MULTIDRUG RESISTANT BACTERIAL ISOLATES AT NOBEL MEDICAL COLLEGE TEACHING HOSPITAL

A DISSERTATION

SUBMITTED TO THE CENTRAL DEPARTMENT OF MICROBIOLOGY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN MICROBIOLOGY (MEDICAL)

BY

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RECOMMENDATION

This is to certify that **Mr. Prashant Thakur** has completed this dissertation work entitled **"Multidrug Resistant Bacterial Isolates at Nobel Medical College Teaching Hospital"** as a partial fulfillment of M.Sc. Degree in Microbiology under our supervision. To our knowledge, this thesis work has not been submitted for any other degree.

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ABSTRACT

Antimicrobial resistance is one of the big issues especially among members of family enterobacteriaceae. This study was conducted for a period of 6 months from January to June 2011 at Nobel Medical College Teaching Hospital and Research Centre with the objective to know the multi-drug resistant bacterial isolates of family enterobacteriaceae from different clinical samples. A total of 2454 non-repeated clinical samples were processed during the study by using standard microbiological techniques and the antibiotic susceptibility pattern in vitro was evaluated by modified Kirby-Bauer disc diffusion method. The total growth was 25.35% (n=622). Among them gram positive and gram negative bacteria accounted for 48.0% (n=298) and 52.0% (n=324) respectively. Of total gram negative isolates, 92.60% (n=300) belonged to family enterobacteriaceae and 7.40% (n=24) were gram negative other than enterobacteriaceae (*Pseudomonas aeruginosa*; *Acinetobacter* species). The bacterial isolates were of 6 different species isolated from 7 different clinical specimens. Among them, *E. coli* 237/300 (79.0%) were the most predominant followed by *Citrobacter* species 36/300 (12.0%), *Klebsiella pneumoniae* 16/300 (5.33%) and *Enterobacter* species, *Proteus mirabilis* and *Morganella morganii* with 0.33% each. Among the antibiotics used, imipenem (98.11%) followed by amikacin (89.55%), meropenem (89.47%) and choramphenicol (78.37%) were found to be most effective. About half of the isolates were susceptible to cefotaxime (52.90%), ceftazidime (42.34%) and ciprofloxacin (53.50%). Overall 59.00% (n=178) of the isolates were multiple-drug resistant with higher among in-patients than out-patients ($p<0.05$). Of total multiple-drug resistant, *E. coli* accounted for highest 81.35% (n=144) followed by *Citrobacter* species 14.40% (n=25). Of total *E. coli* isolated 52.74% (144/273) were multiple-drug resistant while 69.44% (25/36) and 40.00% (6/15) *Citrobacter* species and *K. pneumoniae* respectively were multiple-drug resistant. The study found the higher magnitude of the problems of multiple-drug resistance among enterobacteriaceae that necessitates a reevaluation of first and second line therapies for the treatment of infections due to these organisms and regular monitoring of the usage in order to make reliable information available for optimal empirical therapy.

Key Words: Antimicrobial resistance, Enterobacteriaceae, Multi-drug resistant

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURE

LIST OF PHOTOGRAPHS

LIST OF ABBREVIATIONS

ABL	AmpC Beta Lactamase
BA	Blood Agar
CA	Chocolate Agar
CFU	Colony Forming Unit
CLSI	Clinical and Laboratory Standard Institute
EDTA	Ethylene Diamine Tetra Acetate
ESBL	Extended Spectrum Beta Lactamase
LRTI	Lower Respiratory Tract Infection
MA	MacConkey Agar
MBL	Metallo Beta Lactamase
MDR	Multi-Drug Resistant
MHA	Mueller Hinton Agar
MIC	Minimum Inhibitory Concentration
MRVP	Methyl Red/Voges Proskauer
NCCLS	National Committee for Clinical Laboratory Standards
NCTC	National Culture Type Collection
NMCTHRC	Nobel Medical College Teaching Hospital and Research Centre
PBP	Penicillin Binding Protein
TSI	Triple Sugar Iron
UTI	Urinary Tract Infection

LIST OF APPENDICES