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Original article

Epidemiological Profile and Determinants of Tuberculosis in Urban Nepalese Population

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ABSTRACT

Introduction: Tuberculosis has evolved through ages to remain a major cause of morbidity and mortality worldwide. Despite having a very successful Directly Observed Treatment, Short-course program, tuberculosis is still one of the most widespread infections in Nepal. This study was done to observe the epidemiological profile of tuberculosis patients in an urban Nepalese population.

Materials and Methods: 585 newly diagnosed cases of pulmonary and extrapulmonary tuberculosis in two tertiary level hospitals in the country were enrolled in the study during a period of 18months. A standard questionnaire was formatted and the required information was acquired with the help of interview and investigation reports.

Results: The mean age of presentation was 35.76 with a male to female ratio of 1.48:1. 57% of the cases had less than primary education with 26 % being illiterates. The most commonly involved occupational group was farmers (22%) followed by students (20%) and laborers (14%). 22% of cases had a history of contact with tuberculosis in the family. 41 % were smokers and 18 % abused alcohol. Pulmonary tuberculosis comprised 68% of the total cases. The most common extrapulmonary presentation was lymph node TB (28%) followed by pleural effusion (21.5%) and tubercular meningitis (16%).

Conclusions: Young people with lower literacy levels and with a family history of tuberculosis are at increased risk of acquiring tuberculosis and community approaches for tuberculosis control should target this group to reduce the burden of the disease.

Keywords: : Alcohol abuse; Extrapulmonary; Pulmonary; Smoking; Tuberculosis

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INTRODUCTION

Tuberculosis (TB) is a chronic clinical disease caused by infection with Mycobacterium tuberculosis and is characterized pathologically by the formation of granulomas.[1] It is commonly described as a systemic disease of ''protean manifestations'' that mainly involves the lung. Extrapulmonary involvement, including lesions of the gastrointestinal tract, genito-urinary tract, cardiovascular system, skin, central nervous system, and eyes, may occur either in association with clinically apparent pulmonary tuberculosis (PTB) or in isolation, with no clinical or laboratory evidence of pulmonary infection.[2]

Tuberculosis is still a major cause of morbidity and mortality in a global scenario. There are an estimated 8.7 million new cases of TB a year and it accounts for 1.4 million deaths worldwide.[3]About 60% of cases are in the South-East Asia and Western Pacific regions. Despite having one of the most successful Directly Observed Treatment, Short-course (DOTS) coverage in the world, tuberculosis is still one of the most widespread infections in Nepal posing a serious threat to the health and development of people in Nepal. There are 74,000 people living with TB in Nepal with 50,000 new cases reported in a year.[3]

Despite having effective chemotherapy, tuberculosis has evolved through ages to remain a major cause of morbidity and mortality worldwide. In a developing country like Nepal, the socio-economic variants of the disease have also changed over the years. This study was undertaken to observe the epidemiological profile and evolving patterns of the disease among patients presenting to tertiary level hospitals in central Nepal.

MATERIALS AND METHODS

This hospital-based cross-sectional descriptive study was conducted in the National tuberculosis Centre, Bhaktapur and Tribhuvan University Teaching Hospital, Kathmandu, Nepal during a period of 18 months from February 2010 to August 2011. Permission from the Istitutional Review Committee was obtained. In this study, 585 cases of diagnosed pulmonary and extrapulmonary tuberculosis presenting to these two tertiary centers in central Nepal were included. Cases with HIV co-infection were excluded from this study as TB and HIV together are proving to be a very strong association having distinct socio-economic variants and patterns of the disease, meriting a separate study. The study was explained to all eligible people in their own language, and consent obtained if they agreed. The study cases were interviewed in the hospital according to a standard questionnaire. Along with the demographics of the patients, any known source of tuberculosis contact, past history of tuberculosis and history of other risk factors were recorded. Details of disease patterns were recorded from clinical examination and investigation reports. Collected data were analyzed using Statistical Package for the Social Sciences (SPSS) 14 software to create a profile of disease patterns in the studied population.

RESULTS

The mean age of presentation was 35.8 (3-78) years for overall cases, 37.1 years for PTB and 33.4 years for extrapulmonary TB (fig.1). 23% of cases were concentrated within the age group of 21-30 years.

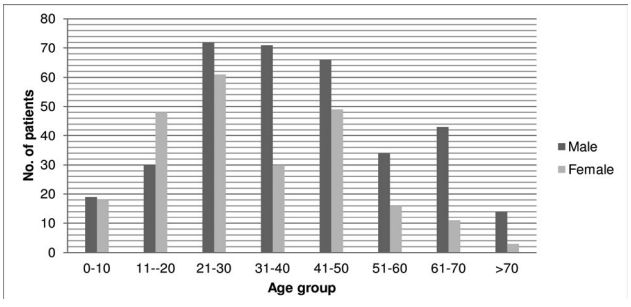

Figure 1: Agegroup-specific sex-wise distribution of TB cases

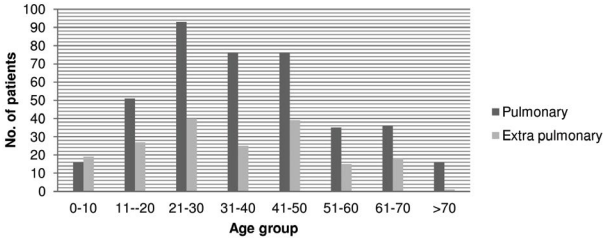

Fig 2: Agegroup-specific distribution of cases according to the site of primary disease

The commonest age group of the presentation was 21-30 years for both pulmonary and extrapulmonary cases (23 and 21% of total cases respectively; fig. 2). Male to female ratio among pulmonary TB cases was 1.9:1 whereas it was 0.8:1 among cases with extrapulmonary TB.

Among the study population, 335 (57%)of patients had less than primary education with 157 (26 %) being illiterates. 138 (24%) patients had education up to the secondary level and only 19% (n=112) of the patients had higher secondary and greater education. Types of occupation of these patients are shown in table 1. Twenty-two percent (n=128) of cases in our study were farmers, followed by students (n=120; 20 %). Laborers and labor migrants to foreign countries also form a major group having a share of 14 and 7 % respectively of the total cases.

Of 585 patients, 137 (23%) had a history of contact with tuberculosis patients. 82/137 (60%) of them had a known history of tuberculosis in their families and 37/137 patients had a history of TB in relatives and/or neighbours. 18/137 had contact with TB patients in the workplace.

Table 1: Distribution of patients according to occupation

Occupation	Number (%)
Agriculture	128 (22)
Student	120 (20)
Laborer	80 (14)
Business/self-employed	70 (12)
Service	54 (9)
Working abroad	39 (7)
Housewife	35 (6)
Jobless/retired	59 (10)
Total	585 (100)

Similarly, risk factors such as smoking, alcohol abuse, biomass exposure, and diabetes were studied. Tobacco smoking was the most common risk factor (n=237; 41%) followed by biomass fuel exposure (n=221; 38%). Alcohol abuse was seen in 106 (18%) of the study population. Diabetes was the least common risk factor (n=14; 3%).

Patterns of Disease according to sites of manifestations

339 (68%) of enrolled patients were cases of pulmonary tuberculosis and 32% (186) were extrapulmonary cases. Pulmonary cases included 301 smear-positive (75%) and 98 smear-negative pulmonary tuberculosis.

The most common extrapulmornary TB cases included lymph node TB (26%) followed by pleural effusion (21%) and TB meningitis (17%) (fig. 3).

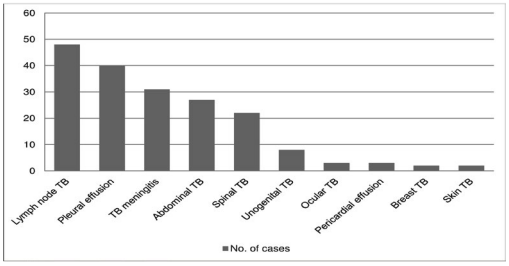

Figure 3: Extrapulmonary TB cases according to the site of involvement

DISCUSSION

In this study, we had 585 cases of tuberculosis. The mean age of presentation was 35.7 years with a range of 3-78 years. The average age of patients with extrapulmonary TB (mean age of 33.4 years) was less than that of cases with pulmonary TB (37.1 years). 21-30 year age group was the most commonly affected age group with 133 cases. 60% of cases were concentrated within the economically productive age group of 20-50 years. The mean age of presentation in our study is less than a study from the Netherlands reporting a mean age of 42 years[4] and comparable to another study from Pokhara, Nepal reporting a median age of 29.5 years in extra-PTB patients and 47.5 years in PTB cases, having nearly equal number of patients in both categories.[5] Findings of our study is similar with the national epidemiological reports on TB which confirm that tuberculosis is more prevalent among the young age group of population (15-54).[3]

Sixty percent of the cases in this study were males with a male to female ratio of 1.48:1. A study by Martien et al reported 65% of their study population to be male.[4] Interestingly, the only the age group in which the male to female ratio was <1 was the age group of < 20 years where the male to female ratio was 0.7. This trend has been observed on a detail global analysis of the age-specific and sex-specific prevalence of tuberculosis. Summary observations on global data from 1997 to 2005 showed that in age group 0-14 years, the sex ratio (male: female) is always below one in all six WHO regions, indicating a higher proportion of TB among female children and adolescents. However, for higher age groups; the ratio increases with age in all regions (except the European Region) where male-to-female ratios are reported to be higher than one.[6] Whether identifying fewer women with TB globally is due to sex (as a biological determinant) or gender (as a socio-cultural determinant influencing access to TB care) has long been a matter of discussion and debate. Some attribute it to barriers women may face in accessing TB care.[7-9] In Nepal, a large number of the female population is adrift from opportunities of education and is involved in household jobs. This makes them financially dependent upon their male counterparts and also less exposed to the outer world leading to have less access to health care facilities. This may have led to the low detection rate of tuberculosis in the female population in Nepal. The same factors, however, might also lead to less exposure of a female population to tuberculosis compared to males who have more chances of acquiring it from their place of occupation.

Male to female ratio among pulmonary TB group was almost 2:1 but interestingly there were more females than males in the extrapulmonary group with male to female ratio of 0.85:1. Our study shows a larger number of female cases in the extra-PTB group compared to some other studies. However, the pattern of increased prevalence of extra-PTB compared to pulmonary tuberculosis among the female population has been observed in those studies. In a study from Pokhara, Nepal; the male to female ratio of extra-PTB patients was only 1.07 when it was 1.6 in overall TB patients and 2.29 among patients with pulmonary TB.[5] The higher number of females in extrapulmonary group as compared to PTB was also seen in studies done in Cambodia and Vietnam. The proportion of females among extrapulmonary cases was 45.2% in Viet Nam and 48.5% in Cambodia.[10] Another study from Vietnam also reported a higher proportion of female patients among extrapulmonary cases (45.4%).[11] Whether this is the case of females acquiring extrapulmonary TB more than pulmonary tuberculosis or if extrapulmonary tuberculosis is being diagnosed more often than pulmonary TB in population among females; is still not clear and further studies are needed to elucidate the subject.

As the economic standard, as well as knowledge and practices about health related activities, correlate directly with the educational status, educational status can have a direct implication on the epidemiology of the disease. People having education below the primary level constituted the most number of patients. The most commonly involved occupational group was that of farmers followed by students and laborers. Thirty-nine Nepalese working abroad were also seen during the study period to have tuberculosis. They had mostly been returned from abroad due to deteriorating health conditions. This distribution in occupational groups can be attributed to the economic and educational status along with congested living habits (many people living in the same room as seen in laborers and people working abroad) making them more susceptible to contracting tuberculosis. However, people from all occupations or educational statuses were seen to be affected by the disease, which goes on to show that tuberculosis is still an important public health problem in the country affecting people from every sector of life.

Only 23% of our cases gave some history of contact with known cases of tuberculosis of which contacts within the family members were common. 22 % of these contacts (among family members) were still under treatment for tuberculosis. This higher incidence of contact with tuberculosis from family members may be due to the congested living style in many of the traditional living homes with very little ventilation. Another factor may be inadequate knowledge about the methods of disease transmission which in part may be due to lack of counseling in the part of health care providers or lack of practice of the knowledge present. In any case, targeting the families with a history of tuberculosis for better counseling about the disease and required screening can help to decrease the burden of tuberculosis in the country.

Forty-one percent of the tuberculosis patients were current smokers in our study whereas a study from a similar population showed a prevalence of current smoking as 17%.[12] This is in accordance to various studies suggesting that active smoking increases risks of active TB 2-3 times.[13,14] 18% of the TB patients had alcohol use disorder, defined as consumption of 40 g alcohol per day or above.[15] A WHO survey determined the prevalence of heavy drinking defined as consumption of 40 gm or more of pure alcohol a day for men and 20 g or more of pure alcohol a day for women as 3% among males and 4 % among females in Nepalese population.[16] Prevalence of alcohol use disorders among TB patients have ranged from 10% to 50% in other different studies.[17-19] Our study suggests that smoking and alcohol abuse are still important risk factors for developing tuberculosis disease.

We also tried to look at the association of use of biomass fuel with TB as various studies have shown that the composition of tobacco smoke has many similarities to that of indoor cooking smoke from biomass fuel.[20,21] 38 % of our patients used biomass fuel. However, in a country where some reports put biomass fuel usage as high as 87% (Nepal Energy sector Synopsis Report 2010) of energy resource; the results need to be interpreted cautiously. Other studies looking for the association between TB and biomass fuel also have not been conclusive.

Diabetes is an uprising cause of morbidity. Several studies looking at the association between diabetes and TB found that people with diabetes are 2-3 times more likely to develop tuberculosis.[21,22] Only 2 % of our cases had diabetes. A study conducted in a tertiary hospital in Nepal reported a 6.3% prevalence of diabetes among patients visiting the hospital.[23] Lower prevalence of diabetes among tuberculosis patients implies that diabetes may not be a major risk factor for TB in a country like ours where other major risk factors for TB are at work. In the meanwhile, the majority of tuberculosis patients are of a younger age group among whom diabetes is less common. As our study is an observational study; this finding needs to be verified by further studies to prove the association between the two diseases in our population.

Thirty-two percent of our cases were of extra-PTB. Of PTB, there were 301 smear-positive (75%) and 98 (25%) smear-negative cases. The higher number of extrapulmonary and smear-positive tuberculosis in our study compared to national statistics[3] (22% and 68% respectively) may be due to the fact that all our cases were seen in tertiary centers where availability of advanced diagnostic facilities and well-trained manpower provide a greater chance of making the diagnosis in difficult cases.

The most common extrapulmonary presentation was of lymph node TB (28%) followed by pleural effusion (21.5%) and tubercular meningitis (16%). Tubercular meningitis was seen more commonly in children and needed hospital admissions for diagnosis and management. Various studies have reported lymph node TB to be the most common site of extrapulmonary tuberculosis. In a study conducted in Manipal Hospital Pokhara, Nepal, the most common site of extra-PTB was the lymph nodes (42.6%) followed by the peritoneum and/or intestines (14.8%); meninges/brain TB was seen in 7.2% of cases.[5] A study from Pakistan reported similar results with lymph nodes (35.6%) and spinal TB accounting for more than 60% of the extra-PTB cases followed by CNS tuberculosis (9.3%).[24]

CONCLUSIONS

This study demonstrated that tuberculosis is still a major cause of morbidity especially among young people with lower literacy levels. Family history of tuberculosis, smoking and alcohol abuse are important risk factors for tuberculosis. We recommend specific community-based approaches to target this group of population to reduce the burden of the disease.

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