CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN OAUTHC ILE-IFE: A TEN-YEAR REVIEW OF HOSPITAL MORTALITY

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Chronic obstructive pulmonary disease (COPD) is a spectrum of chronic lung disease. The prevalence and incidence of COPD is on the increase globally with an attendant increase in morbidity and mortality. There is a lack of data on the prevalence and incidence of chronic obstructive pulmonary disease COPD in developing countries, which is what prompted this study. We reviewed mortality due to COPD in order to identify risk factors for death and possible preventive measures. Out of 161 admissions during the review period–1990 to 1999–there were 41 deaths, accounting for a mortality rate of 25.46%. The highest mortality occurred in the sixth and seventh decades of life with a male to female ratio of 3:1. Chest infections, cor pulmonale, and respiratory failure were the most common complications. 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. Attention should be paid to preventive measures to halt the development and progression of the disease. This offers the best hope of minimizing mortality. (*J Natl Med Assoc.* 2002;94:1071–1076.)

Key words: COPD ◆ lung disease ◆ chest infection ◆ respiratory failure ◆ mortality

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a chronic, slowly progressive disorder characterized by a fixed obstruction of the airway.[1]

The term encompasses chronic obstructive bronchitis, with obstruction of small airways, and emphysema with enlargement of air spaces and destruction of lung parenchyma, loss of lung elasticity and closure of small airways.[2]

There has been an increase in the prevalence of and mortality from COPD.[2] Chronic obstructive pulmonary disease affects 16.4 million people in United States and at least 52 million worldwide, and it accounted for 2.74 million deaths in 2000.[3,4] The World Health Organization (WHO) predicts that by 2020, chronic obstructive pulmonary disease will rise from the current level as the 12th most prevalent disease in the world to the 5th most prevalent, and from the 6th most common cause of death to the 3rd.[5]

The rise in morbidity and mortality has been attributed to various factors, including increased smoking, infectious disease and environmental pollution.[2]

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In Africa, the precise figures on prevalence, morbidity, and mortality are scanty. However, they are bound to increase due to marked increase in cigarette smoking, infectious diseases, and indoor and outdoor pollution.

This work examines mortality from COPD with a view to identify risk factors and to offer practical solutions for minimizing mortality from the disease.

MATERIALS AND METHODS

We conducted a review of the admissions for chronic obstructive pulmonary disease between 1990 and 1999 (10 years) at the Obafemi Awolowo University Teaching Hospital Complex (OAUTHC) Ile–Ife, Osun State, Nigeria. The case records of patients who died were selected for analysis.

Only those who fulfilled the following criteria for the diagnosis of COPD were included in the study[1,6]

(1) An unequivocal history of chronic exertional dyspnoea, chronic cough and sputum production on most days for at least three months for two consecutive years.
(2) Significant chronic obstruction to airflow by pulmonary tests (FEV1, 80% predicted and FEV1/VC, 70%) that was not reversible with use of inhaled bronchodilators.

Information regarding clinical presentation, occupation, co-morbid conditions and pattern of mortality were included. Results were presented in descriptive terms and numerical data expressed as means, ranges and percentages.

RESULTS

There were 161 admissions for chronic obstructive pulmonary disease during the 10-year period, with 41 deaths, resulting in a mortality rate of 25.46%. The age of the patient ranged from 40 to 90 years, with a mean of 63 years. The highest mortality occurred in the sixth and seventh decades of life, with a male to female ratio of 3:1 as shown in Table 1.

Table 1. Age and Sex Distribution of COPD Mortalities

Age Range (Years)	Sex		Frequency % of Total N = 41
	M	F	
40–50	2	1	7.31
51–60	2	–	4.87
61–70	11	5	39.09
71–80	10	2	29.26
> 80	5	3	19.51
Total	30	11	100

Table 2 shows the occupational group distribution among the mortality cases; 68.29% of the mortality cases were farmers.

Table 3 shows the pattern of presentation. Chronic cough, breathlessness, wheezing, sputum production, and chest tightness were the most common symptoms presented. Dyspnoea, cyanosis, and sign of over inflation were the main clinical findings.

As shown in Table 4, smoking, alcohol ingestion, and hypertension were common co-morbid conditions associated with mortality. A total of 63.41% of the mortality cases had a significant smoking history of 10 packs/year and higher.

The majority of the deaths occurred within the first 10 days of admission, with a peak during the first five days. Seventeen (41.46%) of the mortality cases had been admitted previously for COPD and were consistent with follow-up appointments; whereas (58.53%) of those who died had not been admitted before or were not compliant with clinic appointments.

Chest infection was the most frequent com-

Table 2. Occupational Distribution of COPD Mortalities

	Occupational Group	No. of Patients N%
1.	Farming	28 (68.29%)
2.	Trading	9 (21.95%)
3.	Civil Servants	2 (4.87%)
4.	Teaching	1 (2.43%)
5.	Motor vehicle mechanics	1 (2.43%)
	Total	41 (100%)

Table 3. Clinical Features of COPD Patients

S/N	Symptoms	No. of Patients	% of Total
1.	Chronic cough	41	100.00
2.	Breathlessness	41	100.00
3.	Wheezing	41	100.00
4.	Sputum production	41	100.00
5.	Drowsiness	31	75.60
6.	Right hypochondrial pain	40	97.56
7.	Pedal swelling	40	97.56
	Signs		
1.	Dyspnoea	41	100.00
2.	Cyanosis	41	100.00
3.	Raised JVP	40	97.56
4.	Warm periphery	31	75.60
5.	Flapping tremor	31	75.60
6.	Barrel-shaped chest	40	97.56
7.	Hyper-resonant percussion notes	41	100.00
8.	Polyphonic wheeze	31	75.60
9.	Reduced breath sounds	41	100.00

plication and was present in all of the cases. Cor-pulmonale and respiratory failure also were identified complications and causes of death in 97.56% and 75.76% of patients, respectively.

DRUG THERAPY

All patients who died were treated with bronchodilators, theophyline, antibiotics, steroids and intranasal oxygen.

DISCUSSION

In this review, most of the mortalities occurred in the sixth and seventh decades of life, with a male to female ratio of 3:1. This is almost a universal finding. An analysis of deaths due to COPD by Howard and Waterhouse in the UK from 1976 to 1988 showed that the male death-rate had progressively increased in the older age groups when compared to younger groups, while female deaths remained steady at between 45 to 85 years of age. One factor responsible for this may be that women are generally less susceptible to developing COPD.[7]

Table 4. Associated Co-Morbid and Social Conditions

S/N		No. of Patients	% of Total
1.	Smoking	26	63.41
2.	Alcohol	23	56.09
3.	Hypertension	12	29.26
4.	Septicemia	2	4.87
5.	Acute renal failure	2	4.87
6.	Chronic liver disease	3	4.87
7.	Benign prostatic hypertrophy	3	4.31

The occupational impact of mortality in COPD is clearly demonstrated in this review. Over two-third of the mortalities were farmers, most of them working on cocoa plantations. This group of patients, because of their exposure to pesticides, wood smoke (from indoor cooking) and other factors may have suffered a rapid deceleration of lung function, increased disability, and subsequently, death.

Mortality also was found to be high among the lower socio-economic group: farmers and traders. They account for about 90% of the mortalities and 70% of all COPD admissions, and constitute the major occupational groups in the lower socio-economic strata of the country. Patients from lower socio-economic groups are likely to be undernourished, in addition, they are exposed to various irritants. Malnutrition adversely affects the prognosis of COPD patients, probably by diminishing respiratory muscle endurance and by increasing susceptibility to infections.[8] However, serum albumin levels, which could be used to estimate the nutritional state, could not be determined before death and facilities for determining serum phosphorus are not available.

One important factor that may contribute to mortality in COPD is the patients' perception of breathlessness.[9] This has been found to show wide variation in patients with COPD and chronic asthma, and is particularly troublesome in old age.[10] Patients tend to refrain from seeking medical attention until it is too late. This may explain why 57.7% of the deaths had no regular follow-up or clinic visits.

Our study confirmed numerous other studies that identify smoking as one of the most significant factors in COPD mortality. Smoking

is thought to account for approximately 80% of the total COPD-related mortality in Western countries.[11] Smoking–related mortality is broadly related to the number of cigarettes smoked per day. There was a more than two-fold difference in COPD mortality between light (<15 cigarettes/day) and heavy (>25 cigarettes/day) smokers in a British physicians' study.[12] It also is suggested that mortality is higher in individuals who start smoking at a younger age. Pipe and cigar smokers show an increased mortality compared to non-smokers; but the excess is considerably less than for cigarette smokers overall.[12]

As shown from our study, patients with COPD are particularly susceptible to respiratory tract infection (RTI). RTI in these patients is probably multifactorial due to defective lung defenses, disorders of mucociliary clearance, immunoglobulin deficiencies and lymphocyte disorders. Morbidity and mortality is known to be high in patients with predominantly chronic bronchitis who develop RTI due to viruses or bacteria warranting antibiotic use.[13] Acute exacerbations due to RTI caused by bacteria or viruses warranting antibiotic use have a profound effect on quality of life and mortality.

A meta-analysis of controlled trials of antibiotics in COPD showed a statistically significant, small benefit of antibiotic use in terms of clinical outcome and lung fuction.[14] In most developing countries, antibiotics are still widely used for exacerbations of COPD as prophylaxis for bacterial infections. There is a need to document infection by culture sensitivity test so that antibiotics are not used inappropriately.

Weight loss has been identified as a predictor of mortality that is independent of poor lung function in COPD.[15] This is an important target for skeletal and respiratory muscle training in a structured program of education, exercise and physiotherapy. This has been shown to improve exercise capacity, quality of life and reduce the amount of health care needed.

Terminally, most patients with COPD developed respiratory failure. Respiratory failure has been known to be extremely important in determining both the short- and long-term range of prognosis. In one review, the five-year survival rate after the initial episodes of respiratory failure averaged 15% to 20%.[16]

One important question we seek to address in this review is: how can we reduce the mortality from COPD?

Reduction of mortality must focus on two modalities: primary and secondary prevention. Primary prevention must be aimed at those aged 50 years and below; while secondary prevention must focus on persons with established disease.

Primary prevention should aim at reducing primary risk factors such as smoking, indoor pollution, and occupational and ambient air pollution. However, the central focus must be on smoking cessation. Cigarette smoking cessation is the greatest modifying factor in the management of COPD. It is not only a crucial aspect of primary prevention; but it also plays an important role in secondary and tertiary prevention.[17] It has been estimated that those who continue to smoke are certain to lose FEV_1 at an accelerated rate that cannot be prevented by drug therapy, and a worsening disability is likely.[18,19] Anti-smoking campaigns must start from the doctor himself, by quitting smoking and advising the patient to do the same. Anti-smoking campaigns must be intensified in developing countries, since most tobacco companies are directing advertising toward third world countries. Nicotine replacement therapy (by gum, transdermal patch or inhaler) provides help for patients who wish to quit smoking. The use of bupropion, an antidepressant drug, also has proved to be of value[20,21] in quitting smoking.

Long-term oxygen therapy (LTOT) has been found to significantly improve survival and reduced mortality in those with established COPD and chronic hypoxemia. Two major controlled clinical trials have demonstrated the benefit of continuous oxygen therapy for patients with hypoxemic.COPD.[22,23] These studies have shown that low-flow oxygen supplementation sufficient to raise the arterial oxygen ten-

sion beyond 60mm Hg (8kpa) could improve the survival rate by as much as 50%. Oxygen supplementation must be maintained for at least 15 hours per day, including at night.[23] Longer daily periods (>18 hours) offer still better results. The oxygen is administered through nasal cannulae at a flow rate of 21/min. The source of oxygen in most instances is an oxygen concentrator installed in the patient's home; but liquid oxygen offers an alternative method.

Delivering oxygen to patients is quite expensive. In the US, it accounts for over 30% of the cost of treating COPD. In most parts of the developing world, the challenge is to find convenient and cost-effective ways of providing oxygen to patients with severe COPD. A cheaper alternative may be the use of non-invasive positive pressure ventilation at home.[1,24] In six of seven randomized controlled trials of positive-pressure ventilation without intubations, patients who received this type of therapy had better outcomes than those who did not.[25–27] Benefits included lower rate of intubation, lower hospital mortality rates, accelerated symptomatic and physiological improvement, and shorter hospital stays. Non-invasive positive pressure ventilation should be considered when there is need for ventilatory assistance, as indicated by such symptoms as worsening dyspnoea, acute respiratory acidosis and worsened oxygenation (e.g. a ratio of paO_2 to the fraction of inspired oxygen of less-than 200) [24,26,28–30]

In conclusion, the prevention of COPD offers the best hope of controlling mortality, particularly in developing countries, but this requires a number of difficult interventions–such as cessation of smoking, control of the quality of domestic and occupational environments, and reduction of individual susceptibility. In established disease, pharmaceutical therapy, specifically the use of both inhaled beta-adrenagic agonists (e.g. albuterol, fenoterol) and anti cholinergic agents, can improve airflow during acute exacerbations of COPD.[31,32] COPD appears to be more effectively treated by anti-cholinergic drugs than by B_2 agonists, which is in sharp contrast to asthma for which B_2 agonists are more effective.[33] Several randomized, placebo-controlled trials also have demonstrated that systemic corticosteroids accelerate improvement in airflow and gas exchange, and reduce the rate of treatment failure.[34]

It should be noted that although pharmaceutical agents may improve symptoms, they do not appear to slow the progress of the disease and they have so far produced little convincing evidence of long-term survival.[2] Elderly patients with COPD must be managed aggressively, bearing in mind the limitation of medical practice in developing countries. Patients also will benefit from nutritional care and vaccinations. Oxygen therapy for respiratory failure affords some survival benefit and helps to maintain a reasonable improvement in the quality of life of patients, even in advanced cases. Bronchial inflammation lies at the root of the pathogenesis of airway obstruction; novel interventions are needed to interfere with this process in order to prevent permanent damage to the lungs.

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