

Frequency of Sociodemographic Factors Leading to Pulmonary Tuberculosis in Diagnosed Patients Attending Public Health Care Facility

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ABSTRACT

Objectives: To determine the frequency of sociodemographic factors leading to pulmonary tuberculosis in diagnosed patients.

Study Design: Cross-sectional study

Place and Duration of Study: Lady Reading Hospital, Peshawar from 1st June 2016 to 31st December 2016.

Methodology: Two hundred participants were included. Diagnosed and registered patients of both genders between the age 18-70 years which were bacteriologically confirmed (smear positive and clinically diagnosed) were included. All diagnosed and registered patients of both genders between the age 18-70 years group which are bacteriologically confirmed (smear positive and clinically diagnosed and having severe psychiatric illnesses, reluctant/uncooperative patients, bedridden and handicapped and resistant cases were excluded.

Results: In pulmonary tuberculosis, 44.5% were males, 50 were married, 44% between 35-55 years of age, 49.5% were uneducated, 41% were factory workers, 30.5% have below income 20,000 and 65 were smokers. Previous positive family history (46%) and underweight (34%) were found.

Conclusion: Sociodemographic factors not only played a very important role in the exacerbation of the pulmonary tuberculosis but also contributed to the already existing disease, making the disease uncontrollable and time consuming and ultimately untreatable so efforts should be made to control and eliminate all risk factors leading to pulmonary tuberculosis.

Keywords: Sociodemographic, Tuberculosis, Vaccination status, Smoking

INTRODUCTION

Tuberculosis is a common, enduring, communicable disease caused by mycobacterium tuberculosis. The bacteria affects the lungs and developed pulmonary tuberculosis (PTB) but can affect other organ or system of the body e.g. lungs, bones, joints, meninges, intestine, lymph nodes, kidneys etc. and called as extra pulmonary tuberculosis (EPTB). About 1.7-2 billion individuals were infected with tuberculosis (TB) and 8 million people develop TB every year where as 1.3 million die annually.¹ Tuberculosis is an old and deep rooted disease and main health issue. It poses serious challenges in the modern age and a dominant cause of illness worldwide.²

In Africa, Kenya ranked thirteenth among the 27 high-burden TB countries in the world where as graded fifth highest burden among African countries. However, the WHO Global TB report showed that Kenya had almost 132,000 new TB cases and an estimated 74,000 people died.³

In 2015, tuberculosis is one of the top ten causes of deaths worldwide in which 10.4 million people becomes infected with TB and 1.8 million died from the disease (including 0.4 million with HIV). Six countries account for 60% of the total with India leading the count followed by China, South Africa, Indonesia, Pakistan and Nigeria. About 480,000 people developed MDR-TB in 2015.⁴

In 2012, World Health Organization (WHO) reported that incidence rate of Saudi Arabia showed 18/100,000 population per year and remains a moderate TB burden country. Case detection rate was 87%. Keeping in view last 10 years, the death rates among TB patients showed decrease trend i.e. 7.2% to 6.1% whereas mortality rate remains steady among non-Saudis (~5.4%). Countries including in Arabian Peninsula, e.g. Iraq, Jordan, and Yemen has a moderate TB burden. However, Saudi Arabia remains at the seventh position only in terms of prevalence. 44.9%–50.2% were Smear positive PTB cases reportedly among the Saudi national where as 52.1-62.6% were shown by immigrants which is comparatively higher than the global rate of 45.5%.⁵

Statistics of WHO showed that incidence rate of TB for Iranians peoples in 2012 was 21/100,000. Afghanistan, Pakistan, Azerbaijan, and Iraq were categorized as high burdens countries for TB. The latest report of the tuberculosis and leprosy control office, department of health and education of Iran in 2016 has graded Guilan (city of Iran) in an alarming situation due to its high incidence of TB i.e. 24 per 100,000, after the Sistan/Baluchistan and Golestan provinces.⁶ Prevalence of active pulmonary TB in rural china was about 1.8 times more than that of urban areas; that of sputum smear-positive TB was about 1.6 times that of urban areas. Statistics showed that 80% of TB patients live in rural areas have a high prevalence of anti-TB drug resistance, which ultimately

increases the rate of treatment failure and costs of control which is a big challenge to public health for China.⁷

Bangladesh accounting for one fifth of the global incidence of TB, the disease is more prevalent in the productive age group (15-54 years) and have an economic burden on the individual's household when they fall ill.⁸

According to WHO South-East Asia Region (SEAR) accounted for 38% of the global burden of TB. In 2013, incident cases of TB were 3.4 million and mortality reported due to TB was 4,40,000 cases each year. Five of the 11 Member countries of SEAR namely Bangladesh, India, Indonesia, Myanmar and Thailand were among the 22 countries in the world with high-burden of TB. India alone accounted for 23% of incident TB cases and 21% of deaths due to this disease globally. In SEAR (2013) all new TB cases happened among young adults in males in the most productive age group of 25–34 years.⁹

In Pakistan KPK, burden of tuberculosis in the year 2009 was 100.27/100,000. A study conducted in Abbottabad showed that Prevalence of pulmonary TB was 76.9 % while extra pulmonary TB was 23%.¹¹

Another study was done in 2007 in a city Peshawar showed that among 306 patients, 48.7% patients had PTB, whereas 51.3% had EPTB.¹² In 2014, prevalence of tuberculosis in Bajaurkhar Agency reported 33.04%.¹³

MATERIALS AND METHODS

This was a cross-sectional descriptive type of six months, from from 1st June 2016 to 31st December 2016. Two hundred patients of tuberculosis were included. Registered and diagnosed patients of both gender between the age 18-70 years, smear positive and clinically diagnosed, tuberculosis patients visiting public health care facility were included. Registered and diagnosed patients of both genders between the age 18-70 years had taken treatment for any other medical illness, bedridden and handicapped are excluded from the study. For body mass index, Anthropometric measurements (weight in kg and height in meter²) were calculated by using measuring tape (for height) and weight measuring machine(for weight) and calculated nutritional status (BMI)of the patients.age, gender, mmarital status, eeducation, occupation, income,vaccination status (yes/no), smoking (smoker/non smoker) tobacco chewing (yes/no), BCG vaccination (yes/no), previous positive family history (yes/no), BMI (under weight, normal, overweight, obese). The data was entered analyzed through SPSS-22.

RESULTS

Eighty nine (44.5%) were males and 51 (25.5%) were females had pulmonary tuberculosis, 35 (17.5%) were males and 25 (12.5%) were females had extra-pulmonary tuberculosis. 80(40%) married and 60 (30%) unmarried had pulmonary tuberculosis whereas 44 (22%),married and 16(8%) unmarried had extra-pulmonary tuberculosis.26(13%) patient of 20-35yrs, 88 (44%)of 35-55yrs and 26 (13%) of age above 55-yrs had pulmonary tuberculosis whereas 19(9.5%) of 20-35yrs, 26 (13%) of 35-55yrs and 15 (7.5%) of age above 55 years had extra-pulmonary tuberculosis (Table 1).

Out of 200, only 99 (49.5%) uneducated/primary education, 34 (17%) of secondary school, 7 (3.5%) 34 had

pulmonary tuberculosis, where as 45 (22.5%) were uneducated, 10 (5%) attended secondary school and 5 (2.5%) of higher secondary schools had extra-pulmonary tuberculosis. 82 (41%) were factory workers 30 (15%) were shepherd, 24 (12 %) of labor, 4 (2%) were office worker had pulmonary tuberculosis whereas 21 (10.5%) of factory worker, 14 (7%) were shepherd 9 (4.5%) of labor 16 (8%) of office worker had extra pulmonary tuberculosis. 61 (30.5%) patients of income below 20,000, 52 (26%) of income between 20,000-29,999, 27 (13.5%) of income above 29,999 had pulmonary tuberculosis whereas 10 (5%) of income below 20,000, 14 (7%) of income between 20,000-29,999, 36 (18%)of income above 29,999 had extra-pulmonary tuberculosis (Table 2). Ten (5%) non-smokers and 130 (65%) were smokers had pulmonary tuberculosis, where as 44 (22%) non-smoker and 16(8%) were smokers had extra-pulmonary tuberculosis. 15 (7.5%) were non tobacco chewer, 125 (62.5%) were tobacco chewer had pulmonary tuberculosis where as 40 (20%) of non tobacco chewer and 20 (10%) were tobacco chewer had extra-pulmonary tuberculosis (Table 3).

Table 1: Frequency of various characteristics in tuberculosis patients

Variable	Pulmonary TB (n=140)		Extra-pulmonary TB (n=60)	
	No.	%	No.	%
Gender				
Male	89	44.5	35	17.5
Female	51	25.5	25	12.5
Marital status				
Married	80	40.0	44	22.0
Unmarried	60	30.0	16	8.0
Age (years)				
20 – 35	26	13.0	19	9.5
35-55	88	44.0	26	13.0
> 55	26	13.0	15	7.5

Table 2: Frequency of education, occupation, income in TB patient

Variable	Pulmonary TB (n=140)		Extra-pulmonary TB (n=60)	
	No.	%	No.	%
Education				
No education/ primary education	99	49.5	45	22.5
Secondary School	34	17.0	10	5.0
Higher Secondary	7	3.5	5	2.5
Occupation				
Factory worker	82	41.0	21	10.5
Shepherd	30	15.0	14	7.0
Labor	24	12.0	9	4.5
Office worker	4	2.0	16	8.0
Income				
Below 20,000	61	30.5	10	5.0
20,000-29,999	52	26.0	14	7.0
Above29,999	27	13.5	36	18.0
Total	140	70.0	60	30.0

Thirty two (16%) were not vaccinated with BCG at birth and 108 (54%) patients were vaccinated with BCG had pulmonary tuberculosis and 6 (3%) were not previously vaccinated with BCG and 54 (27%) patients were vaccinated with BCG had extra pulmonary tuberculosis.92 (46%) patients had previous positive family history, 48 (24%) patients with no previous positive family history of tuberculosis had pulmonary tuberculosis and 29 (14.5%) with previous positive family history 31 (15.5%) with no previous positive family history had extra-pulmonary tuberculosis (Table 4). Seventy (34%) were

underweight. 36 (18%) were normal, 32 (16%) were overweight, 2 (1%) were obese had pulmonary tuberculosis. 24 (12%) were under weight, 22 (11%) were normal, 10 (5%) were overweight and 2(1%) were obese had extra pulmonary tuberculosis (Table 5).

Table 3: Frequency of smoking status in TB patients

Variable	Pulmonary TB (n=140)		Extra-pulmonary TB (n=60)	
	No.	%	No.	%
Smoking status				
Non Smokers	10	5	44	22.0
Smokers	130	65	16	8.0
Tobacco chewing				
No	15	7.5	40	20
Yes	125	62.5	20	10

Table 4: Frequency of immune status in tuberculosis patients

Variable	Pulmonary TB (n=140)		Extra-pulmonary TB (n=60)	
	No.	%	No.	%
BCG vaccination at birth				
No	32	16	6	3.0
Yes	108	54	54	27.0
Family history of tuberculosis				
Yes	92	46.0	29	14.5
No	48	24.0	31	15.5

Table 5: Frequency of nutritional status of tuberculous patient

Body mass index	Pulmonary TB (n=140)		Extra-pulmonary TB (n=60)	
	No.	%	No.	%
Underweight	70	34.0	24	12.0
Normal	36	18.0	22	11.0
Overweight	32	16.0	10	5.0
Obese	2	1.0	2	1.0

DISCUSSION

Tuberculosis is the one of the most important communicable disease with treatment regimens of 6-9 months .poor compliance due to lower literacy rate, complex treatment regimens and long duration were the problems associated which made it more deadliest among the other infectious diseases. When gender specific results were observed, males were found to be more prone to pulmonary tuberculosis as compared to females. In our study 36% patients were males. Similar result showed that significantly more males were associated with pulmonary tuberculosis infection.³ Similar results were reported in a study conducted in rural and urban areas of India in which pulmonary tuberculosis was more prevalent in males about 74.4% in urban and 49.4% in rural areas.⁹ Highest incidence of tuberculosis was reported in males as compare to females.¹⁰ Similar results were found in studies showing increased frequency (56.43%) of males with tuberculosis.¹³ 53.85% of male were involved in pulmonary tuberculosis.¹⁴ Another study revealed increase male frequency with the diseases.²⁰ The reason of increased frequency of male sex in pulmonary tuberculosis was due to increased exposure to external environment. Secondly most of the populations were working in factories as worker which also strengthened the relationship of pulmonary tuberculosis with male gender.

Age is an important aspect in epidemiology of TB. Tuberculosis was found to be more prevalent in 35-55years age population. In our study the most common age group for pulmonary tuberculosis was 30 to 49 years in which

34% of patients experienced pulmonary tuberculosis more frequently. Similar results found in a study showed that PTB was more prevalent in the age group of 35–54 years both in the urban (46.7%) and rural (49.4%) side.⁹ Similar results were found in a study conducted in china ,which showed that 39% of patients involved in pulmonary tuberculosis in a city of Xiangtan and 24% in a city of Danyang had pulmonary tuberculosis in same age group.⁷ Another study conducted in Hamadan, city of Iran(2005–2013) and found that pulmonary tuberculosis was more in adult age group 85.5%.⁶ Similar result concluded by a study of India showed high frequency 65.5%of patients in middle age group.²³ This age group from 35-45 years is considered to be the most working, young and energetic group among all, so chances were more to get disease. The high frequency of tuberculosis in this age group was due to increase mobility for earning livelihood. But as age increases from 45 years old age issues started and immune status due to compromised immune status with association of many debilitating diseases and systemic diseases appears strengthening the disease. Medically in age group of 45-55 years, frequency of diseases with lower lung field association gradually increased with this age group similarly in diabetic, lower lung lesions with cavitation causes propagation bacteria in lower lung zones.

Low education, occupation and low income are considered as low socio economic status our tuberculosis population belonged to poor or low social class with low literacy rate of 49.5% and a risk factor for tuberculosis in majority of the patient. Illiteracy was related with flourishing of disease¹⁶ Similarly a study conducted by Sana Sharif et al in Nishtar Hospital Multan, 68% patients were illiterate while remaining were educated.¹⁷ The most probable reason of high prevalence of tuberculosis was the illiteracy in Peshawar. Health education should be given to the diseased people so to adopt precautionary measures to decrease the burden of the disease in the city.

41%% employed in factories had pulmonary tuberculosis and 21% had extra-pulmonary tuberculosis. A study conducted in china reported that high frequency of pulmonary tuberculosis was recorded in employed i.e. factory workers and labors in city of Xiangtan (66%) and Danyang (26 %) and less in unemployed respondents.⁷ The reason for increased frequency of tuberculosis in employed group is due to frequent and multiple exposure to various risk factors. Secondly employed people get less time for visiting doctors because of extreme physical and mental tiredness after job so occurrence of disease is more in employed as compare to unemployed people.

Poverty and low income was also an important risk factor for pulmonary tuberculosis. This study found that 30.5% patients of income below 20,000 had pulmonary tuberculosis. In another study ,69.6% of the patients belonged to low income group ⁸.A study conducted in Indian which majority of the patients were of low income 86.1% earning less than 100\$ per month.⁹ Monthly income was major issue in disease transmission with 86.0% of the patients earning less than 100\$ and 34.9% earning less than 50\$ per month (p < 0.05, 95% CI).³similar result shown by another study as well.²² Another study concluded that more than 50% of TB patients have been reported to contribute to poverty by reducing patients' physical power

and ability to work experience. Whereas increasing economic problems and costs more than 10% of annual income. In sub-Saharan countries²² high frequency of tuberculosis put financial and economic burden on patients and households. Tuberculosis patients cannot afford charges for hospitalization, medication, transportation, diagnostic tests e.g. radiography, sputum culture, and drug-susceptibility testing. These costs have the potential to financially weaken the patients, leading to negative effects such as delayed care seeking and increased defaulter rates in TB patients, potentially fuelling the disease and increasing multi-drug resistant cases in low income communities.

Smoking is found to be a major risk factor for tuberculosis. According to our study 63% patients were smokers. A study concluded similar results and showed that Smoking, were more common among urban pulmonary tuberculosis patients.⁹ Data from another study showed that 50% of the patients being smokers had pulmonary tuberculosis.⁸ Study of Nishtar Hospital Multan showed that smoking was major driver of pulmonary tuberculosis.¹⁷ Similar results were shown in another study in which frequency of smoking was more i.e. 26.3% in tuberculosis patients.²¹ The reason of smoking, being a risk factor was due to change in behavioral factors e.g. smoking has negative impact on the treatment of pulmonary tuberculosis. It destroyed the lungs and suppress individual's immune response towards this particular disease.

Tuberculosis is not a hereditary disease and no role of genetics played in the causation of the disease. Current study depicted that 46% patients with a positive family history had pulmonary tuberculosis. Similar studies reported about 16.8% of family history was concluded in patients of tuberculosis.¹⁵ Another study explained 17.5% of previous positive family history with the pulmonary tuberculosis.²¹ The reason of increased frequency of positive family history was due to the fact that TB is not a hereditary disease but results showed similar picture that most of the patients were having positive previous family history of tuberculosis. But this might be due to common environmental factors to which these families were exposed during data collection.

The association of tuberculosis with BMI cannot be ignored. In our study tuberculosis was found to be more common in underweight patients 34%. According to a study conducted by Lonnrothetal concluded inverse relationship between tuberculosis incidence and BMI, the incidence of tuberculosis is being increased as the BMI decreases.¹⁸ Another study of India portrayed the similar result regarding pulmonary tuberculosis and underweight.⁹ 80% of women and 67% of men had moderate to severe under-nutrition (BMI<17.0 kg/m²). 52% of the patients had stunting indicating chronic under-nutrition.¹⁹ Another study of Uganda showed that wasting (body mass index of <18.5 kg/m²) was found in 38.5% of the patients.²¹ Tuberculosis destroyed the physical health of the patient by having poor nutrition, co-morbidities reduces the immune deficiencies, putting impoverished people at high risk of acquiring and developing active disease.

CONCLUSION

Most important sociodemographic factors leading to pulmonary tuberculosis were males, married of 35-55 years of age. No or low education, occupation, income, smoking, low immune status, underweight, previous positive family history.

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