CROSS-SECTIONAL STUDY OF URINARY PATHOGENS AND THEIR ANTIBIOTIC SUSCEPTIBILITY PATTERN WITH REFERENCE TO EXTENDED SPECTREUM BETA LACTAMASE (ESBL) PRODUCING STRAINS IN KATHMANDU MODEL 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

(Environment and Public Health)

Submitted by

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RECOMMENDATION

This is to certify that **Ms. Neelam Karna** has completed this dissertation work entitled **"CROSS-SECTIONAL STUDY OF URINARY PATHOGENS AND THEIR ANTIBIOTIC SUSCEPTIBILITY PATTERN WITH REFERENCE TO EXTENDED SPECTREUM BETA LACTAMASE (ESBL) PRODUCING STRAINS IN MODEL HOSPITAL"** as a partial fulfillment of M.Sc. Degree in Microbiology under our supervision. To our knowledge this work has not been submitted for any other degree.

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CERTIFICATE OF APPROVAL

On the recommendation of **Mr. Binod lekhak, and Ms. Basudha Shrestha** this dissertation work of **Ms. Neelam Karna, entitled "CROSS-SECTIONAL STUDY OF URINARY PATHOGENS AND THEIR ANTIBIOTIC SUSCEPTIBILITY PATTERN WITH REFRENCE TO EXTENDED SPECTRUM BETA LACTAMASE (ESBL) PRODUCING STRAINS IN KATHMANDU MODEL HOSPITAL"** has been approved for the examination and is submitted to the Tribhuvan University in partial fulfillment of the requirements for the Degree of Master of Science in Microbiology (Environment and Public Health).

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Neelam Karna

ABSTRACT

Extended spectrum β-lactamases (ESBLs) hydrolyse expanded spectrum cephalosporins like ceftazidime, cefotaxime and monobactam aztreonam. ESBL producing bacteria may not be detectable in the routine disc diffusion susceptibility tests leading to inappropriate use of antibiotics and treatment failures. Thus, in order to detect antibiotic susceptibility pattern of urinary tract isolates of family enterobacteriaceae with reference to extended spectrum β-lactamase (ESBL) producing strain, a study was conducted among patients attending the outpatient department and hospitalized patients of Kathmandu Model Hospital, who were suspected of urinary tract infection (UTI) during the six months from 1-March-2006 to 31-August-2006.

Altogether, 435 urine samples collected were investigated by conventional semi-quantitative culture technique, microscopy, antibiotic susceptibility test and ESBL detection test.

Out of 435 urine samples, only 23.91% (104/435) showed significant growth. The highest percentage of growth positive samples 29.81% (31/104) belonged to the age group 20-30 years. Status of bacteriuria was found slightly higher in females (26.10%i.e.71/272) than in males (20.25% i.e.33/163) and higher in inpatients (28.17% i.e.20/71) than in outpatients (23.08% i.e. 84/364). Among 104 isolates, *E. coli* (88.46%) was found to be the most predominant isolate followed by *Enterobacter aerogens* (3.85%), *Acinetobacter* species (1.92%), *Pseudomonas aeruginosa* (0.96%), *Proteus vulgaris* (0.96%), *Citrobacter freundii* (1.92%) and *Staphylococcus aureus* (1.9%). Out of 104 isolates, 63 (60.6%) were MDR. And also among 104 isolates 16 (15.38%) were ESBL producing strain. The prevalence of ESBL strains was found to be higher (20.00% i.e. 4/20) in admitted patient than in outpatient 14.29% i.e. 12/84 and also the prevalence of ESBL strain was found to be higher in male (18.18% i.e. 6/33) than female (10/71). Out of 92 *E. coli* isolates, 16.30%i.e. 15/92 were ESBL strains while 25% i.e. ¼ of *E. aerogenes* were found to be ESBL strains.

Based on invitro susceptibility test and phenotypic Double Disc Synergy Test (DDST), it was concluded that a significant number of urinary isolates are MDR and often co-produce ESBL, which can result in unavoidable treatment failures. No doubt the reporting of MDR and ESBLs and other β-lactamases should continue to challenge treatment strategy for years to come.

Key Words: MDR, ESBL, Double Disc Synergy test

LIST OF ABBREVATIONS

BA	:	Blood Agar
cfu	:	Colony forming unit
DDST	:	Double Disc Synergy Test
ESBL	:	Extended Spectrum β-Lactamase
Gm	:	Gram
H_2S	:	Hydrogen Sulphide
KTM	:	Kathmandu
MA	:	MacConkey Agar
MBC	:	Minimum Bactericidal Concentration
MDR	:	Multi Drug Resistance
MIC	:	Minimum Inhibitory Concentration
ml	:	Millititre
mm	:	Millimeter
MR	:	Methyl Red
MSU	:	Mid Stream Urine
NA	:	Nutrient Agar
NCCLS	:	National Committee for Clinical Laboratory Standards
O/F	:	Oxidative/Fermentative
R/Y	:	Red/Yellow (Alkali/ Acid)
RBC	:	Red Blood Cells
SIM	:	Sulphide Indole Motility
TSI	:	Triple Sugar Iron Agar
TUTH	:	Tribhuvan University Teaching Hospital
UTI	:	Urinary Tract Infection
VP	:	Voges-Proskauer
WBC	:	White Blood Cells
WHO	:	World Health Organization

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