PREVALENCE AND ANTIMICROBIAL SUSCEPTIBILITY PROFILE OF *ACINETOBACTER* SPP IN KATHMANDU MEDICAL COLLEGE, SINAMANGAL, NEPAL

A DISSERTATION

SUBMITTED TO THE CENTRAL DEPARTMENT OF MICROBIOLOGY

TRIBHUVAN UNIVERSITY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

MASTER OF SCIENCE IN MICROBIOLOGY

(MEDICAL MICROBIOLOGY)

BY

PITAMBAR BHANDARI

CENTRAL DEPARTMENT OF MICROBIOLOGY
TRIBHUVAN UNIVERSITY
KIRTIPUR, KATHMANDU, NEPAL
2012

RECOMMENTDATION

This is to certify that **Mr. Pitambar Bhandari** has completed this dissertation work entitled "**Prevalence And Antimicrobial Susceptibility Profile Of *Acinetobacter* Spp In Kathmandu Medical College, Sinamangal, Nepal**" as a partial fulfillment of M.Sc. Degree in Medial Microbiology under our supervision. To the best of our knowledge, this is an original research work of him and has not been submitted for any other degree.

……

Dr.Dwij Raj Bhatta
M.Sc., Ph.D. (Microbiology),Associate Professor, Head, Central of Department of Microbiology, Tribhuvan University, Kirtipur, Kathmandu, Nepal.

……

Dr.Chandra.Prakash Bhatta
M.Sc., Ph.D. (Microbiology), Associate Professor, Kathmandu Medical College, Sinamangal, Kathmandu, Nelpal.

……..

Mr. Binod Lekhak
M.Sc. (Microbiology), Assistant Professor,
Central Department of Microbiology,
Tribhuvan University, Kirtipur, Kathmandu,
Nepal.

Date : 2012-03-27

CERTIFICATE OF APPROVAL

On the recommendation of Associate Professor Dr. Dwij Raj Bhatta, Dr.Chandra.Prakash Bhatta and Assistant Professor Mr. Binod Lekhak, this dissertation work by **Mr. Pitambar Bhandari** entitled "**Prevalence And Antimicrobial Susceptibility Profile Of *Acinetobacter* Spp In Kathmandu Medical College, Sinamangal, Nepal**" has been approved for the examination and is submitted to the Tribhuvan University for partial fulfillment of the requirement for M.Sc. Degree in Medical Microbiology.

. . . . . .

Dr. Dwij Raj Bhatta, Ph.D,
Head of Department,
Central Department of Microbiology,
Tribhuvan University, Kirtipur, Kathmandu,
Nepal

Date : 2012-7-2

BOARD OF EXAMINERS

Recommended by :

……..
Assoc. Prof. Dr. Dwij Raj Bhatta, Ph.D.
(Supervisor)

……
Assoc. Prof. Dr. Chandra Prakash Bhatta, Ph.D.
(Supervisor)

……
Mr. Binod Lekhak
(Supervisor)

Approved by :

……
Assoc. Prof.Dr. Dwij Raj Bhatta, Ph.D,
Head of the Department

Examined by :

……
Prof. Dr. Bharat Mani Pokhrel, Ph.D.
(External Examiner)

……
Dr. Megha Raj Banjara, Ph.D,
(Internal Examiner)

Date: 2012-07-02

ACKNOLEDGEMENTS

I would like to express my profound gratitude and earnest compliment to respected supervisors:**Associate Professor Dr. Dwij Raj Bhatta**, Head, Central Department of Microbiology, Tribhuvan University; **Associate Professor Dr. Chandra Prakash Bhatta,** Kathmandu Medical college, Sinamangal, and **Mr. Binod Lekhak, Assistant Professor**, Central Department of Microbiology, Kirtipur, for their proficient guidance, critical supervision, kind encouragement, and support for the completion of this research work.

I express my earnest appreciation to respected teachers, **Dr. Anjana Singh, Dr. Prakash Ghimire, Dr. Shreekanta Adhikari, Dr. Megha Raj Banjara, Mr. Shaila Basnyat, Mr. Dev Raj Joshi and Mr. Komal Raj Rijal** from Central Department of Microbiology, Tribhuvan University for their constant encouragement and support.

I also would like to express my gratitude to **Prof. Dr. Govinda Sharma** (CEO)**, Prof. Dr. Hemang Dixit** (Principal)**, Prof. Dr. M.R Baral** (Medical Director)**, Prof. Dr. Hari Govinda Shrestha,** (Head, Pathology)**, Dr. Silviya Hada** (Lecturer, Microbiology)**, Dr. Badri Thapa** (Lecturer, Microbiology)**,** and other doctors and sisters who provided me clinical details about patients, from Kathmandu Medical College, Sinamangal, for their co-operation and constant support during my research period. I am also thankful to all the staffs of Pathology Department from Kathmandu Medical College, Sinamangal for their kind support and familiar environment they provided throughout my research period. I am incredibly thankful to friends of Central Department of Microbiology for their moral support and positive criticism.

Finally, I would like to express my emotional feeling towards my parents, my wife **Ms. Sabitra Bhandari (Gaire**) who showed their blessing, love, affection constant encouragement and moral support in every step in my life without whom I feel incomplete.

Date : 2012-03-27 ……..

Mr. Pitambar Bhandari

ABSTRACT

Acinetobacter spp. is emerging as a greater threat and challenge worldwide due to its high prevalence and ability to acquire antimicrobial drug resistance by all known modes of mechanisms that is variable in different countries, regions, hospitals and even different wards. Hence, local surveillance based on local scenario of *Acinetobacter* is mandatory for the selection of proper therapeutic options by the clinicians. This study has the objective to determine the overall prevalence and antimicrobial susceptibility profile of *Acinetobacter* spp. and was out carried at Kathmandu Medical College, Sinamangal, Nepal from October 2009 to March 2010. In this study, Conventional bacteriological methods were used for the identification of *Acinetobacter* spp. and susceptibility testing was performed by disk-diffusion method recommended by Clinical Laboratory Standard Institute (CLSI).

The overall prevalence of *Acinetobacter* spp. was 9.1% out of 810 total bacterial isolates and 10.4% out of total 713 gram-negative isolates that was higher in males (52.7%) than in females (47.3%) of age-group 20-40 years and highest in intensive care units (72.2%) among different wards. Among isolates from different types of specimens, the prevalence of *Acinetobacter* spp. was found to highest in miscellaneous specimens followed by catheter tips and respiratory tract specimens. Out of 24 antimicrobial drugs used against all *Acinetobacter* spp., Carbapenems, Ceftriaxone, Co-trimoxazole, Cefoperazone/sulbactam and Chloramphenicol were the most effective antimicrobials in this hospital.

In conclusion, the prevalence of *Acinetobacter* spp in Kathmandu Medical College was higher in male patients of age groups (20-40) year and in intensive care units (ICUs) in miscellaneous specimens followed by catheter tips and respiratory tract specimens. Carbapenems, Ceftriaxone, and Co-trimazole were the most effective antimicrobials against *Acinetobacter* spp. in this hospital.

Key words: *Acinetobacter*, prevalence, susceptibility profile, Carbapenems, Ceftriaxone, Co-trimoxaxole

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOGRAPHS

LIST OF APPENDICES

LIST OF ABBREVIATIONS

AAC	:	Aminoglycoside Acetyltransferase
ADC	:	*Acinetobacter*- Derived Cephalosporinase
AFLP	:	Amplified Fragment Length Polymorphism
ANT	:	Aminoglycoside Nucleotidyl Transferase
APH	:	Aminoglycoside Phosphatases
BAL	:	Bronchioalveolar Lavage
CAT	:	Chloramphenicol Acetyl Transferees
CVP	:	Central Venous Pressure
DHFR	:	Dihydrofolate reductase
Gyr B	:	Gyrase B
HCP	:	Health Care Professional
IS	:	Insertion Sequence
ITS	:	Intergenic Spacer
KMC	:	Kathmandu Medical College
LAM	:	Leeds *Acinetobacter* Medium
MYSTIC	:	Meropenem Yearly Susceptibility Test Information Collection
NNIS	:	National Nosocomial Infection Surveillance
OMP	:	Outer Membrane Proteins
PBP	:	Penicillin Binding Protein
PCR-ESI-MS	:	PCR-Electro-Spray Ionization Mass Spectroscopy
RecA gene	:	Recombinant A gene
RND	:	Resistance Nodulation Division
SIM	:	Seoul Integron- encoded MBL
SMART	:	Study for Monitoring Antimicrobial Resistance Ttrends
SPSS	:	Statistics Package for Social Science
VAP	:	Ventilator Associated Pneumonia
VIM	:	Verona Integron- encoded MBL