Original Article

Frequency of Common Risk Factors for Acute Exacerbation of Chronic Obstructive Pulmonary Disease, at a Tertiary Care Hospital

Acute Exacerbation of Chronic Obstructive Pulmonary Disease

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ABSTRACT

Objective: To determine the frequency of common risk factors for acute exacerbation of COPD at a tertiary care hospital.

Study Design: Descriptive cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Internal Medicine at Bolan Medical College, Quetta, from April 2024 till September 2024.

Methods: After obtaining informed written consent, patients were assessed for risk factors of acute exacerbation of COPD, such as asthma, smoking, ischemic heart disease, poor compliance, and seasonal variation, according to the operational definitions.

Results: A total of 139 patients with acute exacerbation of COPD were included in the study, with 116 males (83.5%) and 23 females (16.5%). The mean age was 51.115 ± 6.893 years. The following risk factors for acute exacerbation of COPD were noted: asthma in 50 patients (36%), smoking in 40 patients (28.8%), ischemic heart disease in 14 patients (10.1%), poor compliance in 26 patients (18.7%), and seasonal variation in 38 patients (27.3%).

Conclusion: Asthma, seasonal variation, and smoking were identified as the most common risk factors for acute exacerbation of COPD. These factors were more prevalent with increasing age, predominantly among the rural population and male patients.

Key Words: Risk factors, common, chronic obstructive pulmonary disease, exacerbation, frequency.

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a complex and heterogeneous disease[1]. It has been proposed that the identification of clinical phenotypes using validated biomarkers may promote the development of targeted treatment strategies directed towards specific biological pathways.[2] Chronic Obstructive Pulmonary Disease (COPD) is a chronic respiratory disease characterised by persistent respiratory symptoms and airflow limitation.

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COPD has a major impact on public health, mainly because of its increasing prevalence, morbidity and mortality. The natural course of COPD is aggravated by episodes of respiratory symptom worsening termed exacerbations that contribute to disease progression. Acute Exacerbations of COPD (AECOPD) can be triggered by a multitude of different factors, including respiratory tract infections, various exposures, prior exacerbations, non-adherence to treatment and associated comorbidities. AECOPD are associated with an inexorable decline of lung function and a significantly worse survival outcome.[3] The exacerbation of chronic obstructive pulmonary disease (COPD) seriously affects the patient's quality of life and prognosis.[4] The clinical manifestations and prevalence of COPD are variable, which may be related to differences in the level of economic development between provinces and the degree of exposure to risk factors.[5] The level of education, disease duration, and the presence of IHD were independent risk factors for AECOPD. Poor compliance due to the lack of understanding of the disease and the high cost of treatment is a risk factor for AECOPD.[4] The cost of hospitalization and drug therapy is higher among

patients with AECOPD, which leads to poor compliance so is one of the factor for AECOPS which also increases economic burden.[6] A retrospective study carried out in Taiwan showed that COPD patients having asthma had more exacerbations (35.3%) than patients with COPD alone (18.6%).[7] Smoking is widely recognised as the major risk factor for COPD development and progression. Smokers have a faster decline in lung function and a higher mortality rate than non-smokers.[8] In a Spanish study[9] the highest hospitalisation rate for AECOPD was in winter (37.6%), followed by autumn (24%), spring (23.7%) and summer (14.6%). Andrijevic et al reported that the most common CVDs associated with AECOPD were arterial hypertension (77.8%), systolic dysfunction (24.2%) and coronary artery disease (14.9%).[10] Several studies have shown incidence of common risk factors in acute exacerbation of COPD.[8,9] Although some single-center studies have been done in different parts of Pakistan, there is currently no published data on UGIB in Quetta. Moreover, there is still no robust national data on the subject. Hence, this study aimed at examining the frequency of common risk factors for acute exacerbation of chronic obstructive pulmonary disease at a tertiary care hospital in Quetta, thereby contributing to the pool of national data. The availability of such information may be useful in healthcare planning, especially for prevention of acute exacerbation of COPD.

METHODS

This descriptive cross-sectional study was conducted in the Department of Internal Medicine at Bolan Medical College, Quetta, from April 2024 till September 2024. All patients meeting the inclusion criteria and admitted to the Department of Internal Medicine, Bolan Medical College, Quetta, were included in the study. Non-probability consecutive sampling was used.

Sample Size:

The sample size was calculated based on the following parameters:

- Smoking prevalence in patients with AECOPD: 77%
- Confidence level: 95%
- Margin of error: 8%
- Sample size (n): 139 patients with acute exacerbation of COPD
  (Population proportion sample size calculator)

Inclusion Criteria:

- Patients aged 30 to 65 years.
- Either gender.
- Patients admitted with acute exacerbation of COPD, as per operational definition, for more than 6 hours.

Exclusion Criteria:

- Patients who did not provide informed consent.
- Patients with lung malignancy, assessed by history, clinical examination, and chest CT scan.

Data Collection:

The study was conducted after receiving approval from the College of Physicians and Surgeons Pakistan (CPSP). Patients admitted to the Internal Medicine Department at Bolan Medical College, Quetta, with acute exacerbation of COPD were enrolled based on the inclusion criteria. Informed consent was obtained from the patients or their families after explaining the risks and benefits of participation. A thorough history was collected regarding age, duration of symptoms, duration of COPD, and comorbid conditions (diabetes mellitus, hypertension).

Each patient was assessed for risk factors associated with acute exacerbation of COPD, such as asthma, smoking, ischemic heart disease, poor compliance, and seasonal variation. Data were recorded on a predesigned proforma, and exclusion criteria were followed strictly to avoid confounding variables.

Data Analysis:

Data were analyzed using SPSS version 22 (SPSS Inc., Chicago, IL, USA). Continuous variables, such as patient age, duration of COPD, and duration of symptoms, were reported as mean ± standard deviation or median (IQR). Categorical variables, including gender, place of residence (urban/rural), education level, and comorbidities (DM, hypertension), were presented as frequencies and percentages. Effect modifiers, such as age, gender, place of residence, education status, duration of COPD, duration of symptoms, and comorbidities (DM, hypertension, IHD, smoking), were analyzed using the Chi-square test or Fisher's exact test, with a p-value ≤ 0.05 considered statistically significant.

RESULTS

Data were collected from 139 patients. In our study 116 patients (83.5%) were males & 23 patients (16.5%) were females. The mean age was 51.115$\pm$6.893 years, the mean duration of COPD was 10.726$\pm$2.481 months & the mean duration of sign & symptoms of acute exacerbation of COPD was 26.280$\pm$12.885 hour.

Table No.1: Demographic data of patients

Variable	Frequency (n)	Percentage (%)
Gender		
Male	116	83.5
Female	23	16.5

Place of Residence		
Urban	36	25.9
Rural	103	74.1
Education Status		
Primary	48	34.5
Intermediate	42	30.2
Graduation or more	7	5.0
Illiterate	42	30.2
Diabetes Mellitus		
Yes	38	27.3
No	101	72.7
Hypertension		
Yes	41	29.5
No	98	70.5
Risk Factors for AECOPD		
Asthma	50	36.0
Smoking	40	28.8
Ischemic Heart Disease	14	10.1
Poor Compliance	26	18.7
Seasonal Variation	38	27.3

Table No.2: Risk factors of AECOPD (asthma, smoking, ischemic heart disease, poor compliance & seasonal variation) according to duration of COPD (months) (n=139)

Duration of COPD (months)	**Asthma**		**Total**	**P-value**
	Yes	**No**		
6-33 months	40(38.5%)	64(61.5%)	104	0.292
34-60 months	10(28.6%)	25	35	
Total	50	89	139	
Duration of COPD (months)	Smoking			P-value
	Yes	No	Total	
6-33 months	30(28.8%)	74(71.2%)	104	0.975
34-60 months	10(28.6%)	25(71.4%)	35	
Total	40	99	139	
Duration of COPD (months)	Ischemic heart disease			P-value
	Yes	No	Total	
6-33 months	13(12.5%)	91(87.5%)	104	0.101
34-60 months	1(2.9%)	34(97.1%)	35	
Total	14	125	139	
Duration of COPD (months)	Poor compliance			P-value
	Yes	No	Total	
6-33 months	19(18.3%)	85(81.7%)	104	0.820
34-60 months	7(20%)	28(80%)	35	
Total	26	113	139	
Duration of COPD (months)	Seasonal variation			P-value
	Yes	No	Total	
6-33 months	27(26%)	77(74%)	104	0.530
34-60 months	11(31.4%)	24(68.6%)	35	
Total	38	101	139	

Table No.3: Risk factors of AECOPD (asthma, smoking, ischemic heart disease, poor compliance & seasonal variation) according to diabetes mellitus (n=139)

Diabetes mellitus	**Asthma**		**Total**	**P-value**
	Yes	**No**		
Yes	10(26.3%)	28(73.7%)	38	0.146
No	40(39.6%)	61(60.4%)	101	
Total	50	89	139	

Diabetes mellitus	Smoking		Total	P-value
	Yes	No		
Yes	11(28.9%)	27(71.7%)	38	0.978
No	29(28.7%)	72(71.3%)	101	
Total	40	99	139	
Diabetes mellitus	Ischemic heart disease		Total	P-value
	Yes	No		
Yes	3(7.9%)	35(92.1%)	38	0.601
No	11(10.9%)	90(89.1%)	101	
Total	14	125	139	
Diabetes mellitus	Poor compliance		Total	P-value
	Yes	No		
Yes	7(18.4%)	31(81.6%)	38	0.958
No	19(18.8%)	82(81.2%)	101	
Total	26	113	139	
Diabetes mellitus	Seasonal variation		Total	P-value
	Yes	No		
Yes	13(34.2%)	25(65.8%)	38	0.265
No	25(24.8%)	76(75.2%)	101	
Total	38	101	139	

Table No.4: Risk factors of AECOPD (asthma, smoking, ischemic heart disease, poor compliance & seasonal variation) according to hypertension (n=139)

Hypertension	**Asthma**		**Total**	**P-value**
	Yes	**No**		
Yes	13(31.7%)	28(68.3%)	41	0.498
No	37(37.8%)	61(62.2%)	98	
Total	50	89	139	
Hypertension	Smoking		Total	P-value
	Yes	No		
Yes	12(29.3%)	29(70.7%)	41	0.934
No	28(28.6%)	70(71.4%)	98	
Total	40	99	139	
Hypertension	Ischemic heart disease		Total	P-value
	Yes	No		
Yes	9(22%)	32(78%)	41	0.003
No	5(5.1%)	93(94.9%)	98	
Total	14	125	139	
Hypertension	Poor compliance		Total	P-value
	Yes	No		
Yes	9(22%)	32(78%)	41	0.526
No	17(17.1%)	61(82.7%)	98	
Total	26	113	139	
Hypertension	Seasonal variation		Total	P-value
	Yes	No		
Yes	10(24.4%)	31(75.6%)	41	0.614
No	28(28.6%)	70(71.4%)	98	
Total	38	101	139	

DISCUSSION

to predict clinical outcome. The results of this study indicate that both the category and grade affect the outcome independently, and the higher the grade of subcategory, the greater the chance that the ulcer will persist or that death will occur. The most important finding of this study is that the simple PEDIS score system can also predict the outcome and may be more accurate than the more widely used system the AUC value to confirm the diagnostic accuracy of the PEDIS score system to predict the outcome of DFUs. The results of this study indicate that the PEDIS score system also has excellent capacity to predict the

outcome. In addition, our study shows that the PEDIS category scores can be summed into an aggregate PEDIS score, with a score of 7 or more being associated with a significantly greater probability of difficulties in healing. We believe that the PEDIS score system should be applied widely in clinical AECOPD affects the natural history of the disease and is associated with age, smoking, comorbidities, number of acute exacerbations, and patients' socioeconomic level.

In addition, AECOPD can decrease lung function, increase mortality, affect the quality of life, and increase socioeconomic burden. This study investigates the risk factors for AECOPD to help prevent and treat this disease and improve prognosis.[11] The main cause of COPD is smoking, which is closely related to a decline in lung function.[12] Previous studies have shown that smoking cessation can delay lung function decline and improve survival. In ours study the risk factors of AECOPD i-e asthma was noted in 50(36%) patients, smoking was seen in 40(28.8%) patients, ischemic heart disease in 14(10.1%) patients, poor compliance in 26(18.7%) patients & seasonal variation in 38(27.3%) patients as compare A retrospective study carried out in Taiwan showed that COPD patients having asthma had more exacerbations (35.3%) than patients with COPD alone (18.6%). Smoking is widely recognised as the major risk factor for COPD development and progression.[13]

Smokers have a faster decline in lung function and a higher mortality rate than non-smokers.[14] In a Spanish study the highest hospitalisation rate for AECOPD was in winter (37.6%), followed by autumn (24%), spring (23.7%) and summer (14.6%). Andrijevic et al reported that the most common CVDs associated with AECOPD were arterial hypertension (77.8%), systolic dysfunction (24.2%) and coronary artery disease (14.9%).[15] In our study the frequency of risk factors of AECOPD increases with the increase in age. Previous studies have shown that age is a risk factor for AECOPD, which may be due to the decline in lung function with age. These findings agree with Dong et al study, where in the risk of exacerbation increased as the disease progressed, probably because of poor lung function and other risk factors such as comorbidities and smoking.[16] In addition, disease duration was an independent risk factor for AECOPD in Dong et al study. In our study the smoking was the 2nd most common risk factor of AECOPD, was noted in 28.8% patients. Smoking is widely recognized as the major risk factor for COPD development and progression.[17] Smokers have a faster decline in lung function and a higher mortality rate than non-smokers.

In a Spanish observational, cross-sectional, multicentre study of over 1.600 COPD patients it was showed that active smoking is more frequent among exacerbator than in non-exacerbator phenotypes (58.91% in emphysema and 57.67% in chronic bronchitis phenotype, $P = 0.03$).[18-20]

CONCLUSION

In conclusion, the most common risk factors of acute exacerbation of COPD were asthma followed by seasonal variation & smoking, these factors increase with the increase in age, predominant in the rural population and male gender.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Kaleemullah Kakar, Gulandam, Mohammed Atif Gulzar
Drafting or Revising Critically:	Azizur Rahman, Abdul Ghaffar Khan, Muzamil Majeed
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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