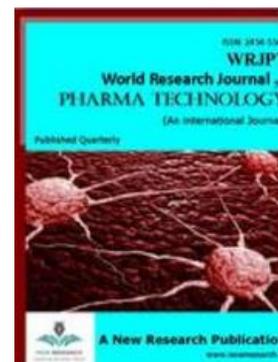**Author's Accepted Manuscript**

Comparison of socio-demographic and behavioral attributes of pulmonary and extra-pulmonary tuberculosis patients

Mahadi Hasan, F. Usaila, A. Hafez, A. Taleb

COMPARISON OF SOCIO-DEMOGRAPHIC AND BEHAVIORAL ATTRIBUTES OF PULMONARY AND EXTRA-PULMONARY TUBERCULOSIS PATIENTS

Mahadi Hasan[1#*], F. Usaila[2], A. Hafez[3], A. Taleb[4]

[1]Dept. of Epidemiology and Biostatistics, Bangladesh University of health sciences,

[2]Dhaka Medical College, Bangladesh

[3]Head of Department of Statistics, Bangladesh University of Health Sciences

[4]Dept. of Community Medicine. Bangladesh University of Health Sciences

#Currently at Department of Biomedical Sciences, City University of Hong Kong

Corresponding Author: Mahadi Hasan, Department of Biomedical Sciences, City University of Hong Kong.

ABSTRACT

This was a cross sectional study conducted in four health care facilitation centers of Dhaka city namely Chest Disease Clinic, Shaymoli; Chest Disease Clinic, Chankharpul; DOTS Center at BSMMU; and Institute of the Diseases of the Chest and Hospital (IDCH), Mohakhali. A total no. of 80 PTB and EPTB patients was studied during the study period. The study aimed to compare the socio-demographic and behavioral characteristics of the patients and their health seeking behavior. Out of 80, there were 47(58.75%) patients having PTB and 33(41.25%) patients having EPTB. Among the whole patient 41 males and 39 females giving a sex ratio of 1.05. For EPTB patients, the male to female ratio was 0.65 (13/20), in other wards 1.47 (28/19) for PTB patients. The difference was statistically not significant (p> 0.05). The modal age group was 29 and 19 for PTB and EPTB patients respectively. The median age of EPTB patients was 37 years (Range: 61, 18) higher than that of PTB patients (34 years). Since the gender distributions were also different for PTB and EPTB, we examined age distributions after stratifying by gender and TB type was male 68.3% and 31.7%, female 48.7% and 51.3% for PTB and EPTB respectively. The day laborers were more prominent for both cases. And most of them are live in urban slam area. There was no significant relationship between smoking habit with PTB and EPTB. Also there was no significant relationship between health seeking behavior with PTB and EPTB. Most of them were initially approach or they usually go for treatment from pharmacy. The researcher has compared PTB and EPTB in terms of socio-demographic characteristics, smoking habit and health seeking behavior. The differences in proportion of each of these factors stated above were not found to be significant. But studies have done elsewhere show significant relationship. This contrast demands a larger but more in-depth and representative study to be conducted.

Key words: *TB, PTB, EPTB, DOT, MTB, X-TB, socio-economic behavior, health seeking behavior.*

INTRODUCTION

Although there is an extensive global effort for combating tuberculosis but it remains as a major public health problem for people death mainly child under five years of age. WHO estimates that one-third of the world population is infected with Mycobacterium tuberculosis (MTB) (CDC, 2000). Approximately 2 billion peoples are currently infected worldwide and an estimated 1.5-2 million death are reported each year [1]. Research found that *M. tuberculosis* kills more people than

any other single infectious agent. The more perilous things is that it can remain in dormant and the affected survivor's play as a reservoir and shared the organism unremittingly. This reservoir of infected persons results in eight million new cases of TB each year[2-4]. The spread of HIV/AIDS, the breakdown in health services and the emergence of multidrug-resistant *M. tuberculosis* are contributing to the impact of the disease[3-6]. The growing epidemic led the World Health Organization to declare TB a global emergency in 1993. In the South-East Asia Region it's also remain as a thoughtful public health burden, with an estimated 4.88 million prevalent cases and an annual incidence of 3.17 million TB cases, carries one-third of the global burden of TB. Five of the 11 Member countries in the Region are among the 22 high-burden countries, with India accounting for over 20% of the world's cases with high incidence is in African countries.

Worldwide Tuberculosis can be classified in to two categories namely pulmonary tuberculosis (PTB) and extra-pulmonary tuberculosis (EPTB). In this study, we mainly discuss about PTB and EPTB and compare PTB and EPTB patients on the basis of socioeconomically condition among them. Tuberculosis occurs in both sexes, in all age groups and can affect virtually all organs of the body [11]. Depending upon the anatomical site involved, it has a wide spectrum of clinical presentation. Most cases occur in the age group of 15-54 years, with males being disproportionately affected. The male/female ratio among newly detected cases is 2:1.

Tuberculosis (TB) remains a major public health problem in Bangladesh. The World Health Organization (WHO) estimated that in 2005 there were approximately 576000 TB cases in the country. The number of new cases occurring in 2005 was estimated at approximately 322000. Of these, approximately 145000 were infectious cases transmitting TB in the community. WHO further estimated that about 67000 TB patients, most of them not registered, had died of tuberculosis in 2005.

In Bangladesh of the total number of 145 186 cases reported to NTP in 2006, 82% were reported from the upazilas, 13% by units located in the metropolitan cities and 5% by CDCs. Just over 70% were new smear-positive cases and almost 3% were relapses. New smear-negative and extra-pulmonary cases were 17% and 10%, respectively. The proportions of extra-pulmonary and new smear-negative cases were higher in the metropolitan cities and CDCs compared to the upazilas (Table 1.3). This is not surprising since only limited diagnostic facilities to detect smear-negative or extra-pulmonary cases are available at the upazila level. Childhood TB represents 1.5% of new smear positive patients and 6.5% of smear-negative and extra-pulmonary TB cases. Smear-negative and extra-pulmonary patients and childhood TB are certainly under-diagnosed within the NTP.

Tuberculosis (PTB) is one of the major causes of adult death in Bangladesh. Although the prevalence rate of pulmonary tuberculosis is high but recently the prevalence of extra-pulmonary tuberculosis is increasing dramatically in globally as well as Bangladesh due to improve diagnostic facilities, awareness of the patient and increase HIV epidemic. Tuberculosis can involve any organ system in the body. While pulmonary tuberculosis is the most common presentation, extra-pulmonary tuberculosis (EPTB) is also an important clinical problem [11, 12, 13]. The term EPTB has been used to describe isolated occurrence of tuberculosis at body sites other than the lung. However, when an extra-pulmonary focus is evident in a patient with pulmonary tuberculosis, such patients have been categorized under pulmonary tuberculosis as per the guidelines of the World Health Organization (WHO) [14]. Although the cause & risk factors are almost similar in both cases but somewhat different in clinical presentation, socio-demographic & behavioral pattern of the patient. But appropriate studies to investigate this are lacking. The aim of this study is to compare the PTB & EPTB patients on the basis of socio-demographic characteristics and behavioral attributes (smoking habit & health seeking behavior) for identifying the unique risk factors or

characteristics (personal behavior) which is responsible for causing EPTB or which acts as major risk factors for EPTB.

Table 1: Case notification by type of reporting unit 2006, Bangladesh.

Reporting Unit	Pulmonary positive (smear +ve)				New pulmonary negative (smear -ve)		New extra-pulmonary		Total	
	New case		Relapse case							
	Number	%	Number	%	Number	%	Number	%	Number	%
Upazilla	89729	75.5	2644	2.2	16722	14.1	9735	8.2	118830	82
Metroplitan city	9219	47.9	1267	6.6	5304	27.6	3469	18	19259	13
CDC	3040	43	299	4.2	2493	35.2	1243	17.6	7975	5
Total	101988	70.3	4210	2.9	24519	16.9	14447	10	145164	100

Source: NTP Annual Report 2007

MATERIALS AND METHOD

Study Population:
Patients registered in 4 National TB control project (Chest Clinic) in Dhaka city under DOT program within the study period.

Study Place:
The study was conducted in 4 different Chest disease clinics namely Chest disease clinic, Shyamoli, TB control and Training Institute, Chankharpul, DOTS center, BSMMU and IDCH, Mohakhali. The four different chest disease clinics are the secondary and tertiary care hospital under Bangladesh government serving the population of Dhaka city others people came to Dhaka from another area of Bangladesh. Here diagnosis of pulmonary TB is followed by examination of three sputum smears by Ziehl Nielssen staining for acid fast bacilli [AFB]. Chest radiographs & Maltose tuberculin test are also used to support the diagnosis. At MTH, patients diagnosed with TB are referred to the DOTS clinic where they are registered and treated according to NTP guidelines [16].

Sample size:
The population was TB patients in Dhaka city under the DOTS program during the study period. The sample was TB patients recorded in four tertiary clinics under DOTS program in Dhaka city during the study time. Due to time limitation 80 samples was observed during this study period.

Duration of the study:
The study was conducted at 1st June to 31st June, 2009.

Sampling Technique:
Sample of the study was collected purposively.

Data collection tools:
- Check list
- Pre-structured questionnaire

Inclusion and exclusion criteria:
- Respondent $\leq$ 15 years of age

Data collection Procedure:
A total of 231 TB patients registered in the DOTS clinic from 1 January, 2009 to June 30, 2009 were included in the study. Patients' who were present, at the time of data collection, was interviewed (by face to face interview), registration numbers were used to obtain corresponding files from the medical records department. From each medical case file, the patient's history, physical findings, chest radiographs and reports of laboratory investigations were reviewed to obtain the necessary information about diagnosis of TB. For getting other information of tobacco use pattern & health care seeking behavior pre-structured questionnaire was used & this was done by face to face interview. For each patient, demographic information, lifestyle factors (smoking habit), health seeking behavior, past history of TB were recorded.

Classification of PTB and EPTB patients:
It is well known that lymph node and pleural involvement in TB is a direct extension of the disease from lung parenchyma. Therefore, patients with exclusively intrathoracic involvement (i.e., confined to lung parenchyma, pleura, and intrathoracic lymph nodes) were considered as PTB for the purpose of this analysis. Patients with extension of disease to organs or tissues outside the thorax, including those patients who also had pulmonary involvement, were considered as EPTB in our analysis.

Statistical analysis:
Data were analyzed using SPSS (Statistical Package for Social Sciences, version 13.5). Demographic variables, life-style factors and behavioral attributes (tobacco use pattern & health seeking behavior) were compared between EPTB and PTB groups. The Chi square test for categorical variables was used to test for differences between the groups. Our main analysis was carried out using chi square analysis. Odds ratios (OR), 95% confidence intervals (95% CI) and p-values were calculated for each potential predictor variable.

RESULTS
A total of 231 tuberculosis patients were registered in the four different care giving site during the study period. Eighty cases of TB were included in the final analysis through face to face interview. In our study the author found that among the four cares giving site most of the TB patients were came from IDCH & DOTS center, BSMMU. This was due to in both places have modern diagnostic facilities & higher treatment facilities. This finding is shown in Table 2.

Table 2 Care giving site of tuberculosis disease.

Care giving site	frequency	percentage
Chest disease clinic, Shaymoli	15	18.8
DOTS center, BSMMU	15	18.8
Chest disease clinic, Chankharpul	20	25.0
IDCH, Mohakhali	30	37.5
Total	80	100.0

Socio-demographic information:
Out of 80 TB patients 33 (41.2%) were classified as EPTB and 47 (58.8%) as PTB. Out of 33 EPTB patients, 13 were males & 20 were females. Out of 47 PTB patients, 28 were males and 19 were females.

Table 3 Comparison of pulmonary and extra pulmonary tuberculosis according to demographic characteristics, EPTB (n-33) and PTB (n-47).

Sex of the respondent	Classification of the Disease (TB)		Total
	PTB	**EPTB**	
Male	28	13	41
(%)	68.3	31.7	100.0
Female	19	20	39
(%)	48.7	51.3	100.0
Total	47	33	80
(%)	58.8	41.3	100.0

Chi-Square value-3.160 and df-1 p-value 0.075

Association of TB types (PTB and EPTB) with age was examined by applying χ^2-test. The value of χ^2 was 0.075 with 1 df. The association was to be not statistically significant (p= 0.075). Mean age of the PTB and EPTB patients were 36.04 and sd 13.60, median age were 34.50. Age group was collapsed in to two groups namely < 45 years group & > 45 years group.

Table 4 Comparison of pulmonary and extra pulmonary tuberculosis according to age group.

Age group	Classification of the Disease (TB)		Total
	PTB	**EPTB**	
< 45 years	33	25	58
>45 years and above	14	8	22
Total	47	33	80

Chi-Square value- 0.299 and df-1 and p value- 0.585

Association of age group with EPTB & PTB patients was examined by using χ^2-test. The value of χ^2 was 0.299 with 1 df. The association was found to be non-significant (p-0.585). The associations of age group with TB types are shown in the Table 4.

Occupation group was collapsed in to four groups namely 1. Day labor (day labor, riksha puller, driver, farmer) 2. Service (service, garments worker) 3. House wife 4. Others (student, business, unemployed, others). The associations of occupation group with TB types are shown in the Table 5.

Table 5 Comparison of pulmonary and extra pulmonary tuberculosis according to age group.

Occupation group	Classification of the Disease (TB)		Total
	PTB	**EPTB**	
Day labor (Day labor, Ricksapullar, Farmer, Diver)	17	14	31
Service (Service, Garments worker)	8	5	13
House wife	6	7	13
Others (Student, Business, Unemployed, Others)	16	7	23
Total	47	33	80

Chi-Square value- 2.199 and df-3, p value- 0.532

Association of occupation group with EPTB & PTB patients was examined by using χ^2-test was 2.199 with 3 df. The association was found to be not significant (p value- 0.532).

Similarly income group was collapsed in to three groups namely income 1. <6000tk group, 2. Income 6000tk to > 10000tk group and 3. No income group. The relationship between income group and TB types were shown in figure 3.2.
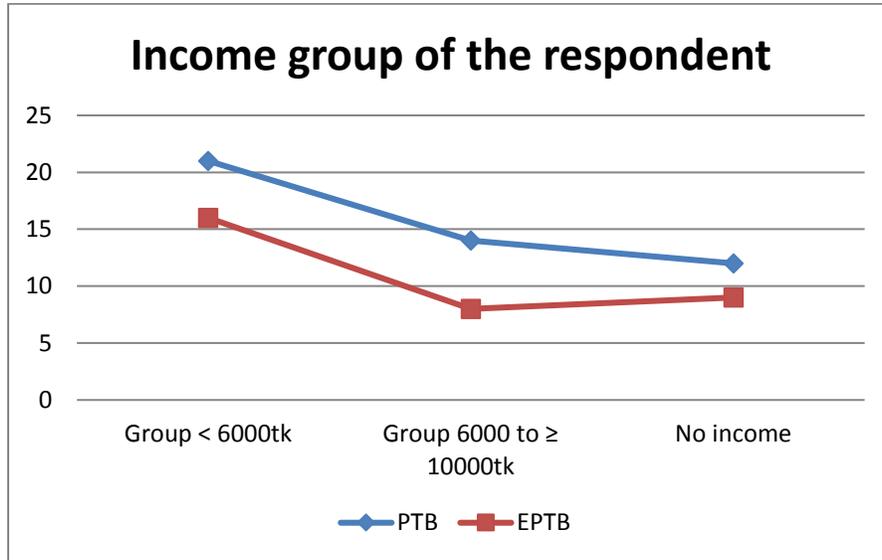
Figure 1 The relationship between income group and TB types.

Association of income group with EPTB & PTB patients was examined by using χ^2-test. The value of χ^2 was 0.30 with 2 df. The association was found to be not significant (p-0.86). The associations of age group with TB types are shown in the figure 3.13.

Smoking Habit:
The smoking habit of the EPTB & PTB patients was again categorized in to 0. Yes, 1. No. The associations of smoking habit with TB types are shown in the Figure 3.3.
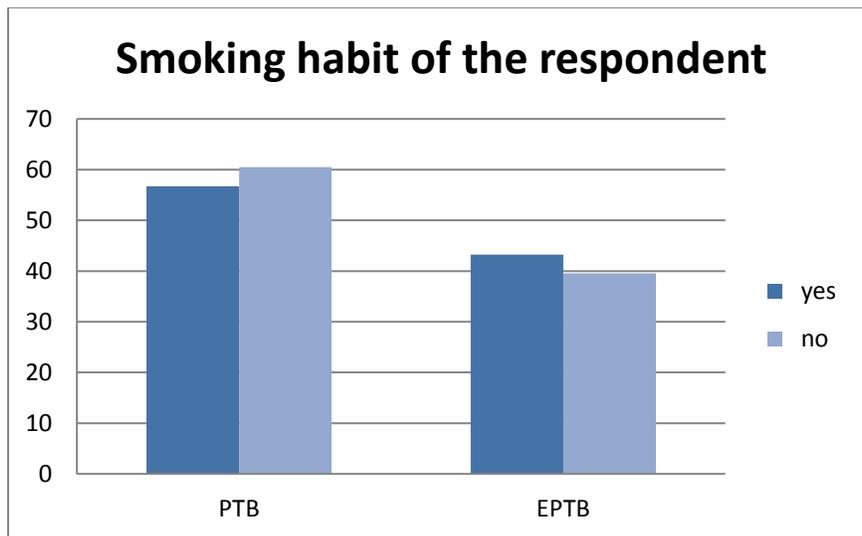

Figure 2 Associations of smoking habit with TB types (EPTB & PTB) patients.

The smoking habit of the EPTB & PTB patients was again examined by using χ^2-test and found the value 1.062 with df 1. The association between smoking habit & TB patients was not statistically significant. The associations of smoking habit with TB types are shown in the figure 3.13.

History of diseases:
Previous TB history of the respondent was categorized in to 0. Yes and 1. No, on the basis of TB types (PTB and EPTB patients). The associations of smoking habit with TB types are shown in the Table 4.8.

Table 6 associations of previous TB history with TB types (EPTB & PTB) patients.

Previous TB history of the respondent	Classification of the Disease (TB)		Total
	PTB	EPTB	
Yes	6	2	8
No	41	31	72
Total	47	33	80

Chi-Square value- 0.969, df-1 and p value- 0.325

The association of previous TB history of the EPTB & PTB patients was examined by using χ^2-test and found the value 1.062 with df 1. The association between smoking habit & TB patients was not statistically significant. The associations of smoking habit with TB types are shown in the Table 4.8.

Vaccination history of the TB patients was again categorized on the basis of history of scar present and absence. This was shown in Table 4.9.

Table 7 the association of previous BCG vaccine history with TB type's (EPTB & PTB) patients**.**

BCG vaccine history	Classification of the Disease (TB)		Total
	PTB	EPTB	
Scar present	20	18	38
scar absent	27	15	42
Total	47	33	80

χ^2 value 1.11 with 1 df and p value 0.29.
The association between previous BCG vaccine history & TB types (PTB and EPTB) patients was examined by using χ^2-test. The χ^2-test value was found 1.11 with 1 df. The association of previous BCG vaccine history with TB type's patients was found to be statistically not significant (p value- 0.29). The associations of previous BCG vaccine history with TB type's patients are shown in table 3.10.

Health seeking behavior:
Distance of hospital from patient's home was collapsed in to two groups namely 1. < 3km, 2. > 3km. The associations of occupation group with TB types are shown in the Table 4.10.

Table 8 Association of distance of hospital from patient's home with TB types (EPTB & PTB) patients.

Distance of hospital from patients home	Classification of the Disease (TB)		Total
	PTB	EPTB	
<3 km	21	16	37
> 3 km	11	7	18
Total	32	23	55

Chi square value is 0.094, df- 1 and p value- 0.75**.**

The association of distance of hospital from patient's home with the type of the EPTB & PTB patients was examined by using χ^2-test and found the value 0.094 with df 1.The association of distance of hospital from patient's home & TB type patients was not statistically significant (p value-0.75).The association of distance of hospital from patient's home with TB types are shown in the Table 4.10.

Health seeking behavior of TB patients was again collapsed in to two groups namely 1. Taking modern methods (MBBS doctor, hospital, pharmacy, health complex) 2. Taking traditional methods (Jhar/fuk, homiopath, ayurbad, kobirag, village cuak, others). The associations of health seeking behavior with TB types (EPTB & PTB) patients are shown in the Figure 3.4.
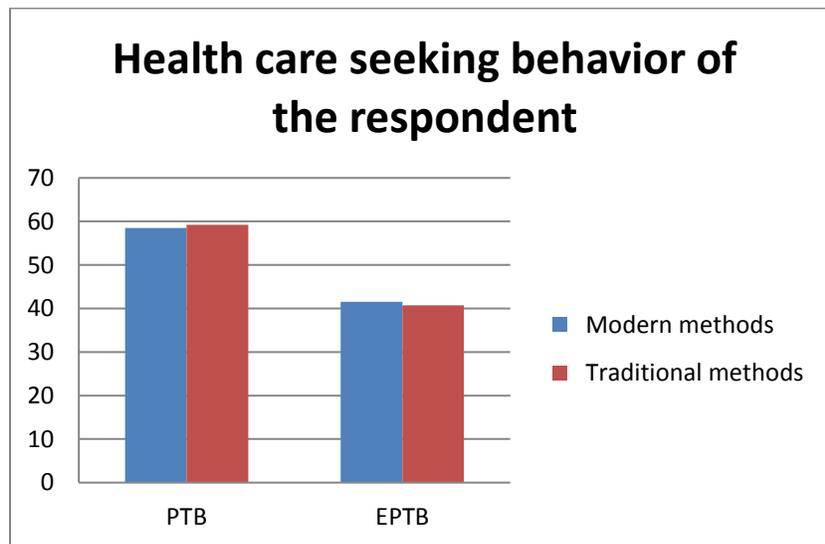

Figure 3 This figure shows that the relationship with health care seeking behavior and TB types.

Association of health seeking behaviors with EPTB & PTB patients was shown in the bar diagram found that the association was found to be not significant (p value- 0.947). The associations of health seeking behavior with TB types (EPTB & PTB) patients are shown in the Table 4.11.

Table 9 Summary of associations are shown in this table.

Association between		χ^2 value	df	P value
TB type's (EPTB and PTB)	Sex	3.16	1	0.585
vs	Age	0.299	1	0.585
	Occupation	2.19	3	0.532
	Education level	0.081	2	0.96
	Marital status	1.261	3	0.736
	Income level	0.30	1	0.303
	Smoking habit	1.55	1	0.212
	Use of tobacco leaves	0.002	1	0.96
	Use of Gul	0.969	1	0.325
	Previous TB history	0.093	1	0.760
	Distance of the hospital	0.094	1	0.75
	Health seeking behavior	0.004	1	0.947
	BCG vaccine status	1.118	1	0.29

Table 10 overall findings of the study was summarized in the following table.

Variables	PTB (n-47)	EPTB (n-33)	Remarks
Age group			
< 45 years	55.4%	45.6%	
>45 years	65.2%	34.8%	
Mean	37.13	34.48	
SD	13.89	13.23	
Median	34.00	37.00	
Mode	29.0	19.00	
Maximum	67	61	
Minimum	16	18	
Sex			
Male	28 (68.3%)	13 (31.7%)	
Female	19 (48.7%)	20 (51.3%)	
Total	47	33	
Smoking habit			
Yes	21 (56.8%)	16 (43.2%)	Chi square- 1.13
No	26 (60.5)	17 (39.5%)	P value- 0.737
Total	47	33	
Tobacco use pattern			
Yes	28 (65.1%)	15 (34.9%)	Chi square- .155
No	19 (51.4%)	18 (48.6%)	P value- 0.212

	47	33	
Total	47	33	
Gul using habit			
Yes	14 (58.3%)	10 (41.7%)	Chi square- .002
No	33 (58.9%)	23 (41.1%)	P value- 0.96
Total	47	33	
Previous TB history of the patients			
Yes	6 (75%)	2 (25%)	
No	41 (56.9%)	31 (43.1%)	
Health seeking behavior of the patients			Chi square- 0.004
	31 (58.5%)	22 (41.5%)	P value- 0.947
Modern treatment	16 (59.3%)	11 (40.7%)	
Traditional treatment			

Demographic factors:

The overall male to female ratio of TB cases was 1.05 (41/39). For EPTB patients, the male to female ratio was 0.65 (13/20), but 1.47 (28/19) for PTB patients. The difference was statistically not significant (p> 0.05). The median age of EPTB patients (37 years) was higher than that of PTB patients (34 years) (p < 0.05) (Table 3.13). Since the gender distributions were also different for PTB and EPTB, we examined age distributions after stratifying by gender and TB type. Figure 3.4 shows the age distributions of EPTB and PTB for males and females, confirming the tendency for EPTB to occur at <45 years age in both genders.
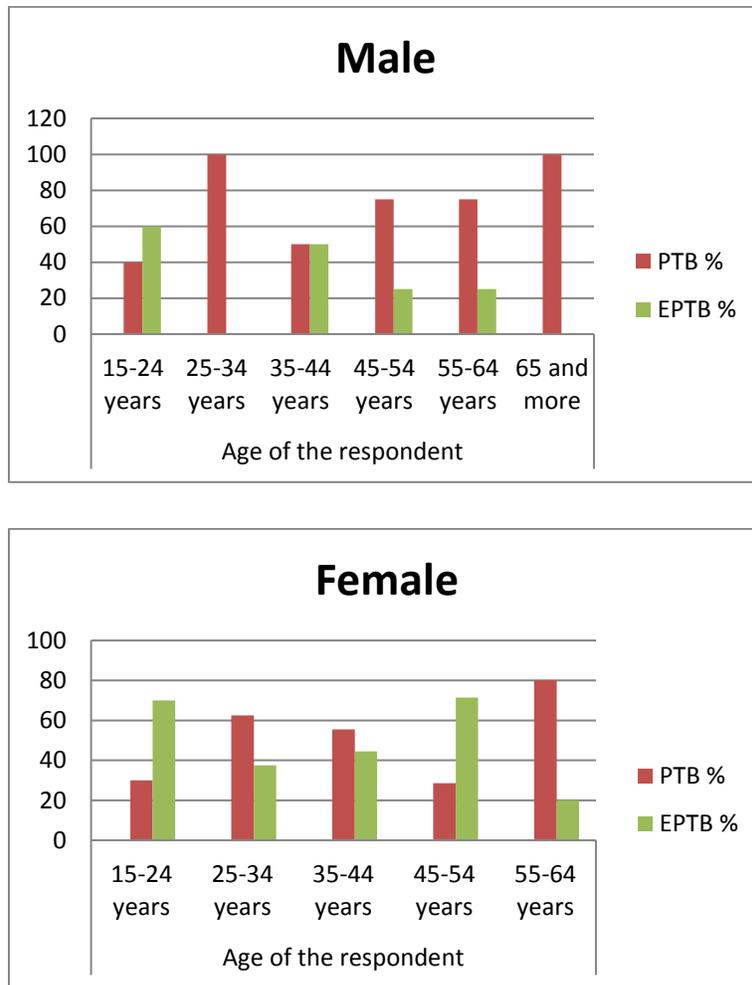
Figure 4 Relationship between age distributions of EPTB and PTB for males and females.

Life-style factors:
The proportion of 'ever smoked', (those who were either currently smoking or ex-smokers) was not significantly higher among PTB patients (53.5%) compared to EPTB patients (46.5%) (Table 3.6). The proportion of using tobacco leaves was not significantly higher among PTB patients (65.1%) compared to EPTB patients (34.9%) (Table 3.8) and the proportion of 'use of gul', was not significantly higher among PTB patients (58.3%) compared to EPTB patients (41.7%) (Table 3.8). In male PTB percentage were higher that female who were 'ever smoked' and incase of EPTB case female patients were higher than male. In 'Using of tobacco leaves' habit male were higher than female in PTB cases and female were higher than male in EPTB cases. This analysis is not statistically significant (p value >0.05). Patients 'using of gul' as compared to PTB and EPTB patients was found to same picture   and this difference was statistically not significant (p <0.05).

Health seeking behavior:
As compared to the health seeking behavior of both cases patients suffering from PTB, using higher percentage of modern treatment than patients suffering from EPTB (58.5% vs 41.5%). Some people in both cases are using the traditional methods for their treatment & it was also higher in PTB patients (59.3% vs 41.7%).

DISCUSSION

Earlier studies of risk factors for EPTB had a lower proportion of EPTB cases[17.21]. But in this study, proportions of PTB and EPTB were almost same, possibly because it was carried out in Dhaka city and the main four referral centers for the region and the proportion of EPTB may be higher due to availability of diagnostic facilities. Pulmonary TB cases are also diagnosed at primary health care centers because of the decentralization of diagnostic and treatment facilities under NTP. Gender differences observed in our study confirm the findings of previous studies in both developing[23, 24] and developed countries[25, 26]. This may be due to gender differences in both exposures to TB infection and prevalence of susceptible risk factors (e.g., smoking) [23]. Other possible factors accounting for the difference are health seeking behavior associated with having TB and lack of access to health care, especially for females, in some developing countries like Bangladesh[24].

The female ≥ 45 years was predominantly higher than the female < 45 years in case of EPTB relative to PTB that was found in this study. This is consistent with studies from the USA[21] and Europe[22] which have reported that younger age was an independent risk factor for EPTB. However studies from the USA[17] and Turkey[18], have reported that age was not associated with EPTB. These inconsistencies could be due to differences in prevalence of host-related factors or important co-exposures.

Smoking habit

In this study, 14 patients out of 25 patients <45 years of age were "ever smokers" as compared to 7 out of 12patients who were age ≥ 45 years . Proportions of "ever smokers" differed between males (71.4%) and females (5.3%) in PTB cases and male (76.9%) female (30%) in EPTB cases. This raises the possibility that the age and sex differences between PTB cases (in whom smoking was more common) and EPTB cases could be a result of confounding by smoking. However, younger age and female gender remained strongly associated with EPTB. It would be useful to confirm the association of age and gender with EPTB in other high-burden countries.

This study found that, smoking was not associated with PTB. This is not consistent with a meta-analysis which reported that smoking is a risk factor for TB infection and for pulmonary TB disease[27]. Another report has suggested that smoking is associated with relapse of TB and smokers are less likely to have isolated extra-pulmonary TB[28]. In this study found that past history of TB was not associated with PTB, although researcher could not identify if this was as a result of reactivation (relapse) or reinfection[29]. However, evidence suggests that in high-burden countries reinfection is more common than relapse[30]. Therefore history of smoking and contact with a case of TB should arouse a high degree of suspicion for active TB. Such information would be useful for screening the patients for TB.

The study results of comparison of EPTB and PTB by using chi square test suggested that factors like diabetes mellitus, past history of TB and previous BCG vaccination history are not associated with PTB compared to EPTB. Our results are not consistent with other studies that have reported an association between diabetes mellitus and PTB[31, 32]. However, study from Turkey[18] examined the association of diabetes, use of immunosuppressive drugs/steroids and past history of TB with EPTB but found no association with any of these factors.

Studies from developed countries have reported an increasing trend of EPTB among HIV infected persons[19, 20] and HIV infection is associated with EPTB[17, 20, 22]. A recent study from a large tertiary hospital in south India reported that EPTB showed an increasing trend among HIV infected patients[22]. In Bangladesh, the adult HIV/AIDS prevalence is 0.1%. Therefore, we did not have enough data to carry out a useful analysis of the association between HIV infection and EPTB.

In this study the researcher attempt to compare the socio-demographic characteristics and behavioral attributes of PTB and EPTB patients. The socio-demographic characteristics compared

were: age, sex, educational status, income level, occupation, marital status, and behavioral attributes were : smoking habit, tobacco leaves using behavior, Gul using behavior and health care seeking behavior. None of the characteristics showed significant relationship. Studies done elsewhere, however, showed significant association between TB types (PTB and EPTB) with socio-demographic characteristics and behavioral attributes (p< 0.05).

CONCLUSION

The researcher has compare PTB and EPTB in terms of socio-demographic characteristics, tobacco use pattern and health seeking behavior. The differences in proportion of each of these factors stated above were not found to be significant. Although studies in abroad have significant findings. This contrast demands more in depth and representative studies to be conducted. Although we have not found any remarkable differences between PTB and EPTB in terms of the factors compared but both is caused by M. tuberculosis which have serious effects on human health. In this study it was found that smoking is the one of the major risk factors for both PTB and EPTB. So the sole recommendation is to cessation and prevention of smoking. Although the cause and risk factors were same in both cases, so, same preventive measures were taken for the prevention and control of both PTB and EPTB. It is better to conduct a large in depth study to fulfill the aim of the study. Sole recommendation that, we can make at this stage in "To conduct a large in depth representative study."

ACKNOWLEDGEMENT

CONFLICT OF INTERESTS

This study shows comparison of socio-demographic and behavioral attributes of PTB and EPTB patients. To our knowledge no similar study has been conducted in our country, but a few studies were conducted in other south Asian countries like Nepal.

ABBREVIATION

TB, tuberculosis, PTB, Pulmonary tuberculosis, EPTB, Extra pulmonary tuberculosis,

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7. Total TB control costs for 2003–2007 are based on expenditure, whereas those for 2008–2009 are based on budgets. Estimates of the costs of clinic visits and hospitalization are WHO estimates based on data provided by the NTP and from other sources. See Methods for further details.

8. N TP available funding for 2004–2007 is based on the amount of funding actually received, using retrospective data; available funding for 2003 and 2008–2009 is based on prospectively reported budget data, and estimated as the total budget minus any reported funding gap.– indicates not available or not applicable; pop, population; ss+, sputum smear-positive; ss–, sputum smear-negative pulmonary; unk, pulmonary – sputum smear not done or result unknown.

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