Results: A total of 238 patients involved, 82.0% were males and the male to female ratio was 4.5:1. Patients with supportive therapy have a poor quality of life and all aspects of functioning are greatly disturbed when compared to patients with other treatment modalities. In this study, during chemotherapy treatment, the quality of life was improved including global health status and role functioning. This study also assessed the effect of patient education on quality of life of the patients and after follow up of the patient's minimal improvement in global health status was observed. Emotional, cognitive and physical functions improved whereas role and social functional status deteriorated. Various symptoms like fatigue, pain, appetite loss, dyspnea, constipation also improved.

Conclusion: This community based study found that lung cancer is an old age disease and smoking is the principle etiological factor in the development of lung carcinoma among men in Malappuram district of Kerala. Many patients did not receive cancer specific treatment, may be caused by diagnosis of disease at a too late stage of illness, or patients own request and these findings represents a crucial need to additional improvement in health care options for patients with lung carcinoma, including supportive and palliative care.

Key words: Chemotherapy, Lung cancer, Patient education, Quality of life, Supportive care

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INTRODUCTION

Cancer one of the most important causes of deaths worldwide and is the reason for death in economically developing and developed countries and second most regular illness after cardiovascular disease [1,2]. The burden for cancer is increasing global in spite of advances for diagnosis and therapy. In the year 1900, the estimated total number of neoplasm cases was approximately one million [3].

The International Agency for Research on Cancer GLOBOCAN 2012 project has prognosticated that India's tumor burden will nearly double in the coming 20 years, from over a million recent cases in 2012 to more than 1.7 million by 2035. These results indicate that the independent number of tumor deaths will also increase from about 680,000 to 1.2 million in the same duration [4]. In Kerala, in 2013, according to hospital-based cancer registries (HBCRs) of Trivandrum RCC reported that lung carcinoma (15%) was the most

familiar cancer among males [5]. The GLOBOCAN 2018 report says that there will be approximately 18.1 million new cases of neoplasm (17.0 million excluding non-melanoma skin cancers) and 9.6 million cancer mortality (9.5 million excluding non-melanoma skin cancers) in 2018 [6].

Lung carcinoma is the most common malignant neoplasm globally, accounting for greater mortality than due to any other cancer [7]. In the mid-1900s lung carcinoma was an uncommon disease. Now, it is in relevant proportions and is presently the prominent cause of cancer related mortality in the western countries [8]. It accounts for about 13% of all new cases of cancers and 19% of cancer-related mortality globally [9].

In India, lung cancer comprises 6.9% of all new cases of cancer and 9.3% of all cancer-related mortality in both sexes [10]. A project of the National Cancer Registry Program (NCRP) given information on various cancers in some districts in Kerala. It showed that eight of the fourteen districts of the state including Kollam, Thrissur, Trivandrum, Palakkad, Kannur, Pathanamthitta, Kasargod, and Ernakulum provide data for which detailed description of the leading site of cancer was given. Among males, lung carcinoma was the leading cancer in all the districts except Trivandrum and it was constituted 12-14% of all cancers in males in these districts [11,12].

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Lung cancer is usually diagnosed by late stages, and the vast majority of patients with this lung carcinoma die within a year and thus, quality of life in lung carcinoma patients is a supreme treatment outcome in addition to the length of survival [13]. So the assessment quality of life in these patients is very important. Quality of life is an early index of disease progression and could help the doctors in daily practice to strictly observe the patients'. Quality of life is also used as a prognostic feature in lung cancer, help in predicting survival, evaluating the efficacy of various treatment regimens. So the assessment of the quality of life is very important. In lung cancer, there are different therapeutic regimens are available, but survival was not significantly improved [14]. This study is also focusing to find out the quality of life lung cancer

patients those who receiving various kinds of treatments like chemotherapy, chemotherapy + radiation, surgery, supportive care, etc. Nowadays assessment of the health-related quality of life is very important and quality of life has been introduced as an endpoint for therapy comparisons in many cancer types, particularly in late stages. This type of study has not been conducted in this district until now.

MATERIALS & METHODS

This is a prospective, observational study conducted in patients those who registered in various palliative care clinics in Malappuram district, Kerala, India for a period of one year (2017 - 2018). These various palliative care clinics together form a district umbrella organization called Malappuram Initiative in Palliative Care (MIP) which was set up in 2000. The objectives include to improve the quality of care, share good and bad experiences and provide training to professionals and volunteers. While access to palliative care is calculated to be less than 3% nationally, it is more than 85% in Malappuram district. An approval from the institutional ethics committee for research work involving human study subjects was obtained from Malappuram Initiative in Palliative care (MIP) (112/MIP/MPM/2017).

(I) Inclusion Criteria

- Both genders.
- Age 18 years and above
- All established cases of patients with lung carcinoma registered at the palliative clinic during the study period.
- Physically fit.

(II) Exclusion Criteria

- Patients with any other cancer.
- The cases with doubts about the primary origin.
- Patients whose biopsy report were available.
- Patients who were not willing to participate.
- Patients with a severe neuropsychiatric disorder.
- Presence of metastases in the CNS

A well-structured patient data collection form was developed and used for the study. This form was prepared by consulting a physician in one of the palliative clinics, the staff of the pharmacy practice department. Patient demographic details such as age, gender, marital status, religion and education were collected and recorded.

In case of quality of life assessment studies, two type questionnaires were used, the EORTC QLQ C-30 and its lung carcinoma supplementary questionnaire EORTC QLQ-LC-13. The EORTC QLQ-C30 + LC 13 is the commonly used questionnaire to evaluate the quality of life. This questionnaire has many versions, but the most commonly used version was 3.0. It was translated into 81 languages and it was

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also validated one. This questionnaire was used in more than three thousand studies globally. It is also used to examine the quality of life for many different cancers such as breast, lung, esophagus, head and neck, stomach, ovaries, cervix and multiple myeloma [14]. These questionnaires used in the study were previously validated and translated into the native language (Malayalam) and are approved and certified by the EORTC and EuroQol group.

The EORTC QLQ - C 30 questionnaire is made up of 30 questions distributed in five scales of functionality including cognitive function, physical function, social function, emotional function and role performance; three symptom scales (fatigue, pain, nausea and vomiting); six additional items assessing symptoms frequently associated with tumor patients (dyspnea, insomnia, lack of appetite, constipation and diarrhea); a scale for global quality of life and health, and a scale for evaluating the financial effect of the therapy and of the disease [15].

The EORTC QLQ LC-13 is a questionnaire which used as supplementary to the EORTC QLQ - C 30 and it's particularly used in lung cancer. It is one of the good questionnaires to assess the quality of life in patients with lung carcinoma. It consists of a 13 - item measure of lung carcinoma related symptoms and therapy side effects, including the following: Coughing (1 item), dyspnea (3 item), sour mouth or tongue (1 item), hemoptysis (1 item), dysphagia (1 item), neuropathy (1 item), alopecia (1 item), feeling of pain (3 item), and use of analgesic medicine (1 item) [16].

Each patient was requested to fill the questionnaire by themselves. If this was not possible, or if they preferred so, they were helped by a nurse or caregiver. After getting the written consent, participants filled in these questionnaires at two different points such as 1) baseline - after registration was completed in the clinic, 2) one month after the first visit. At the baseline, 238 patients filled the questionnaire and after follow up only 104 patients were included. At the time of the initial visit, we understood the condition of the patient on the basis of the questionnaire and after that, we provide patient education to each and every patient based on their condition. In the questionnaire, each item was measured on a 4-point response scale (very much, quite a bit, a little, not at all), and two items: global health and quality of life were the exceptions and were measured on a 7-point response scale and the item score was transformed to a 0 to 100 scale as reported in the EORTC scoring guide [17]. In the interpretation of the normal state of health/QoL and functional scales, the highest score represents the better level of functioning - good quality of life and a highest score for a symptom scale or item indicates an increased level of symptoms or low quality of life [18,19].

All the data were entered in Microsoft Excel 2007 and double checked. The data were analyzed with the use of software SPSS. The qualitative data were expressed as percentages and frequencies, while the quantifiable details were summarized as means and standard deviations. The association between independent variables and dependent variables was tested using Pearson's Chi-square test. All P values were two-tailed and a value of $P < 0.05$ was considered as statistically significant.

RESULTS

A total of 238 lung cancer patients were included in this study, among which 195 were males (82.0%) and 43 (18.0%) were females. The male female ratio was found to be 4.5:1. The mean age of the study subjects was 63.45 ± 11.4 years. In case of males and females, the mean age was found to be 64.5 ± 11.11 and 59.02 ± 11.9 respectively.

Table 1: Demographic characteristics of patients

Category	Number of subjects	Percentage
Gender		
Male	195	82.0%
Female	43	18.0%
Total	238	100%

Table 2: Study subjects based on age

S l n o.	Age group	Male	%	Female	%	Total	%
1	<40	8	4.1 %	2	4.7 %	10	4.2 %
2	40-49	9	4.6 %	9	20.9 %	18	7.6 %
3	50-59	28	14.4 %	9	20.9 %	37	15.5 %
4	60-69	78	40 %	15	34.9 %	93	39.1 %
5	≥ 70	72	36.9 %	8	18.6 %	80	33.6 %
6	Total	195	100 %	43	100 %	238	100 %

In case of male subjects, most of the patients presents in age group of 60-69 (40%) followed by ≥ 70 (37%) and only 4.1% of subjects represents below 40 age group. In case of female patients; 35% patients present in 60-69 age group and followed by 50-59 and 40-49 (21%). In total subjects, approximately 73% belonged to above 60 years of age. (Table 2)

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Table 6: Smoking characteristics of study population

Category	No. of patients (n=166)	Percentage
Duration of smoking (years)		
1-19	4	02.4
20-39	59	35.54
40-59	98	59.04
≥60	5	03.01
Age at starts smoking		
Under 16	20	12.05
16-19	48	28.91
≥20	98	59.03
Number per day		
1-10	88	53.01
11-20	60	36.14
21-30`	16	09.63
>30	2	01.20
Pack years		
<20	50	30.12
20 – 40	88	53.01
>40	28	16.87

Majority of study subjects (55%) were use both beedi and cigarette for smoking. 43 subjects (26%) and 32 subjects (19%) were used only beedi and cigarette for smoking respectively. 98 subjects (59%) had the history of 40-59 years of smoking followed by 59 subjects (36%) had 20-39 years duration of smoking. 5 subjects had above 60 years duration of smoking. Around 20 cases started their

smoking under 16 years of age and 48 cases (29%) started in between 16-19 years of age. 98 cases (59%) started 20 years or above. In case of smokers, 88 subjects (53%) used 1-10 cigarettes per day followed by 60 patients used 11-20 cigarettes per day. 2 patients used more than 30 cigarettes per day. In case of pack years, 88 smokers (53%) had the pack year of between 20-40 years; 50 smokers (30%) had below 20 pack years and 28 patients (17%) had a pack year of more than 40 years. (Table 6).

Table 12: Initial treatment

Treatment mode	Stage I	Stage II	Stage III	Stage IV	Total	%
Treatment for NSCLC (n=220)						
Supportive	00	00	28	39	67	30.45
Chemo alone	00	08	62	25	95	43.18
Chemo+Radiation	00	06	27	13	46	20.91
Radiation alone/ Radiation+ Surgery	00	02	09	01	12	05.45
Treatment for SCLC (n= 18)						
Treatment mode	Limited		Extensive		Total	%
Supportive	02		03		05	27.78
Chemo alone	03		09		12	66.67
Chemo+Radiation	00		01		01	05.55
Radiation alone/ Radiation+ Surgery	00		00		00	00

In case of patients with NSCLC, 95 patients (43.2%) received chemotherapy alone as initial treatment, followed by chemotherapy plus radiation (21%). 67 patients received only supportive care means not using any chemotherapy or radiation or such therapy, these patients received only palliative therapy. In case of SCLC, 66.7% patients received chemotherapy alone as initial treatment and 27.8% patients received supportive therapy. (Table 12)

Table 26: EORTC QLQ-C30 Scores at different treatments (n=238)

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Parameter	Supportive	Chemotherapy alone	Chemotherapy + Radiation	Radiation alone/ Radiation + Surgery	P value
Global Health	26.5 ±13.6	32.7 ±11.5	31.0 ±11.5	31.9±16.2	0.013*
Physical function	15.4 ±15.3	29.0 ±17.0	24.2 ±14.5	30.0±24.9	0.000*
Role function	12.3 ±14.8	21.8 ±17.0	18.1 ±14.3	19.4±21.1	0.002*
Emotional function	37.3 ±25.5	31.8 ±21.6	33.2 ±20.6	45.8±17.2	0.126
Cognitive function	40.5 ±19.3	47.0 ±19.5	46.4 ±15.9	56.9±15.0	0.016*
Social function	06.2 ±13.2	10.4 ±14.6	09.9 ±13.3	13.9±19.9	0.153
Fatigue	78.7 ±15.8	70.5 ±14.2	74.5 ±13.1	68.5±19.4	0.002*
Nausea/Vomiting	18.5 ±21.6	23.5 ±26.2	26.9 ±25.2	13.9±25.5	0.173
Pain	82.6 ±19.5	70.4 ±25.8	86.2 ±46.7	69.4±36.1	0.006*
Dyspnea	80.5 ±21.5	72.3 ±24.0	75.9 ±21.6	63.3±33.2	0.042*
Insomnia	70.4 ±22.8	60.4 ±24.3	59.6 ±25.9	47.2±30.0	0.004*
Appetite loss	53.2 ±28.9	39.6 ±22.9	35.5 ±22.40	33.3±14.2	0.000*
Constipation	74.5 ±28.8	68.2 ±31.5	61.7 ±27.8	63.9±30.0	0.133

Diarrhoea	02.8 ±16.5	03.4 ±16.5	00.0 0	00.00	0.524
Financial difficulties	93.5 ±14.4	95.9 ±12.7	96.4 ±10.4	94.4±13.0	0.557

*P Value= <0.05

In this study compares the quality of life of different treatment group of patients by using EORTC QLQ C-30 questionnaire and it was found that in case of global health status/QoL, chemotherapy alone produces comparatively more quality of life followed by radiation alone/surgery+radiation. Supportive therapy produces very less quality of life. In case of functioning, chemotherapy showed better quality of life. Those patients receiving supportive therapy having comparatively higher rate constipation, appetite loss, insomnia, dyspnea.

Table 27: EORTC QLQ-LC13 Scores at different treatments (n=238)

Variable	Supportive	Chemotherapy alone	Chemotherapy + Radiation	Radiation alone/ Radiation + Surgery	P value
Dyspnea	77.5±17.4	71.4 ±17.9	75.4 ±14.3	71.3±21.4	0.122
Coughing	43.5±26.0	48.9 ±27.2	39.7 ±29.2	52.8±36.1	0.187
Hemoptysis	07.9±22.0	06.2 ±17.2	07.8 ±14.3	05.5±13.0	0.913
Sore mouth	31.0±28.7	22.1 ±23.3	24.1 ±22.7	22.2±16.4	0.119
Dysphagia	40.7±33.7	29.6 ±29.4	26.2 ±27.7	33.3±31.8	0.045*
Peripheral Neuropathy	32.4±25.0	32.4 ±23.5	34.7 ±24.0	25.0±20.7	0.662
Alopecia	02.3±12.9	23.4 ±24.3	31.9 ±25.0	11.1±21.7	0.000*
Pain in Chest	71.8±25.4	62.3 ±31.4	63.1 ±25.3	66.7±31.8	0.165

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Pain in arm or shoulder	68.5±34.9	52.0±38.1	53.9±40.3	66.7±40.2	0.025*
Pain in other parts	30.5±41.0	33.3±41.5	37.6±42.1	50.0±43.8	0.451

*P value= <0.05

The EORTC QLQ LC-13 score found that radiation alone/radiation+surgery produces comparatively less lung cancer specific symptoms such as dyspnea, hemoptysis followed by chemotherapy alone. Supportive therapy produces very less hair loss (02.3) and chemo+radiation therapy produces very higher rate of hair loss (31.9) due treatment.

Table 29: Comparison of mean score of the EORTC QLQ – C 30 before and after patient education

Variable	Pre-education	Post-education	t value	P value
Global health	30.5±13.6	35.9±15.3	-04.6	0.000
Physical function	27.0±19.3	30.1±17.9	-02.6	0.009
Role function	21.6±16.9	15.2±18.4	04.7	0.000
Emotional function	30.0±21.3	47.6±20.5	-08.1	0.000
Cognitive function	46.6±17.4	51.0±17.5	-03.7	0.000
Social function	09.6±15.3	02.9±08.8	05.7	0.000
Fatigue	71.8±17.2	66.3±15.5	03.0	0.003
Nausea/vomiting	25.3±25.9	24.0±15.9	00.5	0.631
Pain	76.8±38.3	59.8±21.5	04.4	0.000
Dyspnea	75.6±26.0	63.8±20.8	04.8	0.000
Insomnia	61.8±27.6	49.3±21.8	04.8	0.000
Appetite loss	44.5±29.6	38.1±21.5	02.1	0.032

Constipation	67.6±31.6	39.7±22.8	10.4	0.000
Diarrhoea	03.8±18.2	01.3±07.9	01.4	0.158
Financial difficulties	94.5±14.0	98.1±07.8	-03.5	0.001

*P Value= <0.05

Table 30: Comparison of mean score of the QLQ-LC13 before and after patient education

Variable	Pre-education	Post-education	t value	P value
Dyspnea	73.9 (19.3)	69.0 (14.4)	03.0	0.003*
Coughing	48.7 (29.7)	42.6 (17.0)	02.0	0.043*
Hemoptysis	07.7 (20.4)	06.1 (15.2)	00.8	0.041*
Sore mouth	25.6 (27.1)	22.1 (19.5)	01.8	0.078
Dysphagia	33.0 (32.3)	27.6 (20.5)	02.5	0.012*
Peripheral Neuropathy	33.3 (24.1)	31.1 (18.7)	01.1	0.252
Alopecia	18.6 (25.4)	23.7 (21.6)	-02.9	0.004*
Pain in Chest	65.1 (29.9)	56.1 (21.4)	02.8	0.005*
Pain in arm or shoulder	55.4 (39.0)	50.0 (29.4)	01.6	0.110
Pain in other parts	35.3 (40.7)	27.6 (31.3)	03.3	0.001*

*P value= <0.05

The results of EORTC QLQ LC-13 questionnaire showed that there is improvement in the dyspnea, coughing, hemoptysis, dysphagia, and pain in chest and other parts and these improvements is significant also. The sore mouth, peripheral neuropathy was also improved, but the change was not significant. Increase in the hair loss was observed after follow up of the patient and it was statistically significant.

DISCUSSION

Lung cancer is considered as the most commonly identified cancer since 1985. In India, roughly 63,000 recent cases of lung carcinoma are reported annually [20]. Lung carcinoma is the important community health challenge in India [5]. This study included 238 lung cancer patients from different regions of Malappuram district and was aimed to find out the demographic parameters, histopathological profile, quality of life and cost of lung cancer in this region.

In this current study, a male to female ratio of 4.5:1 was observed which was similar to another study from RCC Trivandrum, Kerala with a male to female ratio of 4.7:1. The sex ratio reported in several Indian studies ranged from 4.5:1 to 8.2:1 [21,22]. In another Indian study, a male: female ratio of 2.7:1 was reported and in a US-based study, the male: female ratio was 5:1 [23,24]. In the present study, the sex ratio demonstrates a clear male predominance.

The current study reveals that around 83.25% of the male patients were habited to smoking; while the trend is very less among females. Majority of female patients (95.12%) were non-smokers. This clearly notes that the elevation in the rate of lung carcinoma in males could be related to the increasing consumption of tobacco in any form. In Kerala, the habit of tobacco using in females is very low compared to males [25].

In these lung cancer patients, the survival rate was very less and so their quality of life during therapy was also important. In this study, assessment of the quality of life was done and quality of life mention to global well being which consisting mental, physical, social, emotional and behavioural components. There are a number of valid and informative QoL questionnaires to measure the quality of life. The most extensively applicable tool to measure the quality of life in tumour patients is the EORTC QLQ-C30 and its supplementary module LC-13, which was used in this study. The elucidation of clinical importance was used for assessing results which are given in the EORTC guidelines and the results were considered as clinically relevant if there were 5 to 10 points difference in values [15].

Authors of many types of research held a discussion on the effect of age on the quality of life. Some authors reported lesser quality of life in geriatric patients while Zimmermann et al. described that geriatric patient's experienced a good quality of life compared to younger patients [26]. In this study, age less than 40 years and age between 50 and 59 show comparatively good quality of life.

In the present study, during chemotherapy treatment, the quality of life was improved including global health status and role functioning. This study described that nausea, vomiting, and alopecia were notable side effects for the people treated with chemotherapy and the same results are shown in

other studies also [27]. One study showed that chemotherapy treatment does not produce any significant decline in the person's quality of life [15]. In case of patients with radiation alone and radiation plus surgery showed improved physical, emotional and cognitive functioning. The patients with chemotherapy had fewer symptoms such as dyspnea, insomnia, hemoptysis, sore mouth while radiation plus chemotherapy had fewer symptoms of dysphagia and coughing compared with other treatment modalities. Radiation plus Chemotherapy treatment resulted in symptoms like nausea, vomiting and alopecia. Supportive therapy only produced a better quality of life in case of hair loss compared to other groups. Radiation alone/ radiation plus surgery produced a better quality of life in this study. Similar results were also shown in other studies. A combination of chemotherapy and radiation treatment causes comparatively fewer symptoms of cognitive functions, insomnia, coughing and appetite loss [14, 28,29,30]

This study also assessed the effect of patient education on quality of life of the patients and after follow up of the patient's minimal improvement in global health status was observed. Emotional, cognitive and physical functions improved whereas role and social functional status deteriorated. Various symptoms like fatigue, pain, appetite loss, dyspnea, constipation also improved.

CONCLUSION

This community based study found that lung cancer is an old age disease and smoking as the principle etiological factor in the development of lung carcinoma among men in Malappuram district of Kerala. Radiation plus surgery treatment produces more quality of life followed by chemotherapy. Patient education has role in the improvement of quality of life of patients with lung carcinoma. Many patients did not receive cancer specific treatment, may be caused by diagnosis of disease at an too late stage of illness, or patients own request and these findings represents an crucial need to additional improvement in health care options for patients with lung carcinoma, including supportive and palliative care.

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