

# High Prevalence of Dyspnea in Lung Cancer: An Observational Study

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## Abstract

**Introduction:** Dyspnea is a subjective, multidimensional experience of breathing discomfort, commonly seen in patients with advanced cancer. This study is a secondary analysis to seek the clinical prevalence of dyspnea on a subset of patients with lung cancer. Improving the quality of life (QoL) in dyspnea requires aggressive symptom management, which in turn entails a detailed understanding of its symptomatology. **Materials and Methods:** This was a subset analysis of lung cancer patients of a prospective observational study done over 6 months from April to September 2014 at the Department of Palliative Medicine, Tata Memorial Centre (Mumbai). **Results and Conclusions:** About 71.43% of the patients with advanced lung cancer experienced dyspnea. Dyspnea increased with worsening fatigue, anxiety, appetite, and well-being. Patients described it as an increased sense of effort for breathing, and it lowered the QoL substantially.

**Keywords:** Dyspnea, lung cancer, palliative care, prevalence

## INTRODUCTION

The terms “breathlessness” and “dyspnea” have been used interchangeably in literature and often point to the same sensation of difficult/labored breathing.<sup>[1]</sup> It is one of the most common symptoms in advanced cancer.<sup>[2]</sup> In a systematic review by Viniol *et al.* in 2015, the authors report that 0.8%–0.59% of the general population experiences dyspnea.<sup>[1]</sup> Analysis of secondary data from the World Health Survey 2002 for India reports these figures as 7.2% – much higher than elsewhere in the world. Lung cancer is one of the most common causes of dyspnea seen in 60% of such patients.<sup>[3]</sup> A cross-sectional study done in our center by Damani *et al.* reported the clinical prevalence of dyspnea as 44.37% in patients with advanced cancer.<sup>[4]</sup> The concept of “dyspnea” as a symptom has seen marked evolution in recent times and has led to expert consensus on the term “chronic breathlessness syndrome” – defined as breathlessness that persists despite optimal treatment of the underlying pathophysiology, resulting in disability. Interestingly, a stated duration is not needed for classifying it as “chronic.”<sup>[5]</sup> Seminal work has been done in Europe but not in India where the burden is probably more.<sup>[6]</sup> This study is a secondary analysis to seek the clinical prevalence of dyspnea on a subset of patients with lung

cancer. The findings will help us understand the magnitude of dyspnea in patients with lung cancer and prioritize symptom management based on its associations.

## MATERIALS AND METHODS

This was a subset analysis of lung cancer patients of a prospective observational study done over 6 months from April to September 2014 at the Department of Palliative Medicine, Tata Memorial Centre (Mumbai). All patients presenting to the outpatient clinic of the palliative care service were screened and accrued as per the inclusion criteria – all literate adult patients with advanced lung cancer with normal cognitive status with the ability to understand the nature of the study and who provided informed consent. We excluded patients on ventilators/noninvasive ventilation or on disease-modifying therapy. Compensation in any form was not provided for taking part in this study, and diligence was taken to protect

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**Table 1: Descriptive statistics on demographics and clinical data (n=42)**

	Number of patients (%)
Gender distribution	
Male	23 (54.8)
Female	19 (45.2)
Income groups* (USD/month)	
<25.17	1 (2.4)
25.17-75.22	23 (54.8)
75.23-125.52	10 (23.8)
125.53-188.45	6 (14.3)
188.46-251.37	2 (4.8)
Education	
Illiterate	5 (11.9)
Primary-school certificate	17 (40.5)
Middle-school certificate	8 (19.0)
High-school certificate	4 (9.5)
Graduate and above	8 (19.0)
Marital status	
Married and living with a spouse	36 (85.7)
Widow	5 (11.9)
Widower	1 (2.4)
Treatment received	
Multimodal	11 (26.2)
Chemotherapy	22 (52.4)
Radiotherapy	3 (7.1)
None	6 (14.3)
Comorbidities	
None	23 (54.76)
Diabetes mellitus	4 (9.52)
Hypertension	5 (11.9)
Ischemic heart disease	2 (4.76)
COPD	2 (4.76)
Hypothyroidism	1 (2.38)
Asthma	1 (2.38)
Others	2 (4.76)
Multiple	2 (4.76)
ECOG score	
0	0 (0.00)
1	9 (21.4)
2	10 (23.8)
3	15 (35.7)
4	8 (19.0)

ESAS items	None (0) (%)	Mild (1-3) (%)	Moderate (4-6) (%)	Severe (7-10) (%)
Pain	11 (26.2)	10 (23.81)	13 (30.95)	8 (19.05)
Fatigue	0 (0.0)	12 (28.57)	17 (40.48)	13 (30.95)
Nausea	28 (66.67)	14 (33.33)	0 (0.0)	0 (0.0)
Depression	28 (66.67)	12 (28.57)	1 (2.38)	1 (2.38)
Anxiety	14 (33.33)	13 (30.95)	14 (33.33)	1 (2.38)
Drowsiness	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Appetite	0 (0.0)	5 (11.90)	19 (45.24)	18 (42.86)
Well-being	0 (0.0)	7 (16.67)	23 (54.76)	12 (28.57)
Dyspnea	0 (0.0)	12 (28.57)	9 (21.43)	9 (21.43)

**Dyspnea scoring in CDS**

Items	Minimum	Maximum	Mean	SD
Factor 1 (effort)	0.00	17.00	4.36	4.33

*Contd...*

**Table 1: Contd...**

Dyspnea scoring in CDS				
Items	Minimum	Maximum	Mean	SD
Factor 2 (anxiety)	0.00	12.00	1.40	2.36
Factor 3 (discomfort)	0.00	11.00	1.81	2.41
Total score	0.00	40.00	7.57	8.53
QoL scores in EORTC QLQ-C15-PAL				
Items	Mean	SD		
Overall QoL (higher values indicating a higher QoL)	44.44	25.94		
Function scales (higher values indicating better functioning)				
Physical functioning	38.41	29.94		
Emotional functioning	68.47	17.0		
Symptom scales (higher values indicating greater presence)				
Dyspnea	42.06	36.85		
Pain	50.79	28.02		
Insomnia	38.09	29.96		
Fatigue	64.02	22.88		
Appetite loss	48.41	25.72		
Nausea/vomiting	3.98	7.19		
Constipation	18.25	26.75		

\*According to the Kuppuswamy's socioeconomic status scale with updated income range. QoL: Quality of life, EORTC QLQ-C15-PAL: European Organization for Research and Treatment of Cancer QoL Core 15 Palliative, SD: Standard deviation, CDS: Cancer Dyspnea Scale, ESAS: Edmonton Symptom Assessment Scale, ECOG: Eastern Cooperative Oncology Group

patients' confidentiality. The trial is registered with Clinical Trials Registry of India (CTRI REF/2014/05/006948). All study-related procedures including data collection were done by the author and coauthors; all physicians trained in palliative medicine who did a one-time assessment of the participants during their first visit. It involved medical consultation, recording of sociodemographic information, symptom scores using Edmonton Symptom Assessment Scale (ESAS), performance score using Eastern Cooperative Oncology Group (ECOG) scale, dyspnea by Cancer Dyspnea Scale (CDS), and quality of life (QoL) of the patients using European Organization for Research and Treatment of Cancer QoL Core 15 Palliative (EORTC QLQ-C15-PAL) questionnaire.

## RESULTS

A sample of 500 patients was recruited for the original study, of which 42 (8.4%) had primary cancer of the lung.

### Demographic and clinical information

Twenty-three (54.8%) were men. The median age of all patients with lung cancer was 58 years (range 34–80 years). All had Stage IV cancer, three (7.14%) patients had respiratory comorbidities, while nine (21.43%) had cardiovascular comorbidities.

### Symptomatology

Fifteen (35.7%) patients had poor performance status (ECOG 3). At the initial visit, 30 patients screened positive for dyspnea on ESAS, which gives a clinical prevalence of 71.43%. On the CDS, perceived sense of effort for breathing was a major component, with a mean value of 4.36 (standard deviation 4.33)

as compared to other two components (i.e., sense of anxiety and sense of discomfort). The patients had good emotional functioning but comparatively poor physical functioning. Major symptoms affecting QoL were pain, loss of appetite, and breathlessness [Table 1].

### Factors influencing dyspnea

Significant correlations of dyspnea ( $P < 0.05$ ) were found with ESAS items such as fatigue ( $r = 0.603$ ), anxiety ( $r = 0.44$ ), appetite ( $r = -0.332$ ), and well-being ( $r = -0.509$ ) and were also found with global QoL score ( $r = -0.574$ ), physical functioning ( $r = -0.574$ ), sleep ( $r = 0.471$ ), and appetite ( $r = 0.423$ ) on EORTC QLQ-C15-PAL.

## DISCUSSION

This study shows that breathlessness is a common symptom in patients with advanced lung cancer (seen in 71.43%) – higher than seen in a systematic review (19%–51%).<sup>[3]</sup> This is probably because none of the research articles included were from India and can also be attributed to differences in patient selection, lack of clear symptom definition, and variation in dyspnea measurement techniques. In our study, patients reported the perceived sense of effort of breathlessness as most bothersome. This was also associated with multiple other symptoms – fatigue, anxiety, appetite, and loss of well-being items on ESAS and lower QoL in the patients. These were consistent with a study done by Polanski *et al.*<sup>[7]</sup> Scoping search on breathlessness in lung cancer in the Indian context showed no published literature. Major strengths of this study lie in its prospective design and usage of validated tools. There are a few limitations – these results are from a subset analysis of the

original larger study, and there are chances of selection bias. To overcome it, we matched the relative proportion of lung cancer patients in our cohort with annual hospital data which was comparable. There might be contributory thoracic pathology which might overestimate the prevalence of dyspnea; however, as a part of standard care, most of our patients would have been treated for underlying correctable causes for dyspnea. The use of single-item tool (ESAS) to measure anxiety and depression might be inadequate; instead, a more specific tool such as the Hospital Anxiety Depression Scale would have been better.<sup>[8]</sup> The temporal relationship between dyspnea and QoL cannot be evaluated in this study because both were assessed at the same time.

Future studies should consider longitudinal designs on wider populations, also qualitative research to gain a deeper understanding of the issues affecting breathlessness.

## CONCLUSIONS

The prevalence of breathlessness in lung cancer patients was high (71.43%). Patients described it as an increased sense of effort for breathing, and it was associated with multiple factors such as fatigue, anxiety, and low QoL.

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## Conflicts of interest

There are no conflicts of interest.

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