IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 23, Issue 9 Ser.2 (September. 2024), PP 39-44
www.iosrjournals.org

Outcome of Exacerbation of Chronic Obstructive Pulmonary Disease (COPD) in a Tertiary Care Hospital

[1]Dr. Md. Ashiqur Rahman, *Senior Consultant, Department of Medicine, Barisal General Hospital, Barisal, Bangladesh.*
[2]Dr. Choudhury Faisal Md. Manzurur Rahim, *Junior Consultant Medicine, Shibchar Health Complex, Madaripur, Bangladesh.*
[3]Dr. Qumrun Nassa Ahmed, *Associate Professor, Department of Obstetrics and Gynecology, Green Life Medical College & Hospital, Dhaka, Bangladesh.*
[4]Dr Md Mahbubor Rahman, *Associate Professor, Department of Medicine, Shaheed Mansur Ali Medical College, Dhaka, Bangladesh.*
[5]Professor Dr Uzir Azam Khan, *Principal, Noakhali Medical College, Noakhali, Bangladesh.*
Corresponding Author: *Dr. Md. Ashiqur Rahman, Senior Consultant, Department of Medicine, Barisal General Hospital, Barisal, Bangladesh. Email: drashikur29@gmail.com*

ABSTRACT
Background: *Patients with chronic obstructive pulmonary disease (COPD) may suffer from recurrent exacerbations, with a worsening of symptoms and reduction in lung function that may not be recovered in a small proportion of patients. Exacerbations of COPD are associated with increased morbidity and mortality.*
Objectives: *The objectives of the study were to find out the in-hospital outcome of patients admitted with COPD exacerbation*
Methods: *This prospective observational study was conducted in the Department of Medicine, Shere Bangla Medical College Hospital, Barisal during the period of January 2022 to December 2022. 42 known patients with COPD exacerbation admitted in medicine unit during the study period were enrolled in the study by convenient sampling. COPD with bronchogenic carcinoma, with bronchiectasis and with ischaemic heart disease were excluded from the study. All patients were examined regularly for cough, sputum, grading of dyspnoea, tracheal tug, prominence of accessory muscles, sleep disturbance, frequency of inhaled β-2 agonist therapy per day for 7 days. After 7 days follow up, patients were categorized into-improved, when it fulfills the following GOLD criteria or not improved. After processing all available information Statistical analysis was done using SPSS for windows version 22.*
Results: *The mean±SD age of the patients was 66.3±10.0 years with a range of 46-85 years.There were 37(88.1%) male patients and 5(11.9%) female patients. The mean±SD duration of illness of the patients was 9.24±4.05 years with a range of 2-15 years. The median duration was 10 years. Tracheal tag, prominence of accessory muscles of respiration, sleep disturbance, cyanosis, and loss of consciousness was present in 95.2%, 95.2%, 71.4%, 28.60% and 9.5% patients respectively. X-ray chest P-A view showed that 88.1% patients had the diagnosis of only COPD, 2.4% had COPD with cardiomegaly and 2.4% had COPD with cor-pulmonale and 7.1% normal X-ray finding. ECG finding showed that 9.5% patients had cor pulmonale with COPD. 11.9% had sinus tachycardia, 4.8% had. RVH, 2.4% had p pulmonale with sinus tachycardia. The mean±SD oxygen saturation of the patients was 92.10±5.27% with a range of 72-95%. The median saturation was 94%. The mean±SD length of hospital stay was 5.21±1.18 days with a range of 3-7 days. The median length of hospital stay was 5 days. 39(92.9%) patients were improved and discharged from the hospital and 3(7.1%) patients died.*
Conclusion: *The mean length of hospital stay was about 5 days. 92.9% of the cases, the symptoms of exacerbations of COPD subside within 10 days with standard regimen of treatment and in-hospital mortality was 7.1%.*
Key words: *Outcome, chronic obstructive pulmonary disease (COPD), morbidity, mortality.*

I. INTRODUCTION:

Chronic obstructive pulmonary disease (COPD) has been defined by Global Initiative for Chronic Obstructive Lung Disease (GOLD), as a preventable and treatable disease with some significant extra-pulmonary effects that may contribute to the severity in individual patients. Its pulmonary component is characterized by airflow limitation that is not fully reversible. The airflow limitation is usually progressive and is associated with an abnormal inflammatory response of the lungs to noxious particles or gases, primarily caused by cigarette smoking. Although COPD affects the lungs, it also produces significant systemic consequences. [1] Most patients

or more in at least 2 consecutive years. Emphysema is a pathological diagnosis that denotes abnormal permanent enlargement of air spaces distal to the terminal bronchiole, with destruction of their wall and without obvious fibrosis. [2] Patients with COPD may suffer recurrent exacerbations, with a worsening of symptoms and reduction in lung function that may not be recovered in a small proportion of patients. Moreover, exacerbations are associated with an impaired quality of life, reduced survival, and a high healthcare expenditure. [3] COPD exacerbation may be defined as 'sustained worsening of the patient's condition from the stable state that is acute in onset and may warrant additional treatment. [4] Exacerbations of chronic obstructive pulmonary disease (COPD) are associated with increased morbidity and mortality. [5] Cigarette smoking is associated with over 80% of all cases of COPD, and a smoker is 10 times more likely to die of COPD than a non-smoker. Smoking irreversibly changes the structure of the lungs and accelerates the decline in lung function that normally accompanies ageing. [6] Prevalence of COPD in people of Bangladesh is 3% in the general population aged 30 or above and 6% in medical college inpatients. [7] The National Institute of Diseases of Chest and Hospital (NIDCH), the only tertiary referral hospital for chest diseases in Bangladesh, admits about 4500 patients annually in the department of respiratory medicine, of them 19% suffer from COPD. Smoking and indoor air pollution is thought to be the two most important causes of COPD in Bangladesh. [8] Human exposure to air pollution is dominated by the indoor environment where people spend most of their time. Studies have shown reasonably consistent and strong relationships between the indoor use of solid fuels and COPD. Some important work-related risk factors include pesticides, heavy metals that cause occupational asthma and COPD. [8] COPD is one of the most common respiratory causes of acute hospital admission. Patients with this condition have a high morbidity and mortality resulting in a significant financial cost and socioeconomic burden to society. Evidence from audit studies has suggested variable outcomes in the management of acute medical conditions dependent upon patient characteristics and medical care received. Defining important associations of outcomes is an important step towards comparing standards of COPD care being delivered in different hospitals. [9] However, the outcome of patients with exacerbation of COPD admitted in Shere Bangla Medical College Hospital, one of the largest tertiary care hospitals, situated in the southern part of Bangladesh has not been evaluated. For this reason, we designed this prospective study to found out two identifiable outcomes for patients admitted with acute exacerbation of COPD- length of hospital stay and mortality rate. The objective of the study was to find out the in-hospital outcome of patients admitted with COPD exacerbation

II. METHODOLOGY:

This prospective observational study was conducted in the Department of Medicine, Shere Bangla Medical College Hospital, Barisal during the period of January 2022 to December 2022. A total of 42 patients with COPD exacerbation admitted in the department of Medicine Shere Bangla Medical College Hospital, Barisal during the study period were enrolled for the study by convenient sampling. Known patients of COPD with acute exacerbation according to GOLD criteria were included. COPD with bronchogenic carcinoma, with bronchiectasis and with ischaemic heart disease were excluded from the study. The study protocol was approved by Bangladesh College of Physicians & Surgeons (BCPS). Informed consent from all patients was taken before enrollment in the study. History and clinical findings including risk factors were recorded in a predesigned data collection sheet. Investigations like chest X-ray, ECG and Pulse oximetry were done. All patients were examined with the following checklist regularly for 7 days: cough, sputum, grading of dyspnoea, tracheal tug, prominence of accessory muscles, sleep disturbance, frequency of inhaled β-2 agonist therapy per day. After 7 days follow up, patients were categorized into-improved, when it fulfills the following GOLD criteria- inhaled β-2 agonist therapy required no more frequently than every 4 hours, Patient is able to move across the room, Patient is able to eat and sleep without dyspnoea, Patient has been clinically stable for 12- 24 hours and Patient fully understands correct use of medications or not improved referral to higher center. After processing all available information Statistical analysis was done using SPSS for windows version 24. Result was expressed as frequency, percentage, mean (±SD) standard deviation, range, median value.

III. RESULT:

Table I: Distribution of the patients according to baseline (n = 42)

Age group	Frequency	%
Mean±SD	66.3±10.0	
Range	46-85	
Sex Distribution		
Male	37	88.1
Female	5	11.9

Duration of the illness (years)		
Mean±SD	9.24 ±4.05	
Range	2-15	
Median	10	
Number of cigarette smoking (pack year)		
Mean±SD	19.55 ±8.63	
Range	1-40	
Median	20	
Grade of dyspnoea		
Grade I	2	4.8
Grade II	7	16.67
Grade III	14	33.3
Grade IV	19	45.24
Pulse oximetry		
Mean±SD	92.10 ±5.27	
Range	72-95	
Median	94	

The mean±SD age of the patients was 66.3±10.0 years with a range of 46-85 years. There were 37(88.1%) male patients and 5(11.9%) female patients. The mean±SD duration of illness of the patients was 9.24±4.05 years with a range of 2-15 years. The median duration was 10 years. The mean±SD number of cigarette smoking of the patients was 19.55±8.63 pack-year with a range of 0-40 pack-year. The median number of cigarette smoking was 20 pack-year. Nineteen (45.24%) patients were suffering from grade IV dyspnoea, 14(33.3%) from grade III, 7(16.67%) from grade II and 2(4.8%) from grade I. The mean±SD oxygen saturationof the patients was 92.10±5.27% with a range of 72-95%. The median saturation
was 94%. [Table-I]

Table II: Findings of physical examination, Xray and ECG of the patients (n=42)

Variable	Frequency	%
Findings of physical examination		
Tracheal tag	40	95.2
Prominence of accessory muscles of respiration	40	95.2
Sleep disturbance	30	71.4
Cyanosis	12	28.6
Loss of consciousness	4	9.5
Findings of X-ray chest P-A view		
COPD	37	88.1
COPD with cardiomegaly	1	2.4
COPD with cor-pulmonale	1	2.4
Normal finding	3	7.1
ECG findings		
COPD	37	88.1
COPD with cor-pulmonale	4	9.5
Normal finding	1	2.4
COPD with p pulmonale with sinus tachycardia	1	2.4
Right ventricular hypertrophy (RVH)	2	2.4
Sinus tachycardia	5	11.9
Inhaled β-2 agonist therapy per day		

½ hourly	**10**	**23.8**
1 hourly	**2**	**4.8**
2 hourly	**26**	**61.9**
3 hourly	**4**	**9.5**
Mean±SD	**20.62**	**15.78**
Median	**12**	
Range	**8**	**48**

Tracheal tag, prominence of accessory muscles of respiration, sleep disturbance, cyanosis, and loss of consciousness were present in 40(95.2%), 40(95.2%), 30(71.4%), 12(28.60%) and 4(9.5%) patients respectively. (Table-II) X-ray chest P-A view showed that 37(88.1%) patients had the diagnosis of only COPD, 1(2.4%) patient had COPD with cardiomegaly and 1(2.4%) patient had COPD with cor-pulmonale and 3(7.1%) patients had normal X-ray finding. [Table-II] ECG 37(88.1%) showed patients were diagnosed as COPD, 4(9.5%) patients as COPD with Cor pulmonale, 5(11.9%) patients as sinus tachycardia. RVH was diagnosed in 2(4.8%) patients, COPD with p pulmonale with sinus tachycardia in 1(2.4%) patient. 1(2.4%) patient had normal ECG findings. On admission10(23.8%) patients took β-2 agonist ½ hourly, 2(4.8%) patients took hourly, 26(61.9%) patients took 2 hourly and 4(9.5%) patients took3 hourly. (Table-II)

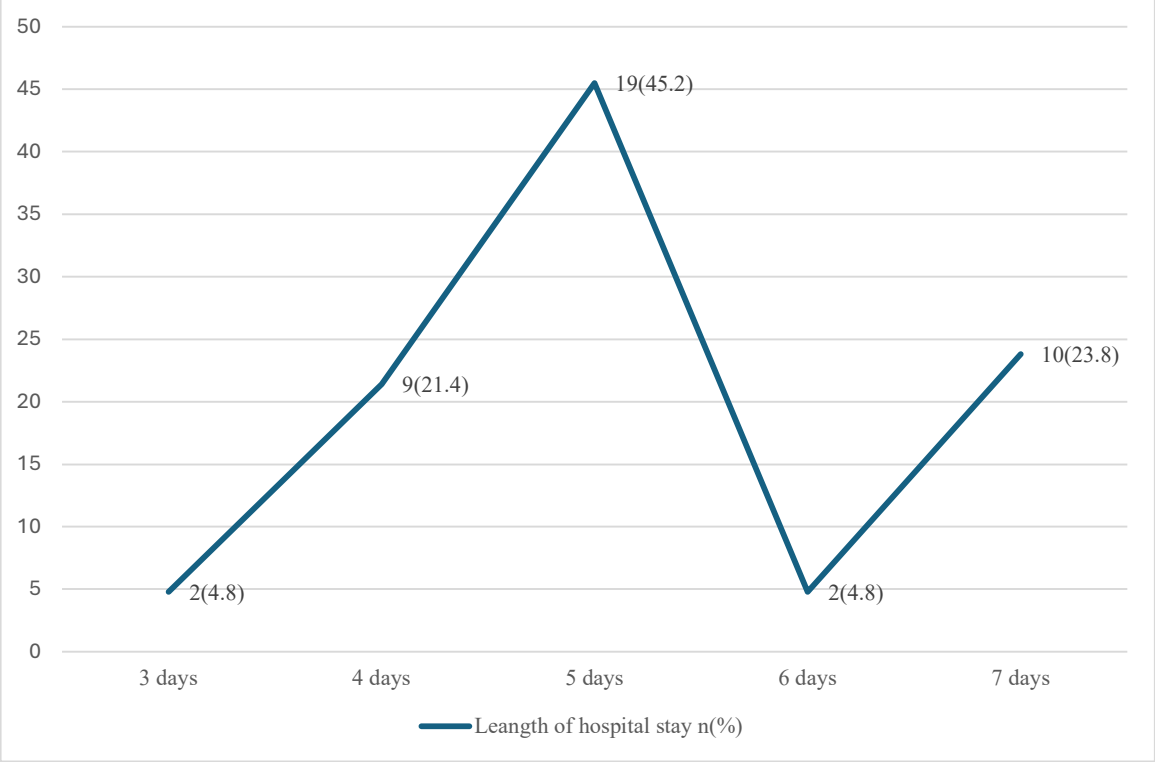
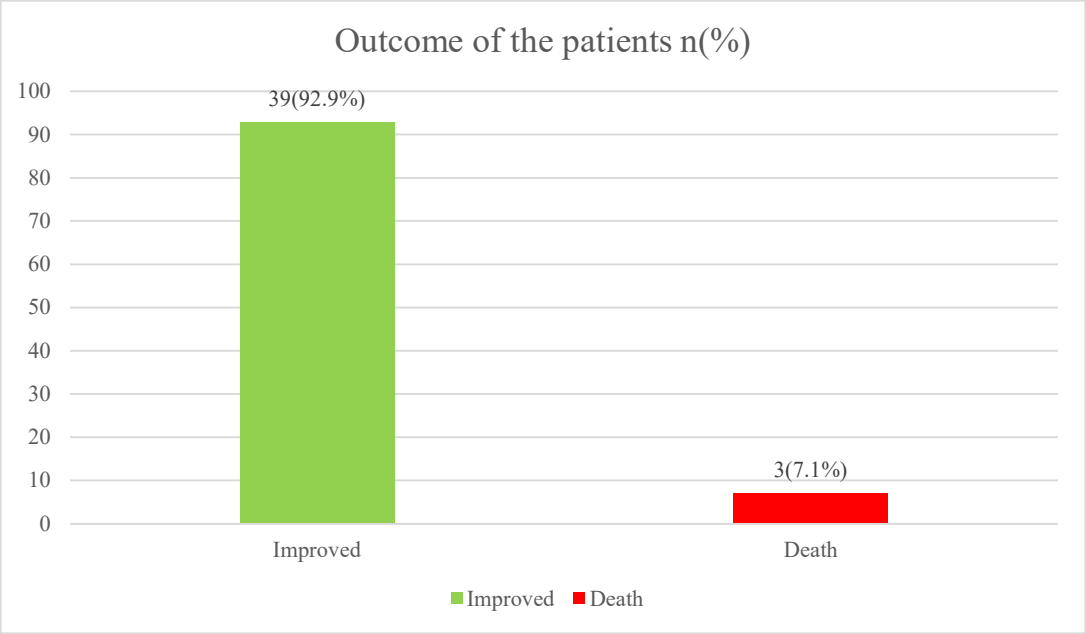


Figure 1: Distribution of the patients by length of hospital stay

Two (4.8%) patients had to stay at hospital for 3days, 9(21.4%) patients stayed 4 days, 19(45.2%) for 5 days, 2(4.8%) for 6 days and 10(23.8%) for 7 days. The mean±SD length of hospital stay was 5.21±1.18 days with a range of 3-7 days. The median length of hospital stay was 5 days. [Figure-1]



Out of 42 patients 39 (92.9%) patients were improved and discharged from the hospital and 3(7.1%) patients died. So, the in-hospital mortality of the patients with exacerbation of COPD was 7.1%. [Figure-2]

IV. DISCUSSION:

To find out the outcome of COPD exacerbation in a tertiary care hospital we enrolled 42 patients with exacerbation of COPD. The mean±SD age of the patients was 66.3±10.0 years with a range of 46-85 years. Patients were predominantly male (88.1%). Our findings were supported by some studies conducted a study with 340 patients of COPD who admitted into hospitals, in one year. [3, 10-12] There were 92% men and the mean (SD) age was 69(9) years. Pauwels reported a study, with 1,277 patients (mean age of 52 years), of whom 74% were men. [10] A studied the clinical presentation and predictors of outcome in 116 patients presenting with severe AE-COPD requiring admission to the medical intensive care unit. [11] The mean age was 62.1 ± 9.8 years. [11] In a study with 94 patients in India, Chandra and Guleria (2009) found that 21.3% were females. The mean age of the patients was 61.2 years. The mean±SD duration of illness of the patients was 9.24±4.05 years with a median duration of 10 years. Most of the patients suffered from COPD for 5-15 years. The mean±SD number of cigarette smoked by the patients was 19.55±8.63 pack-year with a range of 0-40 pack-year. The median number of cigarette smoking was 20 pack-years. These findings are supported by Pauwels and Mohan. [10, 11] Pauwels studied 1,277 patients who had an average of 39 pack-years of smoking. [10] Mohan;s study found that all males were smokers (22.3 ± 11.2 pack years); 35.2% smoked cigarettes and 64.8% smoked bidis. [11] All women were exposed to domestic fuel. [11]

In our study 19(45.24%) patients were suffering from grade IV dyspnoea, 14(33.3%) from grade III, 7(16.67%) from grade II and 2(4.8%) from grade I. These findings are consistent with the findings of Wong studies. [13] To determine the factors that influence length of stay (LOS) in the hospital and readmission for patients with AECOPD in an inner-city hospital. Wong and colleagues conducted a retrospective review of admitted patients with diagnosis of AECOPD. The authors found that more than 85% of admissions had the severity of COPD equal to or greater than GOLD stage 3. [13] Tracheal tag, prominence of accessory muscles of respiration, sleep disturbance, cyanosis, and loss of consciousness were present in 40(95.2%), 40(95.2%), 30(71.4%), 12(28.60%) and 4(9.5%) patients respectively. On admission 10(23.8%) patients took β-2 agonist ½ hourly, 2(4.8%) patients took hourly, 26(61.9%) patients took 2 hourly and 4(9.5%) patients took 3 hourly. The mean±SD length of hospital stay was 5.21±1.18 days with a range of 3-7 days. The median length of hospital stay was 5 days. Two (4.8%) patients had to stay at hospital for 3days, 9(21.4%) patients stayed 4 days, 19(45.2%) patients for 5 days, 2(4.8%) for 6 days and 10(23.8%) for 7 days. The median length of hospital stays in our series was less than that of findings of Roberts study. [9] They recorded 1400 admissions and found that median length of hospital stay was 8 days.

In our study we observed that 39 (92.9%) patients were improved and discharged from the hospital and 3(7.1%) patients died. The findings of our study regarding in-hospital mortality are comparable with the findings of found that inpatient mortality was 7.4% and mortality at 90 days was 15.3% in their patients. [13-15] Mean length of stay for discharged patients was 8.7 days (median 6 days). [15] Wang and Bourbeau recruited 282 patients to evaluate retrospectively and found that readmission was needed for 54 patients, 28 patients (9.9%) died during hospitalization, 241 patients (85.5%) were discharged home, and only 13 patients (4.6%) needed long-term care facilities. [13, 14] A prospective cohort study of 1,016 adult patients with an exacerbation of COPD. Outcomes were evaluated over a 6 months period. Although only 11% of the patients died during the index hospital stay, the 60-d, 180-d, 1-yr, and 2-yr mortality was high (20%, 33%, 43%, and 49%, respectively). The median length of the index hospital stay was 9 d (5 to 15 d). [14] Our findings were, however, not consistent with the findings of some studys [3, 12, 16]

Garcia-Aymerich et al (2003)3 found that the death rate was 29%. The difference in death rate was due to the fact that they estimated the death rate during a period of 1.1 year after admission. Some study found that the in-hospital mortality rate was 12.8% and 37.2% requiring ICU care. The median duration of in-hospital stay was 11 days, with a minimum of two and a maximum of 72 days. [12] This finding was higher than our findings. Seneff's study selected a total of 362 patients with COPD admitted to an ICU for an acute exacerbation have a mortality rate of 24%. They explained that hospital and longer-term mortality is closely associated with development of nonrespiratory organ system dysfunction; severity of the underlying respiratory function substantially influences mortality following hospital discharge. [16] A study explained that units with more respiratory consultants and better-quality organized care have lower mortality and reduced length of hospital stay. This may reflect unit resource richness. Dissemination of good organizational practice and recruitment of more respiratory specialists offers the potential for improved outcomes for hospitalized COPD patients. [15]

V. CONCLUSION:

The present study concludes that the mean length of hospital stay is about 5 days. In majority (92.9%) of the cases, the symptoms of exacerbations of COPD subside within 10 days with standard regimen of treatment of a tertiary care hospital. the in-hospital mortality from exacerbation of COPD was 7.1%.

REFERENCES:

[1]. Buist A, Antonio SA, Peter C et al. Global initiative for chronic obstructive lung disease (GOLD) 2006;2:62-69.
[2]. McPhee SJ and Papadakis MA (eds). Clinical Medicine. 7th edition. Elsevier Saunders 2009, 837.
[3]. Garcia-Aymerich J, Farrero E, Felez MA, Izquierdo J, Marrades RM, Anto JM, on behalf of the EFRAM investigators. Risk factors of readmission to hospital for a COPD exacerbation: a prospective study. Thorax 2003; 58:100-105.
[4]. Burge S and Wedzicha JA. COPD exacerbations: definitions and classifications. Eur Respir J 2003; 21: Suppl. 41, 46s–53s.
[5]. O'Donnell DE and Parker CM. Pathophysiology of COPD exacerbations. Thorax 2006;61:354–361.
[6]. Yawna BP and Kaplan A. Co-morbidities in people with COPD: A result of multiple diseases, or multiple manifestations of smoking and reactive inflammation? Primary Care Respiratory Journal 2008; 17: 199-205.
[7]. Mathew J, Veena GV, Kurpad AV, D'Souza. Nutritional status predicts outcome in patients hospitalized with exacerbation of COPD.Lung India 2006; 23: 143-146.
[8]. Directorate General of Health Services, Ministry of Health and Family Welfare, 2007.
[9]. Roberts CM, Lowe D, Bucknall CE, Ryland I, Kelly Y, Pearson MG on behalf of the British Thoracic Society Audit Subcommittee of the Standards of Care Committee and the Royal College of Physicians of London. Clinical audit indicators of outcome following admission to hospital with acute exacerbation of chronic obstructive pulmonary disease.Thorax 2002;57:137–141.
[10]. Pauwels R. COPD; The scope of the problem in Europe. Chest 2000; 117:332S–335S.
[11]. Mohan A, Premanand R, Reddy LN, Rao MH, Sharma SK, Kamity R and Bollineni S. Clinical presentation and predictors of outcome in patients with severe acute exacerbation of chronic obstructive pulmonary disease requiring admission to intensive care unit. BMC Pulmonary Medicine 2006, 6:27 doi:10.1186/1471-2466-6-27.
[12]. ChandraD and GuleriaR. Effects of seasonal variation on hospitalisations for acute exacerbations of chronic obstructive pulmonary disease. Indian J Chest Dis Allied Sci 2009;51:139-143.
[13]. Wang Q and Bourbeau J. Outcomes and health-related quality of life following hospitalization for an acute exacerbation of COPD. Respirology (2005);10: 334–340.
[14]. Connors AF Jr, et al Outcomes following acute exacerbation of severe chronic obstructive lung disease. The SUPPORT investigators (Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatments). Am J Respir Crit care Med 1996;154:959-67.
[15]. Price LC, Lowe D, Hosker HSR, Anstey K, Pearson MG, Roberts CM, on behalf of the Ramanath KV and Sabith JK. Pharmacoeconomic evaluation of acute exacerbations of copd treatment in a rural tertiary care hospital. International Journal of Pharmaceutical sciences and REASEARCH, 2012; 4: 1155-1160.
[16]. Seneff MG, Wagner DP, Wagner RP, Zimmerman JE, Knaus WA. Hospital and 1-Year Survival of Patients Admitted to Intensive Care Units with Acute Exacerbation of Chronic Obstructive Pulmonary Disease. JAMA. 1995;274:1852-1857.