TB CATEGORY;
ASSOCIATED FACTORS IN MULTAN

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ABSTRACT… Objective: To determine the risk factors for type of TB category in Multan. **Methods:** A cross-sectional study was conducted in Nishtar Medical College and Hospital, Multan at Chest and Pulmonology Ward to explore the major factors for the type of TB in Multan, Pakistan. We surveyed 164 patients diagnosed for TB from March 2012 to August 2012. The chi-square test was used to find the responsible factors for type of TB category. The data were analyzed by using SPSS 20 software. **Results:** The mean age of these patients was 40.5,100 male and 64 female patients. 68.9% of cat-1 and 31.1% patients of Cat-2, 65.3% patients having no education, 35.4% patients were of labor profession working in different scenarios, 76.8% patients have their family income less than ten thousands, 67.7% patients belong to the urban residence, 65.2% patients have poor sanitary condition of their houses, 63.41% patients were smoker and 70.1% patients have TB in their families. On the basis of p-value for each factors, we have found that blood pressure (p=0.0100), already treated (p=0.0000), doctor visited (p=0.0000), smoking habit (p=0.0263) and area (p=0.0020) of patients are statistically significant factors while gender (p=0.7040), Education (p=0.0800), family history (p=0.3090), current ATT period (p=0.7280), weight (p=0.1300), environment (p=0.2590), income level (p=0.3690), profession (p=0.0540) and age (p=0.4130) are the insignificant factors. **Conclusions:** We have found that blood pressure, already treated, doctor visited, smoking habit and area of patients are the significant factors for type of TB category.

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INTRODUCTION
With the implementation of government rules and policies, Tuberculosis (TB) still a main health problem in the world[1]. TB is the second largest epidemiological disease for death after the HIV/AIDS in the world. TB is the most common cause of death in less developed countries for adults[2]. Every year, around 10 million people get infected with TB and this disease has been considered among the deadliest epidemiological disease all over the countries of the world[3].

Different researches have been carried out on TB. Here is the review of some of the statistical researches on TB that have been carried out yet in Pakistan. Marsh et al[4] conducted study in Sindh, Pakistan to determine the level and quality of TB case management by non-TB control program. They compare general program treatment and government program by a physician and found that general program is better than government and suggest that there must be interaction between government physicians general program treatment. Khan et al[5] study TB research with associated factors i.e. stage of treatment, sex and area (Urban/Rural) to determine the effect of TB on their personal lives in Pakistan. They have found that TB most common in poor people, no awareness about TB and doctors gave limited knowledge and also found that people are not satisfied with treatment strategies in Pakistan.

Various factors are associated with TB. HIV is one of them that affect on TB by age and gender that

results TB in children[6]. Hussain et al.[7] have studies the TB prevalence and associated risk factors of prisoners in NWFP Pakistan with age 18-60 years. They used multiple logistic regressions and found that a prisoner's age, educational level, smoking status, duration of current incarceration, and average accommodation area are the significant factors of TB infection. Khuwaja and Mobeen[8] conducted TB research in Karachi to determine the awareness about TB and have found that most people not having awareness about TB. Ahmed et al.[9] Conducted a research study to know the attitude and diagnosing behavior of private practitioner (PP) in a rural district Thatta of Sindh, Pakistan and found that majority PPs (85%) did not follow the treatment process of DOT. This study revealed the fact that the private sector does not fulfill the required criteria to treat effectively the TB diagnosed patients. Safdar et al[10]. Carried a research projects at nine public hospitals in three different districts of Punjab and studied the case management of children aged below 15 years, having TB disease before and after introducing the NTP. 920 cases were surveyed and Chi-square and Student t-test was used for continuous variables. It was found from the study that the development and application of NTP is vital in all sectors of medication in Pakistan to wipe away the TB disease. Gilani and Khurram[11] performed a research to know the perception, knowledge and attitude of the people belonging to all four provinces of Pakistan. Of the 2742 respondents, 1422 (52%) were male and 1320 (48%) female. It was resulted from the study that mostly people in Pakistan (90%) were aware of the TB disease, while there was about 10% who have never heard about the word TB. There have also been were many misconceptions also about the treatment duration, medication and consultancy. It was obvious from this study that Pakistani population has deficient knowledge and misconceptions regarding symptoms, diagnosis, treatment, and impact of TB. It's the need of hour to launch new awareness programs to make people aware about this fatal killer. Mushtaq et al.[12] performed a cross-sectional survey to explore the knowledge, attitudes, practices and socioeconomic determinants of people regarding TB in Punjab province. Two districts were chosen and 1080 individuals were surveyed. Bivariate analysis using the χ^2 test was applied. 42% of the surveyed population had good knowledge about TB that was highly linked with proper education. In Pakistan, (48.8%) people know that TB treatment is free. It was suggested that education is vital for the masses in Pakistan and people should be made aware about the basic information's of diseases. Siddiqui et al.[13] has conducted children TB research which was conducted at the National Institute of Child Health (NICH) Karachi, Pakistan and have found that TB is mostly present in those children who are belonging to the lower socioeconomic class. Tariq et al.[14] conducted TB research in Abotabbad Pakistan and have found that poor hygienic system, late diagnosis and non-compliance are the significant factors for pulmonary TB. Ahmed et al.[15] evaluate ANTI A60 IgM for diagnosing TB by using ELISA method in Karachi and conclude that ANTI A60 IgM is diagnosing TB rapidly. Rafiq et al.[16] study multidrug-resistant TB in Karachi, Pakistan from 2006 to 2009. Awan et al.[17] study the quality of life under TB with associated risk factors in Sargodha division. They have found that female quality of life is better than male under TB and rural quality of life is better than urban and also found that use of drug and death threat are affecting negatively on TB. There is also a relation between TB, HIV and TB lung cancer and that may be the highest risk factors for developing TB[18]. Dogar et al.[19] study the prevalence and comparison of TB by gender in provinces of Pakistan from 2001 to 2010. They have found that in Punjab and Sindh provinces TB is more common in male than female while in KPK and Balochistan TB is more common in female than male. Masood-us-syed et al.[20] conducted the study in Sialkot, Pakistan to diagnose the TB in Children by using Pediatric Association Scoring Chart System and have found that this method is simple and effective for diagnosing TB in children.

All these have studied some factors regarding TB, but mostly research related to smoking. In the light of literature there is need to search some other factors which contribute most significantly for the prevalence of TB. The purpose of this study is to

explore the major factors that are responsible for the prevalence of type of TB in Multan. The Scenario is different in different countries of the world, but there are some factors that have resemblance all over the world such as the socioeconomic level of the masses, literacy rate and awareness with TB, occupation of the masses, awareness with the hygienic precautions, government's measures to control the TB.

MATERIAL AND METHODS

A cross sectional study of 164 patients was conducted at Chest and Pulmonology Ward, Nishtar College and Hospital Multan. Face to face interviews were conducted from the patients admitted in the wards and visiting the outdoor for seeking treatments. This study was surveyed during the period March to August, 2012 comprising of any age and locality seeking treatment from the TB ward by using convenience sampling techniques to collect the required information.

Here in our study variable of interest is the type of TB category. The person who gets any treatment of TB for the very first time is placed in category one (Cat-1) and the person who has already got any kind of TB treatment is placed in category two (Cat-2). Factors which are studied for type of TB are included Gender, Age, Smoking, Income Level, Family History, Weight, Education, Profession, Current ATT course, Doctor visited, Area, Environmental conditions, Already treated and Blood pressure of TB patients.

Statistical tools and software's

There is no scientific field of study, where statistical methods are not used for one intention or the other. These days, the grandness of statistics can hardly be over encouraged. It is important to remark that the knowledge of applied statistics is a necessity for analyzing statistical data. Applied statistics have to do with the application of the methods of mathematical statistics to specific subject areas such as biological sciences, demography, economics, agriculture, genetics, and many else ones. After getting the data, the most important work is to carry out suitable statistical analysis for valid results. Here we use percentages, chi-square test with respective p-value for each factor are used as a statistical tool to find the significant factors. SPSS software is used to analyze the data to find some facts regarding TB and its associated factors

RESULTS

In this research TB with different associated factors are explored in detail. These results with percentages and significance are presented in table-I.

The association results between TB categories with the gender shows that the total number of patients in Cat- 1 and Cat-2 are 113 (68.9%) and 51 (31.1%) respectively. This indicates that there are more male patients in Cat-1 and Cat-2 TB than the females. Chi-square test indicate gender wise insignificance for type of TB category as p=0.7040. Associative results between TB categories with the family history of the patients show that there are 50.0% patients with TB family history and 18.9% patient without a TB family history from Cat-1. In cat-2, there are 11.0% patients without a family history of TB and 20.1% patients with a family history of TB. There are total 70.1% patients with a family history of TB in their family and it is large enough to conclude that TB may be spread from person to person during coughing, sneezing, or in case of any other contact from person to person. Statistically, family history no significant effect on type of TB category as p=0.3090. The effect of education level on the TB categories is also studied. Results show that the patients who are illiterate in Cat-1 and Cat-2 are 69 (42.1%) and 38 (23.2%) respectively. The patients whose education are metric and under matric in Cat-1 and Cat-2 are 39 (23.8%) and 9 (5.5%) respectively. The number of patients who have got their education in college and university are 5(3.0%) and 3(1.8%) in Cat-1 and Cat-2 respectively. This indicates that the number of patients, who are illiterate, and matric and who are going to college are higher in Cat-1 than in Cat-2. The Chi-square test indicates the insignificant effect of education on type of TB as p-value for this factor is p=0.0800. The association between TB

categories and age categories indicates that there are 15.2% and (3.0%) patients of age less than 20 years from the cat-1 and cat-2 respectively. Between the ages 20 to 30 years, there were (18.9%) patients from the both categories. There were (31.1%) patients from both categories of age greater than 50 years. This shows that the majority of the patients from both categories were of age greater than 50 years. While for statistical test, we have found that age has no significant effect of type of TB as p=0.4130. The type of TB patients according to their occupations shows that there are (17.1%) and (4.3%) patients from cat-1 and cat-2 respectively with no work. There are (2.4%) patients from the cat-2 of farmer profession. There are (34.2%) female patients and all of these are housewives. Majority patients (35.4%) are worker/labor from both of the TB category. P-value for this factor (p=0.0540) has shown the insignificant effect of patient profession on type of TB category. The association between the TB category and income levels of the TB patients indicated that there are (20.7%) and (7.3%) patients from cat-1 and cat-2 respectively with income less than 5000 rupees. The majority of the patients (48.8%) has an income level between 5000 and 10000 from both the categories. There are only (0.6%) patients of the total who belonging to a family with fairly high income (>20000). This is obvious from the results that the majority of the patients belong to the lower class of the society. Income level also has no significant effect on type of TB as shown in table 1 (p=0.3690). In the association figures between TB category and weight of the patients there are total of (18.9%) patients having weight less than 40 kilograms from both the categories. The number of patients with both categories whose weights are between 40-50 kg are 23.8 % .There are (19.5%) and (6.1%).

Patients from the Cat-1 and Cat-2 respectively having weight more than 60 kilograms. We also found that weight is insignificant factor for the type of TB category as p=0.1300. The associative figures of smoking and categories of TB give the result that there are (15.24%) patients of Cat-2 with no smoking habit. There are (15.85%) patients of cat-2 with smoking habits and (47.56%) patients of

cat-1 with smoking habits. The chi-square test has shown the significant effect of smoking habit of patients on TB category as p=0.0263. Like TB history, sanitary conditions, HIV, many others respiratory problems, smoking could be a major source of prevalence of TB.

Locality, where the people are living may be cause the TB. We evaluated the results of TB type with locality. Table indicated that majority of patients (68.9%) from urban locality. Reason for this may be small, ugly houses and the trend of urbanization towards the cities. There are (51.8%) and (15.9%) patients from urban localities respectively for Cat-1 and Cat-2 while (17.1%) and (15.2%) patients are from rural localities for Cat-1 ans Cat-2 respectively. It means that there is no much discrepancy among the Cat-2 patients and they have been equally distributed among the rural and urban inhabitants. Chi-square test indicated the significant effect on type of TB category of this factor as p=0.0020. The results to determine the effect of the sanitary conditions of the residing houses of patients on TB shows that there are (65.3%) residing in the states with miserable conditions from both of the categories. There were (31.7%) patients with satisfactory environment and only (3.50%) has a fair environment condition of their houses. Environmental situations have insignificant effect for the TB category as indicated by p= 0.2590. The cross table for the category of the patients TB level and the number of doctors visited by each patient shows that there are (40.8%) patients from both categories that have visited only one medical attendant i.e. they have only come to the Nishtar hospital for their medical treatment. In Cat-2, there are (9.1%) patients who went to more than six health care centers for seeking the treatments. There are (28.7%) in both categories, who have visited more than two doctors for their medication. Chi-square test p-value has shown the significant effect as p=0.0000. The results about the association between the current TB category of the patients and the duration of their running ATT course indicates the majority of patients in Cat-1 with course duration less than one month (34.1%). This suggests that our study mainly includes newly

Factors	Levels	Cat-I N (%)	Cat-II N (%)	Chi-square	P-value
Gender	Over All	113 (68.9)	51 (31.1)	0.144	0.7040
	Male	70 (42.7)	30 (18.3)		
	Female	43 (26.2)	21 (12.8)		
Education	Over All	113(68.9)	51(31.1)	6.758	0.0800
	Illiterate	69(42.1)	38(23.2)		
	Matric or under matric	39(23.8)	9(5.5)		
	College and above	5(3.0)	3(1.8)		
Smoking	Over All	113(68.9)	51(31.1)	4.93	0.0263
	Yes	78(47.56)	26(15.85)		
	No	35(21.34)	25(15.24)		
Already treated	Over All	113(68.9)	51(31.1)	1.328E2	0.0000
	Yes	110(67.1)	4(2.4)		
	No	3(1.8)	47(28.7)		
Family history	Over All	113(68.9)	51(31.1)	1.036	0.3090
	Yes	82(50.0)	33(20.1)		
	No	31(18.9)	18(11.0)		
Blood pressure	Over All	113(68.9)	51(31.1)	9.182	0.0100
	120/80	40(24.4)	8(4.9)		
	<120/80	71(43.3)	39(23.8)		
	>120/80	2(1.2)	4(2.4)		
Current ATT period	Over All	113(68.9)	51(31.1)	2.817	0.7280
	ATT <1 month	56(34.1)	22(13.4)		
	$1 \leq$ ATT < 2months	27(16.5)	12(7.3)		
	$2 \leq$ ATT < 3months	8(4.9)	5(3.0)		
	$3 \leq$ ATT < 4months	6(3.7)	6(3.7)		
	$4 \leq$ ATT < 5months	10(6.1)	4(2.4)		
	ATT $\geq$ 5 months	6(3.7)	2(1.2)		
Doctor visited	Over All	113(68.9)	51(31.1)	73.347	0.0000
	1	63(38.4)	4(2.4)		
	2	36(22)	11(6.7)		
	3	11(6.7)	11(6.7)		
	4	1(0.6)	4(2.4)		
	5	0(0.0)	5(3.0)		
	6	1(0.6)	15(9.1)		
	8	0(0.0)	1(0.6)		

	14	1(0.6)	0(0.0)		
Weight	Over All	113(68.9)	51(31.1)	5.652	0.1300
	Weight < 40 Kg	22(13.4)	9(5.5)		
	40 ≤ Weight < 50	21(12.8)	18(11)		
	50 ≤ Weight < 60	38(23.2)	14(8.5)		
	Weight ≥ 60	32(19.5)	10(6.1)		
Environment	Over All	113(68.9)	51(31.1)	2.704	0.2590
	Poor	71(43.3)	36(22.0)		
	Normal	37(22.6)	15(9.1)		
	Fair	5(3.0)	0 (0.0)		
Area	Over All	113(68.9)	51(31.1)	9.440	0.0020
	Urban	85(51.8)	26(15.9)		
	Rural	28(17.1)	25(15.2)		
Income level	Over All	113(68.9)	51(31.1)	4.282	0.3690
	Income < 5000	34(20.7)	12(7.3)		
	5000 ≤ Income <10000	50(30.5)	30(18.3)		
	10000 ≤ Income <15000	20(12.2)	8(4.9)		
	15000 ≤ Income <20000	8(4.9)	1(0.6)		
	Income ≥20000	1(0.6)	0(0.0)		
Profession	Over All	113(68.9)	51(31.1)	12.392	0.0540
	Students and old persons	28(17.1)	7(4.3)		
	Army	1(0.6)	0(0.0)		
	Employee	7(4.3)	2(1.2)		
	Farmer	0	4(2.4)		
	House wife	37(22.6)	19(11.6)		
	Worker/labor	39(23.8)	19(11.6)		
	Shop keeper	1(0.6)	0(0.0)		
Age	Over All	113(68.9)	51(31.1)	3.948	0.4130
	Age <20	25(15.2)	5(3.0)		
	20 ≤ Age <30	19(11.6)	12(7.3)		
	30 ≤ Age <40	20(12.2)	10(6.1)		
	40 ≤ Age <50	15(9.1)	7(4.3)		
	Age ≥ 50	34(20.7)	17(10.4)		

Table-I. Type of TB category and associated factors

diagnosed TB patients who have just been started their ATT courses and there are (13.4%) with Cat-2 of TB and course duration less than one month. This summary of association suggests that first time diagnosed patients are more likely to have ATT courses. P-value from the chi-square test indicated the insignificant effect of current ATT course on type of TB category as p=0.7280. The association between TB categories and blood pressure of the patients gives the result that there were (29.3%) patients with normal blood pressure among the both categories of TB. There are about (43.3%) and (23.8%) patients from both the categories with low blood pressure (<120/80) and there were only 6 patients (3.7%) suffering from high blood pressure. The Chi-square test indicated the significant effect of blood pressure on type of TB as p=0.0100.

DISCUSSION

The research is used to investigate the type of TB factors presents in Multan. Resultantly, it is observed that TB is a disease which is found more in males than females. The study revealed that TB is commonly present in those patients who are either illiterate or under metric. Smokers were found to be the sufferers of TB as well. The study showed that TB was common in those patients who had already been treated for the same disease and whose family is also facing this disease. Blood pressure was one of the reasons, the sufferers were mostly below 120/80 blood pressure. Furthermore, TB was observed to be present in those patients who did not complete their TB ATT course. Those who remained careless and irresponsible regarding the TB disease were found to be chronic patients of TB. Low income and poor living conditions were also the factors which contributed in making the inhabitants to be patients of TB. More over TB was found to be more common in those patients whose age was above 50 and whose profession was related to dusting, labor, and other works of toil. From the chi-square analysis, we have found that Blood pressure, already treated, Doctor visited, smoking habit and Area of patients are the significant factor for type of TB.

CONCLUSIONS

From the results and discussions, we have found that blood pressure, already treated, doctor visited, smoking habits and area of patients are living are the significant factors which are associated with the type of TB category. Awareness program must be launched to make people aware about TB and its symptoms. Improve the living conditions and hospital facilities to overcome this burning issue.
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REFERENCES

1. Shaarraswy H. **Assessment of the role of high resolution computed tomography in the diagnosis of suspected sputum smear negative active pulmonary TB.** Egyptian Journal of Chest Diseases and tuberculosis, 2013;(In Press).

2. Walley JD, Khan MA, Newell JN, and Khan MH. **Effectiveness of the direct observation component of DOTS for tuberculosis?: a randomised controlled trial in Pakistan.** The Lancet, 2001;357: 664–669.

3. Yang Z et al. **Identification of risk factors for extrapulmonary tuberculosis. Clinical infectious diseases?:** an official publication of the Infectious Diseases Society of America, 2004; 38(2):199–205.

4. Marsh D, Hashim R, Hassany F, Hussain N, Iqbal Z, Irfanullah A, Islam N. et al. **Planning and practice front-line management of pulmonary tuberculosis?: an analysis of tuberculosis and treatment practices in urban Sindh , Pakistan.** Tubercle and Lung Disease, 1996;77: 86–92.

5. Khan A, Walley J, Newell J, and Imdad N. **Tuberculosis in Pakistan?: socio-cultural constraints and opportunities in treatment.** Social Science and Medicine, 2000; 50: 247–254.

6. Marais BJ, Rabie H, and Cotton MF. **TB and HIV in children – advances in prevention and management.** Paediatric Respiratory Reviews, 2011; 12(1): 39–45.

7. Hussain H, Akhtar S, and Nanan D. **Prevalence of and risk factors associated with mycobacterium tuberculosis infection in prisoners, North West Frontier Province , Pakistan.** International Journal of Epidemiology, 2003; 23(7), 794–799.

8. Khuwaja AK, and Mobeen N. **Knowledge about tuberculosis among patients attending family practice clinics in Karachi.** JLUHMS, 2003:44-47.

9. Ahmed, Mubashir, Fatmi Z, Ali S, Ahmed J and Ara N. **Knowledge, attitude and practice of private practitioners regarding TB-DOTS in a rural district of Sindh, Pakistan.** Journal of Ayub Medical College, Abbottabad?: JAMC, 2009; 21(1):28–31.

10. Safdar, Nauman et al. **Are children with tuberculosis in Pakistan managed according to national program policy guidelines? A study from 3 districts in Punjab.** BMC research notes, 2010; 3(1):1-7.

11. Gilani S and Khurram M. **Perception of tuberculosis in Pakistan?: findings of a nation-wide survey.** Pakistan Journal of Medical Association, 2012; 2(62), 116–120.

12. Mushtaq MU et al. **Knowledge, attitudes and practices regarding tuberculosis in two districts of Punjab, Pakistan. The international journal of tuberculosis and lung disease?**: the official journal of the International Union against Tuberculosis and Lung Disease, 2009; 14(3):303–310.

13. Siddiqui E, and Raza SJ. **Investment in paediatric tuberculosis prevention in Pakistan?**: loss or gain. Journal of Pakistan Medical Association, 2010; 60(11): 897–901.

14. Tariq S, Rauf A, Malik S and Rashid A. **Presentations of tuberculosis in northern Pakistan.** Journal of Ayub Medical College Abbottabad, 2010; 23(1): 40-42.

15. Ahmed SO, Kharal SA, Shahzad MA and Hassan SS. **Evaluation of ANTI A60 IgM for the diagnosis of tuberculosis with ELISA method.** Pakistan Journal of Pharmacology, 2011; 28(2): 51–57.

16. Rafiq Y, Jabeen K, Hasan R, Jafri S, Laiq R, Malik F, Mangi R. et al. **Fluoroquinolone resistance among mycobacterium tuberculosis Strains from Karachi, Pakistan?**: Data from community-based field clinics. Antimicrobial Agents and Chemotherapy, 2011; 55(2): 929–930.

17. Awan MS, Waqas M and Aslam MA. **Factors influencing quality of life in patients with active tuberculosis in Pakistan.** World Applied Sciences Journal, 2012; 18(3):328–331.

18. Seidi K, and Jahanban-esfahlan R. **A novel approach to eradicate latent TB?: Based on resuscitation promoting factors.** Journal of Medical Hypotheses and Ideas, 2013; 7(2): 69–74.

19. Dogar OF, Shah SK, Chughtai AA, and Qadeer E. **Gender disparity in tuberculosis cases in eastern and western provinces of Pakistan.** BMC Infection Diseases, 2012; 12(244):1–7.

20. Masood-us-syed SS, Basit AK, and Mohammad et al. **Screening of childhood tuberculosis with pediatric association scoring chart system Pakistan.** Pakistan Paedriatic Journal, 2012; 36(4): 1-6.

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