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### The scenario of COPD in Dhaka city Bangladesh: Extensive analysis of the prevalence, manifestations and standards of diagnosis and treatment

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#### ABSTRACT

Chronic Obstructive Pulmonary Disease (COPD) is a slowly progressive disease which is characterized by airflow obstruction mainly caused by bronchitis. Our study focused on the scenario of COPD in Dhaka, Bangladesh. A cross sectional, prospective, observational & spontaneous reported study was carried out on all patients with COPD belonging to either gender and all ages, who were receiving treatment during study, from National Institute of Diseases of the Chest and Hospital (NIDCH), Dhaka, Bangladesh. A case report form (CRF) comprised of questions was prepared for this study. The data obtained from this study were entered into computer and were analysed and presented by using GraphPad Prism. During the study, a total of 583 COPD patients were enrolled. Most of the COPD patients were within the age of 46-75 years and 98.0% of them were male. Two-third of the total COPD patients were advised to perform multiple diagnostic tests and 78% of the patients were diagnosed by the sputum test to determine the presence of microorganism and 83% patients were not diagnosed based on spirometry. Most of the COPD patients in this study were found to suffer from chest tightness (72%), shortness of breath (100%), shortness of breath during exercise (97%) and they perceived that when cold attacks it goes to the chest of the patients (97%). Our findings have revealed that 37% patients were taking beta agonist medication (salbutamol), 29% patients were taking long-acting anti-cholinergic medication, 100% of the patients were using a combination inhaler, 61% patients were using inhaled corticosteroids, 38% patients were taking prednisone, and 92% patients received three or more antibiotics. Doctors should be more aware to diagnose COPD patients by the application of spirometry test and frequent prescription of antibiotics should be taken into account to preclude the chance of developing antibiotic resistance.

**Keywords:** Chronic Obstructive Pulmonary Disease, COPD, Spirometry, Shortness of Breath, Combination Inhaler, Antibiotic.

## INTRODUCTION

COPD is a chronic, slowly progressive disease, characterized by airflow obstruction and a range of pathological changes in the lung, some significant extra-pulmonary effects, and important co morbidities which may contribute to the severity of the disease in individual patients <sup>[1]</sup>. Airflow obstruction is defined as a reduced forced expiratory volume in 1 second (FEV<sub>1</sub>) of less than 80% of the predicted value and a FEV<sub>1</sub> to forced vital capacity (FVC) ratio of less than 0.7 (FEV<sub>1</sub>/FVC). The treatment of COPD is no longer focused exclusively on inhaled therapy but is taking on a multidimensional approach, especially because the treatment of the comorbidities might positively affect the course of COPD itself <sup>[2]</sup>.

Worldwide, COPD affects 9.8% of men and 5.6% of women. COPD is the fourth largest cause of death worldwide <sup>[3]</sup>. Every year, nearly 3 million people die directly from this disorder and millions more are hospitalized. Discouragingly, over the next 20 years, COPD mortality is expected to increase more than double, such that by 2030, it will be responsible for 10% of the world's total mortality (currently 7%), accounting for 7 million deaths annually <sup>[4]</sup>. The largest increase in the tobacco related mortality is estimated to occur in Bangladesh, India, China, and other Asian countries.

Bangladesh is directly attributed to the continued increase in tobacco smoking. Exposures to environmental tobacco smoke (ETS) from smokers, exhausts of solid fuel combustion and ambient air pollution are some other risk factors in non-smoker individuals. In a large, cluster study (Burden of Obstructive Lung Disease, BOLD) from Bangladesh, the population prevalence of COPD was 21.6% of 2947 subjects with a male to female ratio of 1.61:1. Almost all forms of smoking products such as cigarettes and 'biris' used in different parts were found to be significantly associated with COPD. In non-smokers, especially women, an exposure to indoor air pollution from domestic combustion of solid fuels was an important factor. Tobacco smoking was also the most frequent cause of chronic cor pulmonale which occurred as a long term complication of COPD both amongst men and women. As per general clinical observation, the prognosis of COPD in the developing countries is somewhat worse than that in the developed countries

of Asia. Low socio-economic conditions, poor dust, environmental pollution and childhood infections are not only responsible for the development of COPD but also for continued decline in lung function, disease complications and an early mortality. There is a need of generating data to support these assumptions. Disease management and control is a major challenge. Pharmacological interventions and rehabilitative programs are known to improve prognosis and quality of life of these patients. But tobacco cessation strategies are crucial to prevent as well as to arrest the development of COPD <sup>[5]</sup>. Due to the widespread cigarette smoking there is a prevalence of COPD in Bangladesh. This study aimed to know the current scenario of COPD in Bangladesh.

## MATERIALS AND METHODS

A cross sectional, prospective, observational & spontaneous reporting study was carried out to find out the management and treatment strategies of chronic obstructive pulmonary disease (COPD) with the formal permission of honourable director of National Institute of Diseases of the Chest and Hospital (NIDCH), Dhaka, Bangladesh. NIDCH is the only tertiary level centre in Bangladesh for the treatment and management of complicated tuberculosis and chest diseases. Overall study period was one year commencing from July 2010 to June 2011.

All patients with chronic obstructive pulmonary disease (COPD) belonging to either gender and of all ages, who were receiving treatment during study, from NIDCH were included in the study. In this study, purposive sampling technique was followed. A case report form (CRF) was prepared and was used for collection of all the relevant information regarding the patient's treatment & demographic details of COPD.

At first relevant information with the prepared questionnaire like diagnosis history, drugs used in the hospital were obtained from the administration of NIDCH. Then other relevant information like socio-demographic history, patient's smoking history, symptoms, complications were obtained from the direct patient contact.

All the data were obtained from the NIDCH. The collected data reports were analysed for causality, severity, preventability and predictability by suitable

scales. All the data were checked after collection. Data were entered into computer and were analysed and presented by using GraphPad Prism.

## RESULTS AND DISCUSSION

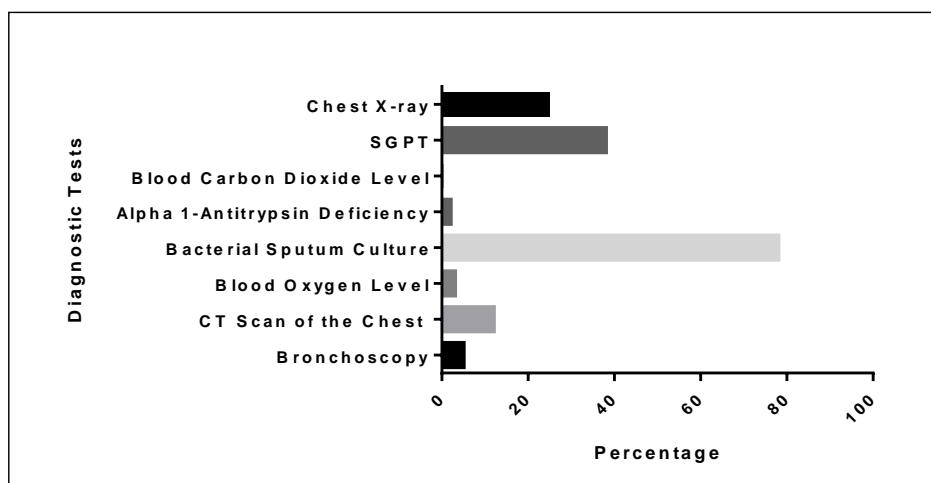
COPD is the fourth largest cause of death worldwide. In Bangladesh, major portion of males are smoker. Therefore, COPD is a rising threat for the health of these smokers in the late stage of their lives. The aim of this study was to know the scenario of COPD in Dhaka city of Bangladesh. A total of 583 COPD patients were enrolled in the study.

In this study, we observed that most of the COPD patients are within the age of 46-75 years and 98.0% of them were male. Among them over two-third (63%) of the COPD patients were from rural area, whereas, 26% and 11% of the patients were from urban areas and semi-urban areas successively. According to the patient's occupation, 38% of the patients were found retired from their jobs, 31% of them were involved with agriculture. On the other

hand, 12% of the COPD patients were involved with various government and private services; for patients with business background, construction work, driving these percentages were 10, 5 and 3 respectively. Interestingly only 1% of the COPD patients were housewives.

During our study we have found that two-third of the total patients advised to perform multiple diagnostic tests to detect the COPD and from these tests 78% of the patients were diagnosed by the sputum test to determine the presence of microorganism but unfortunately they were not diagnosed by the spirometry which is the core and most important pulmonary function test to determine the condition of a COPD patient. In the study, we have seen that application rate of spirometry was very low and 83% of the COPD patients were not diagnosed based on spirometry. The lists of diagnostic tests received by the COPD patients have been shown in Figure 1.

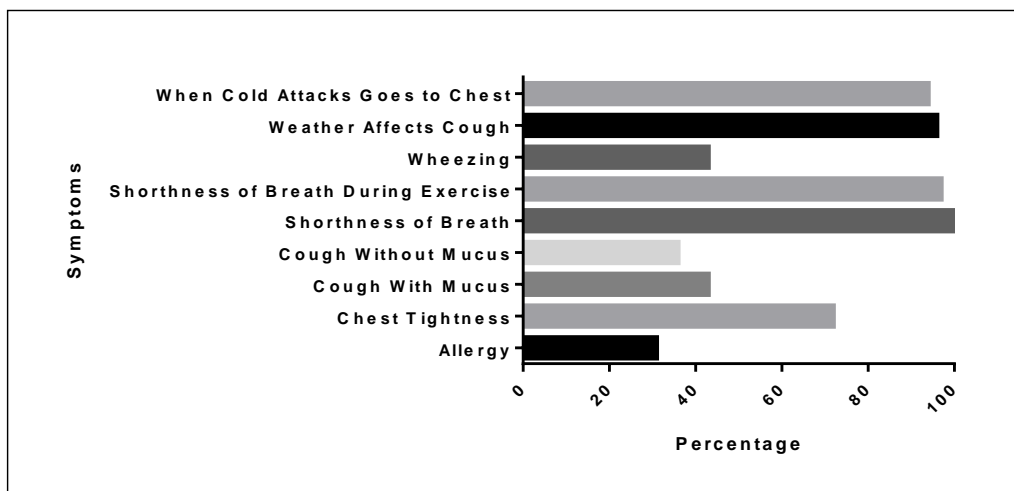
**Figure 1: Percentage of COPD patients receiving various diagnostic tests during the 12 months of the study.**



In similar studies from Korea and the UK, 57% & 22% COPD patients were not diagnosed based on spirometry, respectively [6][7]. Patients of our study appear to have significant disease. There is a discouragingly low rate of spirometry use, lower than the the global initiative for chronic obstructive lung disease (GOLD) guidelines.

Most of the COPD patients in this study were found to suffer from chest tightness (72%), shortness of breath (100%), shortness of breath during exercise (97%) and they perceived that when cold attacks it goes to the chest of the patients (97%). The proportions of observed symptoms with the COPD patients have been illustrated in Figure 2.

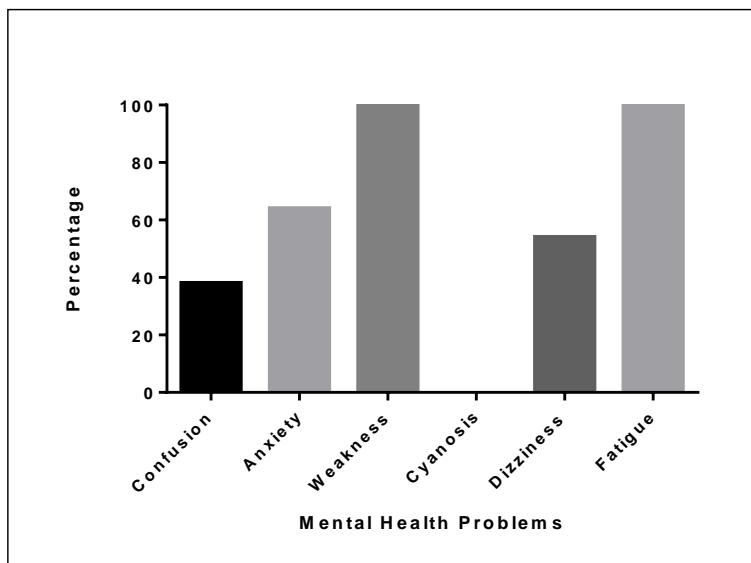
**Figure 2: Percentage of symptoms reported by COPD patients.**



Our findings in this study emerge that, mental statuses of the patients were in worsening conditions which include fatigue (100%), weakness (100%),

confusion (38%), anxiety (64%) and dizziness (54%). Figure 3 has reflected mental statuses of the patients.

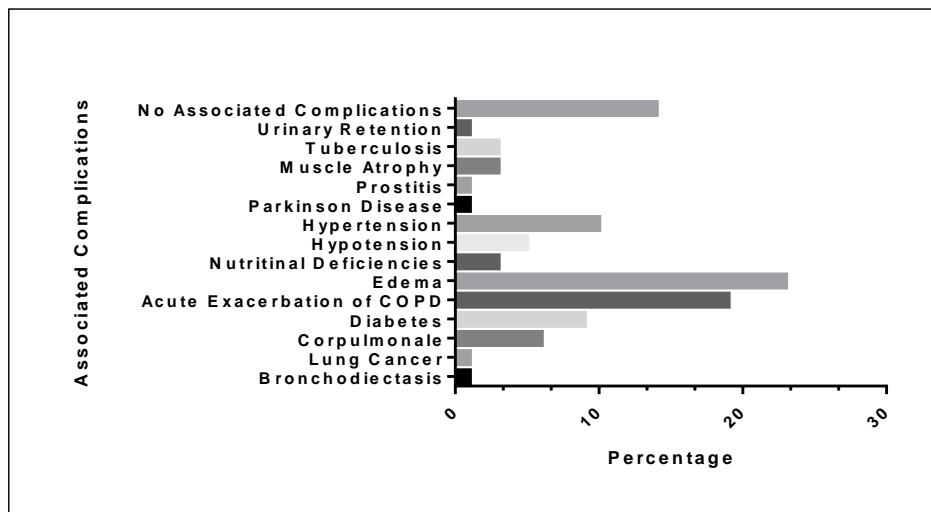
**Figure 3: Percentage of COPD patients reporting mental health problems during the study.**



In terms of associated complications, we observed from our study that prodigious numbers of patients were suffering from edema (23%) and acute exacerbation of COPD (19%). On the other hand,

only 14% of the patients reported that they were not suffering from any associated complications. The list of associated complications noted in the study period has been depicted in Figure 4.

**Figure 4: Percentage of inpatients reporting associated complications during the study.**

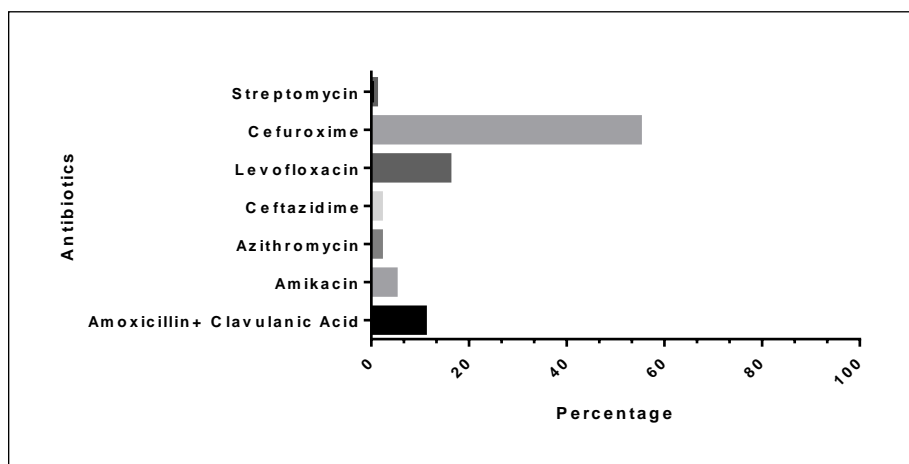


For treating the COPD, most of the health practitioners normally used multiple drug therapy depending on condition of the patient. In our study, we have seen that 37% patients were on beta agonist medication (salbutamol). Inhaled medication was preferred over oral medication for both stable and acutely exacerbated state of COPD. Use of inhaled corticosteroids with/without long-acting beta-agonists was associated with a reduction of rehospitalisation or death in COPD patients [8]. In our study, 29% patients were taking long-acting anti-cholinergic medication, 100% of the patients were using a combination inhaler, 0% patient was on long-acting beta agonist medication, and 61% patients were using inhaled corticosteroids. In a similar study from the

UK, it was seen that 59% of the patients were taking long-acting anti-cholinergic medication, 74% were using a combination inhaler, 61% were on long-acting beta agonist medication and 69% were using inhaled corticosteroids [7]. Thus our study indicates an appreciable number of patients are on multiple medications.

Study shows that prednisone is able to accelerate the improvement in FEV1 after bronchodilation and shorten the hospital stay of patients with exacerbations of their COPD [9]. In case of our study, 38% patients were taking prednisone, 92% patients received three or more antibiotic courses. The proportions of COPD patients in the study who received antibiotics have been shown in Figure 5.

**Figure 5: Use of prescribed antibiotics in COPD patients.**



In a similar study from the UK, 74% received prednisone and 58% received three or more antibiotic courses [7]. Thus, in our study we have found that, there is high use of prednisone and antibiotics.

A simple and low-cost pulmonary rehabilitation program is able to improve health outcome for patients with COPD [10]. In our study we observed that no patient was undergone pulmonary rehabilitation program. In a similar study from the UK, 15% patients were known to have undergone a pulmonary rehabilitation program [7]. This study shows that there is a very poor step towards pulmonary rehabilitation program for the management of COPD. Interestingly, use of oxygen for the patients suffering from COPD in our study was 98% which probably reflects the severity of this patient group. 31% were known to have been prescribed oxygen in a similar study from the UK [7].

## CONCLUSION

In Bangladesh, there is a significant number of patients suffer from COPD. As most of the patients were past smokers, thus government and people's awareness along with the careful attention of doctors are necessary to prevent and manage COPD. Especially, doctors should be more aware to determine the condition of COPD patients by spirometry; otherwise there is a chance of lack of proper treatment of COPD patients. In our findings,

we have seen that there is an excessive number of antibiotics is used to treat the COPD patients. Thus, healthcare practitioner should cautiously prescribe antibiotics because there is a high chance of developing antibiotic resistance in the patients due to frequent use. Furthermore, we have seen in our study that, almost all patients are using oxygen to minimize the risk in their treatment period which probably reflects the severity level of patients. Thus, if the health practitioners become more cautious to diagnose COPD as well as to treat their patients, it will definitely lower the level of severe conditions of the patients, which will eventually reduce the death rate.

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