COMPARISON OF DIFFERENT CONCENTRATIONS OF CARBOL FUCHSIN FOR DETECTION OF ACID-FAST BACILLI FROM DIRECT SPUTUM SMEAR MICROSCOPY

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(MEDICAL MICROBIOLOGY)

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RECOMMENDATION

This is to certify that **Miss. Ranju Karki** has completed this dissertation work entitled **"Comparison Of Different Concentrations Of Carbol Fuchsin For Detection Of Acid-fast Bacilli From Direct Sputum Smear Microscopy"** 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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ABSTRACT

This study was conducted with an objective to evaluate efficiency of different concentrations of carbol fuchsin in detecting acid- fast bacilli from direct sputum smear microscopy.

Direct sputum smears were prepared from the sputum for the ZN staining and processed for the culture on Lowenstein Jensen (LJ) media by modified Petroff's method. From each sputum sample three direct smears were prepared and stained with 3 different concentrations (1%, 0.5% and 0.3%) of carbol fuchsin. Culture was employed as a reference gold standard for the study.

A total 230 direct smears were evaluated by ZN staining using all 3 concentrations of carbol fuchsin. Out of 230 suspected TB patients, 151 (65.65%) patients were diagnosed as having pulmonary tuberculosis by culture. Compared to culture, the sensitivity, specificity, and positive and negative predictive values for ZN staining for 1% carbol fuchsin, 0.5% carbol fuchsin and 0.3% carbol fuchsin were 76.82%, 85.93%, 92.8% and 61.11%, 71.52%, 84.37%, 91.52% and 55.67% and 61.58%, 84.37%, 90.29% and 48.21% respectively. Among 130 (56.52%) positives by 1% carbol fuchsin staining techniques, 116 were positive by both (1% and 0.5%) methods, 104 (89.65%) had equal numbers of AFB on both smears, 11 (9.48%) had more AFB on the smear stained using 1% and 1 (0.86%) had greater number of AFB on the smear stained using 0.5% carbol fuchsin. Also, of the 103 (44.78%) positive smear by both (1% and 0.3%) method, 67 (65.04%) had equal number of AFB in both smears and 35 (33.98%) had more AFB on the smear stained using 1% carbol fuchsin. Staining with 1% increases smear positivity by 10.76% and 20.76% when compared with 0.5% and 0.3% carbol fuchsin respectively.

This study indicates that the ZN staining technique using 1% carbol fuchsin enables visualization of greater number of AFB in direct sputum smears and is highly correlated to culture than 0.5% and 0.3% ZN staining techniques.

Keywords: *M. tuberculosis*, Ziehl-Neelsen, Carbol fuchsin, sensitivity, Culture

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LIST OF ABBREVIATIONS

AFB	Acid-fast bacilli
CMI	Cell mediated Immunity
DOTS	Directly Observed Treatment Short Course
DRS	Drug Resistance Surveillance
EPTB	Extra Pulmonary Tuberculosis
FM	Fluorescence Microscopy
FN	False negative
FP	False positive
HIV	Human Immuno Deficiency Virus
IUATLD	International Union Against Tuberculosis and Lung Disease
LJ	Lowenstein Jensen
MC	Modified Cold
MDR	Multi-drug Resistant
MOTT	Mycobacteria Other than tubercle bacilli
MTB	*Mycobacterium tuberculosis*
NaOCL	Sodium Hypochlorite
NaOH	Sodium Hydroxide
NPV	Negative predictive value

NTC	National Tuberculosis Centre
NTM	Non-tuberculosis Mycobacteria
NTP	National Tuberculosis Control Programme
OPD	Out Patient Department
PCR	Polymerase Chain Reaction
PPV	Positive predictive value
PTB	Pulmonary Tuberculosis
SAARC	South Asian Association for Regional Cooperation
STC	SAARC Tuberculosis Centre
TB	Tuberculosis
WHO	World Health Organization
XDR	Extensively Drug Resistant
ZN	Ziehl Neelsen