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Original Research Article

Incidence of Acid-Fast Bacilli among the Patients Attending in a Tertiary Care Hospital in North India - Some Socio-Demographic Correlates

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ABSTRACT

Objective: To estimate the incidence of acid-fast bacilli (AFB) among the patients attending in a tertiary care hospital in north India.
Methods: This was a cross-sectional hospital based study conducted in a tertiary care hospital in north India. a total of 245 samples were collected from patients suspected of pulmonary tuberculosis between for a period of 6 month (2 days in a week in the clinic). Three consecutive sputum samples were collected from each patient as recommended by the WHO[7] into clean wide-mouth specimen bottles. The sputum sample that was mostly saliva, were regarded as "unsuitable" and the patients were requested to submit fresh samples following specific instructions.
Results: The mean (±sd) age of the patients was 39.60 (±12.34) years. The percentage of male patients was higher than females. Majority of the patients had persisting fever (86.9%) followed by chronic cough (95.5%) and expectoration (87.8%). Other frequent symptoms were chest pain (78.4%), breathlessness (71.8%) and hemoptysis (31.8%). The overall incidence of AFB was found to be 39.2% (96/245). The incidence was significantly (p=0.001) higher among older patients compared with younger being higher among males (p=0.02) also.
Conclusion: ZN stain was found to be excellent in diagnosis of TB. There is a immediate attention for the control of TB in this area.

Key words: Acid-fast bacilli, Sputum, incidence

INTRODUCTION

India has featured among the 22 high TB burden countries; and has accounted for an estimated one quarter (26%) of all TB cases worldwide.[1] National Tuberculosis Programme (NTP) based on a cost effective operational strategy was implemented all over India from 1962; after a nation-wide survey during 1955–1958 revealed that tuberculosis (TB) was highly prevalent throughout the country.[2] Surveys carried out thereafter in geographically defined areas revealed that the prevalence of TB continued to be high, though varied, in different parts of the country.[3] Taking cues from a review of NTP, Revised National tuberculosis Control Programme (RNTCP) adopting DOTS (an internationally

recommended strategy for TB control) was launched in 1997 and expanded in phases to cover the entire population by 2006.[4] Implementation of RNTCP lead to improvements in case detection and high treatment success rates in most parts of the country[3,5]

Treatment outcomes according to internationally accepted definitions[6] includes cure, treatment completion, treatment failure, death, default, and transfer out. A cure is defined as having negative sputum at the end of eight months treatment in a patient with positive acid-fast bacilli (AFB) at entry to treatment. Treatment failure is defined as persistence of sputum positivity for AFB while patient is on anti-TB treatment for 5 months or more or reversion to smear positivity after initial smear negative sputum following treatment for TB. This includes patients who were initially smear negative before starting treatment but became smear positive after the second month of treatment. Some of the factors associated with treatment failure include poor drug compliance, primary drug-resistant TB, lack of efficacious anti-TB drugs, and presence of comorbidities such as HIV infection and diabetes mellitus.

The present study was conducted to estimate the incidence of acid-fast bacilli among the patients attending in a tertiary care hospital in north India.

MATERIALS AND METHODS

Study design: Cross-sectional hospital based study design was used.

Study site: A tertiary care hospital in north India.

Patients: The patients attending the out patients clinic of the Department of Tuberculosis.

Methods:After ethical clearance by the Ethical committee of the hospital and informed consent from the patients, a total of 245 samples were collected from patients suspected of pulmonary tuberculosis between for a period of 6 month (2 days in a week in the clinic). Three consecutive sputum samples were collected from each patient as recommended by the WHO [7] into clean wide-mouth specimen bottles. The sputum sample that was mostly saliva, were regarded as "unsuitable" and the patients were requested to submit fresh samples following specific instructions. The smears were air-dried in a safety cabinet and stained by Ziehl Neelsen (ZN) staining method one as described elsewhere by Cheesbrough[7] The stained slides were examined microscopically, first with X40 objective piece to see the distribution of materials in the background and then systematically with the immersion oil objective piece to look for acid-fast bacilli (AFB) morphologically resembling *Mycobacterium tuberculosis.* [8] As part of our control measures, five smears of known high and low positivity and five sputum smears of known negativity were stained and examined to ensure that the carbol fuchsin dye, staining technique and the microscopic examination of the smears under study are satisfactory.

Analysis: The results are presented in mean±SD and percentages. The Chi-square test was used to compare categorical/dichotomous variables. The p-vale<0.05 was considered as significant. All the analysis was carried by using SPSS 16.0 version (Chicago, Inc. USA).

RESULTS

The distribution of socio-demographic characteristics of the patients is depicted in the Table -1. The mean (±sd) age of the patients was 39.60 (±12.34) years. About one third (29%) of the patients were in the age group of 31-40 years followed by 41-50 years (27.3%), 21-30 (22%), >50 (13.9%) and <21 years (7.8%). The percentage of males patients was higher than females. More than half (55.5%) of the

patients belonged to Hindu community and were in upper lower (54.3%) class of socio-economic status (SES).

Table-1: Distribution of patients by Socio-demographic characteristics.

Characteristics	Number(n=245)	Percent (%)
Age in years		
<21	19	7.8
21-30	54	22.0
31-40	71	29.0
41-50	67	27.3
>50	34	13.9
Mean±sd	39.60±12.34	
Sex		
Male	136	55.5
Female	109	44.5
Religion		
Hindu	160	65.3
Muslim	85	34.7
Socio-economic status (SES)		
Upper	9	3.7
Upper Middle	11	4.5
Lower Middle	16	6.5
Upper Lower	133	54.3
Lower	76	31.0

In the clinical examination, majority of the patients had persisting fever (86.9%) followed by chronic cough (95.5%) and expectoration (87.8%). Other frequent symptoms were chest pain (78.4%), breathlessness (71.8%) and hemoptysis (31.8%) (Fig.1).

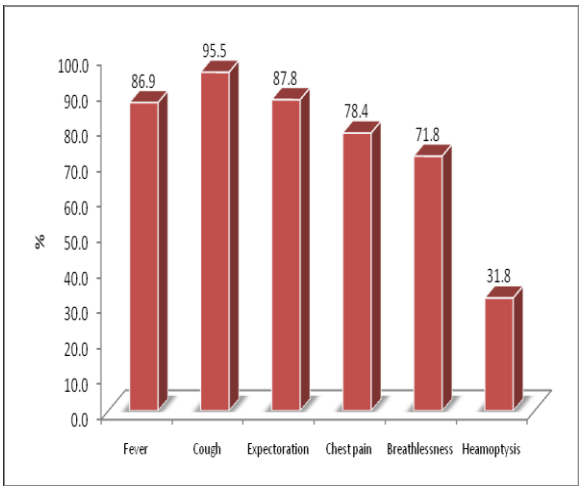

Fig.1: Distribution of clinical symptoms.

The overall incidence of AFB was found to be 39.2% (96/245). The incidence was significantly (p=0.001) higher among older patients compared with younger being higher among males (p=0.02) also. No difference was seen in the pattern of incidence according to religious status. However, the incidence was high among the patients belonging to lower SES (Table-2).

Table-2: Association of prevalence of AFB with Socio-demographic characteristics.

Demographic characteristics	No. of patients	No. with AFB positive	% AFB positive	p-value
<21	19	3	15.8	0.001*
21-30	54	9	16.7	
31-40	71	26	36.6	
41-50	67	31	46.3	
>50	34	27	79.4	
Gender				
Male	136	61	44.9	0.02*
Female	109	35	32.1	
Religion				
Hindu	160	65	40.6	0.52
Muslim	85	31	36.5	
SES				
Upper	9	1	11.1	0.001*
Upper Middle	11	2	18.2	
Lower Middle	16	4	25.0	
Upper Lower	133	54	40.6	
Lower	76	35	46.1	

*Significant

DISCUSSION

A number of surveys had earlier been carried out in different parts of India since mid-twentieth century. In 1956, a nation-wide survey using screening by MMR followed by sputum examination by

smear and culture among those with abnormal shadow on X-ray film revealed the prevalence of bacteriologically positive AFB at 400 per 100,000 population.[2] During subsequent surveys in different geographical locations at different points of time, prevalence of bacteriologically positive TB varied between 182–1270 per 100,000.[2] These surveys not strictly comparable due to variations in definition of symptoms, screening tools (symptoms and/or MMR), case definition and analytical methods, nonetheless revealed that TB continued to be a high burden disease in India. Male to female ratio in these surveys has been found to vary between 2:1 to 5:1.[3] In the present study, the overall incidence of AFB was found to be 39.2% (96/245). The incidence was significantly (p=0.001) higher among older patients compared with younger being higher among males (p=0.02) also in this study.

In India as well as in other parts of the World, some TB patients avoid seeking treatment for fear that their infection will be equated with HIV. This belief and behaviour favour the spread of the disease within family cycles and extending it to the community. In a poor setting where facilities for culturing sputum samples for *Mycobacterium tuberculosis* are not available, ZN staining offers a reliable and efficient method for diagnosis of tuberculosis if proper guidelines and quality controls are adequately adhered to. Since the study was properly controlled and international method of reporting followed, the results obtained in this study could be said to be reliable and dependable especially for the purpose of diagnosis and monitoring the incidence of TB in a community setting.

Control of communicable diseases must be government's priority. A strategic framework to reduce the burden of TB on the population must be put in place. Other agencies should be encouraged to be involved in this kind of prevention programme. Proper measures should be in place to control the problem of emergent of drug resistant strains. Also, the general population need to be well informed that TB does not equate to HIV, so that they can seek treatment on time. The best defense against TB is to avoid contact with person who has 6 active TB.

CONCLUSION

In conclusion, ZN stain was found to be excellent in diagnosis of TB. There is a immediate attention for the control of TB in this area.

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