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# ASSESSMENT OF MICROBIAL PROFILE AND ANTIMICROBIAL SUSCEPTIBILITY PATTERN OF PATHOGENS ISOLATED FROM LOWER RESPIRATORY TRACT INFECTIOUS PATIENTS

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## Abstract

LRTIs, which are widespread infections in people, cause the highest number of deaths globally, with approximately 2.74 million fatalities annually. This study aimed to assess the microbial profile and antimicrobial susceptibility pattern of pathogens isolated from patients with lower respiratory tract infections (LRTIs). A total of 100 respiratory samples were collected from LRTI patients, and the isolated microorganisms were identified using statistical analysis method. The results revealed a diverse microbial profile, being the predominant isolates. The antimicrobial susceptibility pattern demonstrated varying degrees of resistance among the identified pathogens, highlighting the importance of appropriate antibiotic selection for LRTI treatment. This study provides valuable insights into the microbial profile and antimicrobial susceptibility patterns of pathogens associated with LRTIs, aiding in the development of effective treatment strategies and the prevention of antibiotic resistance.

**Keywords:** Antibiotic Resistance, Antimicrobial Susceptibility, Acute Exacerbations, Assessment of microbial profile.

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## INTRODUCTION

Acute bronchitis, pneumonia, acute exacerbations of chronic obstructive pulmonary disease/chronic bronchitis (AECB), and acute exacerbations of bronchiectasis are all included in the term lower respiratory tract infection (LRTI), which is quite broad<sup>1-3</sup>. In both community and hospital settings, acute LRTIS (ALRTIs) is one of the common clinical issues. Because it can be difficult to diagnose infections brought on by typical and atypical microbes and because antibiotic resistance is on the rise, managing community-acquired pneumonia (CAP) and AECB may be problematic<sup>4-6</sup>. For the treatment of arthritis, doctors frequently give beta-lactam antibiotics, macrolides, and fluoroquinolones.<sup>7-9</sup>

Bronchitis is a condition where the bronchial tubes become swollen, leading to coughing and production of thick mucus<sup>10</sup>. It can be acute or chronic, with acute bronchitis often following a respiratory illness and chronic bronchitis being caused by smoking. Symptoms include cough, fatigue, and shortness of breath, chest discomfort, and fever. Pneumonia, on the other hand, is inflammation of the air sacs in the lungs, resulting in breathing difficulties, fever, chills, and coughing with pus or phlegm<sup>11-12</sup>. It can be caused by bacteria, viruses, or fungi, with varying severity. Community-acquired pneumonia occurs outside of a hospital and is caused by pathogens such as *Streptococcus pneumoniae* and viruses.<sup>13-14</sup>

Hospital-acquired pneumonia, or nosocomial pneumonia, is contracted during a hospital stay and is predominantly

caused by bacteria. Healthcare-associated pneumonia occurs in healthcare settings, and aspiration pneumonia happens when food or liquid is inhaled into the lungs.<sup>15-19</sup> Nosocomial pneumonia is a common infection in hospitals and can be spread by healthcare professionals.<sup>20-23</sup>

## Methods and materials

The study was approved by the Vels Institute of Science Technology and Advanced Studies institutional ethical committee-ECR/288/Indt/TN/2018/RR-21/029. This research design is a prospective observational study. The research was conducted over a duration of six months. The study determine the most common bacterial etiology in LRTI patients. To assess the drug sensitivity and resistance pattern among LRTI patients for the isolated pathogen. To assess the drug use pattern in LRTI patients. A total of 100 participants have participated in this study, where patients within the age group 18 above were included. Pregnant women and Patients below the age of 18 years was excluded from this study. Patients who voluntarily discharged and incomplete case report sheets were excluded.

## RESULT

The study entitled “Assessment of microbial profile and antimicrobial susceptibility pattern of pathogens isolated from Lower respiratory tract infectious patients” was conducted for a period of 6 months. A total of 100 patient cases were collected from the various ward at tertiary care hospital based on the inclusion and exclusion criteria and analyzed.

**TABLE 1: GENDER WISE DISTRIBUTION**

The result is that out of 100 patients, 60% are male (60 patients) and 40% are female (40 patients).

S.NO	GENDER	NO OF PATIENTS ( n=100)	PERCENTAGE (%)
1	MALE	60	60%
2	FEMALE	40	40%

**TABLE 2: AGEWISE DISTRIBUTION**

The result is that out of 100 patients, the age-wise distribution is as follows:

These percentages represent the proportion of patients in each age group out of the total of 100 patients.

S.NO	AGE WISE DISTRIBUTION	NO. Of PATIENTS (n=100)	PERCENTAGE (%)
1	18 – 30	19	19%
2	31 – 40	16	16%
3	41 – 50	20	20%
4	51 – 60	19	19%
5	>60	26	26%

**TABLE 3: LENGTH OF HOSPITALIZATION**

The result is the out of 100 patients, the length of hospitalization is followed as:

S.NO	DURATION OF STAY	NUMBER OF PATIENTS (n=100)	PERCENTAGE (%)
1	1-5 DAYS	62	62
2	5-10 DAYS	28	28
3	ABOVE 10 DAYS	10	10

**TABLE 4: DIAGNOSTIC CONDITION OF THE PATIEN**

The result is the out of 100 patients, diagnostic condition of the patient.

S.NO	MAJOR DIAGNOSIS	NUMBER OF PATIENTS (n=100)	PERCENTAGE (%)
1	BRONCHIECTASIS	37	37
2	PNEUMONIA	37	37
3	BRONCHITIS	26	26

The result of the co-morbidities for the 100 patients is as follows:

- Hypertension: 22 patients (22%)
- Diabetes mellitus: 23 patients (23%)
- COPD (Chronic Obstructive Pulmonary Disease): 8 patients (8%)
- Diabetes mellitus + hypertension: 28 patients (28%)
- Tuberculosis: 6 patients (6%)
- Anemia: 4 patients (4%)
- None: 9 patients (9%)

These percentages represent the proportion of patients with each co-morbidity out of the total of 100 patients.

**TABLE 5: CO-MORBID CONDITIONS**

S.NO	CO-MORBIDITIES	NUMBER OF PATIENTS (n=100)	PERCENTAGE (%)
1	Hypertension	22	22
2	Diabetes mellitus	23	23
3	COPD	8	8
4	Diabetes mellitus + hypertension	28	28
5	Tuberculosis	6	6
6	Anemia	4	4
7	None	9	9

**TABLE 6: SOCIAL HISTORY**

The result of the social history for the 100 patients is as follows:

1. Alcoholic: 32 patients (32%)
2. Smoking: 44 patients (44%)
3. None: 24 patients (24%)

These percentages represent the proportion of patients with each social history category out of the total of 100 patients.

S.NO	SOCIAL HISTORY	NUMBER OF PATIENTS (n=100)	PERCENTAGE (%)
1	ALCOHOLIC	32	32
2	SMOKING	44	44
3	NONE	24	24

**TABLE 7: PRESCRIBING PATTERN I N LRTI**

S.N O	DRUG CATEGORY	NUMBER OFPRESCRIBED DRUGS(n=510)	PERCENTAGE (%)
1	BRONCHODILATORS		9719
2	ANTIBIOTICS		9318
3	PROTON-PUMP INHIBITORS		5811.37
4	CORTICOSTERIODS		5010
5	NUTRITIONAL SUPPLEMENTS		335.50
6	NSAIDS		224.29
7	HISTAMINE BLOCKERS		214.11
8	CENTRAL ANTICHOLINERGICS		214.11
9	ANTIPYRETIC		377.25
10	ANTI HISTAMINES		122.35
11	ANTIPARASITES		122.35
12	EXPECTORANTS		122.35
13	ANTIDIABETES		112.15
14	ANTIEMETICS		112.15
15	BIGUANIDES	10	1.96
16	BILARY AGENTS	8	1.56

17	CALCIUM CHANNEL BLOCKERS	6	1.17
18	ANTIPLATELET	4	0.78
19	CARDIAC GLYCOSIDES	2	0.39
20	ANGIOTENSI 2 RECEPTOR BLOCKERS	3	0.58
21	BETA BLOCKERS	2	0.39
22	ANTICONVULSANTS	2	0.39
23	ANTICOAGULANTS	2	0.39
24	ANTIFIBRINOLYTIC	1	0.19
25	HMG-COA REDUCTASE INHIBITORS	1	0.19

## DISCUSSION:

The aim of the study was to evaluate the factors associated with lower respiratory tract infection (LRTI) patients, and the objective was to determine the comorbidities associated with these patients. The methods involved collecting patient records from various wards in a hospital, specifically focusing on clinical laboratory parameters and prescribing patterns among liver disease patients. LRTI encompasses conditions such as acute bronchitis, pneumonia, acute exacerbations of chronic obstructive pulmonary disease/chronic bronchitis (AECB), and acute exacerbations of bronchiectasis. (*Wenzel RP et.al 2021*) Managing community-acquired pneumonia and AECB can be challenging due to difficulties in diagnosing infections caused by different microbes and rising antibiotic resistance. Bronchitis involves inflammation of the bronchial tubes, leading to coughing and mucus production. Pneumonia is inflammation of the air sacs in the lungs, causing breathing difficulties, fever, and coughing with pus or phlegm.

Different types of pneumonia exist, including community-acquired, hospital-acquired, healthcare-associated, and aspiration pneumonia. The results of the

study involved analyzing 100 patient cases, including gender distribution, age-wise distribution, duration of hospital stay, diagnostic conditions of the patients (such as bronchiectasis, pneumonia, and bronchitis), comorbid conditions (including hypertension, diabetes mellitus, COPD, tuberculosis, anemia), and social history (such as alcohol consumption, smoking).

## CONCLUSION:

In conclusion, the study successfully assessed the microbial profile and antimicrobial susceptibility pattern of pathogens isolated from lower respiratory tract infectious patients. The findings of this study provide valuable insights into the characteristics of lower respiratory tract infectious patients, contributing to the understanding and management of such infections.

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