

# Quality of Life in Patients of Chronic Obstructive Pulmonary Disease (COPD) in District Moradabad of Uttar Pradesh.

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## Abstract

**Introduction:** Chronic obstructive pulmonary disease (COPD) is one of the leading causes of mortality and morbidity worldwide. It has a profound impact on quality of life for patients and their families. It is known that almost 90% of COPD deaths occur in low-and-middle-income countries. COPD progressively reduces breathing capacity and impairs patients' ability to carry out activities of daily living, thereby adversely affecting health-related quality of life (HRQOL). Patient focused HRQOL studies will provide the health care personnel with specific information regarding the problems that these patients experience and will thereby enable them to develop interventions directed toward improving their care.

**Aim:** To study the quality of life in patients of COPD in district Moradabad of Uttar Pradesh.

**Methods:** This study was a community based cross-sectional study conducted in rural and urban areas of Moradabad for a period of one year. Eight hundred diagnosed cases of COPD of age >18 years were included. The study tool was a pretested, predesigned, semi structured, questionnaire (SF-36).

**Results:** The mean age was 56.7 years. It was found that COPD is more prevalent in older age groups esp. males who are illiterate. The mean physical component score (PCS) was 52.29+16.41 while the mental component score (MCS) was 61.86+15.59. On univariate analysis, it was found that age, occupation, education and income are significantly associated with quality of life.

**Conclusion:** The study reveals that patients with COPD have an average HRQOL with wide range of disturbances in physiological well being and psycho-social functioning which they experienced in daily life. Evaluating HRQOL is useful in identifying patients at risk of steep decline for which preventive measures may be instituted.

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**Keywords:** Chronic obstructive pulmonary disease, Global Initiative for Chronic Obstructive Lung Disease, National Heart Lung and Blood Institute, World Health Organization

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## Introduction

Chronic respiratory diseases are among the leading causes of mortality and morbidity worldwide. Of all chronic respiratory diseases, chronic obstructive pulmonary disease (COPD) and asthma are the most common. These diseases ranked among the top 20 conditions causing disability globally and were ranked 8<sup>th</sup> (COPD) and 23<sup>rd</sup> (Asthma) as causes of disease burden as measured by disability - adjusted life years (DALYs) in 2015 [1,2]. They

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Received: 01.02.19

Accepted: 14.03.19

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have a profound impact on quality of life for patients and their families and COPD accounts for several million premature deaths per year worldwide [3].

The Global Initiative for Chronic Obstructive Lung Disease (GOLD) launched by the National Heart Lung and Blood Institute (NHLBI) and World Health Organization (WHO), defines COPD [4] as: "COPD is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitations that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases. The chronic airflow limitation that characterizes COPD is caused by a mixture of small airways disease (e.g. obstructive bronchiolitis) and parenchymal destruction (emphysema), the relative contributions of which vary from person to

person. Chronic inflammation causes structural changes, small airways narrowing and destruction of lung parenchyma. A loss of small airways may contribute to airflow limitation and mucociliary dysfunction, a characteristic feature of the disease."

It is known that almost 90% of COPD deaths occur in low and middle income countries (5). In 2016, there were 251 million cases in the world of COPD and it is estimated that COPD causes 3.15 million deaths per year [6].

In India, the burden of all non-communicable diseases has increased since 1990 [7]. As on 2016, three out of five leading causes of mortalities constitute non-communicable diseases whereas COPD is the second biggest cause of death in India today [8]. Different studies have revealed varying range of prevalence of COPD in different states. The prevalence ranged between 2 to 22% among the males and 1.2 to 19% among females in different population-based studies across India [9].

In high and middle income countries tobacco smoke is the biggest risk factor, meanwhile in low income countries exposure to indoor air pollution such as the use of biomass fuels for cooking and heating causes the COPD burden. Other risk factors include occupational dusts and chemicals and frequent lower respiratory infections during childhood.

In clinical settings, the diagnosis of COPD relies on presence of partially reversible impairment of lung function (FEV<sub>1</sub><80% predicted and FEV<sub>1</sub>/FVC ratio <70%), history of chronic progressive symptoms like cough, wheeze, dyspnea and usually history of smoking for more than twenty packet years [10]. Most patients are aged more than 40 years and are likely to attend without evidences of respiratory infections [10]. FEV<sub>1</sub> differentiates COPD with asthma and other diseases [10,11]. GOLD grading based on 2007 guidelines divide the COPD cases in four grades based on FEV<sub>1</sub> % predicted whereas 2011 guidelines stratify the cases with additional measures like quality of life and history of exacerbation [12].

Because COPD, like many other medical conditions, is not presently curable, the most likely future scenario is that most COPD patients will live progressively longer and thus will suffer more often from concomitant chronic diseases [13].

In this sense, several studies performed in patients hospitalized for COPD have reported an increase in the percentage of people older than 85 years of age, along with a greater prevalence of co-morbidities and a decrease in physical performance [14,15]. Hence, the focus should be on preventing disability, preserving quality of life and integrating patient perception and adaptation into the limitations caused by the disease [14,16]. Several other studies performed with large databases or cohorts also

suggest that the prognosis of patients with COPD has improved in the last decade [15,17-20].

Patients with COPD experience reduced HRQOL. Some factors such as depression, poor mobility, dyspnea and inadequate social support adversely affect HRQOL and these factors may be more amenable to treatment than treating only lung function impairment. Patient focused HRQOL studies will provide the health care personnel with specific information regarding the problems that these patients experience and will thereby enable them to develop interventions directed toward improving their care. There is a paucity of published literature regarding factors affecting the QOL of COPD patients in India.

The HRQOL can be quantified through various health evaluation questionnaires, both general and specific, widely validated [21]. The former covers a broad range of dimensions, enable the comparison between groups of patients with different diseases and facilitate the detection of problems or unexpected effects [22]. One of them is the Short Form 36 (SF- 36) questionnaire [23], that also has an abbreviated version (SF- 12) [24, 25]. Since one of the main objectives of the treatment of COPD is to improve the general health condition, it is important to identify possible factors determining the HRQOL of these patients. Some of these have been identified previously [26]. Relationships have been shown between HRQOL during acute exacerbation of chronic bronchitis with post exacerbation functional status, hospital readmission for acute exacerbation or COPD and mortality [27-31].

A chronic progressive disease like COPD reduces the lifespan and quality of life among the affected population. In addition, the lost productivity and high treatment cost can affect the nation in a broader scale. Such an alarming public health issue warrants immediate attention of the researchers and policy makers to investigate the risks in the context of India, identify the gaps in managing the patients at primary and secondary care centres, develop patient centric comprehensive model of diagnosis and treatment, explore the opportunities to prevent the disease through modifying the lifestyles and environmental exposures that affect the quality of life.

The present study would help to understand the relationship between QOL and selected demographic and physiologic variables.

### **Aim**

To study the quality of life in patients of Chronic Obstructive Pulmonary Disease (COPD) in district Moradabad of Uttar Pradesh.

## Objectives

- 1.) To assess the quality of life associated with COPD;
- 2.) To study the associated factors of quality of life with COPD.

## Materials and Methods

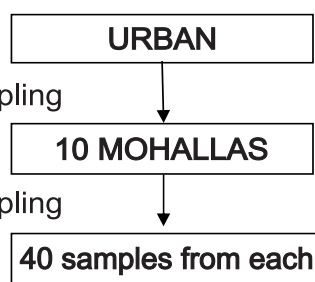
This community based, cross-sectional study was conducted in rural and urban areas of Moradabad over one year on total of 800 diagnosed cases of COPD (at least 12 months duration) above 18 years, 400 each from rural and urban areas after obtaining written informed consent

Pretested, predesigned, semi structured, questionnaire (SF-36). It contains 36 items divided into eight domains: Physical Functioning (PF), Role Physical (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role Emotional (RE) and Mental Health (MH). These domains create a profile of the subject. Two summary scores can also be aggregated, the Physical Component Summary (PCS) and the Mental Component Summary (MCS). Scores range from 0 to 100, with higher scores representing better HRQOL. The SF-36 Health Survey has 36 questions to measure functional health and well being from the patient's point of view. It is a practical, reliable and valid measure of physical and mental health that can be completed in five to ten minutes [32].

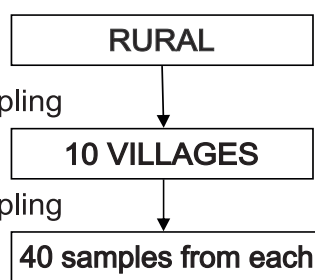
## Exclusion Criteria

- 1) Patients with complication or acute worsening in last 30 days.
- 2) Individuals with neurological or severe psychiatric disease precluding measurement of quality of life.

From urban,



Similarly, from Rural Moradabad,



A multistage sampling design with simple random sampling technique was used for sample collection.

A predesigned self administered questionnaire was used to assess socio demographic characteristics like age, religion, education, type of family, socio economic status etc. of COPD cases while SF-36 questionnaire was used to assess the quality of life among COPD cases.

Primary data was collected by face-to-face interviews. The collected data was analyzed by appropriate statistical tests. The difference was considered statistically significant at  $p < 0.05$ .

## Observations and Results

Table 1 shows that majority of subjects were above 40 years of age and maximum subjects were in age group of 61-70 years (36.4%) and minimum in the age group of 18-30 years (3.6%) showing that COPD is more prevalent in old age. COPD is more common in males (78.3%) than females (21.8%). Majority of subjects were either unemployed or unskilled worker (39.3%) whereas majority of females were housewives (19.5%). Majority of respondents were illiterate (57.9%) and very few were graduate and above (4%). It is important to note that proportion of illiterate subjects was less in urban areas than rural areas as expected. In Table 1 it can be seen that majority of study population was Muslim (65.4%) and rest were Hindus (34.6%) which is partially because of high proportion of Muslims in the region. It has also been found that in urban areas majority of subjects lived in nuclear families (60%) as compared to rural areas where majority of subjects lived in joint families (69.3%). Table 1 also shows that majority of respondents belonged to lower middle class (49.3%) and middle class (27.6%) of Modified BG Prasad classification and very few belonged to upper class (1.4%).

Table 2 shows that 23.8% of subjects never smoked whereas 48.6% of subjects have quit smoking and 27.6% of subjects are currently smoking. It is important to note that the proportion of never smokers was higher in urban areas than rural areas. Majority of subjects smoked 11-20 cigarettes per day (45.2%) which was commoner in urban than rural areas. Mean pack years of tobacco consumption was higher in rural areas (22.82%) as compared to urban areas (16.10%). Moreover, majority of subjects had normal BMI (42%) however nearly one-fourth were underweight (26.8%).

Table 3 shows distribution of mean scores in four physical and mental domains. The mean scores were lower in physical role and general health than physical functioning & bodily pain depicting the more affected domains of physical quality of life. Vitality domain was more affected than the other mental domains with lower mean scores.

The PCS score was lower than the MCS score depicting that physical quality of life was more affected than the mental quality of life.

Table 4 shows significant association between age and PCS – MCS score as depicted by independent t-test. The physical and mental quality of life deteriorates with increasing age. No significant relationship between gender and quality of

life mean scores is noted. There is significant difference in the physical quality of life in the rural and urban areas however the difference in mean scores of mental quality of life is insignificant. There are significant differences between different occupations and the mean scores of physical and mental quality of life. Semi-skilled worker had lowest quality of life while semi-professional had better

**Table 1: Distribution of COPD patients according to Socio-demographic Characteristics**

Socio-demographic Characteristic (N=800)	Urban n (%)	Rural n (%)	Total n (%)
<b>Age Category (in years)</b>			
18-30	29(7.3)	0(0.0)	29(3.6)
31-40	53(13.3)	31(7.8)	84(10.5)
41-50	68(17.0)	71(17.8)	139(17.4)
51-60	60(15.0)	108(27)	168(21.0)
61-70	122(30.5)	169(42.3)	291(36.4)
>71	68(17)	21(5.3)	89(11.1)
<b>Sex</b>			
Male	278(69.5)	348(87.0)	626(78.3)
Female	122(30.5)	52(13.0)	174(21.8)
<b>Residence</b>			
	400(50.0)	400(50.0)	800(100.0)
<b>Respondent's Occupation</b>			
Unemployed & Unskilled Worker	122(30.5)	192(48.0)	314(39.3)
Semi-Skilled Worker	48(12.0)	78(19.5)	126(15.8)
Skilled Worker	82(20.5)	22(5.5)	104(13.0)
Clerical/Shop	32(8.0)	51(12.8)	83(10.4)
Semi-Professional & Professional	8(2.0)	9(2.3)	17(2.1)
Housewife	108(27.0)	48(12.0)	156(19.5)
<b>Respondent's Education</b>			
Illiterate	206(51.5)	257(64.3)	463(57.9)
Primary	82(20.5)	42(10.5)	124(15.5)
Middle School	42(10.5)	31(7.8)	73(9.1)
High school	38(9.5)	58(14.5)	96(12)
Intermediate/Diploma	1(0.3)	11(2.8)	12(1.5)
Graduate & above	31(7.8)	1(0.3)	32(4.0)
<b>Respondent's Religion</b>			
Hindu	141(35.3)	136(34)	277(34.6)
Muslim	259(64.8)	264(66)	523(65.4)
Others	Nil	Nil	Nil
<b>Type of Family</b>			
Nuclear	240(60.0)	112(28.0)	352(44.0)
Joint	148(37.0)	277(69.3)	425(53.1)
Living Alone	12(3.0)	11(2.8)	23(2.9)
<b>Family Income</b>			
Upper Class	11(2.8)	0(0)	11(1.4)
Upper Middle Class	71(17.8)	21(5.3)	92(11.5)
Middle Class	140(35)	81(20.3)	221(27.6)
Lower Middle Class	168(42)	226(56.5)	394(49.3)
Lower Class	10(2.5)	72(18)	82(10.3)

**Table 2: Distribution of COPD patients according to Personal Characteristics**

Personal Characteristic (N=800)	Urban n (%)	Rural n (%)	Total n (%)
<b>Smoking Status</b>			
Never Smoked	160(40.0)	30(7.5)	190(23.8)
Quit Smoking	149(37.3)	240(60.0)	389(48.6)
Current Smoker	91(22.8)	130(32.5)	221(27.6)
<b>Mean Pack years of tobacco smoked (Mean ± SD)</b>	<b>16.1 ± 2.4</b>	<b>22.8 ± 4.5</b>	<b>19.5 ± 3.5</b>
<b>No. of cigarettes smoked daily (n=610)</b>			
1-10	29(12.1)	116(31.4)	145(23.8)
11-20	161(67.1)	115(31.1)	276(45.2)
20-30	39(16.3)	117(31.6)	156(25.6)
> 30	11(4.6)	22(5.9)	33(5.4)
<b>BMI Units</b>			
Underweight (< 18.5)	90(22.5)	124(31.0)	214(26.8)
Normal (18.5-22.9)	190(47.5)	146(36.5)	336(42.0)
Overweight (23-24.9)	50(12.5)	92(23.0)	142(17.8)
Obese (> 25)	70(17.5)	38(9.5)	108(13.5)

**Table 3: Distribution of COPD patients according to Domains and Summary Scores**

Characteristic	Urban		Rural		Total	
	Mean	SD	Mean	SD	Mean	SD
<b>A) Physical Domains</b>						
Physical functioning	63.50	26.23	54.50	28.88	59.00	27.94
Role physical	52.34	23.82	43.75	20.52	48.05	22.63
Bodily pain	63.25	20.76	53.13	20.59	58.19	21.28
General Health	43.50	7.93	44.38	7.01	43.94	7.49
<b>B) Mental Domains</b>						
Vitality	55.47	15.78	52.34	14.85	53.91	15.39
Mental Health	67.62	15.31	66.63	15.73	67.13	15.52
Social functioning	64.06	18.39	64.38	20.67	64.22	19.55
Role emotional	64.38	20.94	60.00	19.32	62.19	20.25
<b>C) Summary Scores</b>						
Physical Component Score (PCS)	55.65	16.57	48.94	15.55	52.29	16.41
Mental Component Score (MCS)	62.88	15.43	60.84	15.69	61.86	15.59

quality of life. There is significant association between education and quality of life. Illiterate subjects had poorer quality of life as compared to subjects who had Diploma and above educational qualification. There is significant difference in quality of life between Hindus and Muslims with latter have poorer quality of life probably because of different socio-economic conditions, risk factors and perception. Subjects who lived in joint family had poorer quality of life than those who had nuclear families. Lower

middle class had poorest quality of life among all Modified BG Prasad classes while upper class had best quality of life.

### Discussion

The majority of the COPD patients both in urban and rural areas were males. In urban 69.5% of cases were males whereas in rural areas 87% were males. Of all the COPD cases females were 30.5% in urban and 13% in rural areas. In a similar study conducted by Malpani et al [33] included

**Table 4: Association between Age and Physical & Mental Component Scores of COPD patients**

Summary Scores	PCS			MCS		
Age category (in years)	Mean	SD	p-value	Mean	SD	p-value
18-30	70.50	9.83	p<0.001	79.02	9.27	p<0.001
31-40	64.04	12.05		66.60	12.09	
41-50	46.45	13.57		53.90	14.78	
51-60	55.94	17.87		64.29	17.22	
61-70	49.22	16.24		61.55	14.82	
>71	47.58	11.74		60.66	13.42	
<b>Sex</b>						
Male	51.71	15.65	p=0.084	62.37	14.77	p=0.117
Female	54.40	18.78		60.01	18.15	
<b>Occupation</b>						
Unemployed & Unskilled worker	54.77	14.10	p<0.001	64.87	15.35	p<0.001
Semi-skilled worker	41.49	15.84		53.04	13.12	
Skilled worker	54.36	18.93		62.58	15.18	
Clerical/Shop	51.78	9.58		63.36	10.60	
Semi-Professional & Professional	52.32	2.25		66.83	1.88	
Housewife	54.93	19.47		61.11	18.39	
<b>Education</b>						
Illiterate	51.59	18.55	p<0.05	60.12	17.75	p<0.001
Primary	52.27	15.02		62.18	14.38	
Middle School	54.43	11.21		62.21	9.95	
High school	51.77	11.85		67.58	7.20	
Intermediate/Diploma	59.01	8.90		68.76	6.10	
Graduate & above	56.74	10.32		65.25	12.91	
<b>Religion</b>						
Hindu	54.43	16.72	p<0.05	67.18	13.55	p<0.001
Muslim	51.16	16.14		59.04	15.87	
<b>Type of Family</b>						
Nuclear	56.21	14.74	p<0.001	62.86	15.52	p<0.001
Joint	48.56	17.04		60.23	15.30	
Living Alone	61.32	10.63		76.68	13.09	
<b>Family income</b>						
Upper class	70.26	4.33	p<0.001	79.43	4.30	p<0.001
Upper middle class	67.84	10.93		77.92	8.92	
Middle class	50.80	18.05		60.85	14.10	
Lower middle class	47.45	13.50		56.27	14.14	
Lower class	59.71	15.99		71.05	14.83	

76.6 % males and 23.4 % females. Study done by Garrido et al [34] also had 75.6 % males.

The mean age was 56.7 years (range 18-82 years) with majority i.e. 36 % were in 61-70 years age group. In a study conducted by Malpani et al [33], Voll Aanerud et al [35] and Garrido et al [34] the mean age of the subjects was 64.3, 48.8 and 64.1 years respectively.

In our study, 57.9 % were illiterate while 15.5 % had completed primary education, 9.1 % middle school, 12 % high school, 1.5 % intermediate or diploma and only 4 % were graduate or above. Malpani et al [33] had similar results with 70.8 % subjects illiterate, 20% had primary, 5.1 % secondary and 4.1 % higher education. In a study done by Garrido et al [34] had 20.5% illiterate, 56.7 % primary, 17.5 % secondary and 5.2 % higher education.

Around 23.8 % of COPD cases have never smoked while 48.6 % have quit smoking and 27.6 % of cases are smoking currently. In a study by Voll Aanerud et al [35] 32.8 % were never smokers, 32.9% were ex-smokers and 34.3 % were current smokers. In a similar study done by Garrido et al [34] 23.2 % were never smokers, 57.8 % were ex-smokers and 19.0 % were current smokers. The mean pack years of tobacco smoked is 19.46 years with standard deviation of 3.5 years. Of all the respondents 26.8 % were underweight while 17.8 % were overweight and 13.5 % were obese and the rest 42 % had normal Body mass Index (BMI). In a similar study done by Voll Aanerud et al [35] 0.9 % were underweight while 46.8 % were overweight and 10.8 % were obese and the rest 41.2 % had normal BMI.

The mean score for physical functioning was found to be 59.00, 48.05 for Physical Role, 58.19 for bodily pain and 43.94 for general health. The mean score for various mental domains was 53.91 for vitality, 67.13 for mental health, 64.22 for social functioning and 62.19 for emotional role. In a study conducted by Malpani et al [33] the mean scores for different domains were 54.45 for physical functioning, 49.16 for Physical Role, 65.61 for bodily pain and 44.1 for general health, 44.58 for vitality, 54.4 for mental health, 56.87 for social functioning and 51.11 for emotional role. In a study conducted by Berkus et al [36] the mean scores for different domains were 45.5 for physical functioning, 37.5 for Physical Role, 53.6 for bodily pain and 43.1 for general health, 47.0 for vitality, 66.0 for mental health, 68.2 for social functioning and 58.3 for emotional role.

In our study, the total score of PCS is 52.29 which means that patients have not achieved average health. The mean score for mental component summary score was 61.86 denoting a significant decrease in mental wellbeing. Although in a study done by Malpani et al [33] had lower mean scores of PCS (40.46) and MCS (40.22) probably because it was a hospital based study. Similar results were

found by Voll Aanerud et al [35] in which PCS scores were lower than the MCS scores. In a study done by Jones et al [37] in European countries the mean PCS score was 37.7 and MCS score was 47.2.

Although the influence of age on HRQOL in patients with COPD is controversial. Some studies have detected no association between the two parameters [38] and others have demonstrated it through a logistic regression analysis that is an independent factor [39].

However, no significant association was seen between gender and quality of life. In a study done by Garrido et al [34] had lower HRQOL levels than men, both in the physical and mental component of quality of life. Several authors have reported that women usually suffer more respiratory symptoms than men [40]. Furthermore, it has been demonstrated that, after adjusting for smoking, women show a higher risk of hospital admission for COPD than men [41].

In a study done by Garrido et al [34] the mean PCS and MCS scores were 36.0 and 48.3 respectively. With regard to the PCS, significant differences were only detected between men and women in patients with moderate COPD. With regard to MCS, differences were found between the two sexes in patients with mild and moderate COPD, but not in patients with severe COPD.

There was significant association between rural and urban PCS scores however no significant association was found in MCS scores for rural and urban areas. Association between respondent's occupation and PCS & MCS mean scores was found to be significant. The level of education was also found to be significantly associated to the quality of life as shown by PCS & MCS scores. Religion is also found to be significantly associated with mean scores of PCS and MCS. Quality of life is also found to be significantly associated with type of family and different socio-economic class.

The mean PCS score was significantly associated with the smoking status with the current smokers having poor physical quality of life than those cases who have never smoked. However mean MCS score was not significantly associated with smoking status. This signifies that smoking impairs physical quality of life.

There seems to be an association between a poor nutritional status and quality of life worsening in patients with COPD, particularly those with emphysema. (42) Our results confirm that there is significant association between BMI and quality of life. On the contrary, other authors have not evidenced any influence of bodyweight on the HRQOL of the patients with COPD [43, 44].

## Conclusion

Patients with COPD have an average HRQOL with wide range of disturbances in physiological wellbeing and psychosocial functioning in daily life. Evaluating HRQOL is useful in identifying patients at risk of steep decline for which preventive measures may be instituted. The quality of life is more affected in physical component than mental component

<b>Conflict of interest:</b>	All authors declare no COI
<b>Ethics:</b>	There is no ethical violation as it is based on voluntary anonymous interviews
<b>Funding:</b>	No external funding
<b>Guarantor:</b>	Dr. Rajul Rastogi will act as guarantor of this article on behalf of all co-authors.

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