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Original Article

Microbiological Assessment of Patients with Tuberculosis Visited in Tertiary Care Hospital

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ABSTRACT:

Background: Tuberculosis (TB) is caused by *Mycobacterium tuberculosis*. It is a chronic bacterial contagious disease that continues to be major public health problem in the world. The present study was conducted for microbiological assessment of patients with tuberculosis in study population. **Materials & Methods:** The present study was conducted on 520 subjects with suspected tuberculosis. It comprised of 340 males and 180 females. From all subjects sputum was collected and direct smears were prepared, and then each of smear specimens was air dried, fixed, stained with Ziehl-Neelsen (Z-N), and examined under a microscope following standard procedure. Acid fast bacilli (AFB) were detected under microscope and were labeled as AFB positive or negative. **Results:** Out of 340 males, 120 were found to be AFB +ve and out of 180 females, 90 were found AFB +ve. Age group 10- 20 years had 24 males and 15 females, 20-30 years had 26 males and 27 females, age group 30- 40 years had 45 males and 34 females and >40 years had 25 males and 14 females. The difference was non- significant ($P > 0.05$). Bacillary load in sputum was paucibacillary (35%) and multibacillary (65%). **Conclusion:** *Myobacterium tuberculosis* infection in males was found to be higher than females. Bacillary load in sputum was paucibacillary and multibacillary.

Key words: Acid fast bacilli, *Myobacterium tuberculosis*, Ziehl-Neelsen

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INTRODUCTION

Tuberculosis (TB) is caused by *Mycobacterium tuberculosis*. It is a chronic bacterial contagious disease that continues to be major public health problem in the world. Most commonly, the disease attacks the lungs (pulmonary TB), and the lymph nodes, spine, or brain. Pulmonary TB is the only type of TB that can be passed on to others. It is transmitted from person to person via droplets from the throat and lungs of people with the active respiratory disease. If someone with TB coughs or sneezes, the bacteria in these tiny droplets can be inhaled into the lungs of another person, causing infection.¹

The history of sputum examination dates back to 1882 when Robert Koch discovered the tubercle bacillus and confirmed the bacterial etiology of tuberculosis. The bacilli in the sputum can be detected by Zn staining which is

commonly used throughout the world and still remains the standard method against which new tests must be measured.² The smears stained by Zn staining method can detect bacilli when they are at the order of 10⁵/milliliter (ml) of sputum. Zn staining microscopy is cheaper and more useful for laboratory diagnosis of disease in poor and developing countries like Nepal and also it is simple and rapid. Thus for the developing countries with a large numbers of cases and financial constraints, evaluation of rapid and inexpensive diagnostic methods like demonstration of acid fast bacilli in smears is of great importance.³ The present study was conducted for microbiological assessment of patients with tuberculosis in study population.

MATERIALS & METHODS

The present study was conducted in the department of microbiology of Mahatma Gandhi Medical College & Hospital, Jaipur, Rajasthan, India. It comprised of 520 subjects with suspected tuberculosis. It comprised of 340 males and 180 females. All were informed regarding the study and written consent was obtained. Ethical clearance was taken prior to the study.

General information such as name, age, gender etc. was recorded. From all subjects sputum was collected and direct smears were prepared, and then each of smear specimens was air dried, fixed, stained with Ziehl-Neelsen (Z-N), and examined under a microscope following standard procedure. Acid fast bacilli (AFB) were detected under microscope and were labeled as AFB positive or

negative. Results thus obtained were subjected to statistical analysis using chi-square test. P value less than 0.05 was considered significant.

RESULTS

Table I shows that out of 340 males, 120 were found to be AFB +ve and out of 180 females, 90 were found AFB +ve. Table II shows that age group 10- 20 years had 24 males and 15 females, 20-30 years had 26 males and 27 females, age group 30- 40 years had 45 males and 34 females and >40 years had 25 males and 14 females. The difference was non-significant (P> 0.05).

Graph I shows that bacillary load in sputum was paucibacillary (35%) and multibacillary (65%).

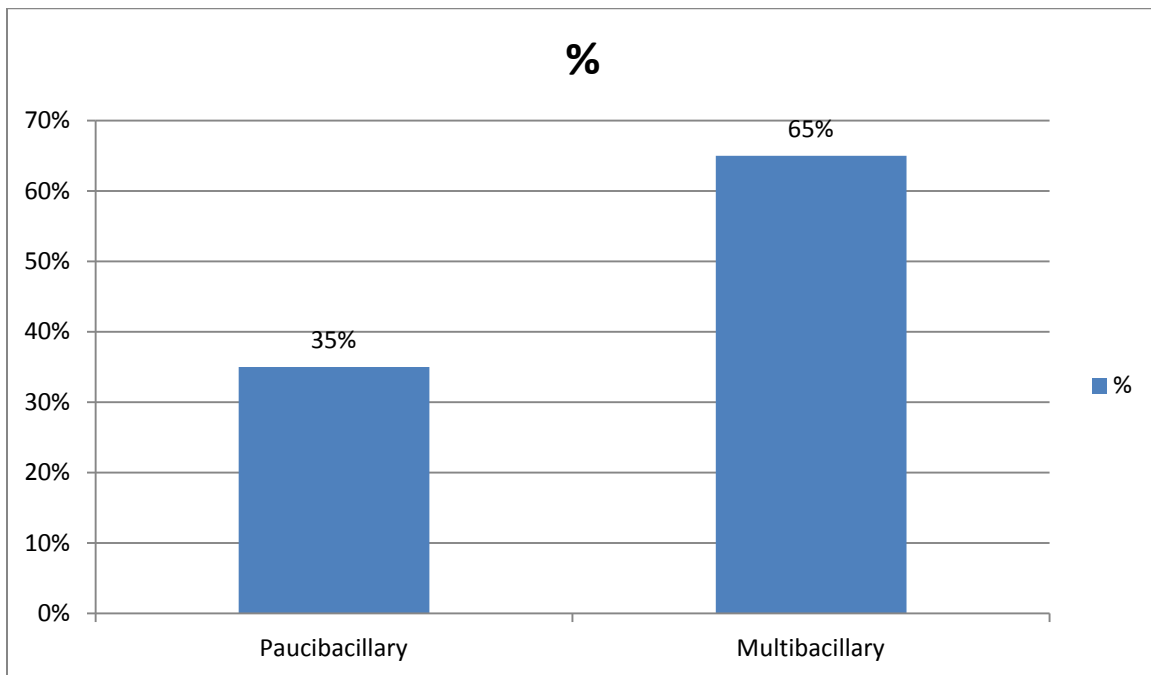
Table I Prevalence of TB patients

Total males	AFB positive	Total females	AFB positive
340	120	180	90

Table II Age wise distribution of cases

Age group	Males	Females	P value
10-20 years	24	15	0.5
20-30 years	26	27	1
30-40 years	45	34	0.4
>40 years	25	14	0.7

Graph I The bacillary load in sputum among the positive cases of pulmonary tuberculosis



DISCUSSION

Physicians differentiate between two kinds of TB infection: latent and active. In latent TB, the TB bacteria remain in the body in an inactive state. The bacteria do not cause symptoms and are not contagious, but it is possible that they can become active. In active TB, the bacteria cause symptoms and can be transmitted to others.⁴ It is generally estimated that one-third of the world's population is believed to have latent TB; and there is a chance that 10% of latent TB is becoming active TB. This risk is much higher in people who have compromised immune systems, that is, people living with HIV or malnourished, or people who smoke. Besides, TB affects all age groups and all parts of the world. However, the disease mostly affects young adults and people living in developing countries.⁵

Dinna et al⁶ in their study found that out of 340 males, 120 were found to be AFB +ve and out of 180 females, 90 were found AFB +ve. This is in agreement with Barez et al.⁷

Dinker et al⁸ in the cross-sectional study, three consecutive early morning sputum collected from 626 patients were subjected to Zn staining and observed under oil immersion. Among 626 patients, 85 (13.57%) were found to be Acid fast positive by Zn staining microscopy. Of total suspected patients, 16.0% of male and 8.7% of female were infected, common among 41-60 years group (17.2%) followed by 21-40 years (12.6%) and multibacillary cases was 71.8%. The prevalence of pulmonary tuberculosis among National medical college teaching hospital was found to be higher than the Nation pulmonary tuberculosis detection rate, most commonly infecting males.

We found that age group 10- 20 years had 24 males and 15 females, 20-30 years had 26 males and 27 females, age group 30- 40 years had 45 males and 34 females and >40 years had 25 males and 14 females. Bacillary load in sputum was paucibacillary (35%) and multibacillary (65%). The study done by Kolappan et al⁹ found that TB prevalence rate was 2.2% (49/2212) for male and 3.9% (15/386) for female. The observed high prevalence of TB (10%) in this study as compared to the three surveys may be due to combination of factors including overcrowding, poor health care facilities, and malnutrition.⁹ On the other hand, Banu et al¹⁰ in their study indicated that, from 466 inmates with suspected pulmonary TB and who tested with smear microscopy, 357 (77%) and 109 (23%) were found positive and negative for the test, respectively.

Gebre and Mimano¹¹ showed that 8.9% (33) from a total of 371 were confirmed as smear- or culture-positive PTB. Similar survey conducted in Jimma University indicated that the overall prevalence of TB among student population was 2.2% (49/2212). Even though family history is considered to be major risk factor for TB, in this study cases of AFB positive were found to be more among those patients without history of TB in their families (75%).

However, in the study conducted by Kirenga et al¹² among tuberculosis patients in Kampala, Uganda, family history (17.5%) was shown as one of the important TB prevalence risk factors.

CONCLUSION

Myobacterium tuberculosis infection in males was found to be higher than females. Bacillary load in sputum was paucibacillary and multibacillary.

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