STUDY OF ANTIBIOTIC SUSCEPTIBILITY PATTERN OF *MYCOBACTERIUM TUBERCULOSIS* IN PULMONARY TUBERCULOSIS PATIENTS VISITING NATIONAL TUBERCULOSIS CENTER, THIMI, BHAKTAPUR, NEPAL

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DISSERTATION

SUBMITTED TO THE CENTRAL DEPARTMENT OF MICROBIOLOGY

TRIBHUVAN UNIVERSITY

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN MICROBIOLOGY

(ENVIRONMENT & PUBLIC HEALTH MICROBIOLOGY)

By

SEMUHANG SUBBA

CENTRAL DEPARTMENT OF MICROBIOLOGY

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2007

RECOMMENDATION

This is to certify that **Mr. Semuhang Subba** has completed his dissertation work entitled **"Study of antibiotic susceptibility pattern of *Mycobacterium tuberculosis* in pulmonary tuberculosis patients visiting National Tuberculosis Center, Thimi, Bhaktapur, Nepal"** as a partial fulfillment for award of M.Sc. degree in Microbiology under our supervision. To the best of our knowledge, this is an original research work of his and has not been submitted for award of any other degree.

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CERTIFICATE OF APPROVAL

On the recommendation of **Mr. Binod Lekhak, Mr. Dhurba Kumar Khadka**, **Dr. Keshab Bhakta Shrestha** and **Mrs. Reshma Tuladhar**, this dissertation work entitled **"Study of antibiotic susceptibility pattern of *Mycobacterium tuberculosis* in pulmonary tuberculosis patients visiting National Tuberculosis Center, Thimi, Bhaktapur, Nepal"** of **Mr. Semuhang Subba** is approved for the examination and is submitted to the Tribhuvan University in Partial Fulfillment of the requirement for M.Sc. Degree in Microbiology.

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ABSTRACT

A study was conducted by Central Department of Microbiology, Tribhuwan University in collaboration with National Tuberculosis Center (NTC), Thimi, Bhaktapur, Nepal from September 2005 to May 2006 to study the anti-tuberculosis drugs susceptibility pattern of *Mycobacterium tuberculosis* isolated from the suspected pulmonary tuberculosis (PTB) patients visiting National Tuberculosis Center (NTC).

The study included total 295 cases of pulmonary tuberculosis patients attending NTC.Among 295 cases, 250 cases were previously treated patients and 45 cases were untreated patients. The sputum samples were examined by auramine fluorochrome staining method and cultured on Ogawa media followed by biochemical tests (Niacin test, Nitrate test & Catalase test). Finally, Drug susceptibility testing was performed on lowenstein-Jensen media by Proportional Method.

Among 295 PTB cases, 73.56% were males and 26.44% were females. According to drug sensitivity test, EMB (66.10%) was found to be the most effective drug followed by RMP (60.33%), SM (59.66%) and INH (41.69%) against *Mycobacterium tuberculosis*. The highest number of cases belonged to the age group 21-30 (28.81%).

Among 45 isolates isolated from untreated patients, primary drug resistant to one drug in 20%, to two drugs in 17.77%, to three drugs in 11.11%, to four drugs in 6.66% and primary multi-drug resistance in 22.22% of the total isolates. Among 250 isolates isolated from previously treated patients, acquired resistant to one drug was found in 23.60%, to two drugs in 12.40%, to three drugs in 16.40%, to four drugs in 18.80% and acquired multi-drugs resistance in 37.20% of the isolates. Among 250 treated cases, 68.4% were relapse, 18% were chronic, 7.6% were follow-up, 3.2% were defaulted and 2.8% were treatment

failure. MDR- TB was found the highest in chronic cases (64.44%) followed by follow-up cases (47.36%), treatment failure cases (42.85%), relapse cases (27.48%) and defaulted cases (12.5%).

Only 150 culture positive cases were interviewed during the study. Among 150 culture positive isolates obtained from the interviewed PTB patients, 47.33% (n=71) were resistant and 52.66% (n=79) were sensitive. Out of 71 resistant isolates isolated from interviewed patients, 39.43% (n =28) had the habit of smoking, 35.21% (n=25) with habit of taking alcohol and 29.57% (n=21) had previous history of TB in their family. The habits of smoking, taking alcohol and having previous history of TB in their family were not significantly related with the development of drug resistance.

Key words: *M. tuberculosis*, pulmonary tuberculosis, Drug susceptibility test, Proportion method, RMP, INH, EMB, SM, MDR-TB

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AFB	Acid Fast Bacilli
AIDS	Acquired Immuno Deficiency Syndrome
AMP	Adenosine Monophosphate
BCG	Bacilli Calmetti Gurein
Chr	Chronic
CMI	Cell mediated Immunity
DOTS	Directly Observed Treatment Short Course
DR	Drug Resistant
DRS	Drug Resistance Surveillance
DST	Drug Sensitivity Testing
EMB or E	Ethambutol
FU	Follow UP
GENETUP	German-Nepal Tuberculosis Project
INH or H	Isoniazid
IL	Interleukin
IUATLD	International Union Against Tuberculosis and Lung Disease
M	*Mycobacterium*
MDR-TB	Multi Drug Resistant Tuberculosis
MTB	*Mycobacterium tuberculosis*
NTC	National Tuberculosis Centre
NTP	National Tuberculosis Programme
PCR	Polymerase Chain Reaction
PDR	Primary Drug Resistant
PPD	Purified Protein Derivative
PTB	Pulmonary Tuberculosis

PZ or Z	Pyrazinamide
RAD	Return After Default
RMP or R	Rifampicin
Re	Relapse
SAARC	South Asian Association for Regional Corporation
SM or S	Streptomycin
STC	SAARC Tuberculosis Centre
T	Thiacetazone
TB	Tuberculosis
TF	Treatment Failure
TST	Tuberculin Skin Test
WHO	World Health Organization
ZN	Ziehl-Neelsen Staining Method

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