



## IDENTIFICATION OF BACTERIOLOGICAL PROFILE PATTERN OF LOWER RESPIRATORY TRACT INFECTIONS IN A TERTIARY CARE HOSPITAL IN EASTERN INDIA.

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### ABSTRACT

Lower respiratory tract infections are the major cause of death from infectious disease, even in modern antibiotic era. The emergence of multidrug resistance among organisms is an issue of increasing concern. The study was conducted with the aim of identification of respiratory pathogens and their antibiogram. Lower respiratory secretions (sputum, pleural fluid, bronchoalveolar lavage) of 400 patients over one year were cultured, identified and antimicrobial susceptibility was performed by standard methods. Out of these, 244 were culture positive. Most prevalent pathogen was *Klebsiella pneumoniae*. Sensitivity of the gram negative and gram positive isolates were performed to find out most effective drug by in vitro tests.

### KEYWORDS:

antimicrobial, antibiogram.

### INTRODUCTION

Lower respiratory tract infections are among the most common infectious diseases of humans worldwide [1]. LRTI are the most common bacterial infections among patients in neurological intensive care units (NICUs), occurring in 10-25% of all intensive care units (ICU) patients and resulting in high overall mortality, which may range from 22-71%. Infection and antibiotic resistance are important public health issues [2-3]. It is not a single disease but a group of specific infection each with a different epidemiology, pathogenesis, clinical presentation and outcome. The etiology and symptomatology of respiratory diseases vary with age, gender, season, the type of population at risk and other factors. These are frequently the first infection to occur after birth and pneumonia is too often the final illness to occur before death [4]. Respiratory tract infections are usually contracted through air and by direct contact [5].

In India, acute lower respiratory tract infection is responsible for one million deaths. There is inadequate information from India on various lower respiratory tract bacterial pathogens and their resistance patterns in hospital settings. In addition, the emergence of resistance as a major problem has drawn attention to a need for better diagnostic techniques and newer drugs to allow more specific therapy [6].

At present the therapy for community-acquired lower respiratory tract infections is often empirical, and how to choose an effective antimicrobial agent is a new challenge to the clinicians, as the composition and the resistance to antimicrobial agents of infectious pathogens was changing frequently. The knowledge of likely prevalent strains along with their antimicrobial resistance pattern will help in better management of patients and framing the antibiotic policy [7].

Hence, the present study was undertaken to define the common bacterial profile in lower respiratory tract infection.

### AIMS AND OBJECTIVES

To identify and characterize bacterial pathogens causing lower respiratory tract infections.

### MATERIALS AND METHODS

The study was conducted for the period of one year from February 2016 to January 2017 in the Microbiology Department of CNMC, a tertiary care hospital. The LRT specimens from patients admitted in CNMC during the study period were processed after screening the sputum sample under microscope. Following culture, the isolated organisms were identified and antimicrobial sensitivity was performed Kirby Bauer Method.

### INCLUSION CRITERIA

Adults with age >18 years showing the symptoms of LRTI, cough and distress for more than a week, without prior antibiotic therapy were taken for diagnosis.

Samples in leak proof, sterile containers were taken.

Fresh coughed out or induced sputum samples, within 2 hrs of collection were taken.

### EXCLUSION CRITERIA

24 Hrs sputum samples were not taken.

Submission in an improper and non-sterile technique collection of specimen.

### RESULTS AND INTERPRETATIONS

A total of 400 lower respiratory tract samples (sputum) of all ages and both sexes were studied. Out of the 400 collected samples 100 were obtained from females and 300 were obtained from males.

In the present study, out of 400 samples, 244 (39%) were culture positive. Out of the positive culture, 44 were GPC and 200 were GNB.

Organism	Total number of isolated	Percentage (%)
<i>Klebsiella sp</i>	100	40.98%
<i>Acinetobacter sp</i>	80	32.79%
<i>Pseudomonas sp.</i>	20	8.2%
<i>Staphylococcus aureus</i>	44	18.03%

**Table 1: Distribution of Micro-organisms**

The occurrence of bacterial pathogens varies with age, in that, age group ranging from age group 18-30 years recorded (4.34%) each, 31-40 years (13.04%), 41-50 years recorded 26.08% isolates followed by 51-60 years, 61-70 years, 71-80 years showed (17.39%) each. The age group 51-60 years recorded highest number of isolates.

Sex related occurrence of pathogens reveals male subjects reported higher number of pathogens compared to females.

The most common pathogen causing lower respiratory tract infection isolated was *Klebsiella sp.* 100 (40.98%) followed by *Pseudomonas* 20 (8.2%), *Acinetobacter sp.* 80 (32.79%), *Staphylococcus aureus* 44 (18.03%).

### DISCUSSION

The high prevalence of pathogens reported among patients ranging 41-50 years in this study, this was in accordance with the study conducted by Rana et al [7]. where age group ranging from 41-50 years (44.4%) recorded highest isolation did not agree with findings of Panda et al., 2012, in which they recorded higher occurrence among patients ranging from 51-60 and 60-70 years. LRTIs were found to be more prevalent in males than females in our study similar findings were observed by the preponderance of males in present study as among the total number cases studied males were 33(55%) and females were 13 (21.66%) by Shrivastav et al [8]. These results contradicts the data obtained by El-

Mahmood et al [5].

In our study, Gram negative bacilli showed higher resistance patterns towards penicillin, third generation cephalosporins and beta lactam inhibitors. Similar observations were made by various reporters including Sofianou et al [9], and Goel et al.[2] showing increased prevalence of drug resistance among Gram negative bacilli strains from LRTI. The antimicrobial resistance among the respiratory pathogens is a major barrier interfering with an effective treatment. Differences in the prevalence of antimicrobial susceptibility may be due to several factors, which lead to selective pressure, as well as distribution of specific serotypes and the spread of resistant clones within certain areas.

### CONCLUSION

An increase in the predisposing conditions in recent years, like smoking, chronic alcoholism, lower immunity due to increasing age has resulted in an increased incidence of LRTIs. Indiscriminate and long-term use of antibiotics has emerged as an important predisposing factor for lower respiratory tract infections. Considering the fact that the etiology of LRTIs varies between different geographical regions and the antimicrobial susceptibility patterns also show variability, we emphasize the need to regularly update the etiology, predisposing factors and improve the laboratory diagnostic facilities. Improving the quality of samples may help in producing better laboratory results and thereby improved patient management.

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