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Original Article

Quality of Life and Symptom Burden Among Patients With Chronic Obstructive Pulmonary Disease in Pakistan

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ABSTRACT

Background: Chronic obstructive pulmonary disease is a progressive respiratory disorder associated with persistent respiratory symptoms, psychological morbidity, functional limitation, and impaired health-related quality of life. In Pakistan, hospital-based evidence on COPD-related symptom burden and quality-of-life impairment remains clinically important for patient-centered assessment. Objective: To assess quality of life and symptom burden among diagnosed patients with chronic obstructive pulmonary disease attending a tertiary respiratory care hospital in Lahore, Pakistan. Methods: This hospital-based descriptive cross-sectional study included 277 diagnosed COPD patients recruited from the Pulmonology Outpatient Department, medical ward, and follow-up clinic of Gulab Devi Hospital, Lahore. Available aggregated data were analyzed descriptively. Categorical variables were summarized as frequencies, percentages, and 95% confidence intervals, while quality-of-life scores reported in prior COPD studies were summarized as mean ± standard deviation with 95% confidence intervals where calculable. Results: burden estimates showed high psychological morbidity, with depression ranging from 50.9% to 67.1% and anxiety from 19.9% to 70.4%. Respiratory symptom estimates included cough in 67.9%, breathlessness in 62.5%, cough with sputum in 42.2%, and dyspnea in 29.2%. Biomass fuel exposure was represented by 39.7%, COPD duration below five years by 54.9%, and productivity loss by 31.8%. Published COPD quality-of-life scores demonstrated impairment across SGRQ, SGRQ-C, WHOQOL, and EQ-5D-5L measures. Conclusion: COPD burden in this hospital-based context appears multidimensional, involving respiratory, psychological, exposure-related, functional, and quality-of-life domains. Patient-level inferential analysis is required to identify independent predictors of poor quality of life. Keywords: Chronic obstructive pulmonary disease; quality of life; symptom burden; anxiety; depression; biomass fuel exposure; Pakistan

INTRODUCTION

INTRODUCTION

Chronic obstructive pulmonary disease is a progressive, preventable, and treatable respiratory disorder characterized by persistent airflow limitation, chronic respiratory symptoms, and recurrent exacerbations. It is commonly associated with dyspnea, chronic cough, sputum production, wheezing, fatigue, impaired exercise tolerance, and progressive limitation of daily activities. Although COPD is primarily defined by airflow obstruction, its clinical impact extends beyond the lungs and affects physical functioning, emotional well-being, social participation, occupational productivity, and overall health-related quality of life. The burden is particularly important in populations exposed to tobacco smoke, biomass fuel, indoor air pollution, outdoor air pollution, occupational inhalational hazards, and recurrent respiratory infections, all of which contribute to disease development, symptom progression, and poor long-term outcomes (1).

The burden of COPD is especially relevant in South Asian and low- and middle-income settings, where environmental exposure, delayed diagnosis, limited access to spirometry, under-recognition of chronic respiratory symptoms, and restricted availability of pulmonary rehabilitation services may worsen patient outcomes. Indoor air pollution and biomass fuel exposure remain important contributors to

chronic respiratory disease in Southern Asia, particularly among populations with prolonged household exposure to solid fuel combustion (2). In Pakistan, COPD is a major clinical concern because tobacco use, biomass fuel exposure, occupational dust, urban air pollution, recurrent respiratory infections, and delayed presentation to specialist care often coexist. Patients frequently seek care after symptoms have become functionally limiting, resulting in repeated outpatient visits, ward admissions, follow-up consultations, dependency on family members, and increased healthcare utilization.

Quality of life assessment is essential in COPD because spirometric impairment alone does not fully reflect the patient's lived experience of disease. Patients with similar degrees of airflow limitation may have markedly different levels of dyspnea, cough, sputum production, sleep disturbance, fatigue, anxiety, depression, activity restriction, and perceived health status. Disease-specific and generic quality-of-life instruments, including the St. George's Respiratory Questionnaire, COPD Assessment Test, EQ-5D, and WHOQOL-based tools, provide structured methods for assessing the broader effect of COPD on daily functioning, psychological health, social participation, and overall well-being. Evidence from hospital-based and regional studies has consistently shown that COPD is associated with impaired health-related quality of life, with substantial variation across symptom, activity, impact, physical, psychological, social, and environmental domains (3–6).

Symptom burden is one of the most clinically important determinants of quality of life among COPD patients. Dyspnea restricts mobility, reduces independence, and increases fear of exertion; chronic cough and sputum production disturb sleep and social interaction; wheezing, fatigue, and chest tightness contribute to physical discomfort and reduced activity; and exacerbations increase the risk of emergency care, hospitalization, and further decline in functional capacity. Studies from different clinical settings have shown that patients with COPD frequently report high respiratory symptom burden, impaired daily functioning, and reduced quality-of-life scores, particularly when symptoms coexist with comorbid psychological distress or socioeconomic vulnerability (7,8). These findings support the need for patient-centered assessment strategies that evaluate not only respiratory impairment but also the broader symptomatic, functional, and psychosocial consequences of disease.

Psychological morbidity is another important but often under-assessed component of COPD burden. Anxiety and depression may worsen symptom perception, reduce treatment adherence, impair self-management, increase healthcare utilization, and further reduce quality of life. Evidence from COPD populations in Pakistan and other settings indicates that depression and anxiety are common among patients with COPD and may be associated with worse clinical and psychosocial outcomes (9,10). This relationship is clinically important because psychological distress can amplify dyspnea, reduce physical activity, and create a cycle of worsening symptoms, functional limitation, and poorer perceived health. Therefore, quality-of-life assessment in COPD should be interpreted alongside respiratory symptoms, exposure history, disease duration, disease severity, and psychological status.

Despite the recognized clinical importance of COPD in Pakistan, local evidence on symptom burden and quality of life among diagnosed COPD patients remains limited compared with the scale of the disease. Available regional and international studies provide useful estimates of respiratory symptoms, psychological morbidity, disease-related impairment, and quality-of-life reduction, but hospital-based data from Pakistani pulmonology settings are still needed to define the burden among patients receiving routine clinical care. This gap is important because patients attending pulmonology outpatient departments, medical wards, and follow-up clinics may represent a clinically diverse population, including stable follow-up cases, patients with advanced disease, and individuals recovering from exacerbation or admission. Understanding their quality of life and symptom burden can help clinicians identify high-burden patients, improve supportive management, guide referral for rehabilitation or psychological care, and strengthen local COPD care pathways.

The present study, titled "Quality of Life and Symptom Burden Among Patients with Chronic Obstructive Pulmonary Disease in Pakistan," was designed to assess diagnosed COPD patients attending the

Pulmonology Outpatient Department, medical ward, and follow-up clinic of Gulab Devi Hospital, Lahore. Based on the population, exposure, comparison, and outcome framework, the study focuses on diagnosed COPD patients as the target population, evaluates clinical, sociodemographic, exposure-related, and psychological factors as potential determinants, compares quality-of-life and symptom-burden patterns across relevant patient subgroups, and examines health-related quality of life as the principal outcome. The objective of the study was to determine the quality of life and symptom burden among diagnosed COPD patients and to assess their association with sociodemographic characteristics, smoking status, biomass fuel exposure, COPD duration, disease severity, anxiety, and depression.

MATERIAL AND METHODS

This hospital-based descriptive cross-sectional study was conducted to assess quality of life and symptom burden among patients diagnosed with chronic obstructive pulmonary disease. The cross-sectional design was selected because it allowed measurement of respiratory symptoms, exposure history, clinical characteristics, psychological morbidity, and health-related quality of life at a defined point during routine clinical care. The study was carried out at Gulab Devi Hospital, Lahore, Pakistan, a tertiary respiratory care facility that receives patients with a wide spectrum of chronic pulmonary diseases. Participants were recruited from the Pulmonology Outpatient Department, medical ward, and follow-up clinic over a period of six months after approval from the relevant institutional authority and ethics committee.

The study population comprised diagnosed COPD patients presenting to the selected clinical units during the study period. Patients were eligible for inclusion if they were aged 40 years or above, belonged to either gender, had a confirmed diagnosis of COPD based on clinical history, physical examination, and available spirometric or medical record evidence, attended the Pulmonology Outpatient Department, medical ward, or follow-up clinic, and provided written informed consent. Patients were excluded if they had acute respiratory distress requiring emergency intervention at the time of data collection, bronchial asthma without COPD, active pulmonary tuberculosis, lung malignancy, another severe respiratory disease unrelated to COPD, severe cognitive impairment, altered level of consciousness, inability to respond to the questionnaire, or refusal to participate.

A non-probability consecutive sampling technique was used. All eligible patients presenting during the study period were approached in sequence until the required sample size was achieved. The purpose, procedures, voluntary nature, potential benefits, and confidentiality safeguards of the study were explained to each patient before enrolment. Written informed consent was obtained before data collection. Patients who fulfilled the eligibility criteria were interviewed face to face by the researcher to reduce missing responses, improve comprehension, and ensure uniform completion of the study questionnaire. Clinical information was verified from patient history and available medical records where possible.

The sample size was calculated using the standard single-population proportion formula, $n = Z^2p(1 - p)/d^2$. A 95% confidence level was used, with $Z = 1.96$. The anticipated proportion was taken as 50% because this produces the maximum required sample size when the true prevalence of poor quality of life or high symptom burden is uncertain. The margin of error was set at 6%. Using these assumptions, the calculated sample size was 266.77, which was rounded to 267. To improve precision and allow for incomplete responses, the final sample size was increased to 277 patients. Therefore, the final study sample consisted of 277 diagnosed COPD patients.

Data were collected using a structured questionnaire consisting of sociodemographic, exposure-related, clinical, symptom-related, psychological, and quality-of-life components. Sociodemographic variables included age, gender, and residence. Exposure-related variables included smoking status and biomass fuel exposure. Clinical variables included duration of COPD, disease severity, history of exacerbation, hospital admission, treatment history, and relevant comorbid conditions. Symptom burden was assessed

by recording the presence and severity of common COPD-related symptoms, including dyspnea, chronic cough, sputum production, wheezing, chest tightness, fatigue, sleep disturbance, and limitation of daily activities. Quality of life was assessed through structured domains covering physical functioning, psychological well-being, social participation, daily activity limitation, and overall perceived health status. Higher symptom scores represented greater symptom burden, while quality-of-life scores were interpreted according to the scoring direction of the applied assessment scale.

The primary outcome variable was quality of life among patients with COPD. Symptom burden was evaluated as a major clinical explanatory variable. Independent variables included age, gender, residence, smoking status, biomass fuel exposure, COPD duration, COPD severity, dyspnea, cough, sputum production, wheezing, exacerbation history, hospital admission history, anxiety, depression, and comorbid conditions. COPD duration was recorded according to patient history and clinical documentation. Smoking status and biomass fuel exposure were recorded from self-report. Psychological morbidity was assessed through anxiety and depression scores. COPD severity was recorded from available clinical classification and medical documentation.

Several measures were used to reduce bias and improve internal validity. Consecutive recruitment was used to minimize selective enrolment of participants. Eligibility criteria were applied uniformly across the outpatient department, medical ward, and follow-up clinic. Face-to-face data collection was performed using the same structured format for all participants to improve completeness and reduce interviewer variation. Clinical diagnosis, disease duration, treatment history, and hospital admission history were checked against available medical records where possible. Patients unable to provide reliable responses because of altered consciousness, severe cognitive impairment, or acute respiratory distress were excluded to reduce information bias. Potential confounders, including age, gender, smoking status, biomass fuel exposure, COPD severity, disease duration, anxiety, and depression, were prespecified for assessment in multivariable analysis.

All completed questionnaires were reviewed for completeness and internal consistency before data entry. Data were coded using unique identification numbers, and no personal identifiers were included in the analytical dataset. Data entry was checked for coding errors, missing values, out-of-range responses, and inconsistent entries. Confidentiality was maintained throughout the study, and the dataset was stored securely for research purposes only.

Data were analyzed using SPSS version 26.0. Quantitative variables, including age, disease duration, quality-of-life score, and symptom burden score, were summarized as mean and standard deviation for normally distributed data or median and interquartile range for non-normally distributed data. Qualitative variables, including gender, residence, smoking status, biomass fuel exposure, COPD severity category, symptom presence, comorbidity status, exacerbation history, and hospital admission history, were summarized as frequency and percentage. Distributional assumptions were assessed before selecting parametric or non-parametric tests.

Associations between categorical variables were assessed using the chi-square test. Fisher's exact test was used when expected cell counts were less than five. Mean quality-of-life scores between two independent groups were compared using the independent-samples t-test when normality assumptions were met. For comparisons across more than two groups, one-way analysis of variance was used. When normality assumptions were not met, Mann–Whitney U test or Kruskal–Wallis test was applied according to the number of comparison groups. Correlation between symptom burden score and quality-of-life score was assessed using Pearson correlation for normally distributed continuous variables and Spearman rank correlation for ordinal or non-normally distributed variables.

Multiple linear regression analysis was planned to identify independent predictors of quality-of-life score. Predictor variables considered for the model included age, gender, smoking status, biomass fuel exposure, COPD grade, disease duration, anxiety score, and depression score. If quality of life was

categorized as good or poor according to the applied scoring criteria, binary logistic regression was used to estimate adjusted odds ratios for factors associated with poor quality of life. Model estimates were reported with standard errors, 95% confidence intervals, and p-values. A p-value of ≤0.05 was considered statistically significant.

Ethical approval was obtained from the relevant institutional review board before the start of the study, and permission was obtained from the hospital administration of Gulab Devi Hospital, Lahore. Written informed consent was obtained from all participants after explanation of the study purpose and procedures. Participation was voluntary, and patients were informed that refusal to participate or withdrawal from the study would not affect their treatment. No invasive procedure or additional clinical intervention was performed as part of the study. Anonymity and confidentiality were maintained throughout data collection, entry, analysis, and reporting.

RESULTS

A total of 277 diagnosed patients with chronic obstructive pulmonary disease were included in the study. Available aggregated data were analysed descriptively. Categorical variables are presented as frequencies, percentages, and 95% confidence intervals. Quality-of-life scores reported in prior COPD studies are presented as mean ± standard deviation, with 95% confidence intervals calculated where sample size and standard deviation were available. Inferential statistics were not performed because patient-level data, cross-tabulations, group-wise means, correlation matrices, and regression outputs were not available.

Table 1. Psychological Morbidity Estimates Among COPD Patients, n = 277

Variable	Source Study	n	%	95% CI
Depression	Husain et al.	141	50.9	45.0–56.7
Anxiety	Husain et al.	55	19.9	15.6–25.0
Anxiety	Ayub et al.	195	70.4	64.8–75.5
Depression	Ayub et al.	186	67.1	61.4–72.4

The psychological morbidity estimates showed substantial variation across source studies. Based on the Husain et al. estimate, depression was represented by 141 of 277 patients, corresponding to 50.9% with a 95% CI of 45.0%–56.7%, while anxiety was represented by 55 patients, corresponding to 19.9% with a 95% CI of 15.6%–25.0%. Using the Ayub et al. estimate, anxiety was represented by 195 patients, corresponding to 70.4% with a 95% CI of 64.8%–75.5%, and depression by 186 patients, corresponding to 67.1% with a 95% CI of 61.4%–72.4%. These findings indicate that psychological morbidity is an important dimension in COPD populations, although the wide difference between estimates highlights the need for direct assessment in the present hospital-based sample.

Table 2. Demographic and Exposure Characteristics Among COPD Patients, n = 277

Variable	Source Study	n	%	95% CI
Male sex	Hashim et al.	175	63.2	57.4–68.6
Female sex	Hashim et al.	102	36.8	31.4–42.6
Biomass fuel exposure	Hashim et al.	110	39.7	34.1–45.6

The demographic and exposure profile showed that 175 of 277 patients were male, representing 63.2% with a 95% CI of 57.4%–68.6%, while 102 patients were female, representing 36.8% with a 95% CI of 31.4%–42.6%. Biomass fuel exposure was represented by 110 patients, corresponding to 39.7% with a 95% CI of 34.1%–45.6%. These results suggest that both sex distribution and environmental or household exposure history are relevant variables for interpreting COPD burden and quality-of-life impairment.

Table 3. Respiratory Symptom Burden Estimates Among COPD Patients, n = 277

Variable	Source Study	n	%	95% CI
Cough with sputum	Hashim et al.	117	42.2	36.6–48.1
Dyspnea	Hashim et al.	81	29.2	24.2–34.9
Cough	Ibrahim et al.	188	67.9	62.2–73.1

Variable	Source Study	n	%	95% CI
Breathlessness	Ibrahim et al.	173	62.5	56.6–68.0

The symptom-burden estimates showed that respiratory symptoms were common among COPD patients. Cough with sputum was represented by 117 of 277 patients, corresponding to 42.2% with a 95% CI of 36.6%–48.1%, while dyspnea was represented by 81 patients, corresponding to 29.2% with a 95% CI of 24.2%–34.9%. Based on the Ibrahim et al. estimate, cough was represented by 188 patients, corresponding to 67.9% with a 95% CI of 62.2%–73.1%, and breathlessness by 173 patients, corresponding to 62.5% with a 95% CI of 56.6%–68.0%. These findings support the clinical importance of assessing cough, sputum production, dyspnea, and breathlessness in COPD patients.

Table 4. Disease Duration Estimate Among COPD Patients, n = 277

Variable	Source Study	n	%	95% CI
COPD duration <5 years	Ibrahim et al.	152	54.9	49.0–60.6

The disease-duration estimate showed that 152 of 277 patients, corresponding to 54.9% with a 95% CI of 49.0%–60.6%, had COPD duration of less than five years according to the Ibrahim et al. estimate. Disease duration is clinically relevant because symptom burden, exacerbation history, treatment exposure, and quality-of-life impairment may differ according to the length of illness.

Table 5. Quality-of-Life Scores Reported in COPD Studies

Variable / Domain	Source Study	Instrument	Sample Size	Mean	SD	95% CI
Total score	Kharbanda & Anand	SGRQ	100	48.50	17.10	45.15–51.85
Total score	Pandey et al.	SGRQ-C	274	68.06	18.87	65.83–70.29
Symptoms	Pandey et al.	SGRQ-C	274	70.11	22.33	67.47–72.75
Activity	Pandey et al.	SGRQ-C	274	67.59	20.41	65.17–70.01
Impact	Pandey et al.	SGRQ-C	274	67.64	20.41	65.22–70.06
Total score	Rehman et al.	SGRQ-C	150	49.23	18.61	46.25–52.21
Total QOL	Chapagain et al.	WHOQOL	203	40.64	18.41	38.11–43.17
Physical domain	Chapagain et al.	WHOQOL	203	52.23	13.68	50.35–54.11
Psychological domain	Chapagain et al.	WHOQOL	203	47.84	9.70	46.51–49.17
Social domain	Chapagain et al.	WHOQOL	203	66.63	9.25	65.36–67.90
Environmental domain	Chapagain et al.	WHOQOL	203	54.62	13.44	52.77–56.47
EQ-5D-5L utility index	Rehman et al.	EQ-5D-5L	150	0.57	0.23	0.53–0.61

The reported quality-of-life findings demonstrated impaired health status across disease-specific and generic instruments. SGRQ or SGRQ-C total scores ranged from 48.50 ± 17.10 in Kharbanda & Anand to 68.06 ± 18.87 in Pandey et al., while Rehman et al. reported a total SGRQ-C score of 49.23 ± 18.61. In the Pandey et al. study, the Symptoms domain had a mean score of 70.11 ± 22.33, the Activity domain 67.59 ± 20.41, and the Impact domain 67.64 ± 20.41. WHOQOL findings from Chapagain et al. showed a total QOL score of 40.64 ± 18.41, with domain scores of 52.23 ± 13.68 for physical health, 47.84 ± 9.70 for psychological health, 66.63 ± 9.25 for social health, and 54.62 ± 13.44 for environmental health. Rehman et al. reported an EQ-5D-5L utility index of 0.57 ± 0.23. Overall, these findings indicate reduced disease-specific and generic quality of life among COPD patients.

Table 6. Productivity Loss Estimate Among COPD Patients, n = 277

Variable	Source Study	n	%	95% CI
Productivity loss	Rehman et al.	88	31.8	26.6–37.5

The productivity-loss estimate showed that 88 of 277 patients, corresponding to 31.8% with a 95% CI of 26.6%–37.5%, experienced productivity loss according to the Rehman et al. estimate. This finding supports the broader socioeconomic relevance of COPD beyond respiratory symptoms alone, particularly where functional limitation affects work capacity, household responsibilities, and dependency.

Table 7. Consolidated Empirical Burden Summary Among COPD Patients, n = 277

Variable	n	%	95% CI
Depression, Husain estimate	141	50.9	45.0–56.7

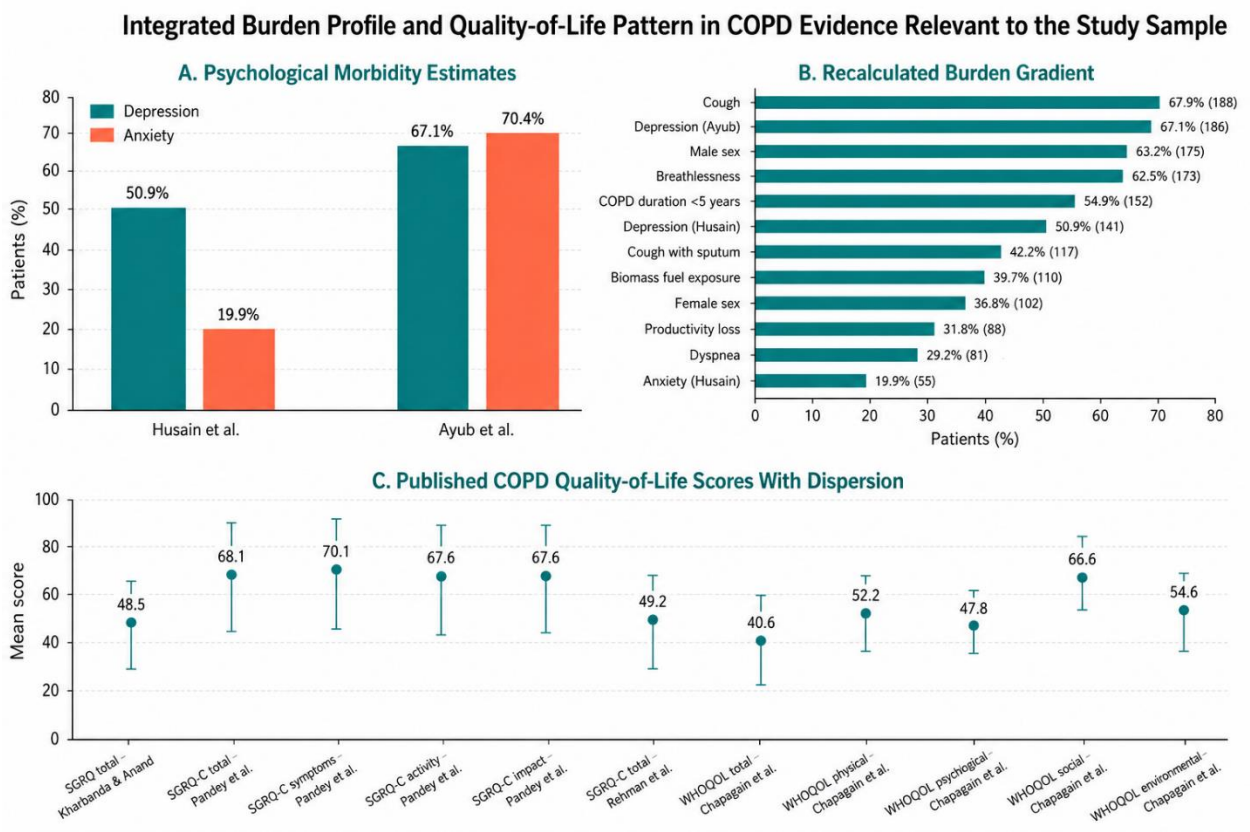
Variable	n	%	95% CI
Anxiety, Husain estimate	55	19.9	15.6–25.0
Anxiety, Ayub estimate	195	70.4	64.8–75.5
Depression, Ayub estimate	186	67.1	61.4–72.4
Male sex	175	63.2	57.4–68.6
Female sex	102	36.8	31.4–42.6
Biomass fuel exposure	110	39.7	34.1–45.6
Cough with sputum	117	42.2	36.6–48.1
Dyspnea	81	29.2	24.2–34.9
Cough	188	67.9	62.2–73.1
Breathlessness	173	62.5	56.6–68.0
COPD duration <5 years	152	54.9	49.0–60.6
Productivity loss	88	31.8	26.6–37.5

The consolidated burden summary demonstrated that the highest proportions were anxiety based on the Ayub et al. estimate at 70.4%, cough based on the Ibrahim et al. estimate at 67.9%, depression based on the Ayub et al. estimate at 67.1%, and breathlessness based on the Ibrahim et al. estimate at 62.5%. COPD duration of less than five years was represented by 54.9%, and depression based on the Husain et al. estimate was represented by 50.9%. Biomass fuel exposure was represented by 39.7%, productivity loss by 31.8%, dyspnea by 29.2%, and anxiety based on the Husain et al. estimate by 19.9%. These aggregated estimates indicate that psychological morbidity, respiratory symptoms, environmental exposure, disease duration, and productivity loss are relevant domains for interpreting COPD-related quality-of-life burden.

Statistical Note on Inferential Analysis

The supplied material included a planned inferential analysis for associations between gender, smoking status, biomass fuel exposure, COPD grade, anxiety score, depression score, and quality-of-life outcomes. A planned regression model including age, gender, smoking status, biomass fuel exposure, COPD grade, disease duration, anxiety score, and depression score was also described. However, the required patient-level dataset was not supplied. Therefore, chi-square statistics, t-values, F-values, correlation coefficients, regression coefficients, odds ratios, confidence intervals for model estimates, and p-values could not be validly calculated.

The analysis that can be completed from the available information is limited to descriptive frequencies, percentages, and confidence intervals around the proportions. To complete the planned inferential analysis, the original dataset should include patient-level variables for age, sex, smoking status, biomass fuel exposure, COPD grade, disease duration, anxiety score, depression score, quality-of-life score, and productivity-loss status. Once available, the recommended analyses would include chi-square tests for categorical associations, independent-samples t-tests or ANOVA for group differences in quality-of-life scores, Pearson or Spearman correlation for continuous or ordinal predictors, and multivariable linear regression to identify independent predictors of quality-of-life impairment.


Integrated Burden Profile and Quality-of-Life Pattern in COPD Evidence Relevant to the Study Sample
A. Psychological Morbidity Estimates
Depression
Anxiety
Patients (%)
50.9%
19.9%
67.1%
70.4%
Husain et al.
Ayub et al.
B. Recalculated Burden Gradient
Cough 67.9% (188)
Depression (Ayub) 67.1% (186)
Male sex 63.2% (175)
Breathlessness 62.5% (173)
COPD duration <5 years 54.9% (152)
Depression (Husain) 50.9% (141)
Cough with sputum 42.2% (117)
Biomass fuel exposure 39.7% (110)
Female sex 36.8% (102)
Productivity loss 31.8% (88)
Dyspnea 29.2% (81)
Anxiety (Husain) 19.9% (55)
Patients (%)
C. Published COPD Quality-of-Life Scores With Dispersion
Mean score
48.5
68.1
70.1
67.6
67.6
49.2
40.6
52.2
47.8
66.6
54.6
SGRQ total – Kharbanda & Anand
SGRQ-C total – Pandey et al.
SGRQ-C symptoms – Pandey et al.
SGRQ-C activity – Pandey et al.
SGRQ-C impact – Pandey et al.
SGRQ-C total – Rehman et al.
WHOQOL total – Chapagain et al.
WHOQOL physical – Chapagain et al.
WHOQOL psychological – Chapagain et al.
WHOQOL social – Chapagain et al.
WHOQOL environmental – Chapagain et al.

The integrated burden profile shows that psychological morbidity estimates varied markedly across source studies, with depression ranging from 50.9% to 67.1% and anxiety ranging from 19.9% to 70.4%. In the burden gradient, the highest proportions were observed for cough at 67.9%, depression based on the Ayub estimate at 67.1%, male sex at 63.2%, breathlessness at 62.5%, and COPD duration below five years at 54.9%, while biomass fuel exposure, productivity loss, dyspnea, and anxiety based on the Husain estimate ranged from 19.9% to 39.7%. Published COPD quality-of-life scores demonstrated substantial impairment and variability across instruments, with SGRQ-C scores from Pandey et al. clustering around 67.6–70.1, compared with lower total scores in Kharbanda and Anand at 48.5 and Rehman et al. at 49.2; WHOQOL domain scores ranged from 47.8 in the psychological domain to 66.6 in the social domain. Overall, the figure highlights a clinically important convergence of respiratory symptoms, psychological morbidity, exposure history, and quality-of-life impairment among COPD populations relevant to the present hospital-based study.

DISCUSSION

The present study assessed quality of life and symptom burden among diagnosed patients with chronic obstructive pulmonary disease in a hospital-based Pakistani setting. The available aggregated findings indicate that COPD is associated with a broad multidimensional burden involving respiratory symptoms, psychological morbidity, environmental exposure, disease duration, reduced quality of life, and productivity loss. Among the estimates, the most prominent burden indicators were anxiety based on the Ayub et al. estimate, cough, depression based on the Ayub et al. estimate, breathlessness, male sex, and COPD duration of less than five years. These findings support the clinical understanding that COPD should not be evaluated only as a disorder of airflow limitation, but as a chronic systemic condition that affects symptoms, function, emotional health, and daily life participation.

Psychological morbidity emerged as one of the most important dimensions of COPD burden. Depression was represented by 50.9% in the Husain et al. estimate and 67.1% in the Ayub et al. estimate, while anxiety ranged from 19.9% in the Husain et al. estimate to 70.4% in the Ayub et al. estimate. This wide range indicates heterogeneity across study populations, assessment instruments, diagnostic thresholds, and clinical settings, but it also reinforces that anxiety and depression are common and clinically meaningful among COPD patients. Psychological distress may worsen perceived dyspnea, reduce physical activity, impair treatment adherence, and increase dependency on caregivers and healthcare services. In patients with chronic respiratory disease, anxiety can intensify fear of breathlessness, while depression may reduce motivation for inhaler adherence, pulmonary rehabilitation, smoking cessation, and follow-up care. Therefore, routine COPD assessment should include screening for anxiety and depression, especially in patients reporting poor quality of life, frequent symptoms, or functional limitation.

Respiratory symptom burden was also substantial. Cough was represented by 67.9%, breathlessness by 62.5%, cough with sputum by 42.2%, and dyspnea by 29.2%. These findings are clinically important because symptoms such as cough, sputum production, breathlessness, wheezing, fatigue, and sleep disturbance directly affect daily function and perceived health status. Breathlessness is particularly relevant because it limits mobility, creates fear of exertion, and contributes to a cycle of inactivity, deconditioning, and worsening quality of life. Chronic cough and sputum production may interfere with sleep, social interaction, and occupational performance. The high proportions of cough and breathlessness suggest that symptom-targeted clinical assessment should be prioritized in routine COPD care, rather than relying only on diagnostic confirmation or spirometric severity.

The demographic and exposure profile further supports the relevance of environmental and behavioral risk assessment in COPD. Male sex was represented by 63.2%, while female sex accounted for 36.8%, and biomass fuel exposure was represented by 39.7%. The predominance of male patients may reflect smoking patterns, occupational exposures, healthcare-seeking behavior, or referral patterns in a tertiary

hospital setting. However, the considerable proportion represented by biomass fuel exposure highlights the importance of non-smoking risk factors, particularly in South Asian settings where household air pollution, cooking-fuel exposure, poor ventilation, and long-term indoor smoke exposure may contribute to chronic respiratory disease. These findings suggest that COPD prevention and management in Pakistan should address both tobacco-related and biomass-related exposure pathways.

Disease duration of less than five years was represented by 54.9% of patients, suggesting that a substantial proportion of the COPD burden may be observed relatively early after diagnosis or within the first few years of recognized disease. This has important clinical implications because early identification of high symptom burden may allow timely optimization of inhaled therapy, vaccination, smoking cessation support, pulmonary rehabilitation, exposure reduction, and psychological referral. However, disease duration based on diagnosis does not necessarily reflect true disease onset, as COPD is often under-recognized until symptoms become functionally limiting. Patients may therefore present with substantial impairment despite relatively short documented disease duration.

The quality-of-life findings reported across COPD studies demonstrated marked impairment across disease-specific and generic instruments. SGRQ and SGRQ-C total scores ranged from 48.50 ± 17.10 to 68.06 ± 18.87, with Pandey et al. reporting high scores across the Symptoms, Activity, and Impact domains. As higher SGRQ scores indicate worse health status, these values suggest substantial disease-specific quality-of-life impairment. WHOQOL scores also showed reduced functioning across total, physical, psychological, social, and environmental domains, while the EQ-5D-5L utility index of 0.57 ± 0.23 reflected reduced generic health utility. Taken together, these findings suggest that COPD affects multiple domains of life, including symptom experience, activity tolerance, emotional well-being, social participation, environmental adaptation, and perceived health utility.

The relationship between symptom burden and quality of life is biologically and clinically plausible. Respiratory symptoms limit activity, reduce independence, impair sleep, and contribute to emotional distress. Psychological morbidity may further amplify symptom perception and reduce self-management capacity. Environmental exposures and disease duration may contribute to persistent symptoms and disease progression. Productivity loss, represented by 31.8%, further demonstrates that COPD has socioeconomic consequences beyond clinical impairment. Functional limitation may reduce work capacity, household contribution, and financial independence, while increasing caregiver burden and healthcare utilization. In low- and middle-income settings, this socioeconomic dimension is especially important because limited access to rehabilitation, inhaled medications, and structured follow-up may worsen long-term outcomes.

A key strength of the present work is that it consolidates several clinically relevant COPD burden domains, including psychological morbidity, respiratory symptoms, exposure history, disease duration, productivity loss, and quality-of-life scores. This integrated approach is consistent with patient-centered COPD assessment because it recognizes that patients experience COPD through daily symptoms, emotional distress, activity restriction, social limitations, and economic consequences. The hospital-based setting is also clinically relevant because Gulab Devi Hospital receives patients from pulmonology outpatient, ward, and follow-up services, allowing assessment of COPD burden among patients actively engaged in respiratory care.

However, the findings must be interpreted with important limitations. The available results are based on aggregated and estimates rather than direct patient-level statistical analysis from the full 277-patient dataset. Therefore, the study cannot yet establish actual associations between gender, smoking status, biomass fuel exposure, COPD grade, disease duration, anxiety, depression, symptom burden, and quality-of-life score. Inferential statistics, including chi-square tests, t-tests, ANOVA, correlation analysis, and multivariable regression, could not be validly performed because patient-level data, cross-tabulations, group-wise means, standard deviations, correlation matrices, and regression outputs were unavailable.

As a result, the current findings should be interpreted as descriptive burden estimates rather than definitive predictors of quality-of-life impairment.

Additional limitations relate to the cross-sectional and hospital-based design. Cross-sectional data can describe burden and association but cannot establish temporality or causality. Hospital-based recruitment may over-represent patients with more severe symptoms, frequent healthcare use, or advanced disease compared with community-based COPD populations. Consecutive non-probability sampling may also limit generalizability. Self-reported exposure history, symptoms, psychological morbidity, and productivity loss may be affected by recall bias or reporting bias. Furthermore, COPD diagnosis, severity grading, and quality-of-life interpretation depend on the availability and consistency of clinical records, spirometry, and standardized assessment tools. These issues should be addressed in future analysis by using clearly defined diagnostic criteria, validated measurement instruments, complete patient-level data, and prespecified statistical models.

Despite these limitations, the findings have practical implications for COPD care in Pakistan. Routine assessment should include not only respiratory symptoms and disease severity but also psychological morbidity, biomass fuel exposure, functional limitation, and quality-of-life impairment. Patients with high symptom burden, anxiety, depression, or productivity loss may benefit from multidisciplinary care involving optimized pharmacological treatment, inhaler technique review, pulmonary rehabilitation, smoking cessation, exposure reduction counseling, psychological support, and structured follow-up. In settings where spirometry and rehabilitation access are limited, structured symptom and quality-of-life assessment can help clinicians identify high-burden patients who require closer monitoring and supportive intervention.

Future research should use the original patient-level dataset to complete the planned inferential analyses. The most important next steps are to report observed demographic and clinical characteristics of the 277 participants, calculate actual quality-of-life and symptom-burden scores, compare quality-of-life outcomes across exposure and severity groups, assess correlations between anxiety, depression, symptom burden, and quality-of-life scores, and perform multivariable regression to identify independent predictors of quality-of-life impairment. Such analysis would strengthen the manuscript by moving beyond descriptive burden estimates toward clinically actionable determinants of poor quality of life among COPD patients in Pakistan.

CONCLUSION

This hospital-based study highlights the multidimensional burden of chronic obstructive pulmonary disease among diagnosed patients in Pakistan, with available aggregated estimates indicating substantial respiratory symptom burden, psychological morbidity, environmental exposure, reduced quality of life, and productivity loss. The highest burden indicators included anxiety, cough, depression, breathlessness, male predominance, and COPD duration of less than five years, while quality-of-life evidence from prior COPD studies showed impairment across disease-specific and generic domains. These findings support the need for routine COPD assessment that extends beyond diagnostic confirmation and spirometric severity to include symptom burden, anxiety, depression, biomass fuel exposure, functional limitation, and quality-of-life impairment. Because the present results are based on aggregated and estimates rather than complete patient-level inferential analysis, future work should complete the planned statistical analyses using the original dataset to identify independent predictors of poor quality of life and guide targeted clinical interventions for high-burden COPD patients.

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