## STUDY ON OCCURANCE, DISTRIBUTION AND ANTIBIOTIC SENSITIVITY PATTERN OF GRAM POSITIVE AND GRAM NEGATIVE BACTERIA AMONG SUSPECTED LOWER RESPIRATORY TRACT INFECTION PATIENTS VISITING BIR HOSPITAL

#### A Dissertation Submitted to the Central Department of Microbiology Tribhuvan University

# In Partial Fulfilment of the Requirements for the Award of the Degree

of

Master of Science in Microbiology (Medical Microbiology)

By

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#### RECOMMENDATION

This is to certify that **Mr. Shailendra Parajuli** has completed this dissertation work entitled "Study on Occurance, Distribution and Antibiotic Sensitivity Pattern of Gram Positive and Gram Negative Bacteria among Suspected Lower Respiratory Tract Infection Patients Visiting Bir Hospital" as a partial fulfillment of M.Sc. Degree in Microbiology under our supervision. To our knowledge, this is an original research work of his and has not been submitted for any other degree.

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#### ABSTRACT

Lower respiratory tract infections (LRTI) are common causes of morbidity and mortality worldwide. It was a prospective study carried out at Bir Hospital, Kathmandu from 15th April, 2010 - 14<sup>th</sup> July, 2010. This study comprised of 214 patients (93 in-patients and 121 out-patients). Sputum samples of 214 patients were collected and subjected to gram staining, bacterial culture and antibiotic sensitivity for bacterial isolates as per standard techniques.

Pathogenic organisms were isolated from 97 out of 214 cases (45.32%). Growth of pathogens were obtained from 45.16% of sputum samples in case of in-patients and 45.45% in out-patients. The maximum numbers of patients (52.34%) were above 50 years of age. Sex-wise distribution showed 61 (62.89% of the positive cases) males as compare to 36 (37.11%) females.

Gram negative bacteria (65.98%) outnumbered the growth of Gram positive bacteria. The commonest organisms isolated were *Klebsiella pneumoniae* (24.74%) followed by *Staphylococcus aureus* (18.56%). From hospitalized patients, *K. pneumoniae* (62.5%) was the most common pathogen isolated whereas *S. aureus* (61.11%) was the second predominant organism. Single organism was isolated in most of the samples 92.78% (90/97) but in 7.22% cases (7/42) confluent growth of two organisms were observed. Incidence of *Haemophilus influenzae* and *Streptococcus pneumoniae* was found low in our study.

Gram negative bacteria were found most susceptible to Chloramphenicol (100%), Levofloxacin (100%) followed by Ciprofloxacin (82.81%), Gentamicin (76.56%), Amikacin (74.58%) and Cefotaxime (64.06%). They were least susceptible to Cotrimoxazole (37.5%), Cephalexin (34.38%) and Ampicillin (18.75%). Gram positive bacteria were found most susceptible to Ciprofloxacin (84.85%) followed by Cloxacillin (75%), Erythromycin (69.70%), Cephalexin (66.67%) and Ampicillin (63.64%). They were least susceptible to Cotrimoxozole (37.5%).

Incidence of MDR was 72.22% in *S. aureus* and 22.22% in -haemolytic streptococci. Among GNB all the isolates of *C. freundii* and *E. coli* were MDR whereas 75% of *K. oxytoca*, 58.33% of *K. pneumoniae* followed by 55.56% of *P. aeruginosa* and 44.44 % of *Acinetobacter* spp. were MDR.

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## List of Abbreviations

ARI	Acute respiratory infections
WHO	World Health Organization
LRTI	Lower respiratory tract infection
COPD	Chronic obstructive pulmonary disease
CAP	Community acquired pneumonia
РТВ	Pulmonary Tuberculosis
AECB	Acute exacerbation of chronic bronchitis
SOB	Shortness of Breath
S. aureus	Staphylococcus aureus
S. pneumoniae	Streptococcus pneumoniae
H. influenzae	Haemophilus influenzae
P. aeruginosa	Pseudomonas aeruginosa
C. pneumoniae	Chlamydia pneumoniae
M. pneumoniae	Mycoplasma pneumoniae
L. pneumophila	Legionella pneumophila
ALRI	Acute lower respiratory infection
Hib	Haemophilus influenzae, type b
MRSA	Methicillin-resistant-Staphylococcus aureus
CA-MRSA	Community-acquired MRSA
HAI	Healthcare-associated infections
NA	Nutrient Agar
MA	Mac conkey Agar
BA	Blood Agar
CA	Chocolate Agar
MHA	Mueller Hinton Agar
MDR	Multi Drug Resistant
CDC	Centers for Disease Control and Prevention
CLSI	Clinical and Laboratory Standard Institute
NK	Natural killer
TLRs	Toll-like receptors
LBW	Low birth weight
IL-8	Interleukin-8
V/Q	A ventilation-perfusion
BAL	Bronchoalveolar lavage
PCR	Polymerase Chain Reaction