

# Profile of COPD Patients Admitted for Acute Exacerbation at the Pulmonology Department of Fann, Dakar, Senegal

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## Abstract

**Introduction:** Chronic Obstructive Pulmonary Disease (COPD) is a chronic disease with episodes of acute worsening of respiratory symptoms beyond daily variations and leading to therapeutic modification, called acute exacerbations (AE). Knowledge of the characteristics of COPD patients with an exacerbation could contribute to their management.

**Methods:** The data collected were entered and analyzed with SPSS version 20 and archived in order to safeguard confidentiality. The quantitative variables were compared with Student's Z or t law depending on their applicability. The comparison of qualitative variables was done using the chi-square or Fisher's test (as appropriate). A value of  $p < 0.05$  was considered statistically significant.

**Results:** The hospital prevalence of COPD PT was 4.13% over 17 months (May 1, 2016 to October 31, 2017). The mean annual number of exacerbations was 1.99 +/- 0.68. Men had more COPD exacerbations than women. The number of exacerbations increased with age. Patients who lived near a high-traffic street had at least 2 exacerbations per year.

**Conclusion:** Knowing the profile of patients who had AE will allow us to anticipate their prevention.

**Keywords:** Chronic Obstructive Pulmonary Disease (COPD) • Acute Exacerbation • Epidemiology

## Introduction

Chronic Obstructive Pulmonary Disease (COPD) is an inflammatory disease characterized by a permanent, progressive and non-reversible obstruction of the bronchi secondary to significant exposure to harmful particles or gases [1-4]. It is a chronic disease with episodes of acute worsening of respiratory symptoms beyond daily variations and leading to therapeutic modification, called acute exacerbation (AE) [3-6]. Knowledge of the characteristics of COPD patients who experience an exacerbation could contribute to their management. This justified this cross-sectional descriptive study at the Respiratory Clinic of the National University Hospital Center (NUHC) of Fann with the main objective to describe the epidemiological profile of patients admitted for acute exacerbations of COPD.

## Research Methodology

We have conducted an exhaustive recruitment of all cases of acute exacerbation of COPD admitted to the said service from May 1, 2016 to October 31, 2017, a period of seventeen (17) months. The diagnosis of COPD was made before or after the AE by spirometry. The socio-demographic data of the patients were collected by direct interview after free and informed consent. The collected data were entered and analyzed with SPSS version 20 software and archived in order to safeguard confidentiality. The comparison of the quantitative variables was made with Z law or

Student's t test according to their conditions of applicability. The comparison of qualitative variables was done using the chi-square or Fisher's test (as appropriate). A value of  $p < 0.05$  was considered statistically significant.

## Results

The hospital prevalence of AE of COPD was 4.13% over 17 months (May 1, 2016 to October 31, 2017).

### Socio-demographic data

**Gender and age:** The sex-ratio was 21.5 (86 men and 4 women). The mean age of the patients was  $64.1 \pm 8.9$  years. The median age was 64 years (extremes: 40 years and 81 years). The age group [60-70 years] was the most represented at 48.9% of patients ( $n=44$ ), the difference was not statistically significant ( $p$ -value=0.964).

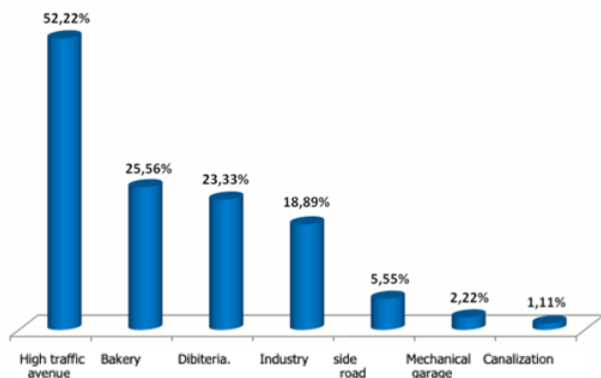
**Education level, sector of activity and socio-economic level:** Educated patients represented 73.3% of the study population ( $n=66$ ) versus 26.7% of the uneducated ( $n=24$ ). The busiest sector of activity was construction (20.7%). Patients who were still active represented 36.8% ( $n=32$ ). Almost all patients ( $N=87$ ) had worked for more than 10 years. Almost half of the patients (46.7%,  $n=42$ ) had no monthly income and 32.2% of them earned more than twice the minimum wage.

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**Address:** Patients lived near a high-traffic avenue, a bakery or a diberia in 52.2%, 25.6% and 23.3% respectively. The difference was statistically significant ( $p$ -value=0.0001) (Figure 1 and Table 1).



**Figure 1.** Distribution of patients by pollutant source near home (n=90).

**Table 1.** Distribution of patients by etiologic factors of acute exacerbation (n=90).

Etiological factors	Employees (a)	Percentage (%)
Bronchopulmonary infections	47	52.2
Indoor pollution Smoking tobacco	23	
Encens	7	
Air pollution	45	50
High cost of drugs	24	
Therapeutic rupture Insufficient therapeutic education	5	34.4
Conventional treatment	2	
Sedative	5	5.6
Inappropriate use of medication	21	23.3
No cause identified	17	18.9

**COPD data:** COPD was post smoking in 90% of cases (n=81) and 66.7% (n=54) were withdrawn. Pulmonary TB sequelae were found in 15.6% of patients (n=14), all of whom were smokers. The mean number of exacerbations was 1.99 +/- 0.68 per year.

Episodes of AE of COPD were significantly more frequent in men compared to women ( $p$ -value=0.043). The number of exacerbations increased significantly with age ( $p$ -value=0.001). More than half of the patients aged 70 years or older had at least 2 exacerbations per year significantly ( $p$ -value=0.006). Subjects younger than 50 years of age had no more than 1 exacerbation per year ( $p$ -value at 0.02). Patients who lived near a high-traffic street had at least 2 exacerbations per year with high significance ( $p$ -value = 0.008).

## Discussion

In 17 months, we collected ninety (90) patients admitted for AE of COPD, i.e., a hospital prevalence of 4.13% (90 cases/2177 patients hospitalized during the study period). The study by Thiam K, et al. [7] conducted in the same department from 2010 to 2012 had fewer cases, 64 in 24 months. This

indicates a gradual increase in the hospital prevalence of AE of COPD, which is believed to be increasingly linked to air pollution in our regions. Our results were comparable to those found by Ourari-Dahri B, et al. [8], in Tunisia, who reported 194 cases of COPD EA out of 3822 hospitalizations, i.e., a prevalence of 5%. This prevalence is probably underestimated due to the existence of cases not reported by patients to a health professional, the absence of pathognomonic signs, the absence of a precise clinical definition of AE of COPD and the under-diagnosis of COPD itself [8-10].

## Socio-demographic data

**Gender and age:** The results of this work corroborate the data in the literature, particularly in Asia, Europe and Africa, which show a male predominance among COPD patients. COPD is a male disease [11-14] and its main etiologic factor, smoking is still the preserve of men despite the progressive increase in female smoking. The sex-ratio noted in this work of 21.5 is much higher than that found by Moncelly L, et al. [14] in France of 3.31. This suggests an underestimation and under-diagnosis of COPD in women who are also exposed to biomass, especially in sub-Saharan Africa, particularly in Senegal. Smoking influences etiological research and there is a tendency to look for COPD only in smokers, in addition to the denial of the disease by women, who do not admit to smoking [14].

The mean age of the patients was 64.1 ± 8.9 (extremes: 40 and 81 years), higher than the mean age of 55.3 years noted by Thiam in the same ward 6 years earlier. Piquet J, et al. [15] showed in their study of AE of COPD a higher mean age of 70.3 ± 11.3 years [16-18]. These results could be explained by an increase in the expectation of COPD in our regions, which nevertheless remains better in developed countries.

The age group (60-70) was the most represented at 48.9% of patients (n=44), confirming the hypothesis that COPD reaches adults over 45 years of age and its frequency increases with age [19].

**Education level, sector of activity and socio-economic level:** The high level of education (73.3%) in our study does not reflect the level of information about the disease. The general public is largely under-informed about COPD, particularly its main risk factor, tobacco and its various co-morbidities. The busiest sector of activity was the construction industry (20.7%). In the construction and cosmetics sectors, patients who were still active predominated significantly. Almost all patients (n=87) had worked for more than ten years. The Building sector is exposed to cement dust, particles (sand, fibers) and paint. Cosmetics generate gaseous pollution.

The socio-economic level is closely linked to the professional activity, and therefore to the monthly income. In this study, almost half of the patients (46.7%, n=42) had no monthly income and 32.2% of them earned more than 2 times (36,000 CFA) the Guaranteed Interprofessional Minimum Wage (SMIG).

Patients who were still working represented 36.8% (n=32), well above the proportion found by Solem et al. [20] of 16% (n=314). The frequency of active patients could be explained by the fact that some patients work in the informal sector and therefore for their own account.

**Address:** Of the patients, 52.2%, 25.6% and 23.3% lived near a high-traffic street, a bakery or a diberia, respectively.

**COPD data:** Cigarette smoke is considered to be a major etiologic factor in the pathogenesis of chronic obstructive pulmonary disease [3-5,11,13,21] These data are confirmed by the results of this study, which found chronic smoking in 90% of patients (n=81), 54 of whom had quit (66.7%). Smoking accelerates the decline in FEV1, hence the importance of withdrawal at any stage of COPD. The after-effects of tuberculosis worsen the functional prognosis of COPD patients and their presence should further encourage smoking cessation.

Patients had more exacerbations within a year (on average 1.99 +/- 0.68) than those in other studies in the literature, particularly in Tunisia and France conducted by Ourari-Dahri B, et al. [8], Jouneau J, et al. [10] and Couvelier

A [22], with 1.78 +/- 0.11, 1.2 and 2.61 respectively. Men had significant more exacerbations per year than women, probably related to continued smoking, which remains more frequent in men.

The number of exacerbations increased very significantly with age and predominated in patients over 70 years of age. There is an abnormally rapid decline in FEV1 in tobacco-sensitive smokers, but also a decline that increases with age [23], which may explain the frequency of AE of COPD. These exacerbations were significantly more frequent in patients who lived near a high-traffic street. Over the last ten years, a large number of epidemiological studies have highlighted links between, on the one hand, living near traffic and/or being more exposed to traffic-related pollutants at home and, on the other hand, damage to the respiratory (asthma, impaired respiratory function, etc.) or cardiovascular (myocardial infarction, heart rhythm disorders, etc.) systems. This can result in simple symptoms or more serious events, such as hospitalization or even death [24].

## Conclusion

The profile of patients admitted for AE of COPD could be a prognostic factor, important for curative and preventive management.

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