To Determine The Association Between Socio Demographic Variables And The Level Of Knowledge Of Pulmonary Tuberculosis Among Pulmonary Tuberculosis Patients Attending Regional Institute Of Medical Sciences Imphal

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Abstract :
India has set the target to eliminate TB by 2025 but much remains to be done to eradicate this ancient disease. TB has become a social disease and it has wrapped its arms more tightly around the weaker sections of the society. Though the country has become the fifth largest economy in the world, majority of the population are poor and have low levels of education, poor access to health facilities and suffer from poor nutrition. Early diagnosis and treatment of tuberculosis is of utmost importance but this can only be achieved by also bringing about social development.

Materials and Methods: *This observational, cross-sectional study was conducted in the Dept of Respiratory Medicine, Regional Institute of Medical Sciences Imphal, Manipur from October 2015 to September 2017 among a total of 242 pulmonary tuberculosis patients. Study tool was in English, pre-designed, pre-tested, self-administered, semi constructed questionnaire, to collect information relating to transmission, diagnosis and treatment of pulmonary tuberculosis. The data collected was tabulated, analysed and interpreted by proper statistical methods.*

Results: *More than half (66.5%) of the respondents were male. Majority of the respondents (48.3%) were more than 50 years of age. More than half (54.5%) of the respondents were from the Hindu faith. About one fifth (20.2%) of the respondents had some kind of formal education. Almost half (46.7%) of the respondents were unemployed. Majority of the respondents (69.4%) were married and most of them (52.5%) were residing in rural areas. More than half of the respondents (71.1%) had inadequate knowledge regarding TB.*

Conclusion: *The study revealed the lack of knowledge of TB signs and symptoms, diagnosis and treatment. Poor level of knowledge can lead to delayed diagnosis and treatment of tuberculosis and also increasing morbidity and mortality.*

Keywords - *Association, knowledge, patients, pulmonary tuberculosis.*

I. INTRODUCTION

Tuberculosis in India has attained the status of a social disease. The stigma surrounding the disease affects the patients' family as a whole. Poor knowledge of signs and symptoms of TB between the patient and their family's lead to delayed diagnosis and late initiation of treatment. This leads to increase in morbidity and mortality and an increase in transmission rates. It can also lead to advanced disease with extensive lung involvement, which in turn can lead to post TB lung scarring and fibrosis. The implications of stoppage of ATT before 6 months and irregular drug intake or the development of ATT induced adverse drug reactions are important factors for treatment failure and ultimately the development of drug resistance. Most cases of drug resistant TB are man made and its incidence will only continue to increase unless the treatment for drug sensitive TB is adequate.

As per the national survey of TB prevalence, which was conducted from 2019 to 2022, the prevalence of microbiologically confirmed pulmonary TB among population aged more than 15 years in India is 316 per

lakh populations[1]. Delhi has the highest prevalence of 534 per lakh populations and Kerala has the lowest prevalence of 115 per lakh populations[1]. This maybe indirectly related to Kerala's highest average literacy rate of 94% among all the states in the country[2]. The prevalence of microbiologically confirmed PTB in these state groups also had a similar age and sex distribution trend[1].

Studies from around the world have established that the major factors for delayed diagnosis and initiation of treatment for TB are mainly the general population's lack of knowledge about the signs of symptoms of TB, poor access to health institutions and other socio demographic factors.

II.   MATERIALS AND METHODS

A cross sectional study was conducted in tertiary care hospital Regional Institute of Medical Sciences Imphal, Manipur, India. Newly diagnosed adult pulmonary tuberculosis patients and adult patients undergoing treatment for pulmonary tuberculosis in Regional Institute of Medical Sciences was taken up in the study. Interview based questionnaire was used to collect information regarding causes, transmission, prevention and treatment of pulmonary tuberculosis. The questionnaire was translated to the local language with the help of an interpreter for the patients who did not understand English. In order to avoid interference and influence of other family members, each respondent was interviewed privately where he/she could feel comfortable. The socio-economic status of the patient namely education, occupation, monthly family income and socio-economic class was assessed using the Kuppuswami's socio-economic scale[37].

Prior approval was obtained from the Institutional Ethics Committee, RIMS Imphal before starting the study. Informed consent was taken before the interview and confidentiality of the participants were maintained. Patients who did want to participate and patients who were very ill were excluded from the study. Study duration was from October 2015 September 2017.

There were 33 questions for evaluating the knowledge regarding causes, mode of transmission, symptoms and treatment of tuberculosis. The maximum attainable score was 33 and the minimum 0. Categorization was done as inadequate knowledge; score below the 75th percentile and adequate knowledge; score above the 75th percentile. Data collected were checked for consistency and completeness and analyzed using SPSS version 21 (IBM). Descriptive statistics like mean, percentage and proportion were used. Chi square test was used to assess the association between selected variables and a P-value <0.05 was taken as statistically significant

III.   RESULTS

"Table 1: Socio-demographic characteristics of the respondents (N=242)"		
Characteristics	**Frequency**	**Percentage**
Gender		
Male	161	66.5
Female	81	33.5
Age groups		
18-19years	21	8.7
20-29years	40	16.5
30-39years	30	12.4
40-49years	34	14
>50years	117	48.3
Religion		
Hindu	132	54.5
Muslim	28	11.6
Christian	76	31.4
Others*	6	2.5
Marital status		
Married	168	69.4
Unmarried	66	27.3
Divorced	0	0
Widow/widower	8	3.3
Residential area		
Urban	115	47.5
Rural	127	52.5
Occupation		
Professional	10	4.1
Semi-professional#	29	12
Clerical/shop owner/farmer	39	16.1

Skilled worker[##]	24	9.9
Semi skilled worker[*#]	16	6.6
Unskilled worker[**]	11	4.5
Unemployed	113	46.7
Education		
Illiterate	18	7.4
Primary or literate	33	13.6
Middle school certificate	42	17.4
Higher school certificate	64	26.4
Post high school diploma	35	14.5
Graduate or post graduate	49	20.2
Professional	1	0.4
Monthly family income (In Rupees)		
>32050	21	8.7
16020-32049	68	28.1
12020-16019	98	40.5
8010-12019	33	13.6
4810-8009	13	5.4
1601-4809	7	2.9
<1600	2	0.8

[*]*Others include Sanamachi, Meitei, Tingkao, Rawang, Chap-Riak*
[#]*Semi-professional includes teaching nursing social work*
[##]*Skilled worker includes craftsman, truck driver, plumber, cook.*
[*#]*Semi skilled worker includes security guard, waiter/waitress, taxi-driver, retail sales person, fisherman.*
[**]*Unskilled worker includes laborer, cleaner, line operator, farm worker*

TABLE 1 shows that more than half (66.5%) of the respondents were male. Majority of the respondents (48.3%) were more than 50 years of age. More than half (54.5%) of the respondents were from the Hindu faith. About one fifth (20.2%) of the respondents had some kind of formal education. Almost half (46.7%) of the respondents were unemployed. Majority of the respondents (69.4%) were married and most of them (52.5%) were residing in rural areas.

"Table 2: Association between knowledge of TB and the ages of the respondents"		
Age in years	**Knowledge of TB**	**p value for trend**
	Inadequate N(%)	**Adequate N(%)**	
18-19	17(81%)	4(19%)	< 0.01
20-29	25(62.5%)	15(37.5%)	
30-39	17(56.7%)	13(43.3%)	
40-49	19(55.9%)	15(44.1%)	
More than 50	94(80.3%)	23(19.7%)	

TABLE 2 shows the association between ages of the respondents and knowledge of TB. It was found that patients of the age group of 30 to 49 years had more knowledge as compared to the rest and this trend was found to be statistically significant.

"TABLE 3: Association between knowledge of TB and gender of the respondents

Gender	**Knowledge of TB**		**p value for trend**
	Inadequate N(%)	**Adequate N(%)**	0.094
Male	120(74.5%)	41(25.5%)	
Female	52(64.2%)	29(35.8%)	

TABLE 3 shows the association between knowledge of TB and gender of the participants. It was found that female had adequate knowledge as compared to males but this trend was not found to be statistically significant.

"TABLE 4: Association between knowledge of TB and religion of the participants"

Religion	Knowledge of TB		p value for trend
	Inadequate N(%)	Adequate N(%)	
Hindu	97(73.5%)	35(26.5%)	
Muslim	17(60.7%)	11(39.3%)	1.00
Christian	56(73.7%)	20(26.3%)	
Others	2(33.3%)	4(66.7%)	

TABLE 4 shows the association between knowledge of TB and the respondents' religion. Most of the participants from various faiths had inadequate knowledge but the trend was statistically insignificant.

"TABLE 5: Association of knowledge of TB with residence of the participants"

Residence	Knowledge of TB		p value for trend
	Inadequate N(%)	Adequate N(%)	
Rural	89(70.1%)	38(29.9%)	0.72
Urban	83(72.2%)	32(27.8%)	

TABLE 5 shows the association between participants' residence and knowledge of TB. Majority of the respondents residing in rural (70.1%) and urban (72.2%) was found to have inadequate knowledge but the result was found to be statistically insignificant.

"TABLE 6: Association of knowledge of TB with level of education of the participants"

Level of Education	Knowledge of TB		p value for trend
	Inadequate N(%)	Adequate N(%)	
Illiterate	15(83.3%)	3(16.7%)	
Primary or literate	26(78.8%)	7(21.2%)	
Middle school	37(88.1%)	5(11.9%)	< 0.01
High school	48(75.0%)	16(25.0%)	
Intermediate or post high school diploma	22(62.9%)	13(37.1%)	
Graduate or post graduate	23(46.9%)	26(53.1%)	
Honours	1(100%)	0(0.00%)	

TABLE 6 shows association between knowledge of TB and education status of the respondents. Inadequate knowledge for TB was more among those who are illiterate and increased as the educational status increases and this trend was found to be statistically significant.

"TABLE 7: Association of knowledge of TB and occupation of the participants"

Occupation	Knowledge of TB		p value for trend
	Inadequate N(%)	Adequate N(%)	
Professional	5(50%)	5(50%)	
Semi-professional	14(48.3%)	15(51.7%)	
Clerical, shop owner, farmer	26(66.7%)	13(33.3%)	
Skilled worker	16(66.7%)	8(33.3%)	0.27
Semi-skilled worker	12(75.0%)	4(25.0%)	
Unskilled worker	10(90.9%)	1(9.1%)	
Unemployed	89(78.7%)	24(21.23%)	

TABLE 7 shows association between occupation and knowledge of TB in the respondents. Knowledge was inadequate among the unemployed and was comparatively adequate in the semiprofessional (51.1%) and professional (50.0%) group but this trend was not found to be statistically significant.

"TABLE 8: Association of knowledge of TB and socio-economic status of the participants"

Socio-economic status	Knowledge of TB		p value for trend
	Inadequate N(%)	Adequate N(%)	
Upper class	1(50.0%)	1(50.0%)	
Upper middle	66(58.4%)	47(41.6%)	
Lower middle	90(85.7%)	15(14.3%)	< 0.01
Upper lower	15(68.2%)	7(31.8%)	
Lower class	0(0.0%)	0(0.0%)	

TABLE 8 shows association between education status of the respondents and knowledge of TB. Lower middle class had the lowest knowledge as compared to the other socio-economic class and this trend was found to be statistically significant.

"TABLE 9: Sources of information regarding TB"

Sources of information	Frequency	Percentage
Television/radio/mobile	36	14.7
Books/magazine, poster/hoardings	7	2.9
Family, neighbor, friend	45	18.6
Health workers	150	61.9
Doctor, nurse	4	1.9

TABLE 9 shows the sources of information gathered regarding the causes, symptoms, mode of transmission and treatment of TB. More than half of the respondents got information from health workers (61.9%) and one fifth of the respondents got information from friends and family (18.6%) and media in the form of television and mobile (14.7%).

"TABLE 10(a): Proportion of correct answers with regards to symptoms of TB"

Symptoms of TB	Correct N (%)	Incorrect N(%)
Cough more than 2 weeks	186(76.9%)	55(22.7%)
Coughing blood	176(72.7%)	66(27.3%)
Fever with evening rise	129(53.3%)	113(46.7%)
Weakness	146(60.3%)	96(39.7%)
Weight loss	190(78.5%)	51(21.1%)
Loss of appetite	118(48.8%)	124(51.2%)
Chest pain	142(58.7%)	100(41.3%)
Breathlessness	119(49.2%)	123(50.8%)
Enlargement of neck glands	52(21.5%)	190(78.5%)
TB can cause death	204(84.3%)	38(15.7%)

TABLE 10(a) shows most of the patients correctly answered the symptomatology of TB. More than half of the participants knew that the symptoms of TB were cough for more than 2 weeks, fever with evening rise, coughing out blood and weight loss.

"TABLE 10(b): Proportion of answers with regards to spread of TB"

Spread of TB	Correct N (%)	Incorrect N(%)
Cough (droplets)	201(83.1%)	41(16.9%)
Physical contact	84(34.7%)	158(65.3%)
Sexual mode	71(29.3%)	171(70.7%)
Sharing food	80(33.1%)	162(66.9%)
Sharing a bed	73(30.2%)	169(69.8%)
Overcrowding	93(38.4%)	149(61.6%)

TABLE 10(b) shows most of the respondents (83.1%) correctly answered coughing (droplet infection) as the chief mode of transmission however they also incorrectly answered that physical contact (65.3%), sharing food or bed (66.9% & 69.8%), and sexual intercourse (70.7%) with a patient could spread TB.

"TABLE 10(c): Proportion of answers with regards to treatment of TB"

Treatment of TB	Correct N (%)	Incorrect N (%)
Effective drugs	179(74.0%)	63(26.0%)
Treatment for 6-9 months	147(60.7%)	95(39.3%)
BCG vaccine	60(24.8%)	182(75.2%)
ATT skipped for 2-3 days	97(40.1%)	145(59.9%)
Prophylactic drugs for TB	40(16.5%)	202(83.5%)

TABLE 10(c) shows that most of the respondents (74.0%) knew about the availability of effective drugs for the treatment of TB, but most of them did have the correct knowledge that ATT should be taken for 6-9 months without missing any dose.

"TABLE 10(d): Proportion of answers with regards to causes of TB"

Causes of TB	Correct N (%)	Incorrect N (%)
Germ	171(70.7%)	71(29.3%)
Heriditary	77(31.8%)	165(68.2%)
HIV	155(64.0%)	87(36.0%)
Cold weather	142(58.7%)	100(41.3%)
Smoking	165(68.2%)	77(31.8%)
Inadequate diet	137(56.6%)	105(43.4%)
Alcoholism	169(69.9%)	73(30.2%)
TB& HIV at the same time	120(49.6%)	122(50.4%)

TABLE 10(d) shows that many of the respondents believed TB to be hereditary (68.2%), caused by cold weather (41.3%) and HIV (36.0%). However more than half of the respondents correctly answered that smoking (68.2%), alcoholism (69.9%) and inadequate diet (56.6%) can lead to TB.

Mean score obtained was 18 (SD of 5.74) and the median score obtained was 19. More than half of the respondents (71.1%) had inadequate knowledge regarding TB.

IV. DISCUSSION

India is one of the countries with the highest burden of TB. Over the years the National Tuberculosis Program has evolved into the National Tuberculosis Elimination Program with greater emphasis on active case finding, reporting, early initiation of treatment and creating greater general public awareness. The mass media campaign by the Government to empower patients and to make the people aware of the facilities and drugs for tuberculosis treatment have to some extent improved the attitudes and participation by the general public, which was reflected in our study where almost all of the patients have heard about TB. Some other studies also showed similar results. In a study in China by Wang et al[3], 99.20% of general population had heard about TB. The corresponding figures were 86.80% in Ethiopia by Mesfin MM et al[4], 99.10% in Delhi by Sharma N et al[5], and 93.20% in Bihar by Devey J et al[6]. However, in a study in Tamil Nadu by Kar M et al[7], only 56% of respondents had heard about TB and another study in Punjab by Singh UP et al[8] revealed that this rate was 75.5%. In our study, the main source of information about tuberculosis was health workers (61.9%). Apart from this the other important sources were friends or relatives (18.6%) and media (14.7%). Results were similar to one study done by Wandwalo ER et al[9], where 45.3% of patients were getting information from a health care worker, 14.9% from friends and relatives, 23.3% by radio/ newspaper. In contrast, according to a baseline KAP study under RNTCP project done by Swamy RK et al[10] the major source of information was hospital, television (media), friends and relatives. In other study by Rami et al[11], 33.7% patients got information from health workers. In our study only 14.7% respondents were getting information from media, 3.9% from books, magazines or hoardings and 1.9% from doctor or nurse.

This study found that the awareness about TB among the respondents was universal as all the participants reported having heard about TB from different sources. However, this general awareness was not translated into comprehensive knowledge about the disease. The study established that there were still important knowledge gaps in terms of causes, symptoms and modes of transmission of the disease. In this study, 70% of patients told about germ or infection as the cause of TB, which indicates an incomplete perception of TB among

general population. Wang J et al[3],in China (16.00%), Devey J et al[6], in Bihar (14.00%), and Singth MM et al[12], in slum of Delhi (23.00%) showed lower results. A study at Rajasthan by Yadav et al[13], showed that only 1.60% and at Ethiopia by Mesfin MM et al[4], only 9.60% had actual perception about cause of TB. A study conducted at rural Delhi in 2006 (Sharma N et al[5]) showed very encouraging result where more than 95% participants were aware of cause of TB. Regarding the modes of transmission, the only correct answer droplet or air-borne was told by majority of respondents 83.1%. In contrast, lower figures by some other studies, Devey J et al[6](21%) and Kar M et al[7] (20%).There were some wrong perceptions about modes of transmission e.g. hereditary, eating together, sharing food and utensils in our study and in some previous other studies, (Sharma N et al[5], Devey J et al[6], Singh UP et al[8], Corless JA et al[15], Jurcev SA et al[16], Khalil S et al[17]), and this indicates that there is a wide knowledge gap regarding TB among the public even after 20 years of DOTS implementation.

In our study, most of the patients knew that cough was the major symptom of TB followed by fever and hemoptysis. Split, Croatia study (Jurcev SA et al[16]) reported that 92.2% participants were able to identify cough and hemoptysis as principal symptoms. Study in Delhi by Malhotra R et al[14], reported 73.7, 34.30, and 30.00%, study in Nepal by Bhatt CP et al[19], reported 82.00, 72.00, and 72.00%, study in Rajasthan by Yadav SP et al[13], reported 45.20, 28.90, and 44.00%, study in Aligarh by Khalil S et al[17], reported 75.0, 47.8, and 31.85%, study in Safdarjung hospital by Matta S et al[51], reported 59.3, 50.6, and 11.3%, study in South India by Subramanian T et al[21], reported 66, 13, and 15% , study in Punjab by Singh UP et al[8], reported 40, 65, and 42%, cough, fever and hemoptysis respectively. Study in China (Wang J et al[3]), revealed that only 16.00% of study population knew cough as the commonest symptom, while a worldwide internet survey (Corless JA et al[15]) showed it was 49.50% and another study in Delhi (Sharma N et al[5]) showed it was as high as 90.10%, and in another study in Vellore, (Gopichandran V et al[18]) it was 80.4%.

The study has revealed that low education levels were associated with lower correct knowledge about TB. Uneducated patients gave less correct responses compared to educated patients. This difference is statistically significant ($p<0.05$). Thus literacy was an important factor for acquiring information and knowledge of tuberculosis. The factor of literacy is confirmed by various studies in the knowledge of tuberculosis (Sharma N et al[5], Rami K et al[22], Hashim DS et al[23]). The proportion of subjects with good knowledge in our study had gradually increased with increasing educational qualification from 16.7% in illiterates to 53.10% in graduates. Vijay S et al[24] have reported that inadequate knowledge, illiteracy as important determining factors resulting in poor compliance with TB treatment along with many other factors. Sagili KD et al[25] have reported only 17% (95% CI 15.6-18.0) of the respondents to be having had appropriate knowledge regarding TB. Other studies have found that lower educational attainment is associated with low knowledge about TB and in turn subsequent delays in TB diagnosis and access to other TB related services (Bates IF et al[26], Johansson, et al[27], Long, et al[28]). Studies by Johansson et al[27] and Long et al[28] have shown that people with no formal education are less likely to know causes, modes of transmission and ways of TB prevention and control. The more educated a participant was, the more likely she/he was able to articulate various causes of TB and modes of transmission of the disease thus supporting earlier studies (Lönnroth K et al[29], Jaramillo E et al[30], Westaway MS et al[31]). These findings seem to suggest that with education one is able to know and understand TB.

In the present study, persons suffering from TB had increased odds for decreasing socioeconomic scale for all the studied socio economic-variables (viz. education, income, level of education) studied, on univariate analysis. Only 28.9% of the subjects had overall good knowledge (knowledge score of >75 percentile). The proportion of subjects with good knowledge had gradually increased with increasing socio economic status from 31.80% in SE class IV to 50.0% in class I. The association between SES and knowledge was statistically significant (P value< 0.05).

There was also an association between knowledge of symptoms of TB and occupation. Certain occupations (e.g. being a farmer) were significantly associated with low knowledge about TB symptoms. Farmers were less likely to know TB symptoms. This finding correlates with (Zhang T et al[32]) findings in Inner Mongolia, China where farmers failed to understand TB symptoms as a result they tended to seek health care after they had failed to treat themselves. In addition, due to lack of knowledge of symptoms of TB most of the farmers sought care from less qualified village level health care providers instead of seeking appropriate care from conventional health facilities.

Ages of the respondent were significantly associated with TB diagnosis. This suggests that the younger and older the person, the less likely one would go to a health facility/clinic for diagnosis or seek any other TB services. This supports earlier findings where young people have been found to be less likely to know TB and access diagnostic services (Zhang et al[32], Long et al[28]). It also augments findings from earlier studies that showed that fewer young people than older people knew that TB was infectious (Zhang et al[32]).

The design of this study was a descriptive and analytical cross-sectional study as such it allowed for assessment of possible relationships, for example, between knowledge of causes of TB as outcome variable and socio-demographic characteristics of the respondents as exposure variables. Although some associations between variables and outcomes have been established in this study e.g. level of education of the respondents

and knowledge of TB symptoms, it is rather difficult to differentiate whether it was education per se that influenced one's knowledge or other factors played a part in one's level of education which in turn had an influence on knowledge of TB symptoms. Internal consistencies for some scales used to gauge knowledge level and socio-economic status was not optimal. This was a cross sectional study and therefore failed to establish whether it was diagnosis that might have influenced knowledge of TB among the study participants; or knowledge of TB among participants may have influenced diagnosis.

V. CONCLUSION

The study highlights socio-demographic and cultural factors that are associated with knowledge of causes, transmission, symptoms and treatment of TB. The results of this study are in line with the findings of numerous studies (Dodor E et al[33], Jackson AD et al[34], Jaramillo E et al[30], Macfarlane L & Newell JN et al[35], Sun X et al[36]) done on the relationship that exists between knowledge, risk perceptions, socio-demographic and cultural factors and TB diagnosis including access to other TB services. It is also expected that being one of the first studies of this nature in Imphal Manipur, the results will inform future similar studies on the relationship between socio-economic and demographic factors in relation to TB diagnosis. The results will be used to inform policy development of health promotion programs that could address issues as knowledge and risk perceptions but also socio-economic factors that may influence uptake of knowledge of causes, symptoms and transmission of TB in Imphal and adjoining areas.

Acknowledgements

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