Socio-Demographic Determinants of Adult Pulmonary Tuberculosis Patients: A Hospital Based Study at Dhanmondi, Dhaka, Bangladesh

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ABSTRACT

Background: Tuberculosis (TB) is a multi-system infectious disease with a major cause of morbidity and mortality all over the world but particularly in developing countries like Bangladesh. A normal healthy individual does not face the symptoms causing by tuberculosis due to their immune system that's why infection among healthy individuals always remain silent. As it is highly infectious air borne disease that's why treatment completion for TB is the cornerstone of its control and prevention. So to understand these factors efficiently this study was carried out about socio-demographic determinants of adult TB patients attending the tertiary care teaching hospital, Dhanmondi, Dhaka.

Methodology: This was hospital based cross sectional observational study done at Bangladesh Medical College Hospital, Dhanmondi, Dhaka with the study period from January 2020 to December 2021. Total 410 patients of age group 18 years and above with persistent cough with sputum production for more than 2 weeks were enrolled for this study purpose.

Results: Total prevalence of sputum positive adult pulmonary TB among the studied group was 69.02%. Majority 54% were male patients in the age group of 41-50 years (31.45%). Pulmonary TB was predominantly diagnosed among employed group 41.34%, those who have completed their high school level (34.28%) in mainly the rural (66.08%) locality. Joint family (61%) with 8-10 family members (43.46%) have been found mostly affected in our study. The cardinal features were cough with sputum production (80.21%) followed by fatigue (71.73%), fever (42.05%), sweating (46.99%), loss of appetite (32.86%) and weight loss (27.56%). Pulmonary TB was found mostly among smokers (57.23%) with normal BMI (44.88%).

Conclusion: To decrease the rate of infection with Tuberculosis, a multi-factorial approach can play the pivotal role by improving the living conditions, education level, economic status and adequate sanitation. Awareness can bring a new dimension in this regard.

Keywords: Socio-demographic determinants, tuberculosis.

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I. INTRODUCTION

Tuberculosis (TB) is a multi-system communicable disease that is responsible for one of the major causes of morbidity and mortality all over the world mainly among developing countries. Among the 30 high TB-burden countries, Bangladesh is one of them. It accounts for 3.6% of the global total. The estimated incidence of TB per 100,000 is 221 in Bangladesh, with a mortality rate of 24 per 1,00,000 population [1]. About 64,000 people die solely due to TB in Bangladesh per year on average. Approximately 80% of all TB cases in Bangladesh are pulmonary TB [2]. The socio-demographic determinants may vary from country to country regarding TB. Among various determinants age is an important factor to stratify the risk of disease. The risk may

increase in the elderly, possibly due to decrease in immunity status and presence of other co-morbidities. Active pulmonary TB bears some common clinical features like cough with sputum production with the presence of blood sometimes, weight loss, loss of appetite, fever, malaise, and night sweats [3]. The transmission of pulmonary TB is an active process because each individual with an active pulmonary TB can infect 10-15 individuals if they remain untreated [4]. Despite a lot of research and millions of dollars spending to uproot this disease, it is still able to contaminate the environment. Not only the medical treatment can concur this war, but we also need to give more focus on its early diagnosis and prevention as well. The aim of our study was to assess the main socio-demographic determinants of adult pulmonary TB patients seeking treatment from tertiary care teaching hospital, Dhanmondi, Dhaka.

II. MATERIALS AND METHODS

A. Study Design & Area

This is a population based cross sectional observational study carried out in both indoor and outdoor Medicine department of Bangladesh Medical College (BMCH), Dhanmondi, Bangladesh.

B. Study Period

The study was conducted from January 2020 – December 2021.

C. Study Population

All the cases of confirmed Pulmonary TB were included here as the study population fulfilling the inclusion and exclusion criteria. After the diagnosis, the patients were interviewed immediately and enrolled in our study until the sample size was achieved.

D. Inclusion Criteria

- Confirmed diagnosis of pulmonary TB on the basis of sputum smear, and gene X pert reports.
- Age 18 years and above
- Informed written consent

E. Exclusion Criteria

- Pregnant woman
- Patients not willing to participate in the study
- Previous history of pulmonary or extra-pulmonary TB
- Alteration in higher psychic function in critically ill patients.

F. Sampling Techniques

Consecutive convenient (purposive) sampling method was applied in here.

G. Data Collection

All the subjects underwent medical history assessment, general clinical examination before enrolment. Patients provided the informed consent before they participated in the study. Once informed consent was obtained, all participants were asked to complete a questionnaire to collect basic demographic information such as age, gender, height, weight, educational level, number of family members living together, employment status, average income in the family, area of residence and smoking history.

Here, we have calculated the BMI from the height and weight of the patients to categorise them more effectively according to the nutritional status.

All the study participants visited to BMCH with various symptoms like cough with productive sputum for more than 2 weeks, fever, malaise, weight loss, loss of appetite underwent investigations to enable appropriate disease diagnosis.

H. Data Analysis

Data was recorded into semi-structured pre-tested pro forma. It was entered into Microsoft Excel and analysed using SPSS v 16.0. Summarisation of data was done according to data types and appropriate statistical tests were done. The various modes of clinical presentation were expressed as the total number of patients presenting with a particular presenting feature and then calculated as a percentage of the

total number of patients. Statistical analysis was done by using appropriate statistical tool like 'chi-square' test, student 't' test, where applicable. A p-value of <0.05 was considered to be statistically significant and p-value of > 0.05 was considered not significant statistically.

Informed consent was taken in all the cases and the records were kept confidentially.

I. Ethical Clearance and Informed Consent:

The study was carried out after obtaining approval from the Institutional Ethical Committee. The participants were briefed about the purpose of the study and informed consent was obtained prior to the data collection.

III. RESULTS

A. Total Prevalence of Pulmonary TB among the Studied Respondents

Among 410 study population sputum was found positive in 283 patients and others (30.98%) were not able to detect. (Table I).

TABLE I: PREVALENCE OF PULMONARY TB AMONG STUDY POPULATION

Sputum Findings (<i>Mycobacterium tuberculosis</i>)	Number of Patients (n)	Percentage(%)
Detected	283	69.02%
Not detected	127	30.98%
Total	410	100%

B. Age and Gender Wise Distribution of Study Group

Among 283 sputum positive patients majority (54%) were male patients (Fig.1).

Fig. 1. Gender wise distribution of study group.

Majority (31.45%) of the sputum positive TB patients were in the age group of 41-50 years followed by 20.14% were in the 51-60 years' category. It was proven statistically significant in our study ($p<0.004$). Interestingly, majority (26.83%) of the sputum negative patients were also at the age group of 41-50 years (Table II).

TABLE II: AGE WISE DISTRIBUTION OF STUDY GROUP

Age	Sputum positive	Percentage	Sputum negative	Percentage	Total (%)
20-30	39	13.79	19	14.97	58(14.14)
31-40	43	15.19	23	18.11	66(16.097)
41-50	89	31.45	21	16.54	110(26.83)
51-60	57	20.14	33	25.98	90(21.95)
>60	55	19.43	31	24.41	86(20.98)
Total	283	100	127	100	410(100)

C. Family Type, Size and Annual Income among Study Group

In our study most (61.13%) of the TB patients belonged from the joint family with the number of family members 8-10 (43.46%). 38.52% TB patients had an annual family income ranged from 51,000-1,00,000 Bangladeshi taka (Fig. 2, 3, 4).

Fig. 2. Types of family among study group.

Fig. 3. Family size among TB patients.

Fig. 4. Annual family income among study group.

D. Area of Residence of Study Population

Most of our Pulmonary TB patients belonged from rural areas (66.08%) in comparison to the urban areas (33.92%) which was not found statistically significant here ($p < 0.324$). (Fig. 5).

Fig. 5. Area of residence of study group.

E. Level of Education and Employment Status among TB Patients

In our study 34.28% TB patients had completed their high school and 41.34% found to be employed. Although these findings were not proven statistically significant here ($p < 0.343$) (Table III, IV).

TABLE III: LEVEL OF EDUCATION AMONG TB PATIENTS

Level of Education	No of patients (n)	Percentage (%)
None	28	9.89
Primary	83	29.33
High School	97	34.28
University	75	26.5
Total	283	100

TABLE IV: EMPLOYMENT STATUS OF THE STUDY GROUP

Employment Status	No of Patients(n)	Percentage (%)
Employed	117	41.34
Unemployed	76	26.86
Retired	47	16.61
Student	43	15.19
Total	283	100

F. Social Habits among Study Population

During analysing of the social habits male smokers (57.23%) were found to be predominant. Very few (2.12%) Alcoholic people were found in our study population. Rest are non-smokers (59.36%) among which mainly are females (Table V).

TABLE V: SOCIAL HABITS ANALYSIS

Social Habits	Male	Percentage (%)	Female	Percentage (%)	Total (Percentage)
Smokers	87	57.23	22	16.79	109 (38.51)
Alcoholic	6	3.95	0	0	6 (2.12)
Non smokers	59	38.82	109	83.21	168 (59.36)
Total	152	100	131	100	283 (100)

G. Distribution of Study Subjects according to BMI

44.88% study subjects were found to be in the normal range of BMI whether as 33.92% belonged to underweight. Only 6% subjects were found obese in our study (Fig. 6).

Fig. 6. Distribution of study subjects according to BMI.

H. Various Clinical Presentation among Study Group

Among various clinical presentations cough with expectoration (80.21%) belonged to one of the main symptoms in our study. There were many variations among presentations of other features like fever (42.05%), fatigue (71.73%), loss of appetite (32.86%) and weight loss (27.56%). Small number of patients (2.12%) complained about chest pain (Fig. 7).

Fig. 7. Various clinical presentation among study group.

IV. DISCUSSION

In our present study maximum study subjects were found to be males (54%) compared to females (46%). Similar findings of male predominant pulmonary TB were found in various studies of different countries. 57.8% male vs 42.2% female with positive pulmonary TB was found in one study conducted by [5]. Another study found the percentage 66% vs 34% among males and females with same condition [6]. But neither the present nor the past studies found this male predominant positive pulmonary TB cases statistically significant.

In the present study majority of the study population (31.45%) belong to age group 41-50 years bearing the 2nd majority group (20.14%) 51-60 years. It implies that age is an important factor here probably due to decrease immunity along with the ageing process leading to the development of more pulmonary TB cases.

The study shows that 61% joint family members came with positive pulmonary TB in comparison to 39% nuclear families. Although the number of family members also play a role in our study where 43.46% cases had 8-10 members living together with an annual income ranging from 50,000-1,00,000 Bangladeshi taka (38.52%). Socio-economic status and living conditions have always got a great impact in the pathophysiology of this disease process. It predominates on the overcrowding situation which can be clearly visible from our findings. Similar findings have also been observed by [7], [8], they found sputum positive pulmonary TB among 44.2% cases but they have not found any statistical significance whether as we found our findings statistically significant with

p value <0.003.

Cigarette smoking is associated with damage to the lung parenchyma and decrease the immune response that's why people may predispose to various respiratory insults. Mycobacterium tuberculosis is one of these insults that can grow very rapidly in such circumstances. Probably due to this we found that 57.23% of our study group members were smokers. Similar findings have also been observed in various studies. One study found that 50% of their study population were smokers and they put it as one of the main factors for the development of pulmonary TB [9]. Alcohol can also put negative effects on the immune system and the treatment of pulmonary TB patients but very few 2.12% cases were alcoholic in our study that's why we couldn't be able to evaluate this factor.

Education is an important factor in the prevention of TB as it can create awareness among people regarding its transmission and importance of treatment continuation. Though there was not that much variation of educational level was found in our study. 41.34% employed persons were found TB positive in here, which has got some similarities with findings found in one study done in [10].

In our present study cough with expectoration (80.21%) was the predominant clinical feature followed by fatigue (71.73%) and fever (42.05%). Patients presented with cough with sputum for more than 2 weeks along with other clinical features mainly chosen primarily for our study population. Similar observations were also seen in many studies among which [11] mentioned cough with expectoration as their main presentation. Weight loss (27.56%) was not that much predominant in our study which has got some similarities with [8] where they have reported 30.32% cases of weight loss among TB patients.

V. CONCLUSION

Bangladesh has got high level of complexity in the public health dimensions as a result multiple risk factors play an important role in the pathogenesis of not only Tuberculosis but also many chronic infectious diseases. Based on our findings of family size, number of family members, socio-economic status, educational level and smoking habit have secured top position among adult pulmonary TB patients. But these factors can be modified by proper education, sanitation, and nutritional requirements. We have to create awareness among people regarding its prevention and treatment continuation otherwise the number of TB patients and its complexity will be very difficult to control in the near future that can result into high number of cases with morbidity and mortality.

VI. LIMITATIONS

As the current study has carried out in a tertiary care teaching hospital in the urban area, hence the results may not be the complete reflection of the Pulmonary TB cases in whole community. More studies need to be accomplished to bring a definitive conclusion in this communicable disease. Moreover, only some specific variables of interest have been taken for observation in our study.

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