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Short communication

Prevalence of Pulmonary Tuberculosis among the suspected patients visiting tertiary care hospital in Birgunj, Nepal

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ABSTRACT

Background and Objectives: Mycobacterial disease continues to cause high morbidity and mortality and is a major public health problem in Nepal. Bacteriological examination of sputum is the cornerstone in the diagnosis of pulmonary tuberculosis in the developing world. This prospective study was carried out with an objective to evaluate the prevalence of pulmonary tuberculosis among the patients visiting National Medical College Teaching Hospital by Ziehl-Neelsen (Zn) staining microscopy.

Material and Methods: The study was cross-sectional study. Three consecutive early morning sputum collected from 626 patients were subjected to Zn staining and observed under oil immersion.

Results: 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%.

Conclusion: 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.

Key words: Pulmonary tuberculosis, Prevalence, Zn staining, Nepal

INTRODUCTION

Tuberculosis (TB), one of the major air-borne infectious bacterial disease is of significant public health importance worldwide [1].
A global emergency was declared by WHO in the year 1993, kills 8000 people a day (2.3 million

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people each year) [2]. Majority (95%) of these cases and 98% of tolls fall only in developing countries [3, 4]. About 45% of Nepal population suffers from this disease. Every year 44,000 people develop active tuberculosis; of whom 20,000 are infectious pulmonary disease resulting 8-11 thousand death range in Nepal are believed [5].

The history of sputum examination dates back to 1882 when Robert Koch discovered the tubercle bacillus and confirmed the bacterial etiology of tuberculosis [6, 7]. 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 [7, 8]. The smears stained by Zn staining method can detect bacilli when they are at the order of 10^5/milliliter (ml) of sputum [9, 10]. Zn staining microscopy is cheaper and more useful for laboratory diagnosis of disease in poor and developing countries like Nepal [11] and also it is simple and rapid [11, 12]. 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 [13].

MATERIAL AND METHODS

Settings: This study was conducted in Tuberculosis laboratory at National Medical College Teaching Hospital, Birgunj, Nepal.

Sputum samples: Routine fresh clinically suspected pulmonary TB patients referred from outpatient department (OPD) to Tuberculosis laboratory were included. Three consecutive sputum samples from 626 patients were collected for 1 year (July 18, 2007 to July 17, 2008).

Smear preparation: Sputum sample was smeared evenly with an uneven end of broom stick on the slide, the smear size being 2cmX 3cm and it was not too thick. The smear was air dried. Then was methanol fixed and then the slides were placed in serial order on the staining rack with the smeared slides facing upward ensuring slides do not touch each other.

Zn-staining procedure: The procedure was described by WHO laboratory guidelines [11]. The fixed smears were flooded with the solution of 1 percent carbol fuchsin then heated underneath until vapors start rising and were allowed to stand for 5 minutes. The smears were then rinsed with water and counterstained with Methylene blue solution and followed by air drying. The slides were then examined under microscope in X100 oil immersion.

Microscopy reports

In recording and reporting of microscopic results, the following reporting scale was used for Zn staining as per guidelines given by WHO [14].

No. of Bacilli seen in a smear	Result reported
No AFB per 300 oil immersion fields	Negative
1-9 AFB per 100 oil immersion fields	Record the exact number
10-99 AFB per 100 oil immersion fields	1+
1-10 AFB per 10 oil immersion fields	2+
>10 AFB per oil immersion field	3+

The number of AFB found is an indication of the degree of infectivity of patient as well as the severity of tuberculosis. (For the present study 2+ and 3+ were classified as multibacillary and 1+ and scanty as paucibacillary) [15].

Statistical analysis: The results were analysed by using the chi-square test (chi^2-test). The data were determined to have statistically significant at 95 percent confidence interval if the P value was less than 0.05.

RESULTS

In the study among 626 suspected patients 85 patients (13.6%) were found to have pulmonary tuberculosis. Out of 626 patients included under the study, 418 were male (66.8%) and 208 were female (33.2%) of which 16.0% of male and 8.7% of female were infected.

The prevalence rate was highest among 41-60 years group (17.2%) followed by 21-40 years (12.6%) and least at the age group of upto 20 years (Table-2).

Fig 1: Positive cases percentage of pulmonary tuberculosis visiting NMCTH

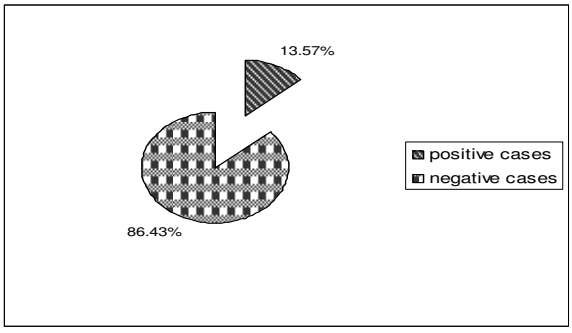


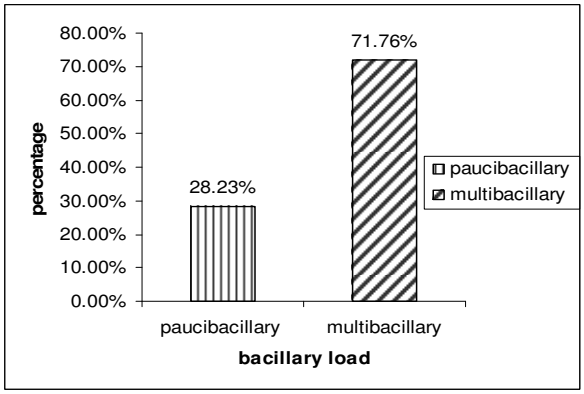
Table 1: Prevalence of pulmonary tuberculosis on the basis of gender

Gender	Positive (%)	Negative (%)	Total	P-value
Male	67 (16.0)	351	418	P<0.05
Female	18 (8.7)	190	208	
Total	85 (13.6)	541	626	

Table 2: Age wise prevalence of pulmonary tuberculosis

Age group	Total	Positive (%)
Upto 20 yrs	91	7 (7.7)
21-40 yrs	215	27 (12.6)
41-60 yrs	239	41 (17.2)
More than 60 yrs	81	10 (12.3)

Fig 2: The bacillary load in sputum among the positive cases of pulmonary tuberculosis



Among the positive case of pulmonary tuberculosis, the bacillary load in sputum as depicted in figure 2 which shows paucibacillary cases were lesser (28.2%) than multibacillary cases (71.8%).

In this study, the prevalence of pulmonary tuberculosis by Zn staining method was found to be 13.6% which was slightly higher than the nati-

on's tuberculosis detection rate (10.0%) but in agreement with findings of Rai *et al*, 2006 (13.1%) in same setup during 2006. The slightly higher prevalence in the study than the nation's tuberculosis detection rate may be due to the more endemic area and easily accessible health care facilities compared to other remote Nepal. Higher prevalence was obtained in the study conducted by Negi *et al* in Dehli, 2005 (33.8%), Ghatole *et al* in Solapur, 2005 (22.5%), Prasanthi K and Kumari AR in Secunderbad, Gandhi Hospital, 2005 (50.0%) and Shrestha *et al* in Dharan, 2005 (21.8%).

The males are more infected (16.0%) than female (8.7%) which is statistically significant ($P<0.05$). Our study showed similar result to Rai *et al* in Birgunj (2006), Shrestha *et al*, 2005 in Dharan and Chern *et al* in Taiwan (2008). This does not reflect an increase in the occurrence of females to OPD is lower than male but may be due to more exposure of male to the environment for the sustenance of life, difference in socioeconomic status and culture factors. The male to female ratio of pulmonary tuberculosis in the study was 3.6, markedly greater than the report made by Sreeramareddy CT *et al* (2008) (2.29) elsewhere in Nepal. This may be due to the higher number of male in our study.

In the present study, maximum number of pulmonary tuberculosis cases was observed in age group of 41-60 years. This result is different from the study conducted by Shrestha *et al* in Dharan (2005) and Prasanthi K and Kumari AR in Gandhi Hospital, Secunderabad (2005). Dharan (2005) and Prasanthi K and Kumari AR in Gandhi Hospital, Secunderabad (2005). The prevalence of disease among different age group shows similar trend with finding at Rai *et al* (2006). In compare to younger one, age group 41-60 years are more infected by tuberculosis which could be due to impaired immune system in elderly people leading increase susceptibility to infectious diseases.

Of the positive cases, it was found that multibacillary cases are more (71.8%) than the paucibacillary cases (28.2%). Similar finding was also noticed in the study conducted by Prasanthi K and Kumari AR (2005). The multibacillary case was found to be more common may be due to the less health care awareness.

CONCLUSION

Accounting all the data together, we can conclude from our observation that, the prevalence is slightly higher than the Nation pulmonary tuberculosis detection rate (10%) [16], most commonly infecting males.

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