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# PREVALENCE OF COMORBIDITY IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

## PREVALENCIA DE COMORBILIDAD EN PACIENTES CON ENFERMEDAD PULMONAR OBSTRUCTIVA CRÓNICA

SHORT TITLE: PREVALENCE OF COMORBIDITY IN PATIENTS WITH LUNG DISEASE

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### ABSTRACT

Comorbidity is common in patients with chronic obstructive pulmonary disease (COPD); however, the relationship between comorbidity and quality of life is inconsistent. The objective was to establish the prevalence of comorbidity and the relationship with the quality of life of patients with COPD in Santa Marta, Colombia. A cross-sectional study was designed in which outpatients diagnosed with COPD participated. Quality of life was evaluated with the CAT (COPD Assessment Test) instrument; scores higher than ten were considered poor quality of life. The sample was of 292 patients, in ages between 49 and 95 years; 61.6% male. A group of 232 participants (79.5%) presented some comorbidity associated with COPD. Quality of life was reduced in 192 patients (65.8%). Comorbidity did not significantly add to the quality of life (OR = 1.33. 95% CI 0.72-2.45), adjusted for age and sex. It is concluded that comorbidity is very frequent; however, it does not affect the quality of life in patients with COPD in Santa Marta. More research is needed with more participants.

**Keywords:** chronic obstructive pulmonary disease; comorbidity, quality of life; cross-sectional studies.

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## RESUMEN

La comorbilidad es frecuente en pacientes con enfermedad pulmonar obstructiva crónica (EPOC); sin embargo, es inconsistente la relación entre la comorbilidad y la calidad de vida. El objetivo fue establecer la prevalencia de comorbilidad y la relación con la calidad de vida de los pacientes con EPOC en Santa Marta, Colombia. Se diseñó un estudio transversal en el que participaron pacientes ambulatorios con diagnóstico de EPOC. La calidad de vida se evaluó con el instrumento CAT (*COPD Assessment Test*), las puntuaciones mayores de diez se consideraron pobre calidad de vida. La muestra fue de 292 pacientes, en edades entre 49 y 95 años; 61,6% de sexo masculino. Un grupo de 232 participantes (79,5%) presentó alguna comorbilidad asociada a la EPOC. La calidad de vida fue pobre en 192 pacientes (65,8%). La comorbilidad no asoció significativamente a la calidad de vida (OR=1,33; IC95% 0,72-2,45), ajustado por edad y sexo. Se concluye que la comorbilidad es muy frecuente; no obstante, afecta poco la calidad de vida en pacientes con EPOC de Santa Marta. Se necesitan más investigaciones con mayor número de participantes.

**Palabras clave:** enfermedad pulmonar obstructiva crónica; Comorbilidad; Calidad de vida; Estudios transversales.

## INTRODUCTION

In Colombia, the prevalence of chronic obstructive pulmonary disease (COPD) is around 10%<sup>1</sup>. COPD is characterized by decreased air-flow and inflammatory response and manifests clinically with dyspnea, cough, and expectoration, of chronic course with remissions partial and exacerbations<sup>2</sup>.

Comorbidity is understood as the coexistence of diseases or the appearance of an additional condition in a person with a previous diagnosis<sup>3-5</sup>. The presence of comorbidity frequently deteriorates the course of concurrent diseases, undermines the quality of life and usually increases the morbidity and mortality of these patients<sup>6-8</sup>.

Quality of life is a concept under permanent construction, without a consensus on it; nevertheless, it can be defined in a simple way as the perception or general feeling of emotional, physical and social well-being<sup>9,10</sup>. Given the clinical characteristics of COPD, patients present with high frequency a significant deterioration in the quality of life, that is, a considerable limitation in the activities of daily life or work demands<sup>11-13</sup>.

The prevalence of comorbidity in patients with COPD varies according to the characteristics of

the population and the number of concurrent diseases evaluated. Crisafulli *et al*<sup>14</sup> reported that 51% of patients who presented at least one condition concomitant with COPD. And García-Olmos observed that 91% of patients with COPD reported a comorbidity<sup>15</sup>.

About comorbid conditions, Battaglia *et al*<sup>16</sup> observed that the most frequent comorbidities were hypertension (64.7%), diabetes (28.5%), coronary disease (19.9%), cardiac arrhythmia (16.6%), and congestive heart failure (3.8%). And Pucha *et al*<sup>17</sup> documented that the most common associated entities were incontinence or prostatic disease (63.6%), arthritis (58.6%), depressive symptoms (42.5%), coronary heart disease (23.4%), chronic kidney disease (21.7%), congestive heart failure (15.1%) and diabetes (13.9%).

Regarding the association between comorbidity and quality of life in patients with COPD, the findings are contradictory. On the one hand, Battaglia *et al*<sup>16</sup> did not observe a statistically significant association and, on the other hand, Pucha *et al*<sup>17</sup> found that only some conditions (congestive heart failure, arthritis, diabetes, and incontinence or prostatic disease) showed deterioration in quality of life in the presence of comorbidity

These observations and others suggest that the relationship between comorbidity and quality of life in patients with COPD is complex and that the multiple particular mediating factors associated with COPD and specific comorbidity interact in a singular way<sup>16-20</sup>. In the present investigation, general comorbidity was also taken, without discriminating by diagnosis, to present the association between comorbidity and quality of life in COPD, a fact that was omitted in previous investigations<sup>16,17</sup>. This knowledge will undoubtedly contribute to rethinking the importance of comorbidities in the evaluation and follow-up of patients with COPD<sup>2,4</sup>.

The study aimed to quantify the association between comorbidity and quality of life in outpatients with COPD in Santa Marta, Colombia.

## MATERIALS AND METHODS

### Design

A quantitative study of observational type was designed given that no interventions were carried out. The prevalence of an event was analyzed cross-sectionally and associations were established.

### Population and sample

We requested the participation of patients with COPD treated in different public and private institutions of Santa Marta; a city located in the Colombian Caribbean at sea level. A non-probabilistic sample was taken, for convenience, consecutively. However, it was expected to have at least 250 patients that allowed the calculation of associations with sufficiently narrow confidence intervals<sup>21</sup>. Only those patients attended in specialized outpatient services, regardless of another characteristic, during the year 2016 were included. Patients who did not complete the entire evaluation were excluded.

### Procedure and measurements

The patients were evaluated in the outpatient consultation by one of the investigators (JCPP). During the evaluation, the primary demographic data, the comorbidity informed and the quality of life were quantified. The COPD Assessment Test (CAT) measured the quality.

The diagnosis of COPD was confirmed by clinical evaluation and the history of exposure to the cigarette or particulate material, that is, the presence of dyspnea, cough and sputum production in people with lung function compatible with COPD, by the GOLD guidelines (Global Initiative for Chronic Obstructive Lung Disease)<sup>22</sup>.

Spirometries were performed with the spirometer (Master Screen PFT System of CareFusion-EU). The criteria and procedures for the measurement were selected according to the recommendations of ATS / ERS for the standardization of spirometry<sup>23,24</sup>.

The CAT is an instrument that was exclusively designed to measure the quality of life of people with COPD and it includes a set of eight items that qualify cough severity, expulsion of phlegm, chest tightness, shortness of breath during the effort, ease to perform domestic activities, feeling of safety when leaving home, quality of sleep and energy level. Each item gives six response options to which are assigned from zero to five points, from lowest to highest severity. Consequently, the total scores are between zero and 40. Scores higher than 10 indicate significant deterioration or reduced quality of life. For the present study, little deterioration in the quality of life was considered to have lower scores 10 and high deterioration, higher than 10<sup>25</sup>. This scale has shown excellent internal consistency in studies in populations of other countries

around the world<sup>26</sup>. Given that the performance of the instrument before the analysis was unknown, it was calculated in the sample that participated in the study that Cronbach's alpha is described, which is a quick and simple measure of validity and reliability, the CAT showed alpha of 0.71.

### Statistic analysis

The descriptive analysis was limited to the determination of frequencies and percentages (%) for nominal and mean data and standard deviation (SD) for quantitative data. Additionally, the age of the patients was dichotomized into two categories (minors and older than 75 years). We calculated risk opportunities or reasons for disparity (OR) with 95% confidence intervals (95% CI). Finally, the association was adjusted by age (two categories) and by sex. The analysis was performed with the statistical package *IBM-SPSS Statistics, version 22*<sup>27</sup>.

### Declaration on ethical aspects

It was reviewed and approved by an ethics board. The participants signed informed consent once they knew the objectives of the study and that the participation did not represent a higher risk for physical and emotional integrity than

the routine clinical review for COPD, all following Resolution 8430 of 1993 of the Ministry of Health<sup>28</sup>.

## RESULTS

A total of 292 patients made up the study sample. The ages of the participants were observed in ages between 49 and 95 years, (M = 73.5, SD = 8.7). Those younger than 75 years old were 162 patients (55.5%) and those older than 75 years, 130 (44.5%). According to sex, the distribution was: 180 men (61.6%) and 112 women (38.4%).

A group of 232 patients (79.5%) presented some comorbidity associated with COPD. Table 1 shows the observed comorbidities. The CAT showed scores between 0 and 38, with an average of 14.4 points (SD = 8.1). According to the cut-off point of 10, the quality of life was poor in 192 patients (65.8%) and acceptable in 100 (34.2%).

The crude association between comorbidity and quality of life showed value OR = 1.78 (95% CI 0.99-3.18) and OR = 1.33 (95% CI 0.72-2.45) once adjusted for age and sex. The crude and adjusted associations for comorbidities with prevalence greater than 5% presented in Table 2 showed the same pattern.

**Table 1.** Comorbidities in patients with COPD in Santa Marta, Colombia.

Comorbidity	f	%
Arterial hypertension	154	52.7
Osteoporosis	41	14.0
Mellitus Diabetes	30	10.3
Coronary heart disease	27	9.2
Bronchial asthma	27	9.2
Gastroesophageal reflux disease	21	7.2

<b>Comorbidity</b>	<b>f</b>	<b>%</b>
Pulmonary tuberculosis or sequelae	18	6.2
Depressive disorder	17	5.8
Congestive heart failure	17	5.8
Bronchogenic cancer	13	4.5
Bronchiectasis	13	4.5
Asthma / COPD overlap syndrome	13	4.5
Pulmonary hypertension and right heart failure	12	4.1
Stroke	8	2.7
Pulmonary fibrosis of any etiology	8	2.7
Cardiac arrhythmias (atrial fibrillation)	7	2.4
Obstructive sleep apnea/hypopnea syndrome	7	2.4
Hypothyroidism	6	2.1
Chronic renal failure	5	1.7
Other	51	17.5

**Table 2.** Crude and adjusted associations for the most frequent comorbidities.

<b>Comorbidity</b>	<b>OR (95% CI) Crude*</b>	<b>OR (95% CI) Adjusted*</b>
Arterial hypertension	1.26 (0.74-2.04)	0.99 (0.59-1.67)
Osteoporosis	2.02 (0.92-4.42)	1.38 (0.59-3.18)
Mellitus Diabetes	0.89 (0.41-1.95)	0.82 (0.36-1.84)
Coronary heart disease	0.87 (0.38-1.99)	0.99 (0.43-3.31)
Bronchial asthma	1.92 (0.75-4.93)	2.32 (0.88-6.13)
Gastroesophageal reflux disease	3.34 (0.96-11.64)	3.25 (0.92-11.51)
Pulmonary tuberculosis or sequelae	1.04 (0.38-2.87)	1.22 (0.43-3.45)
Depressive disorder	1.74 (0.55-5.49)	2.03 (0.63-6.61)
Congestive heart failure	2.54 (0.71-9.07)	2.67 (0.73-9.74)

\* By age and sex

## DISCUSSION

In the present investigation, it is observed that approximately 80% of patients report some comorbidity and about 66% have a poor quality of life. These variables were completely independent.

The prevalence of comorbidity observed in the present investigation is in the range of that reported in previous studies that documented prevalence between 50 and 90 of patients suffering from COPD<sup>14,15</sup>. Comorbidity is the rule in patients with COPD; however, the frequency varies according to the characteristics of the populations examined<sup>29</sup>.

In the same way, it was observed in the present analysis that the quality of life of patients with COPD is independent of the associated comorbidity. This observation is consistent with the findings of Battaglia *et al*<sup>16</sup> who reported that cardiac arrhythmia comorbidities, diabetes, coronary heart disease, hypertension, congestive heart failure and major depressive disorder did not significantly impair the quality of life of Italian patients. However, this observation diverges substantially from the measurements made by Putcha *et al*<sup>17</sup> that showed that some comorbidities negatively affected the quality of life in a group of American patients. Undoubtedly, the association is marked by physiological changes, without forgetting the social and cultural aspects that modify the course of any illness, which add comorbidity to the pulmonary function of patients with COPD<sup>8,30</sup>.

The evaluation of comorbidity in patients with COPD is essential not only in therapeutic plans and actions aimed at comprehensive rehabilitation but can also help to estimate the impact on quality of life, according to the nature of comorbidity. It is evident that some comorbidities, for

example, congestive heart failure, can significantly deteriorate the symptoms of COPD and the overall performance of patients<sup>11,14,31</sup>.

This study provides new knowledge about the association between general comorbidity and quality of life in a group of COPD patients living at sea level. However, it has the inherent limitations of transversal analytical studies that do not allow to know with complete certainty the direction of the association<sup>32</sup>. An additional barrier is represented by the heterogeneous nature of the diseases considered for the comorbidity category, without considering the physiological aspects that explain the association. And finally, the size of the sample for the calculation of the association for comorbidities with low prevalence should be considered small<sup>33</sup>.

As a conclusion, comorbidity is present in four out of five and the significant deterioration in the quality of life of two out of every three patients with COPD in Santa Marta, Colombia. However, quality of life is independent of comorbidity. New research is needed to quantify this relationship in a larger sample of patients with specific comorbidities.

## DECLARATION ON CONFLICT OF INTEREST

The authors have no conflicts of interest to express.

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