

# Risk Factors to predict one-year Community-Acquired Pneumonia in a Low-Middle Income Country: A Prospective Cohort Study

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## BACKGROUND:

Community-acquired pneumonia (CAP) is the principal cause of mortality due to infectious diseases globally. Some risk factors have been identified for CAP, such as age, smoking, environmental exposures, malnutrition, previous CAP, chronic bronchitis/chronic obstructive pulmonary disease (COPD), asthma, functional impairment, poor dental health, and immunosuppressive therapy, among others. However, these studies were conducted in high-income countries and patients without comorbid conditions. Therefore, we aimed to identify the risk factors associated with CAP development within a one-year follow-up in a prospective cohort of patients with comorbid conditions in Colombia.

## METHODS:

This prospective cohort of adult patients with chronic comorbidities between 2020-and 2022 in Bogotá, Colombia. Univariate analysis and multivariate logistic regression model were developed to identify the variables associated with CAP development within a one-year follow-up.

The logistic regression model included variables with a p-value < 0.20 in the univariate analysis.

## RESULTS:

A total of 810 patients were included in the study. Median [IQR] age was 63 [53-62] and the most common comorbidities were 52.2% [423/810] arterial hypertension, 21.7% [176/810] coronary disease, and 19.0% [154/810] congestive heart failure. To date, 678 follow-ups have been made. Thirty-four patients died before the 6-month follow-up, and 46 were lost, leaving 598 patients included in the analysis. The cumulative incidence of CAP was 4.3% [26/598] during one year. After adjusting the logistic regression model, the main risk factors associated with pneumonia development were COPD [OR 4.30, 95% CI 1.66-11.11, p < 0.01], and previous antibiotic treatment [OR 4.08, 95% CI 1.08-15.29, p = 0.04] (Table 1).

## CONCLUSIONS:

Patients with a history of COPD or previous antibiotic treatment have higher risk of developing pneumonia within one year.

**Table 1.** Logistic regression analysis

Variable	Univariate Analysis		Multivariate Analysis	
	P-value	OR (95%CI)	P-value	OR (95%CI)
<b>Demographic</b>				
Age	0.14	1.00 (0.99-1.00)		
Male	0.45	0.98 (0.95-1.02)		
BMI	0.45	1.00 (0.99-1.00)		
Health worker	0.14	1.04 (0.98-1.11)	0.10	2.58 (0.81-8.22)
Geriatric home	0.44	0.95 (0.84-1.07)		
Number of people living together	0.59	1.00 (0.99-1.01)		
Number of children living together	0.64	1.00 (0.97-1.03)		
Overcrowding	0.23	0.95 (0.88-1.03)		
<b>Comorbid conditions</b>				
Smoke	0.37	1.02 (0.97-1.07)		
Alcoholism	0.82	0.95 (0.63-1.43)		
Obesity	0.79	1.00 (0.96-1.05)		
Stroke	0.56	0.95 (0.81-1.11)		
COPD	<b>&lt;0.01</b>	<b>1.08 (1.02-1.14)</b>	<b>&lt;0.01</b>	<b>4.30 (1.66-11.11)</b>
OSAHS	0.79	0.99 (0.94-1.04)		
History of pneumonia	0.23	1.04 (0.97-1.12)		
Anemia	0.62	0.95 (0.79-1.14)		
Transplantation	0.21	1.10 (0.94-1.28)		
Bronchiectasis/ cystic fibrosis	0.82	0.95 (0.63-1.43)		
Cancer	0.22	0.95 (0.88-1.02)		
Cirrhosis	0.82	0.95 (0.63-1.43)		
Dementia	0.70	0.95 (0.75-1.20)		
Diabetes Mellitus	0.44	1.01 (0.97-1.07)		
Liver disease	0.56	0.95 (0.81-1.11)		
Mental disease	0.59	0.95 (0.80-1.12)		
Neurological disease	0.35	1.04 (0.95-1.13)		
Cardiac arrhythmia	0.47	0.98 (0.93-1.03)		
Myocardial infarction	0.70	0.99 (0.94-1.03)		
Coronary disease	0.45	0.98 (0.94-1.02)		
Heart failure	0.69	0.99 (0.95-1.03)		
Arterial Hypertension	0.21	1.02 (0.98-1.05)		
Arthritis/arthritis	<b>0.03</b>	<b>1.10 (1.01-1.21)</b>	0.11	2.98 (0.76-11.60)
Renal disease	0.75	1.00 (0.95-1.05)		

  

Variable	Univariate Analysis		Multivariate Analysis	
	P-value	OR (95%CI)	P-value	OR (95%CI)
<b>Comorbid conditions</b>				
Renal replacement therapy	0.49	1.01 (0.96-1.06)		
Leukopenia/ neutropenia	0.48	0.95 (0.83-1.08)		
Autoimmune disease	0.69	1.01 (0.94-1.09)		
Lupus	0.21	1.10 (0.94-1.28)		
Other immunosuppression	<b>0.04</b>	<b>1.09 (1.00-1.19)</b>	0.08	3.30 (0.85-12.77)
<b>Clinical condition</b>				
Tracheostomy	0.82	0.95 (0.63-1.43)		
Bladder catheter	0.37	0.95 (0.86-1.05)		
Prosthetic material	0.37	0.95 (0.86-1.05)		
Recurrent infections	0.41	0.95 (0.85-1.06)		
Resistant bacteria infections	0.53	0.95 (0.82-1.10)		
Antibiotics use last year	0.59	0.95 (0.80-1.12)		
Biologic therapies use	0.62	1.01 (0.94-1.09)		
Chemotherapy	0.48	0.95 (0.83-1.08)		
Emergency visit last year	0.39	0.95 (0.85-1.06)		
Hospitalized last year	0.48	0.95 (0.83-1.08)		
Days of last year's hospitalization	0.45	0.98 (0.93-1.02)		
Pneumococcal colonization	0.53	0.95 (0.82-1.10)		
Pneumococcal vaccination history	0.08	1.04 (0.99-1.10)		
Number of pneumococcal vaccine doses history	0.15	1.03 (0.98-1.08)		
Influenza vaccination history	0.08	1.03 (0.99-1.06)		
Hospitalization in the last weeks (other than pneumonia)	0.49	1.01 (0.96-1.06)		
Antibiotic management in the last weeks (other than pneumonia)	0.05	1.08 (0.99-1.18)	<b>0.04</b>	<b>4.08 (1.08-15.29)</b>
Influenza vaccination in the last year	0.34	1.02 (0.97-1.06)		
Pneumococcal vaccination in the last year	0.96	0.99 (0.91-1.08)		
COVID-19 vaccination in the last weeks	0.21	1.04 (0.97-1.13)		