ANTIMICROBIAL SUSCEPTIBILITY PATTERN OF COMMUNITY AND NOSOCOMIAL ISOLATES OF *Escherichia coli,* OBTAINED FROM URINE OF PATIENTS VISITING B AND B HOSPITAL, LALITPUR, NEPAL

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DISSERTATION

SUBMITTED TO THE CENTRAL DEPARTMENT OF MICROBIOLOGY

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

BY

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2010

RECOMMENDATION

This is to certify that **Ms. RAKSHYA PAUDYAL** has completed this dissertation work entitled **"ANTIMICROBIAL SUSCEPTIBILITY PATTERN OF COMMUNITY AND NOSOCOMIAL ISOLATES OF *Escherichia coli,* OBTAINED FROM URINE OF PATIENTS VISITING B AND B HOSPITAL, LALITPUR, NEPAL"** as a partial fulfillment of Masters of Science 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

The present study was conducted at B and B hospital, Lalitpur, Nepal during April 2008 to April 2009. It was carried out with the objective to isolate *Escherichia coli (E. coli*) causing urinary tract infection and determine its antimicrobial resistance trend.

Antimicrobial susceptibility to 16 antibiotics was determined for 555 *E. coli* isolates obtained from both community and hospitalized patients in B and B hospital following Modified Kirby Bauer disc diffusion method.

Carbapenems (Imipenem and Meropenem) were the most effective antibiotics (90% susceptible) followed by Cefoperazone sulbactam (84.3%). Similarly, Nitrofurantoin (75.5%) and Amikacin (74%) were the most active agents among the empirically used antibiotics. High percentage of resistance to Amoxicillin (77.4%), Nalidixic acid (71.4%), and Cotrimoxazole (67.2%) were observed in both sets of community and nosocomial isolates.

Isolates exhibiting resistance to multiple drug classes were high (70.1%) which were even higher in case of nosocomial isolates (90.5%) than in Community isolates (62.7%) which was also proven to be statistically significant ($p<0.05$). Similarly high multi drug resistant (MDR) strains were isolated from children (<16 years) than that from adults (≥16 years) where the association was again statistically significant ($p<0.05$).

Among only the MDR isolates, 97.7%, 96.4%, 88.2% and 87.4% of the isolates were resistant to Nalidixic acid, Amoxicillin, Cepahlexin and Cotrimoxazole respectively.

With the exception of Carbapenems, Cefoperazone Sulbactam, Amikacin and Nitrofurantoin, resistance to commonly used empirical oral treatments for Urinary tract infection (UTI) was extremely high. Levels of resistance to Amoxicillin and Nalidixic acid render them unsuitable for empirical use. Therefore a continuous investigation and surveillance in larger area is required for the effective treatment of both community and nosocomial UTI.

Keywords: *E.coli*, urinary tract infection (UTI), multi-drug resistance, Community, Nosocomial.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOGRAPHS

LIST OF APPENDICES

LIST OF ABBREVIATIONS

ATCC	American Type Culture Collection
CC-MSU	Clean Catch Mid Stream Urine
CFA	Colonization Factor Antigens
DoHS	Department of Health Service
DNA	Deoxyribonucleic Acid
EC	European Comission
IPD	In Patient Department
L	Litre
MA	MacConkey Agar
MDR	Multi-drug Resistant
MHA	Mueller Hinton Agar
MRVP	Methyl Red Voges Proskauer
MSU	Mid-Stream Urine
NA	Nutrient Agar
NB	Nutrient Broth
NCCLS	National Committee for Clinical Laboratory Standards
NNIS	National Nosocomial Infections Surveillance
OPD	Out Patient Department
PBP	Penicillin Binding Protein
QREC	Quinolone Resistant *Escherichia coli*
RBC	Red Blood Cell
SIM	Sulfide Indole Motility
TMP-SMX	Trimethoprim-Sulfomethaxole
TPD	Tetramethyl *p*-phenylene diamine dihydrochloride
TSIA	Triple Sugar Iron Agar
UTI	Urinary Tract Infection
WHO	World Health Organization