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Medicine

Prevalence & Impact of COPD on Quality of Life and Daily Life Activities- A Prospective Study

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Abstract		Original Research Article

Introduction: Chronic obstructive pulmonary disease (COPD) is a major and increasing global health problem with enormous amount of expenditure of direct/indirect health-care costs. The prevalence of chronic obstructive pulmonary disease (COPD) varies from country to country, mainly due to the effects of cumulative exposure to smoking and the increased life span of the population. Quality of life (QOL) is an important domain for measuring the impact of chronic disease. Both general and disease-specific instruments have been used to measure QOL in patients with COPD. Among the disease specific questionnaires frequently used to evaluate the QOL of pulmonary patients is St. George's Respiratory Questionnaire (SGRQ). ***Aim of the Study***: The aim of this study was to determine the prevalence of chronic obstructive pulmonary disease (COPD) and study the impact of COPD on health-related quality of life (HRQL) and activities of daily living (ADL). ***Methods***: This was a prospective observational study and was conducted in the Department of Medicine, LABAID Specialized Hospital, Dhaka, Bangladesh during the period from March, 2022 to December, 2022. We included 325 patients with chronic obstructive pulmonary disease (COPD) in our study. ***Result***: In our study we found majority (52.61%) of our patients were aged more than 60 years and 58% were male compared to female (42%).We found the mean age was 61.73 ± 4.5 years. Among all patients 58.77% were smoker, 66.46% had previous history of COPD. Majority (38.15%) of our patients were severe, mild case was 18.15%, moderate was 33.54% and very severe case was 10.15% in this study. The mean SGRQ-C score was significantly higher in very severe group. The QoL was found higher in mild group. The four domains of LCADL were significantly higher in very severe group which indicates greatest impairment in this group. The mean vas score was seen higher in mild group. ***Conclusion***: In our study, we found that patients with COPD have a lower quality of life, which deteriorates significantly as the condition progresses. A considerable increase in SGRQ-C score is associated with increasing severity of COPD. A higher smoking index has an impact on the QOL of COPD patients, particularly their symptoms and impact score (which represent their psychological condition). COPD patients should be evaluated on the basis of QOL measurements.
Keywords: Chronic obstructive pulmonary disease, SGRQ, Quality of LIfe, ADL.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a major and increasing global health problem with enormous amount of expenditure of direct/indirect health-care costs [1]. COPD impairs quality of life, by preventing people with the condition from socializing and enjoying their hobbies. It also makes many feel frustrated and angry about not being able to do the things they want to [2]. Global Initiative for Chronic Obstructive Lung Disease group (GOLD) defines COPD as a disease state characterized by airflow limitation and persistent symptoms [3]. The airflow limitation is usually progressive and associated with an abnormal inflammatory response of the lungs to noxious particles or gases [4]. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines have identified the goals of treatment for patients with COPD, these include the patients' goals of improved exercise tolerance and emotional function (health-related quality of life) and also important clinical goals such as prevention of disease progression and minimization of symptoms [4]. The prevalence of

Citation: Sumanta Kumer Saha, Tamanna Tabassum Moni, Md. Rezaul Kadir, Aliva Haque, Sabiha Tabassum Mithila. Prevalence & Impact of COPD on Quality of Life and Daily Life Activities- A Prospective Study. Sch J App Med Sci, 2023 Apr 11(4): 724-731.

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chronic obstructive pulmonary disease (COPD) varies from country to country, mainly due to the effects of cumulative exposure to smoking and the increased life span of the population. There are increasingly more data on the prevalence and distribution of COPD from around the world, but until very recently most have been derived from expert opinion and not from well-conducted epidemiological studies using postbronchodilator spirometry [5]; moreover, studies differed in terms of age bands as well as in the use of different criteria of COPD [6, 7]. Therefore, direct comparisons between prevalence's obtained in different countries are not always possible. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) has resulted in an agreement on spirometric thresholds for diagnosis and severity and has become the gold standard, at least for epidemiological purposes [6]. An epidemiological survey conducted from 1997 to 1998 in adults between 40 and 70 years of age in Spain reported a prevalence of COPD of 9.1% according to the old European Respiratory Society (ERS) criteria for COPD [7, 8]. Interestingly, only 22% had a previous diagnosis of the disease [9]. Pharmacological management of COPD including inhaled bronchodilators such as anticholinergics, selective β2-adrenergic agonists and theophylline, in addition to glucocorticoids to prevent exacerbations, has not shown a remarkable effect on preventing decline in lung function. The main objective of pharmacological treatment of COPD is symptoms prevention and control [10]. On the other hand, non-pharmacological management including smoking cessation, participation in pulmonary rehabilitation programs and psychosocial support represent the cornerstone in COPD management and improving the quality of life for patients with COPD [11]. On the contrary to most other chronic diseases, mortality rates associated with COPD are gradually increasing [12]. COPD is currently the fourth leading cause of death in the world, and it is expected to be the third by 2020 [13-15]. The Global Burden of Disease Study has found that COPD is a great contributor to disability and mortality around the world. COPD was the eighth leading cause of Day Adjusted Life Years lost across the world in 2005 and jumped to fifth place by 2013 [15]. A recent study in Jordan showed that approximately half of the adult males (48.2%) are smokers [16]. Previous descriptive studies of COPD reported a prevalence of 11.0% among male smokers, with a prevalence of 5.4% of symptomatic COPD among adults [17, 18]. Smoking cigarettes is the leading risk factor of COPD and smokers are 12–13 times more likely to die from COPD than nonsmokers [19]. Anxiety and depression are frequently associated with COPD and with acute and chronic respiratory diseases in general. Whereas anxiety may appear earlier than depression, the latter is related to the severity of COPD and to the degree of impaired functioning. Both conditions significantly affect COPD prognosis. Unfortunately, psychiatric disorders are not systematically evaluated and diagnosed in COPD patients, and consequently they are not always treated adequately. This negatively affects the evolution of the respiratory disease and the patient's quality of life; it also increases healthcare and social costs [20].

Quality of life (QOL) is an important domain for measuring the impact of chronic disease. Both general and disease-specific instruments have been used to measure QOL in patients with COPD [21, 22]. Among the disease specific questionnaires frequently used to evaluate the QOL of pulmonary patients is St. George's Respiratory Questionnaire (SGRQ). A new version of the SGRQ, the SGRQ-C specific only to COPD, is now available [23].

Early detection is essential for encouraging smoking cessation, adequate pharmaceutical treatment, and physical activity. Even in early undetected disease, the demonstration of impairment in activities of daily living (ADL) and health-related quality of life (HRQL) should alert clinicians to the need for case detection in individuals who are at risk.

Therefore, in this study we aimed to study the impact of COPD on health-related quality of life (HRQL) and activities of daily living (ADL).

OBJECTIVE OF THE STUDY

The main objective of the study was to determine the prevalence of chronic obstructive pulmonary disease (COPD) and study the impact of COPD on health-related quality of life (HRQL) and activities of daily living (ADL).

METHODOLOGY & MATERIALS

This was a prospective observational study and was conducted in the Department of Medicine, LABAID Specialized Hospital, Dhaka, Bangladesh during the period from March, 2022 to December, 2022. We included 325 patients with chronic obstructive pulmonary disease (COPD) in our study.

These are the following criteria to be eligible for the enrollment as our study participants: a) Patients aged upto 80 years old; b)Patients diagnosed with chronic obstructive pulmonary disease according to GOLD classification; c) Patients with no recent hospitalization or exacerbation of COPD prior to enrollment; d) Patients had COPD for at least 1 year; e) Patients who were willing to participate were included in the study And a) Patients with uncontrolled DM, b) Patients with cognitive impairment ; c) Patients with previous surgical history; d) Patients with respiratory failure; e) Patients with any history acute illness (e.g., renal or pancreatic diseases, ischemic heart disease etc.) were excluded from our study.

Patients were classified according to GOLD staging system (GOLD 2010) [24] into:

Stage I: Mild COPD (FEV1/FVC <70%; post bronchodilator FEV1 ≥80% predicted).
Stage II: Moderate COPD (FEV1/FVC <70%, 50%≤post bronchodilator, FEV1≤80% predicted).
Stage III: Severe COPD (FEV1/FVC <70%, 30%≤post bronchodilator, FEV1≤50% predicted).
Stage IV: Very Severe COPD (FEV1/FVC <70% predicted or post bronchodilator FEV1 ≤ 30% predicted or post bronchodilator FEV1 ≤ 50% predicted plus chronic respiratory failure).

The London Chest Activity of Daily Living (LCADL) scale is a specific questionnaire that consists of 15 items and four activity groups: self-care (4 items), domestic (6 items), physical (2 items) and leisure time (3 items) [25] A global score as well as a score for each group of activities is obtained. Visual analogue scale (VAS) has a thermometer, the ends of which are labelled with ''the worst health state'' and ''the best health state'', with scores from 0 to 100 respectively. The St George's Respiratory Questionnaire (SGRQ) is a specific HRQL questionnaire that contains 50 items distributed in three dimensions: symptoms, activities and impact. The scores range from 0 to 100, with the lowest scores indicating a better HRQL [26].

Statistical Analysis

All data were recorded systematically in preformed data collection form and quantitative data was expressed as mean and standard deviation and qualitative data was expressed as frequency distribution and percentage. Statistical analysis was performed by using SPSS (Statistical Package for Social Sciences) for windows version 10. Probability value <0.05 was considered as level of significance. The study was approved by Ethical Review Committee of LABAID Specialized Hospital, Dhaka, Bangladesh.

RESULT
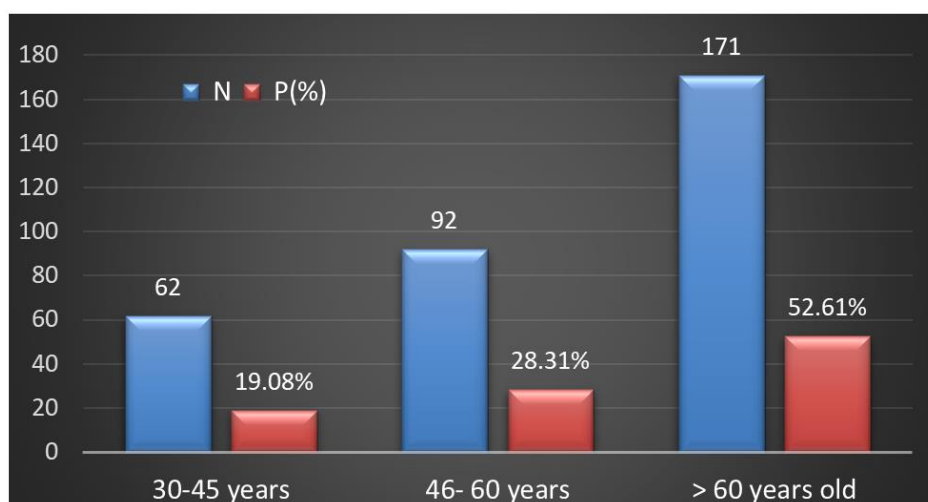
Figure 1: Age distribution of our study subjects
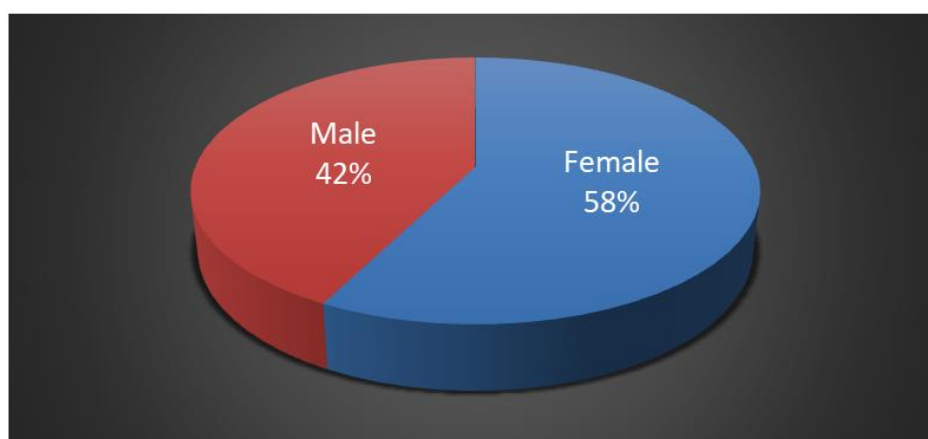
Figure 2: Gender distribution of our study participants

Table 1: Demographic characteristics of our study subjects

Baseline	N	P (%)	P-value
Mean age (years)	61.73 ± 4.5		0.186
Education			
Illiterate	59	18.15	0.412
Primary education	146	44.92	0.214
Secondary education	87	26.77	0.318
Higher above	33	10.15	0.169
Smoking	191	58.77	0.241
Emphysema	78	24.00	0.149
Tuberculosis	33	10.15	0.215
Pneumoconiosis	59	18.15	0.124
History of hypertension	183	56.31	0.056
History of asthma	89	27.38	0.041
History of COPD	216	66.46	0.043
COPD duration	3.29±2.41		0.421
BMI (kg/m^2)	27.67±4.24		0.614
Heart Rate (per minute)	86 ± 17		0.214
Systolic blood pressure (mm Hg)	135.24 ± 20.78		0.041
Diastolic blood pressure (mm Hg)	83.94 ± 10.69		0.062
Spirometry (postbronchodilator)			
FVC (litres)	3.76 ± 1.21		0.015
FVC (% predicted)	87.85±15.04		0.046
FEV1 (litres)	2.83 ± 0.46		0.015
FEV1 (% predicted)	111.21 ± 10.51		0.131

Table 2: Prevalence of chronic obstructive pulmonary disease (COPD) by gold stage guidelines

COPD severity stages	N	P(%)	P-value
GOLD stage I (Mild)	59	18.15	0.352
GOLD stage II (Moderate)	109	33.54	0.141
GOLD stage III (Severe)	124	38.15	0.221
GOLD stage IV (Very severe)	33	10.15	0.123

GOLD=Global Initiative for Chronic Obstructive Lung Disease)

Table 3: Comparison between grades of COPD severity regarding SGRQ-C, QoL, LCADL & VAS score

	Mild I	Moderate II	Severe III	Very severe IV	P-value
SGRQ-C score					
Symptom score (Mean ± SD)	23.03 ± 6.6	63.65 ± 9.5	66.55 ± 14.6	65.38 ± 16.8	0.041
Activity score (Mean ± SD	15.67 ± 15.4	65.97 ± 9.4	67.98 ± 16.32	71.81 ± 21.01	0.021
Impact score (Mean ± SD)	8.68 ± 1.47	20.65 ± 3.30	20.90 ± 3.1	21.57 ± 3.09	0.024
Quality of life (QoL)					
(Mean ± SD)	50.5 ± 26.3	50.2 ± 23.0	41.0 ± 19.0	30.2 ± 26.7	0.051
London Chest Activities of Daily Living (LCADL)					
Self-care	3.0±1.9	3.4 ± 1.5	3.6 ±1.6	3.8 ± 1.5	0.054
Domestic	2.9 ±1.7	3.2 ± 1.4	3.4 ±1.4	3.7±1.9	0.053
Physical	2.1 ± 1.7	2.9 ± 1.5	3.5 ±1.0	3.6±2.1	0.021
Leisure	2.4 ± 1.6	3.1 ± 1.6	3.7 ±1.2	3.9±2.0	0.036
Visual Analogue Scale (VAS)	75.4 ± 23.3	74.4 ± 21.3	72.6 ±19.1	68.6±23.1	0.014

Figure 1 shows that majority (52.61%) of our patients were aged more than 60 years, followed by 28.31% were aged 46-60 years and 19.08% patients were aged 30-45 years old.

Figure 2 shows distribution of study subjects by gender. We found majority of our patients were male (58%) compared to female (42%).

Table 1 shows the demographic characteristics of patients. We found the mean age was 61.73 ± 4.5 years. Majority (44.92%) of our patients got primary education. Among all patients 58.77% were smoker, 24% had emphysema, 56.31% had history of hypertension, 27.38% had asthma, 66.46% had previous history of COPD and the mean duration of COPD was 3.29±2.41 years.

Table 2 shows the prevalence of COPD severity by gold stage guidelines. Majority (38.15%) of our patients were severe cases. Among all patients, mild case was found 18.15%, moderate was found 33.54% and very severe case was found 10.15% in this study.

Table 3 shows SGRQ-C score was significantly higher in very severe group regarding symptoms, activity & impact of COPD. The health quality of life was found higher in mild group whilst the lowest mean was found in very severe group. The four domains of LCADL containing self-care, domestic, physical & leisure activities was significantly higher in very severe group which indicates greatest impairment in this group . The mean vas score was seen higher in mild group compare to severe & very severe group.

DISCUSSION
In this study, the mean age of the patients was 61.73 ± 4.5 years with a non -significant p-value. Zamzam *et al.,* found the mean age was 59.9 ±4.7 years [27]. When evaluating age as a risk factor for COPD, an important issue is also the spirometric criteria of COPD. A fixed ratio for the definition of airway obstruction (FEV1/FVC<0.7) will overestimate COPD in elderly and underestimate COPD among young adults [28]. Fletcher and Peto reported that COPD is characterized by an accelerated rate of decline of FEV1 with age [29]. In the present work, 58% of patients were males. COPD is a male dominant disease; the high prevalence in males is due to higher prevalence of smoking in this gender. Our finding was similar to other studies done by Postma *et al.,* & Kenneth *et al.,* [30, 31] Many epidemiological studies have found that cigarette smoking is by far the most important risk factor for COPD. It is also known that total pack of smoking is predictive of COPD mortality [32]. Lindberg *et al.,* found a high cumulative incidence of COPD after 10 years of smoking. This emphasizes the importance of early smoking cessation in the reduction of incidence of COPD [33].

In our study majority (38.15%) of our patients were severe cases. Among all patients, mild case was found 18.15%, moderate was found 33.54% and very severe case was found 10.15% [Table 2]. Zamzam *et al.,* found six patients had grade I (mild) COPD, 11 patients had grade II (moderate) COPD, 13 patients had grade III (severe) COPD and 10 patients had grade IV (very severe) COPD [27]. In our study SGRQ-C score was significantly higher in very severe group regarding symptoms, activity & impact of COPD. The health quality of life (QoL) was found higher in mild group whilst the lowest mean was found in very severe group [Table 3].

COPD is associated with significant reductions in QOL, even among patients with mild airway obstruction. A poor QOL has been shown to be associated with high levels of dyspnea, physical impairment, depression, and anxiety, and a poor prognosis in terms of readmission to hospital and death [34]. The relationship of the SGRQ-C score with the symptoms (symptoms score) has been extensively documented in the case of dyspnea, but it is more interesting to check its relationship to cough and expectoration. Patients with high scores presented cough with a greater frequency and a tendency to a greater frequency of expectoration, the effect of cough and expectoration on the quality of life has been observed in young patients with mild bronchial disease [35]. According to Doll and Miravitlles, Seemungal the effect of exacerbations on the quality of life of patients with COPD has been demonstrated as patients with a poor quality of life had more exacerbations. Moreover, other studies have found respiratory symptoms to be more closely related to QOL than impairment in FEV1 [36, 37]. Javier *et al.,* have shown that COPD had a considerable impact on daily activities in patients. Aspects of daily life are most affected, either due to the severity of the disease or the existence of social, economic, or occupational factors that could interfere with the management of the disease or complicate its progression. Disease severity in COPD affects exercise tolerance such as walking distance [38]. A study in pulmonary rehabilitation has shown that assessment of exercise tolerance correlates well with disease severity. Also, it corresponds well with QOL scores [39]. With respect to the different domains of the SGRQ-C, Batlle and Esther found that patients showed higher scores in the impact domain than in the symptoms or activity domains; the impact domain was also strongly associated with anxiety (alone or with depression) [40]. The origin of the impact domain, covering psychological disturbances resulting from respiratory disease, partly explains these findings. An analysis excluding psychological items from SGRQ- C resulted in still clinically relevant and statistically significant associations between anxiety, depression, or both, and the Impact domain, suggesting that psychological status plays an important role also in the social function of COPD patients. Hajiro *et al.,* found that patients with mild-to-severe COPD, reported that anxiety was associated with impairment of QOL only in the subset of patients with FEV1 below 60% of the predicted value [41]. Recently, it was found that when anxiety and depression appear together, their influence on QOL is greater in patients with severe-to-very severe COPD than in those with mild-to-moderate COPD [42]. Although spirometry is traditionally seen as the most important determinator of the diagnosis and severity of COPD, the relation between health status and all spirometric values mainly FEV1 is weak. This indicates that assessment of COPD severity in clinical practice could benefit from the additional measurement of health status [43].

The findings of this investigation revealed a 25% overall prevalence of GOLD-defined COPD

between the ages of 40 and 80. Men are likely to be more affected than women, and the risk increases with age, cumulative tobacco smoking, and a poor education level. However, only 66% of the individuals had a previous diagnosis of the condition, but the likelihood of being diagnosed rose with age, smoking intensity, disease severity, and HRQL impairment. Even undiagnosed COPD patients demonstrated significant impairments in HRQL and certain ADL.

Limitations of the Study

Our study was a single centre study. We took a small sample size because of our short study period & limited resources. There are more variables like mobility, utility, emotional scaling, social scaling, functional scaling needs to be evaluated to study the impact of COPD on health related quality life. After evaluating once those patients we did not follow them up for a long period and have not known other possible interference that may happen in the long term with these patients.

CONCLUSION AND RECOMMENDATIONS

In our study, we found that patients with COPD have a lower quality of life, which deteriorates significantly as the condition progresses. A considerable increase in SGRQ-C score is associated with increasing severity of COPD. A higher smoking index has an impact on the QOL of COPD patients, particularly their symptoms and impact score (which represent their psychological condition). COPD patients should be evaluated on the basis of QOL measurements.

So further study with a prospective and longitudinal study design including larger sample size needs to be done to evaluate psychological and psychiatric consultation for improving COPD symptoms and QOL, as well as early detection and treatment of superimposed psychiatric symptoms that might worsen COPD condition and negatively impact QOL.

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