

## Original Research Article

# The observational, cross sectional study to assess quality of life on patient suffering from chronic obstructive pulmonary disease in tertiary care hospital

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### ABSTRACT

**Background:** Chronic obstructive pulmonary disease (COPD) patients often present considerable individual medical burden in their symptoms, limitations, and well-being that complicate medical treatment. Quality of life (QOL) is an important aspect for measuring the impact of chronic diseases. HRQOL measurement facilitates the evaluation of efficacy of medical interventions and also the detection of groups at risk of psychological or behavioural problems.

**Methods:** COPD patient attending the OPD/IPD are screened as per inclusion and exclusion criteria. After obtaining a written informed consent of eligible patient, they were enrolled in the study. QOL of patient is assessed based on a set of questionnaire i.e. COPD Assessment Test™ (CAT). The questionnaire was translated to Hindi and Marathi. Socio demographic variable like age, sex, education occupation and income are also collected. All 8 questions related to health-improvement and management of COPD. CAT scores were given to each question according to the level of impact.

**Results:** In the total score of CAT we observed that there were 2.04% patients with very good QOL, 25.51% with good QOL, 61.22% with moderate QOL and 11.22% with poor QOL.

**Conclusions:** We conclude that the quality of life is moderate in larger number of patient's population. The most affected domain was the patient's energy level. The patients enrolled had COPD from long period of time which might have affected their answer because they have been habitual with the difficulties arising from COPD.

**Keywords:** CAT score, COPD, Health status, Quality of life

### INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a major problem for public health at the global level and an important cause of morbidity and mortality worldwide, characterized by progressive airflow obstruction and inflammation in the airways.<sup>1</sup> According to the World Health Organization, it is not one single disease but in term, which includes chronic lung diseases that affect the airflow. In this regard, chronic bronchitis and emphysema are now included within the COPD

diagnosis.<sup>2</sup> Pharmacological and non-pharmacological treatment should be guided by COPD severity and aim to control symptoms, decrease exacerbations, and improve patient function and quality of life.<sup>3,4</sup>

India is a large country comprising of people with varying socio-demographic profiles, cultural practices and ethnicities. Hence the risk factors for COPD are also likely to be different across various Indian states and regions. A recently completed nationwide questionnaire-based study estimated the prevalence of COPD at 3.49%

in India (ranging from 1.1% in Mumbai to 10% in Thiruvananthapuram).<sup>5</sup> The spirometry test was not employed for the diagnosis of COPD in this study, and it is therefore possible that the reported COPD burden could be underestimated. Recently, the BOLD study conducted in Pune, Mumbai and Srinagar reported overall COPD prevalence estimates of 6.25%, 6.85% and 16.05%, respectively.<sup>6</sup> Though the study adopted standardized procedures, it did not have adequate power to generate dependable prevalence estimates apart from the wide variations of prevalence.<sup>7</sup>

COPD is a paradigm of chronic disease, in which self-management and support are essential for a proper control.<sup>8</sup> Primary medical management of COPD often focuses on improving airflow using bronchodilators and anti-inflammatory therapies; however, the airflow obstruction associated with COPD is not completely reversible and often tends to progressively worsen over time.<sup>9</sup> Much of the deterioration and progression of the disease is related to the number and severity of exacerbations experienced by patients and, as the disease progresses, the patients experience a worsening in their quality of life.<sup>10,11</sup> Because complete recovery/cure from COPD is impossible, health professionals should focus on the improvement of patient-centered outcomes including health status and quality of life; which are important outcome measures for treatment and care in COPD patients.<sup>12</sup>

The study helps to show the quality of life assessment in patient suffering from chronic obstructive pulmonary disease (COPD) using COPD Assessment Test (CAT). The COPD Assessment Test (CAT) was developed as a short, simple, one-dimensional questionnaire based on eight items measuring the impairment of health status in COPD. The score system ranges from 0 to 40, closely correlated to that of SGRQ (St George Respiratory Questionnaire). The COPD Assessment Test (CAT) is available as validated translations in 58 different languages, making it applicable worldwide.<sup>13</sup>

Quality of life (QOL) is an important aspect for measuring the impact of chronic diseases. HRQOL measurement facilitates the evaluation of efficacy of medical interventions and also the detection of groups at risk of psychological or behavioural problems.<sup>14</sup> Many studies have been conducted across the world to study the HRQOL of COPD patients and the factors affecting it using both generic and disease-specific questionnaires.<sup>15-19</sup> However, studies from India and other developing nations are far fewer in number.

This research is an important aspect to measure the impact of chronic obstructive pulmonary disease (COPD). Our aim was to assess the quality of life in patient suffering from chronic obstructive pulmonary disease (COPD). The quality of life (QOL) of patient was assessed based on a set of questionnaire i.e. COPD Assessment Test™ (CAT).

## METHODS

The study was conducted in compliance with declaration of Helsinki, ICH-GCP, ICMR and Schedule Y. The cross sectional observational study was included the data from medicine department of K.E.M. Hospital, Mumbai. The study was conducted only after the approval by ethics committee. COPD patient attending the OPD were screened as per inclusion and exclusion criteria. After obtaining a written informed consent of eligible patient, they were enrolled in the study. QOL of patient was assessed based on a set of questionnaire i.e. COPD Assessment Test™ (CAT). The patient were provided with a set of questionnaire (CAT) and answered the questionnaire were collected and assessed to give the scores as per standard procedure. The questionnaire was translated to Hindi and Marathi. Socio demographic variable like age, sex, education occupation and income were also collected. All 8 questions were related to health-improvement and management of COPD. CAT scores were given to each question according to the level of impact- CAT score >30: very high; CAT score >20: high; CAT score 10-20: medium; CAT score > 10: low; CAT score 5: very low.

### Data analysis

The mean and standard deviation of QOL scores were calculated. Using non-parametric test (i.e. Mann Whitney U' Statistics) for the analysis. Quality of life scores of COPD patients were obtained using CAT (COPD Assessment Test). P value of <0.05 was considered statistically significant.

The CAT score calculated by summarizing the score of each of 8 questions resulting in a maximum of 40 and a minimum of 0. The higher score, the more QOL was impaired. If the score was below 5 considered the impact level of COPD was very low. It means that, the QOL of this patient was considered to be very good. If the score was below 10, the impact level of COPD was low. It means that, the QOL of this patient was considered to be good. If the score was in between 10-20, the impact level of COPD was medium. It means that, the QOL of this patient was considered to be moderate. If the score was more than 20, the impact level of COPD was high. It means that, the QOL of this patient was considered to be poor. If the score was more than 30, the impact level of COPD was very high. It means that, the QOL of this patient was considered to be very poor.

## RESULTS

### *Distribution of COPD patients according to gender*

98 patients were included by QOL-CAT (quality of life-COPD Assessment Test) questionnaire to assess their overall quality of life. All new cases were observed. It was found that, out of 98 patients 58 were male and 40 were female patients.

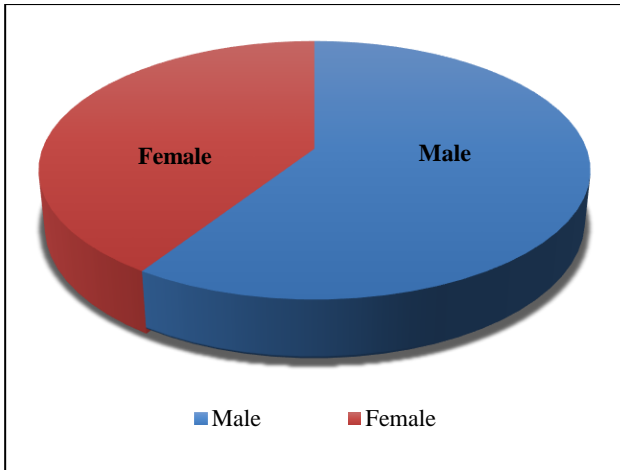


Figure 1: Gender wise distribution of COPD patients.

**Age wise distribution of COPD patients**

It was found that among the total number of patients included into the study- 8 patients were between age of 18-30, 9 patients were between age of 31-40, 13 patients were between age of 41-50, 31 patients were between age of 51-60, 37 patients were between ages of 61-65.

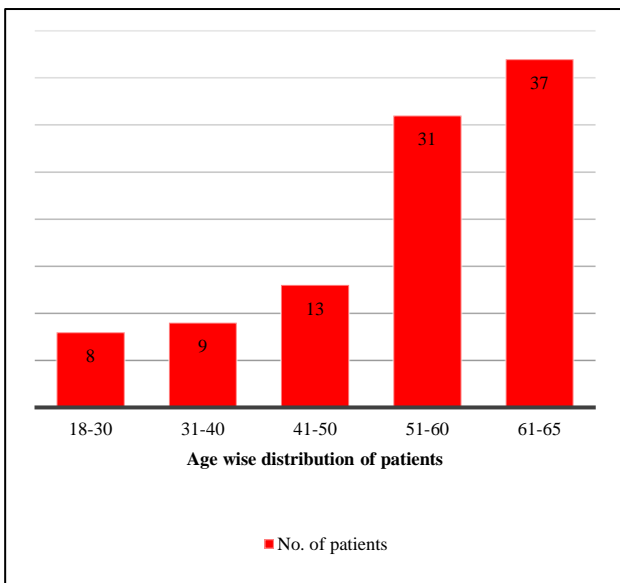


Figure 2: Graphical representation of age wise distribution of COPD patients.

**Age wise quality of life in COPD patients**

It was found that among the total number of patients included into the study- 8 patients were between age of 18-30 had scored 105 out of 320, 9 patients were between age of 31-40 had scored 182 out of 360, 13 patients were between age of 41-50 had scored 259 out of 520, 31 patients were between age of 51-60 had scored 732 out of 1240 and 37 patients were between age of 61-65 had scored 1248 out of 1480 (Table 1).

**Duration wise distribution of the COPD patients**

It was found that among the total number of patients included into the study, 46 patients COPD duration were 1 to 2 months, 34 patients COPD duration were 3 to 4 months, 11 patients COPD duration were 5 to 6 months and 7 patients COPD duration were 7 to 8 months.

Table 1: Distribution of COPD patients according their age wise quality of life.

Age	No. of patients	CAT scored	Max. CAT score	Percentage
18-30	8	105	320	32.81
31-40	9	182	360	50.55
41-50	13	259	520	49.80
51-60	31	732	1240	59.03
61-65	37	1248	1480	84.32
<b>Total</b>	<b>98</b>	<b>2526</b>	<b>3920</b>	<b>64.43</b>

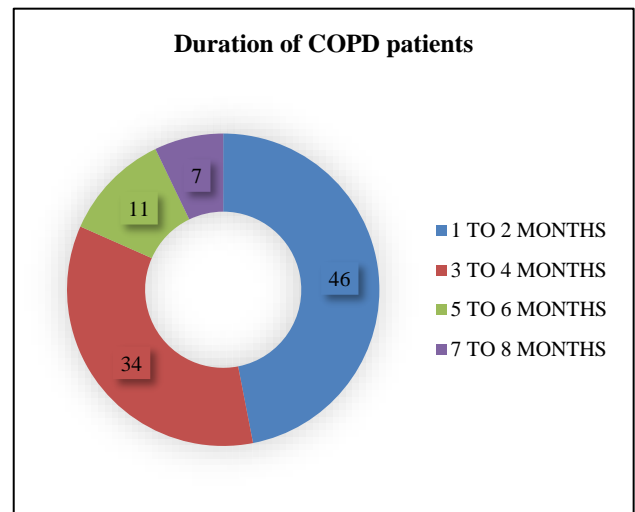


Figure 3: Graphical representation in distribution of COPD patients to their duration.

Table 2: Distribution of scores according to their questions in female.

QOL-CAT question no.	40 female patients score	Total score of each question	Percentage
1	99	200	49.5%
2	108	200	54.0%
3	117	200	58.5%
4	132	200	66%
5	126	200	63%
6	129	200	64.5%
7	122	200	61%
8	133	200	66.5%
<b>Total</b>	<b>966</b>	<b>1600</b>	<b>60.37%</b>

**Quality of life with respect to gender**

It was found that the overall quality of life was more disturbed in female as compare to male 40 female scored

966 against 600 in which question number 8 was dependent upon patients energy level domain was severely affected and a question number 1 dependent on patients coughing domain was least affected. While 58 male scored 1339 against 2320 in which question number 8 was dependent upon patients energy level domain was severely affected and a question number 1 dependent on patients coughing domain was least affected.

**Table 3: Distribution of scores according to their questions in male.**

QOL-CAT question no.	58 male patients score	Total score of each question	Percentage
1	119	290	41.03%
2	140	290	48.27%
3	153	290	52.75%
4	155	290	53.44%
5	164	290	56.55%
6	162	290	55.86%
7	168	290	57.93%
8	175	290	60.34%
<b>Total</b>	<b>1239</b>	<b>2320</b>	<b>53.40%</b>

**Overall quality of life of COPD patients**

The overall quality of life- CAT scoring was done by calculating scoring of all 8 questions. It was found that patients who scored <10 were to i.e. 2.04% and they were least affected by their disease. 25 patients i.e. 25.51% were mildly affected for their quality of life and scored between 10 and 20. 60 patients i.e. 61.22% were moderately affected their quality of life and scored >20. Remaining 11 patients i.e. 11.22% scored >30 as their quality of life was highly affected.

**Table 4: Distribution of patients according to their scoring in all 8 questions.**

QOL-CAT impact level	Patients	Percentage
<b>Low (&lt;10)</b>	2	2.04
<b>Medium (10-20)</b>	25	25.51
<b>High (&gt;20)</b>	60	61.22
<b>Very high (&gt;30)</b>	11	11.22
<b>Total</b>	<b>98</b>	<b>100</b>

**Non- parametric test (Mann-Whitney U test) used for the statistical calculations**

'P' value of age and overall QOL

Do the medians of column A (age) and column B (overall QOL) differ significantly?

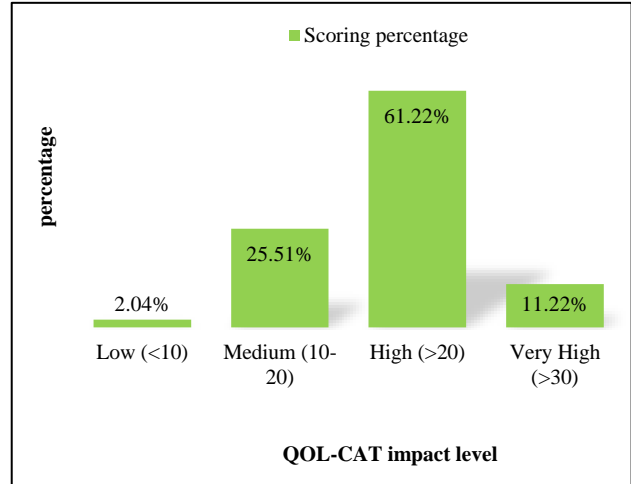
The two-tailed p value was <0.0001, considered extremely significant. The p value was an estimate based on a normal approximation.

Calculation details:

Mann-Whitney U-statistic = 384.50

U' = 9219.5

Sum of ranks in column A = 14071. Sum of ranks in column B = 5235.5.



**Figure 4: Graphical representation in distribution of patients into groups to their scores in all 8 questions.**

**Table 5: Summary of data (age and overall QOL).**

Parameter	Column A	Column B
<b>Mean</b>	53.459	22.582
<b>No. of patients</b>	98	98
<b>Standard deviation (SD)</b>	12.903	5.713
<b>Standard error (SE)</b>	1.303	0.5771
<b>Minimum</b>	18	6
<b>Maximum</b>	65	33
<b>Median</b>	59	23
<b>Lower 95% CI</b>	50.868	21.435
<b>Upper 95% CI</b>	56.050	23.729

'P' value of COPD duration and overall QOL

Do the medians of column A (COPD duration) and column B (overall QOL) differ significantly?

The two-tailed p value was <0.0001, considered extremely significant. The p value was an estimate based on a normal approximation.

Calculation details:

Mann-Whitney U-statistic = 10.000

U' = 9594.0

Sum of ranks in column A = 4861.0. Sum of ranks in column B = 14445.

**Table 6: Summary of data (COPD duration and overall QOL).**

Parameter	Column A	Column B
Mean	3.020	22.582
No. of patients	98	98
Standard deviation (SD)	1.905	5.713
Standard error (SE)	0.1924	0.5771
Minimum	1	6
Maximum	8	33
Median	3	23
Lower 95% CI	2.638	21.435
Upper 95% CI	3.403	23.729

## DISCUSSION

The CAT is a validated, short (8-item) and simple patient completed questionnaire, with good discriminant properties, developed for use in routine clinical practice to measure the health status of patients with COPD. Despite the small number of component items, it covers a broad range of effects of COPD on patients' health. Studies have shown that it is responsive to change and to treatment.

The implication of the CAT scores needs to be considered in relation to an individual's disease severity. Several studies have indicated that the relationship between lung function (FEV1) and health status scores is generally weak. As recognized by the GOLD strategic document the lung function, exacerbation frequency and health status are complementary and all together help to define the severity of the disease in a particular patient.<sup>20</sup>

In our study the quality of life was moderately affected due to COPD. Among 98 patients 40 were female and 58 were male and the most common age group suffering from COPD was 61-65.

The mean±SD of patient's age group is 53.45±12.90 years and the mean±SD duration of COPD patient was 3.02±1.90.

According to the age wise quality of life in COPD patients, it was found that 37 patients were between age of 61-65 had scored 1248 out of 1480 and their percentage is 84.32% which is most common age group suffering from COPD and their QOL is highly affected. The 31 patients were between age of 51 to 60 had scored 732 out of 1240 and their percentage is 59.03%. The 13 patients were age between 41 and 50 had scored 259 out of 520 and their percentage was 49.80%. The 9 patients were age between 31 and 40 had scored 182 out of 360 and their percentage is 50.55%. The least affected age group is 18-30 had scored 105 out of 320 and their percentage is 32.81%. This result is almost similar to Kumar et al.<sup>21</sup>

According to the duration wise quality of life in COPD patient, it was found that the 7 patients COPD duration were 7 to 8 months had CAT scored 193 out of 280 and their percentage was 68.92% which is most affected patients group according to the duration. The 11 patients COPD duration were 5 to 6 months had CAT scored 263 out of 440 and their percentage was 59.77%. The 34 patients were 3 to 4 months had CAT scored 782 and their percentage was 57.5%. The least affected QOL according to the duration of COPD patient is 1 to 2 months 52.98%.

According to the gender wise quality of life using CAT scored we found that the most affected domain was the patients energy level were 63.42% of both male and female patient responded that their energy level were disturbed due to COPD.

The next domain largely affected of the patient was not confident to leave there home. In our study, we observed that QOL was affected of the patient was not confident to leave there home is 60.18% of the patients.

In the daily activity domain was more disturbed in females compared to male. The daily activity domain 63% female and 56.55% males are affected. Whereas 58.5% females and 52.75% male responded that their chest feels tight.

Exactly 66% female and 54.44% male were feeling the breathlessness.

The 48.27% male and 54% female responded that there chest is feels with mucous. 64.5% females responded that they were not slept soundly. Whereas 57.93% males were responded that they were not slept soundly.

The 49.5% female and 41.03% male were least affected in coughing of patient domain.

The p value was <0.0001, considered extremely significant. The p value estimate was based on a normal approximation. We used 'Mann-Whitney U test' which is non-parametric test. We calculated the difference of two column i.e. age and overall QOL and COPD duration and overall QOL. The standard error (SE) of the age and the overall QOL were 1.303 and 0.5771.

The standard error (SE) of the COPD duration and the overall QOL were 0.1924 and 0.5771. The lower 95% CI of age and overall QOL were 50.868 and 21.435. The lower 95% CI of COPD duration and overall QOL were 2.638 and 21.435. The upper 95% CI of age and overall QOL were 56.050 and 23.729. The upper 95% CI of COPD duration and overall QOL were 3.403 and 23.729. This finding is near about Ahmed et al.<sup>22</sup>

According to the our findings, the comparison of age related quality of life, duration wise quality of life and gender wise quality of life are not much differ. In age

wise QOL of Elderly population are mostly affected their quality of life than compare to younger population. In COPD duration wise QOL of longer duration like 7 to 8 month were highly affected as compare to 1 to 2 months. In gender wise QOL of females are mostly affected as compare to male because their daily activity.

In the total score of CAT we observed that there were 2.04% patients with very good QOL, 25.51% with good QOL, 61.22% with Moderate QOL and 11.22% with poor QOL.

The study involves limitations like less sample size and time limit

## CONCLUSION

We conclude that the quality of life is moderate in larger number of patient's population. The most affected domain was the patient's energy level. The patients enrolled had COPD from long period of time which might have affected their answer because they have been habitual with the difficulties arising from COPD.

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*Ethical approval: The study was approved by the Institutional Ethics Committee (IEC) of Seth G.S. Medical College and K.E.M. Hospital, Parel, Mumbai*

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