

Original Article

ASSESSMENT OF SOCIO DEMOGRAPHIC AND ENVIRONMENTAL FACTORS PREDISPOSING TO TUBERCULOSIS IN LAHORE, PAKISTAN

Zill-e-Huma, Zarfishan Tahir, Javeria Gul and Rai Gull Fraz

Objective: To understand various predisposing factors for tuberculosis infection that help to prioritize tuberculosis research and intervention among the most vulnerable persons in our population.

Methods: It was cross sectional study which was conducted in Lahore .The duration was from December 2013 to May 2015. A total of 129 cases of tuberculosis were included in the study.

Results: Questionnaire was completed for 129 tuberculosis subjects. 65 patients (51.39%) were male and 64 (49.61%) female, among the total number of subjects, Diabetes was the most common illness among chronic diseases. Smoking was the most common addiction and all smokers were male.

Conclusion: There are multiple environmental and host related factors, present in tuberculosis patients in Lahore. A proper understanding of their risk factors will contribute in appropriate disease management.

Keywords: Tuberculosis, risk factors, body mass index.

Introduction

Tuberculosis is the major health problem not only in Pakistan but across the whole world. Extensive research has been carried out in diagnosis and treatment to combat tuberculosis but tuberculosis still remain a significant threat across the globe and targets poor communities very hard especially in the developing countries.¹ Eighteen persons are affected with tuberculosis every minute in the world and three of them die in one minute.² World Health Organization (WHO) ranks Pakistan 5th among high burden tuberculosis countries.

Tuberculosis has many predisposing factors in which complex environmental interaction with host factors contribute to overall disease outcome. By understanding various independent variables between degree of exposure and genetic susceptibility to infection, there is strong implication on prevention and treatment of tuberculosis.³ There are several approaches for tuberculosis control and there is urgent need to design interventions against this horrible disease, by paying attention on epidemiological, social and environmental approaches.⁴ Tuberculosis is considered a social disease with medical aspects. There are various non-medical factors such as low socioeconomic status, lack of education, overcrowding and poor quality of life⁵ which also influence an individual susceptibility of tuberculosis infection.

There are negligible studies performed in

developing countries like Pakistan that shed light on socioeconomic and environmental factors contributing to development and progression of the disease. The objective of this study is to understand various predisposing factors for tuberculosis infection that help to prioritize tuberculosis research and intervention among the most vulnerable persons in our population.

Methods

Written informed consent was obtained from all study subjects. The present study was cross sectional study that was conducted among the patients attending chest clinic of a tertiary care hospital in Lahore from December 2013 to May 2015. Four separate investigators collected data from the setting to minimize the risk of bias by using standard WHO definition of tuberculosis; Culture positive for Mycobacterium tuberculosis (confirmed case), sputum smear positive for acid fast bacilli when culture data were not available (smear positive case) or clinical diagnosis only when microbiological test results were negative or not available (clinical case: symptoms compatible with tuberculosis). Extra pulmonary tuberculosis was diagnosed by combination of histopathology, fine needle aspiration cytology or clinical features.⁶ In our study height and weight of patients were measured. Information about socio demographic features as age, sex, marital status, education, occupation and

monthly income was taken. History about BCG vaccination was also taken and if no history was available, then BCG scar was examined. History about any co-morbidity like diabetes mellitus, renal disease, hypertension, and any lung disease was taken. History about any drug intake (recent and past) for conditions like cancer, chemotherapy, radiotherapy and addictive drugs was also taken. Body mass index (BMI) was calculated. All the data about variables was entered in questionnaire.

Results

A total of 129 cases of pulmonary and extra pulmonary tuberculosis were taken during the study period through non probability purposive sampling technique. Male constitute 51.39% (65) of the subjects while female were 49.61% (64). The study showed 62.01% (80) subjects were urban and 37.98% (49) subjects were rural dweller. In the study 39.53% (51) of cases were literate and 60.40% (78) were illiterate. Age and Body mass index was calculated as mean \pm SD and the orphan p value (which is the test of significance employed, orphan p

value < 0.001 is highly significant and orphan p value < 0.05 is significant) of these two parameters were significant.

About 42.62% (55) were unemployed, 57.43% (74) of cases were employed. Among smokers, all were male, 58.46% (38) were heavy smokers (≥ 25 or more cigarettes a day), 9.23% (6) were occasional smokers, (either as not smoking every day or as smoking an average of less than one cigarette a day and 32.30% (21) were non-smokers.

Of 129 total cases, 61.24% (79) had no other chronic illness and 38.76% (50) had some chronic illness like hypertension, Diabetes mellitus and cancer etc. 67.44% (87) case, reside in house with ≤ 3 rooms and 32.57% (42) reside in > 3 rooms / home. 43.41% (56) had their separate kitchen available and 56.59% (73) had not facility of separate kitchen. 31.78% (41) had tuberculosis contact and others 56.59% (73) do not had contact. 79.17% (102) had BCG vaccination while 20.93% (27) had not received vaccine. 48.06% (62) cases were of pulmonary tuberculosis and 51.96% (67) cases were of extra pulmonary tuberculosis.

Table-3: Year wise distribution of types of unnatural deaths.

Characteristics	Total (n=129)	Male (n=65) Values are Mean \pm SD	Female (n=64)	Orphan p-value
Age	31.69 \pm 16.21	36.86 \pm 19.52	28.87 \pm 12.52	<0.001
BMI	17.23 \pm 5.33	17.5 \pm 3.05	17.06 \pm 6.41	<0.001
Values (%) locations				
Urban	80 (62.01%)	47 (72.30%)	43 (67.18%)	0.280
Rural	49 (37.98%)	18 (27.69%)	21 (32.81%)	
Educational Status				
Literate	51 (39.53%)	31 (43.69%)	20 (31.25%)	0.011
Illiterate	78 (60.40%)	34 (52.30%)	44 (68.75%)	<0.001
Occupation				
Employed	74 (57.43%)	60 (61.53%)	8 (12.5%)	<0.001
Unemployed	38 (29.45%)	15 (23.07%)	34 (53.12%)	
Dependent	12 (9.30%)	7 (10.76%)	16 (25.0%)	
Student	5 (3.87%)	3 (4.61%)	2 (3.12%)	
House Old Income				
< 5,000	80 (62.015%)	50 (76.92%)	40 (62.50%)	<0.001
5,000 - 1,000	29 (22.48%)	10 (15.38%)	22 (34.37%)	
>10,000	20 (15.50%)	5 (7.69%)	2 (3.125)	
Smoking				
Regular/Heavy	50 (30.75%)	38 (58.46%)	-	0.003
Occasional	6 (4.65%)	6 (9.23%)	-	
No smoker	73 (56.58%)	21 (32.30%)	-	0.04
Any chronic disease				
Yes	79 (61.24%)	49 (75.36%)	30 (46.87%)	0.04
No	50 (38.76%)	16 (29.61%)	34 (53.125%)	
House Hold Size				
=3 rooms/House	87 (67.44%)	54 (83.06%)	33 (51.56%)	0.54
> 3 rooms/house	42 (32.57%)	11(16.92%)	31 (48.44%)	

Separate Kitchen	Yes	56 (43.41%)	34 (52.30%)	22 (34.38%)	<0.001
	No	73 (56.59%)	31 (47.69%)	42 (65.63%)	
TB Contact	Yes	41 (31.78%)	5 (7.69%)	36 (56.25%)	0.08
	No	88 (68.22%)	60 (92.31%)	28 (43.75%)	
BCG Vaccination	Yes	102 (79.17%)	60 (92.31%)	42 (65.63%)	0.21
	No	27 (20.93%)	5 (7.69%)	21 (32.81%)	
Type of TB	Pulmonary	62 (48.06%)	40 (61.54%)	22 (34.30%)	0.014
	Extra Pulmonary	67 (51.94%)	25 (38.46%)	42 (65.63%)	

Table-2: Frequency of body mass index (BMI) with tuberculosis rate.

Sr. No	BMI	% of TB Cases
1	= 18 (Under wight)	55.03 % (71)
2	18 - 24.9 (Normal)	26.36 % (34)
3	25 - 20.0 (Overweight)	12.40 % (16)
4	= 30 (Obese)	6.21 % (8)

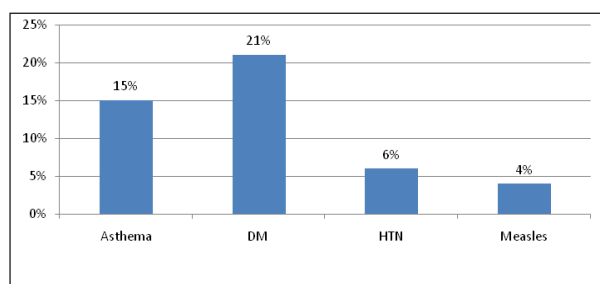


Fig-1: Frequency of chronic disease in tuberculosis patients.

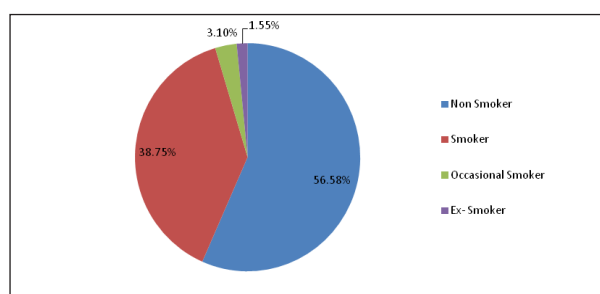


Fig-2: Smoking frequency in study subjects (Males).

Discussion

Variation in age and sex in occurrence of tuberculosis has been reported all around the world in both developed and developing countries.^{7,8} Our study showed peak numbers of tuberculosis cases between 20-40 year of age.^{9,10} Other parameters include socioeconomic status, employment status,

BCG vaccination and BMI that affects susceptibility to infection, progression of disease and treatment outcome.^{11,12}

In our study 38.76 % of the cases have co-morbid illness such as asthma, diabetes mellitus, hypertension & measles. There are a lot of researches and data available concerning increased incidence of DM amount tuberculosis subjects [13]. 21% of our study population was diagnosed to have DM. According to a research, the prevalence of tuberculosis in diabetic patients was 10 times higher than non diabetic patients and this prevalence increases with the duration of DM.^{14,15}

Smoking was the most common type of addiction in the present study (41.57%). Tobacco smoking was also demonstrated in an age related case controlled study from south India.¹⁶ Tuberculosis is disease of poor people associated with, resource poor countries¹⁷. In Guinea Bissau, adult overcrowding was major risk factor for tuberculosis.¹⁸ A study from Malawi showed that higher socioeconomic status was associated with decrease tuberculosis prevalence because of increased awareness and better approach to health services.¹⁹ Studies from China have revealed that per capita income has impact on tuberculosis and good house hold economic condition was a protective factor.^{20,21} Our study also revealed increased tuberculosis occurrence with low income families, unemployment and overcrowding. In our study separate kitchen also have significant impact on tuberculosis. A study of over 88,000 household from India also has impact on tuberculosis by the separate kitchen.¹⁶ In our study 31.78% have history of tuberculosis contacts while others don't have. Our study also showed association of tuberculosis with under nutrition which is more distinct feature of low socioeconomic status.^{22,23}

Conclusion

The study revealed that most of patients presenting with tuberculosis were unemployed and belong to low

socioeconomic status and have low literacy level. It cannot be proven that these patients may have risk factor by chance or if tuberculosis has predisposed to these factors. There is urgent need to plan further more researches on various factors predisposing to

tuberculosis in our setup to prevent the occurrence of this horrible disease.

*Department of Bacteriologist,,
Institute of Public Health.*
www.esculapio.pk

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