

The incidence and clinical pattern of chronic obstructive pulmonary disease (COPD) in Ilorin, Nigeria

^a Desalu OO, a Salami AK, a Fawibe AE, b Oluboyo PO,

^a Department of Medicine, University of Ilorin Teaching Hospital Ilorin, Nigeria.

^b Department of Pulmonary Medicine, Walter Sisulu University, Mthatha Eastern Cape Province South Africa

ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) is one of the leading causes of morbidity and mortality in most countries. Few data exist on the pattern of COPD in Sub Saharan Africa.

Objectives: This study aimed at reviewing the incidence and clinical pattern of COPD managed at the University of Ilorin Teaching Hospital (UITH) Ilorin, Nigeria over a decade.

Methods: We carried out a retrospective study of patients who had a clinical diagnosis of COPD from January 2001 to December 2010. The medical records of the cases were carefully reviewed, clinical information extracted and the data analysed using computer software.

Results: A total of 308 patients with clinical diagnosis of COPD were managed over period of 10 years and there was seven folds increase in the annual number of cases. The mean age of the patients was 66.1 ± 11.7 years and the male to female ratio was 4:1. COPD was more common among aged 60 -69 years, farmers, lower socioeconomic class, and those with only primary school education. The commonest presentations were chronic cough (85.2%), chronic expectoration of sputum (75.0%), breathlessness (77.9%) and wheezing (55.5%). Majority had a mixed pattern of chronic bronchitis and emphysema. Almost 70% of patients had a history of cigarette smoking with a median pack years of 10 years (0.2-45). Hypertension (31.5%) and biventricular failure (26%) were the most common co-morbidities. One hundred and eighty seven (60.7%) were managed as in-patients with an in- hospital mortality rate of 26.2%.

Conclusion: The incidence of COPD is on the increase; therefore, concerted effort should be made to increase its awareness of this multi-systemic, under-recognised condition and risk factors in our society.

Keywords: Pattern, COPD, Chronic Bronchitis, Emphysema, Nigeria

Corresponding Author:

Dr. Olufemi Olumuyiwa Desalu, Department of Medicine, University of Ilorin Teaching Hospital
PMB 1459, Ilorin, Nigeria, Telephone: +23408035025771, E-mail:femuy1967@yahoo.co.uk

INTRODUCTION

COPD is a preventable and treatable disease with some significant extra pulmonary effects that may contribute to the severity in individual patient. Its pulmonary component is characterized by airflow limitation that is not fully reversible. The airflow limitation is usually progressive and associated with an abnormal inflammatory response of the lung to noxious particles or gases¹. The most commonly identifiable risk factor for COPD worldwide is cigarette smoking.^{1, 2} Other risk factors are exposure to occupational dusts, indoor air pollution in poorly vented dwellings, outdoor air pollution, low socioeconomic status, abnormal lung growth, male sex and old age.¹⁻⁶ Chronic obstructive pulmonary disease (COPD) is one of the leading causes of morbidity and mortality in most countries.¹

The Global Burden of Disease Study has projected that COPD, which is ranked sixth as the cause of death in 1990, will become the third leading cause of death worldwide by 2020.²⁻⁴ In the United States in 2000, there were eight million physician office and hospital outpatient visits for COPD, 1.5 million emergency department visits, and 673,000 hospitalisations.⁵ In most countries European countries, consultations for COPD greatly outnumbered consultations for asthma, pneumonia, lung and tracheal cancer, and tuberculosis. COPD is a costly disease that inflict substantial economic and social burden on the patients, caregiver or family.⁶ A review of COPD in Ile- Ife, Nigeria found that indoor pollution and smoking were the commonest aetiological factors; while farmers and traders were the major occupational groups at risk for the disease.⁷

Another hospital based study also on mortality of COPD in Ile-Ife also found that extremes of age, lower socio-economic group, smoking (>10 packs per year), and respiratory tract infection were the most commonly identified risk factors for death.⁸ There is also a recent study on chronic bronchitis and associated risk factors in south western Nigeria.⁹ There is paucity of data on the epidemiology of COPD among hospitalised patients and the general population in Nigeria and sub Saharan Africa. In view of the heterogeneity of country population, the clinical pattern of this illness in Ilorin and middle belt area of Nigeria may differ in a few important aspects from that described in Ile-Ife and industrialised countries. This study aimed at reviewing the incidence and clinical pattern of COPD seen at University of Ilorin Teaching Hospital (UITH) Ilorin, Nigeria over a period of ten years.

METHODOLOGY

Study setting

This study was carried out at the University of Ilorin Teaching Hospital (U.I.T.H) Ilorin, Nigeria; the study setting was a tertiary hospital that serves as a referral centre for other district hospitals and neighbouring states. The hospital also runs a postgraduate residency program in internal medicine. The hospital is in a city in the middle belt region of Nigeria which is about 400km north of Lagos lying at 8° 30' N and 4° 30' E. It is a confluence of cultures, it is populated by Yoruba, Hausa, Fulani, Nupe, Baruba, other Nigerians and foreign nationals. There are very significant Christian and Islamic populations. The major occupations of the indigene are farming, pottery making, and weaving. There are also a greater percentage of the people who engaged in trading activities, while others are self employed in various other areas such as mechanics, carpentry, taxi driving and artisans among others.

Study design

This was a hospital based retrospective study carried out in January 2011.

Inclusion criteria

Cases with clinical diagnosis of COPD were included if they met the clinical criteria: (1) The diagnosis of COPD was made in anyone who has dyspnoea, chronic cough or sputum production, and/or a history of exposure to risk factors for the disease such as regular tobacco smoking confirmed with spirometry.

(2) Patients presenting with clinical features suggestive of COPD in the middle age of life, a history of exposure to risk factors for the disease, radiological signs of hyperinflation, absence of atopic conditions in patient or the family and inconclusive spirometry.^{1,10,11}

Exclusion criteria

In order to prevent misdiagnosis cases that were less 35 years of age and mimic the differential diagnosis of COPD e.g. Asthma, bronchiectasis, heart failure and tuberculosis were excluded from the review.^{1,10}

Data collection

We sought the assistance of the hospital medical record department to retrieve the medical case file of patients with clinical diagnosis of COPD from January 2001 to December 2010. Ten cases index as chronic bronchitis and emphysema were also retrieved COPD in order to prevent under representation of the condition. The medical records files retrieved were carefully reviewed by a senior registrar to obtain the needed information. A proforma was used in recording the information extracted from the medical case file. Socio-demographic information, presenting complaints, identifiable risk factors, co-morbid conditions and outcomes in the admitted cases were obtained.

Statistical analysis

The data were analyzed using the Statistical Package for the Social Sciences, version 15.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were obtained for the variables studied. The Chi-square test was used to determine the significance of the variables, and p values < 0.05 were considered significant. Bar chart was used for illustration.

Ethical Review Approval

The ethical review committee (ERC) of University of Ilorin Teaching Hospital Ilorin, Nigeria approved the study.

RESULTS

A total of 352 cases were indexed by the hospital health record department and the pulmonary unit as cases of COPD, 26 cases were misdiagnosed as COPD (3- bronchiectasis, 13 - congestive heart failure and 3 - asthma in the young and 7 destroyed

lung from TB and 18 cases had their medical record files or data inside the file missing. The remaining 308 cases had required data needed for the study and also met the case definitions 1, 10. Sixty three (20.6%) cases had documentary evidence of spirometry and 42(13.6%) had spirometric diagnosis of COPD while remaining cases were diagnosed on respiratory symptoms and other clinical information.

Incidence of COPD

From 2001, there was a significant increase in the annual number of COPD cases diagnosed in the hospital. Seven cases were seen in 2001 and over a decade, the number of COPD had increased to 56 per annum by 2010 (Figure 1).

Socio-demographic characteristic of the patients

Out of 308 cases, 249 (80.8%) were males and 59(19.2%) were females with a male to female ratio of 4:1. The age range of the patients was 30 to 110 years and their mean age (SD) was 66(12) years. COPD increased with age and the age group 60-69 years was the most commonly affected by the condition (Figure 2). Majority of patients had only primary education (259/ 296: 87.5%) and in the class III and IV socioeconomic class which corresponds to lower socioeconomic class (295/302: 97.7%). The farmers were the occupational group mostly affected by condition followed by traders, road transport drivers and artisans (Figure 3).

Clinical profile of the patients

The median duration of time before diagnosis was four months. One hundred and eighty seven (60.7%) were managed as in patients and 121 (29.3%) were managed as outpatient. Forty nine of those hospitalised patients (26.2%) died during admission. Two hundred and sixty two (81.5%) reported chronic cough, 240 (77.9%) breathlessness, 231(75.0%) chronic expectoration of sputum and 171(55.5%) wheezing (Table 1). Twenty five (8.1%) cases were complicated by Cor-pulmonale.

Risk factors for COPD

Two hundred and fifteen patients (69.8%) had a history of cigarette smoking, and the median pack years of cigarette, smoking was 10 years (range 0.2- 45). Ninety one patients (29.6%) had occupational exposure to dusts, 30(9.7%) occupational exposure to chemical /emissions and 30(9.7%) exposure to indoor pollutants from reported use of biomass fuels (Table 2).

Associated comorbidity

A total of 97(31.5%) patients had systemic hypertension, 80(26.0%) had biventricular failure, 30(9.7%) had chronic kidney diseases, 24(7.8%) infected with pulmonary TB and 20(6.5%) was associated with Diabetes mellitus (Table 3).

DISCUSSION

Table 1:

Reported Clinical Manifestation of COPD.

Clinical manifestation	n	%
Chronic cough	262	85.1
Breathlessness	240	77.9
Chronic sputum	231	75.0
Wheezing	171	55.5
Chest pain/tightness	95	30.8
Leg swelling	102	33.1
Fatigue	151	49.0
Weight loss	112	36.4
Fever	174	56.5

Table 2:

Risk factor for COPD in the study

Risk factors	n	%
Tobacco smoking	215	69.8
Occupational exposure to dust	91	29.6
Occupational exposure to chemical	30	9.7
Biomass fuel	30	9.7

Table 3:

Some identified co-morbidity of COPD

Co morbidity	n	%
Hypertension	97	31.5
Biventricular heart failure	80	26.0
Chronic kidney diseases	30	9.7
Pulmonary TB	24	7.8
Diabetes mellitus	20	6.5
Stroke	8	2.2
Lung cancer	4	1.3

This study has attempted to establish the incidence and clinical pattern of COPD seen at University of Ilorin Teaching Hospital (UTH) Ilorin, Nigeria over a period of ten years.

Chronic Obstructive Pulmonary Disease (COPD) was previously considered a rare condition in Nigeria about 50years ago, but in recent times, there has been a change in the incidence of the disease 12. We observed an increasing number of cases except in year 2006 to 2007 where there was slight drop due to labour strikes and few missing data that were excluded from the analysis. When the number of newly diagnosed cases in 2001 was compared with that of 2010, there was a seven folds increase in the number of new cases. This pattern was similar to a review in south western Nigeria that also reported a rising burden of this disease

over many decades¹². Several reasons might be responsible for the increasing rate of COPD; these are increased awareness and understanding of COPD by physicians and other health care professionals, reduction in the rate of mis-diagnosis of COPD cases as lung disease, rising environmental pollution from uncontrolled industrial and automobile emissions as well as smokes from electrical generators which are widely used due to poor electricity supply.

COPD was also observed to increase with age and was found to be more common in men than in women. This gender disparity is consistent with previous epidemiological studies of COPD.^{1, 7, 13-15} The gender predisposition may be due to higher prevalence of tobacco smoking among men than in women in Nigeria.¹⁶⁻¹⁷ In most developed countries, traditionally it is a male disease however; the male predominance is gradually changing because of the rising prevalence of cigarette smoking in the women.¹

This study also revealed that the majority of our patients had only primary education and belongs to the low socioeconomic class. The socioeconomic class was based on the socioeconomic status classification validated for use in Nigeria.¹⁸ Prescott et al reported that risk of developing COPD is inversely related to the socioeconomic status.¹⁹ Low socioeconomic status is characterised by high level of indoor pollution from occupational dust and chemicals, exposures to outdoor air pollutants, overcrowding, poor nutrition and other related factors.

The occupational group mostly affected were the farmers; this is consistent with the observation reported by Erhabor et al, in south western Nigeria⁷. This pattern might be as a result of farming and pottery making being the major occupation of area while some people are self-employed in various other areas such as mechanics, carpentry, artisans, driving among others which are potential occupational risk for COPD. Farming activities in most developing countries is associated with lack of personal protection against occupational pollutants like ammonia, hydrogen sulphide, inorganic and organic dust as well toxic exposures to pesticides.^{9, 20} We could not classify the types of farming and farming environment due to the design of the study. A recent study in our area has associated the use of pesticide among crop farmers with increased respiratory

symptoms and airflow limitations²¹. Eduard et al, in a study to investigate the role of biological agents in the development of Chronic bronchitis, COPD, and lung function in farmers concluded that livestock farmers have an increased risk of chronic bronchitis, COPD, and reduced forced expiratory volume than crop farmers.²⁰

The commonest presentations were chronic cough, chronic sputum expectoration and breathlessness. Majority of our patient have both symptoms of chronic bronchitis and emphysema. This mixed pattern is similar and in keeping with the clinical manifestations in Ile-Ife.⁷ It has been noted that the diseases is a clinical spectrum with chronic bronchitis and emphysema at both end of the spectrum, and most patients having two phenotypes with variable expression.⁷

In this study, one third of the patients had systemic hypertension, 26 % had biventricular failure and 9.7 % had chronic kidney disease. Cardiovascular disease is a major cause of mortality and morbidity in patients with COPD.¹ These conditions share the same risk factors as COPD. The systemic inflammation in these conditions may predispose to atherosclerotic plaques, which may account for the high prevalence of cardiovascular events in patients with COPD.^{1, 22} Other co morbidities like dyslipidaemia, osteoporosis, malignancy etc. were entertained in course of data collection but some of the investigations and evaluation were not performed due to; poor financial status of the patients, lack of request by the managing team and inadequate data for valid analysis.

Our study also revealed tobacco smoking is the most common reported risk factor for COPD followed by occupational exposure to dust, although the high rate of smoking recorded in this study is lower than prevalence of smoking in the general population¹⁶. Active tobacco smoking in any forms (cigarette, cigar, sheesha and pipe) has been found to be the most commonly encountered risk factor for COPD.^{23, 2} Passive exposure to cigarette smoke (also known as environmental tobacco smoke (ETS) and smoking in pregnancy may also contribute to COPD.²⁵⁻²⁸ The risk of developing the condition in smokers is dose-related to tobacco inhaled and individual genetic

factors.^{1, 29} Cigarette smokers also have higher prevalence of respiratory symptoms and lung function abnormalities, greater annual rate of decline in FEV1, and a greater COPD mortality rate than non-smokers.¹ Therefore smoking prevention programs should be targeted at all ages, including young children, adolescents, young adults, and pregnant women. Interventions to maximize cessation should be implemented at every level of the health care system and the knowledge of tobacco cessation should be increased in all doctors.

Occupational exposure to dust was identified in approximately 30% and to chemicals in 9.7% of the patients. Occupational agents were the second and third leading risk factors recognized after tobacco smoking in this study. These findings were consistent with US Third National Health and Nutrition Examination Survey (NHANES III) involving almost 10,000 adults aged 30-75 years, which estimated the fraction of COPD attributable to work to be 19.2% overall.³⁰ Similarly, the American Thoracic Society has also stated that occupational exposure to dust and chemical contributes 10-20% to burden of clinical features consistent with COPD.³¹ The result highlighted the importance of airway protection and regular occupational surveillance in workers at risk of the condition.

The use of biomass fuel for cooking was reported in 9.7% of the patients whereas in some parts of the Middle East, Africa and Asia it accounted for the high prevalence of COPD among non-smoking women.³²⁻³³ Our observation should be interpreted with caution considering the nature of our study. Biomass smoke contains respirable PM (PM10), carbon monoxide (CO), nitrogen and sulphur oxides (NO₂, SO₂), aldehydes (e.g., formaldehyde), polycyclic aromatic hydrocarbons (e.g., benzopyrene), volatile organic compounds, chlorinated dioxins, and free radical which are known to be toxic or irritants to the respiratory system. Biomass smoke is estimated to kill two million women and children each year.³⁴ The use of biomass fuel is higher in rural than in urban areas and is associated with low income and poverty³⁵, therefore physicians working rural areas were more likely to diagnose and treat high number of cases related to indoor pollution compared to those working in the urban areas. For us to reduce respiratory morbidity associated with indoor pollution, the

government need institute an economic policy that will reduce poverty and improve the use of cleaner source of cooking energy particularly in rural areas.

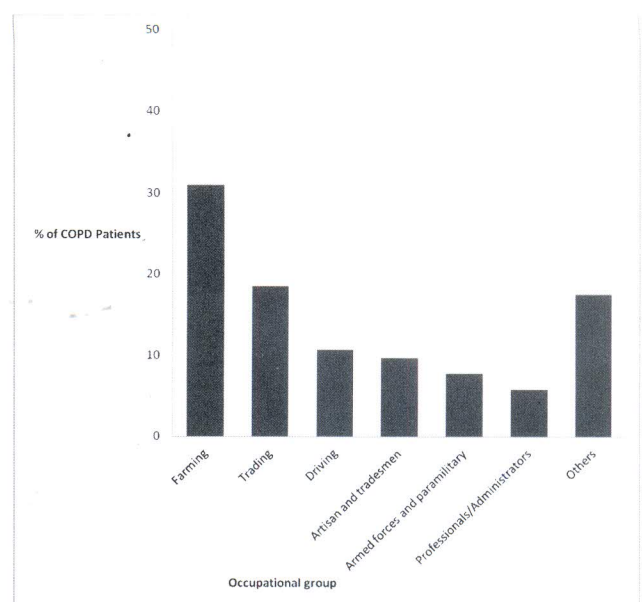
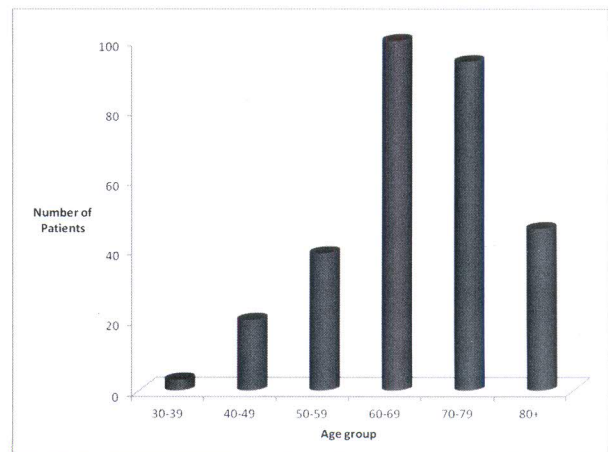
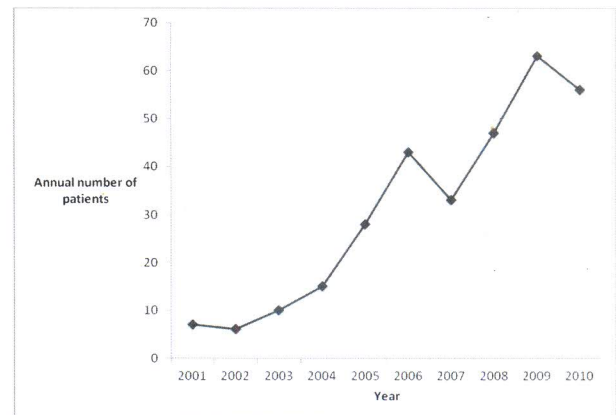


Figure 1: Number of COPD cases seen per annum from 2001-2010

Figure 2: Age range distribution of COPD patients

Figure 3: Occupational group of COPD patients

Strength and limitation of the study

The study because of its design is bedevilled with some inaccuracies which depend upon the case note recording by doctor, missing information and power of the study. Information on the number of exacerbations were not documented by managing physicians and the cause of death not ascertained in most cases because Ilorin population are predominantly Muslims who would bury their dead ones within 24 hours according to Islamic injunction than consenting to post mortem examination. Despite the limitation of the study, we have been able to establish that there is an increase in the incidence of COPD over a period of ten years and it is commoner in aged 60-69, male patients, farmer, poorly educated and those in low socioeconomic status. Majorities of the patients had a history of

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cigarette smoking, and they presented with chronic cough expectoration and breathlessness. Hypertension was the most common co morbidity.

CONCLUSION

In conclusion, there is a rising incidence of COPD in our environment which is in keeping with projection by WHO and effort should be made to increase the awareness of this multi-systemic, under-recognised condition and risk factors in our society.

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