ISSN:2591-8036

Prevalence of pulmonary tuberculosis in district Mardan Khyber Pakhtunkhwa, Pakistan.

Muhammad Shabbir lalokhil*, Aasim Khan, Muhammad Adnan, Muhammad Ishaq khan

*Government Post Graduate College Mardan, Pakistan

Abstract

The current study aims to confine the prevalence rate of *Mycobacterium tuberculosis* in suspected patients of district Mardan khaiber Pakhtunkhwa, Pakistan. It also aims to know about the pathogen of Mycobacterium tuberculosis and their pathogenicity in the host, mainly in human population of the district Mardan, to catch out the mode of transmission in the population of the suspected areas. One of the objectives of the study is to make people aware about the prevention and complete their treatment. District Mardan is one of the huge district of Khyber Pakhtunkhwa Pakistan where the new and relapse cases of tuberculosis found in high rate. Which have a great negative effect on the population of district Mardan. The research work done on the prevalence of tuberculosis in district Mardan in the period of October, November and December 2017. The overall 980 samples were registered in the different hospitals of Mardan area and examined by the use of sputum smear microscopy. A questionnaire has filled to collect data from patients which were include age, sex, area, marital status, diet, economic status, home condition, education, close contact to TB patients, drugs and awareness. In the selected sample the positive patients were 340 (34.69%) in which male were less prevalence 31.89% and female were high prevalence 37.44% that show that female have high rate of TB as compare to male due to the lack of education, awareness, and some other factors. The current study show that high prevalence 37.13% found in those patient who have lived in rural areas because of muddy houses, lack of education and dust in the rural areas. It also confined that high prevalence 42.10% found in the age range of 55 and above. It is noted that 32.77% of the suffering patients who were uneducated. Conclusion: The examination report display that the TB infection is high in the population of the district Mardan. It is also observed that the female are mostly suffered as compared to male. Treatment charges were the financial distressful constrictions challenged by TB patients therefore the role of government must be positive to provide TB drugs and perform many seminars for the people awareness.

Keywords: Prevalence, Tuberculosis, District, Patient, Microscopy, Mardan, Relapse.

Accepted on January 10, 2019

Introduction

The term tuberculosis stands originates as of the Latin word *tubercula* which earnings small bump regarding to slight fright in tissues of undergo individual. It is a bacterial infection which customarily upshot the lungs and likewise other part of the body such like brain, bone, kidney and node etc. TB is stemmed by the rod shape bacteria that are known as tubercle bacillus or *Mycobacterium tuberculosis*. Tuberculosis is a past disease which is extremely catching [1]. Mostly TB initiated to the people who fit to the deprived families, due to the lake of wakefulness, health information, poverty, over inhabitants and immoral social situation is the basic reason of TB [2]. Tuberculosis is an antique disease that killed a number of people than other disease. It has surged in great epidemics and then receded, thus behaving like other infectious diseases, but with a time scale that challenges accepted explanations for epidemic cycles. *Mycobacterium tuberculosis* may have killed more persons than any other microbial pathogen. By saying up one of the people that the genus of *Mycobacterium tuberculosis* was founded it more than 150 million years ago. When the European reached to Africa in 19th century they find well established TB there [3]. One can guess that TB disease carry them along with itself and it look such like that they were totally enclosed by it [4]. In 1890 Koch give demonstration in Berlin to the 10 international medical consultations in which he said that I have conceived a unique type of ingredient from tubercle bacilli that could destruct pathogenic bacteria that are found commonly in human body [5]. Worldwide TB is the second in the graded that foremost cause of the expiry after Human Immunodeficiency Virus (HIV) [6]. In KPK the number of TB cases was roughly 36,000 yearly reported due to the highly broadcast of TB in a community [7]. The government of KPK called it a very solemn disease for which the assembly of KPK conceded an act in 2016 which is known as KP TB statement bill 2016 where they discuss that all complicated patient should be care in government hospitals private section and also public leader [8]. Another everlasting goal in increasing TB in natural population of KPK is the Afghan immigrants who living in very poor situation in campground [9].

In the spreading of *Mycobacterium tuberculosis* human has a well-known reservoir's such as making contact with toilet seats, sharing toothbrushes, shaking hands, by sharing food or drink, or kissing. It be able to just blowout through air precipitations creating from a person who has TB, either by speaking, sneezing, coughing, or singing [10] and puffing on wind devices piano etc. shown in Figure 1. [11].

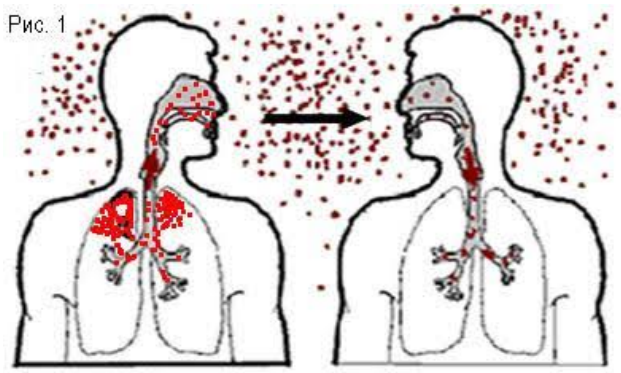

Figure 1. *Transmission of TB (Picture is taken from internet sources)*

TB Indications: The definitive medical structures of pulmonary tuberculosis include phlegm creation, prolonged cough, weightiness, hungriness, night perspires, temperature and hemoptysis [12]. The distinctive harmony of night sweats, temperature and weight loss remain existing in incompletely 45, 75 and 56% of subject correspondingly, although an insistent cough testified indication (95%) [13].

The disease of TB is curable and easily repairable, straight in people alive by means of HIV. Paramount route TB drugs are Isoniazid (H) Rifampicin (R) Pyrazinamide (Z) Ethambutol (E), the isolation of streptomycin, the first bactericidal agent and first antibiotic operational beside M. tuberculosis [3]. Advancement in the treatment of TB is observed now days. Fresh TB treatment routines aimed at decreasing the period of chemotherapy or for use in contradiction of drug-resistant TB using new chemical objects are now systematic through clinical trials. The first priority for compassionate TB patients is shifting to health care benefactor which is blamable for all the fruitful treatment of TB patient. Second the period of treatment is protracted in present circumstances. The third advancement is the obtainability of new agent for caring of TB patient [14].

Starring role of Fresher Agents: Rifabutin, Rifapentine, Fluor quinolones Rifamycins are the supreme medications accessible for the treatment of TB. The Rifabutin has been used against the TB patient alive with HIV [15]. Further freshly, fluoroquinolones have possible first line mediators of the fluoroquinolones, gatifloxacin and moxifloxacin are supposed to have the greatest action in vitro beside *M. tuberculosis*, monitored by ofloxacin and levofloxacin [16]. While in the handling of multidrug hardy insulates of *M. tuberculosis* is levofloxacin and ofloxacin has been used successfully [17]. In the treatment of TB meningitis or TB pericarditis Corticosteroids often have been used extensively. In urinary structure TB, surgery is more commonly essential than in former organs [18]. In 1992 for the treatment of TB infection the bacillus Chalmette-Guerin (BCG) vaccine are industrialized and familiarized. BCG vaccine are greatest regularly used for the caring of childhood TB as well as meningitis form of TB worldwide [19].

Material and Methods

Study design and population

The study area is Mardan. It is one of the largest cities in Khyber Pahktoon Khwa Pakistan. It is situated amongst the Indus and Kabul River in the Palearctic region. The population in the year of 2017 is 2,373,061 [20].

Data collection

A total of 980 suspected patients of TB were studied in the health care center district Mardan. There are 980 samples were collected from the TB advise person with the help of design questionnaire in the laboratories of District Mardan, in the month of October November and December 2017.

Sputum sample have collected in two ways

One of them are collected when the advice person come to laboratory first time. The laboratory reception give a bottle for sputum collection and the person come to sputum room and other samples are collected in sputum bottle provide to patient for the next morning sputum it mean that examination in fasting sputum. The patients are avoiding that the sputum bottle is tightly packed, transparent, clean, and disposable and about 40-50 ml. All the data analyzed statistically and the prevalence rate has determined with the help of formula, pos+ case/ total samples and then multiplied by 100.

Different materials for smear preparation

After collection of sputum sample the sputum were examined for which different materials are required such like sputum container, wire loop, clean glass slide, diamond pencil, forceps, bunsen burner, slide racks, gloves, mask, water, and timer.

Slide preparation

First of all I take a new cleaned sterilized slide and write register number on slide by the help of diamond pencil. A wire loop was dipped in alcohol and then given heat to remove all the germs. Then infected sputum are taken by wire loop from sputum container and placed on slide. The regular round shape of sputum was made on slide. Now the slide is sited to allow completely air dry at room temperature.

Reagents for smear preparation

I have used several reagents such like Methylene blue, Acid alcohol, Auramine, Carbol fuchsin and Cleaned water.

Staining procedure

Auramine-Rodamine stain and Zhiel-Neelsen stain are generally used in MMC laboratory.

Auramine-rodamine stain procedure

On the surface of slide Auramine-Rodamine solution is dropped for 15 minutes to catch stain in the staining rack. Then slide was washed by distilled water to keep clean. After it slide was decolorized by the help of suitable reagent for 2-3 minutes. In de-colorization the slide was flooded in alcohol for 2 minutes. It was again washed by distilled water and left for drying in the lab. Then the florescent microscopy was applied with 20x and 40x magnified power for examination.

Result on microscopy

If the analysis of Auramine-Rodamine stains was positive then the trace organism look like slender bright yellow with background of dark, if negative AFB were not mentioned.

Zhiel-neelsen stain method

The prepare slide is heated two to three second by the help of burner until it become dry. Then carbol fuchsin was used on the surface of prepare slide. It was remained for 10 minutes to penetrate in the cell wall and heated for 5 seconds. Then the slide was washed with distal water. The alcohol was rushed on slide for 3 minutes. Again the slide is wash by distal water carefully. Methylene blue was dropped to get stain for 1 minute. After one minute the excess methylene blue from slide and the slide washed by distal water carefully. Slide is now passed from air to dry at room temperature. One drop of emulsion oil is drop on the slide. Then the prepared slide was studied under the microscope with magnified power is respect number of fields.

Result on microscopy

If the examination of Zhiel-Neelsen stains method were positive then the organism look like slender and red in color, if negative AFB were not point out.

Results

These patients visited to hospitals due to certain complaints related to fever, cough, respiratory and bronchial disorders. For each case, the phenomenon of tuberculosis was studied in relation to different risk factors. The analyses suggest that sex, age, residence, diet, education, household condition, marital status, drug, medical care, living area, economic status and close contact with patients were important risk factors for the occurrence of tuberculosis. The whole data is organized in tables and charts as following Figure 2 and Table 1.

In 980 cases in which 486 were males in which 155 cases are positive with the percentage of 31.89% and 331 cases are negative with percentage of 68.10%, In total 980 cases 494 were females in which 185 cases are positive with the percentage of 37.44% and 309 cases were negative with the percentage of 62.55%, shown in Figure 3 and Table 2.

In total 980 samples 366 cases were from urban area in which 112 cases are positive with percentage of 30.6% and 254 cases are negative with percentage of 69.39% , while 614 cases from rural areas in which 228 cases are positive with percentage of 37.13% and 386 cases are negative with the percentage of 62.86 % as shown below in Figure 5 and Table 4.

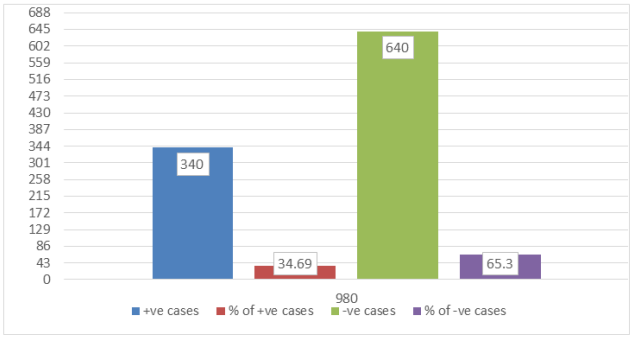

Figure 2. *Overall prevalence of Tuberculosis in District Mardan.*

Table 1. *Overall prevalence of Tuberculosis in District Mardan (Percentage of overall prevalence of Tuberculosis in District Mardan).*

Sample Size	TB				Total
	TB Positive	% of Positive	TB Negative	% of Negative	
980	340	34.69%	640	65.30%	980

Table 2. *Gender wise prevalence of Tuberculosis in District Mardan (Percentage value for the prevalence of Tuberculosis gender wise).*

Sex	TB				Total
	TB Positive	% of +ve	TB Negative	% of -ve	
Male	155	31.89%	331	68.10%	486
Female	185	37.44%	309	62.55%	494

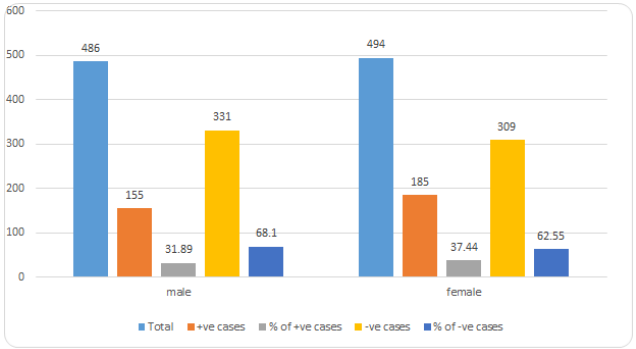

Figure 3. *Gender wise prevalence of Tuberculosis in District Mardan.*

According to age wise prevalence in the age group 15-34 there were total 625 cases in which 201 cases are positive with (32.16%)and 424 cases are negative with (67.84%),In the age group of 35-54 there were total 241 cases which 91 cases are positive with (37.75%) and 150 cases are negative with (62.24%) ,In the age group of 55-above there were total 114 cases in which 48 cases are positive with (42.1%) and 66 cases are negative with (57.89%) shown in Figure 4 and Table 3.

Table 3. *Age wise prevalence of Tuberculosis in District Mardan.*

Age group	TB				Total
	TB Positive	% of Positive	TB Negative	% of Negative	
15-34	201	32.16%	424	67.84%	625
35-54	91	37.75%	150	62.24%	241
55-above	48	42.10%	66	57.89%	114

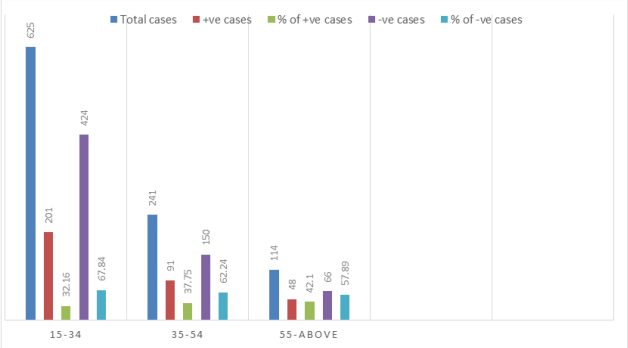

Figure 4. *Percentage value for prevalence of Tuberculosis in District Mardan.*

Table 4. *Area wise prevalence of Tuberculosis in District Mardan.*

Area	TB				Total
	TB Positive	% of +ve	TB Negative	% of -ve	
Urban	112	30.60%	254	69.39%	366
Rural	228	37.13%	386	62.86%	614

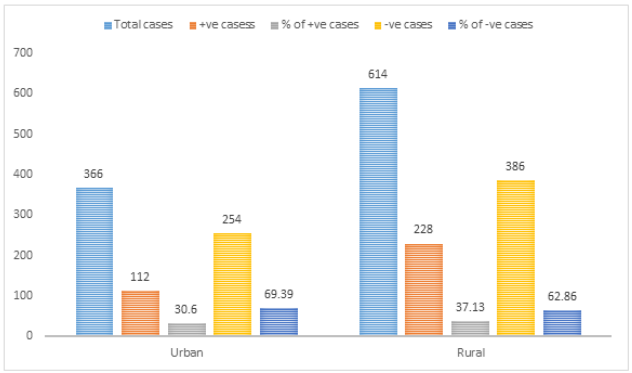

Figure 5. *Area wise prevalence of Tuberculosis in District Mardan.*

In total 980 samples 568 patients lived in muddy houses in which 202 are positive with the percentage of 35.56, and 366 are negative with the percentage of 64.43, despite the fact 412 people survive our life in concreted houses in which the 138 peoples underwent from TB with the percentage of 33.49, and 274 people are free from TB with the percentage of 66.5% as shown in the Table 6 and Figure 7. The prevalence of tuberculosis on basis of marital status is shown in Figure 6 and Table 5.

Table 5. *Prevalence of Tuberculosis on the basis of marital status.*

Marital Status	TB				Total
	TB Positive	% of Positive	TB Negative	% of Negative	
Married	235	35.82%	421	64.17%	656
Un Married	105	32.40%	219	67.59%	324

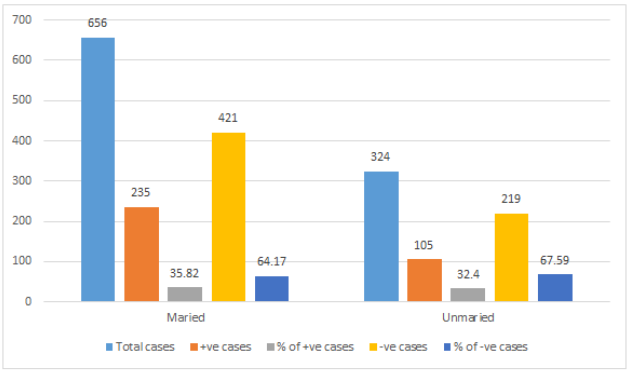

Figure 6. *Prevalence of Tuberculosis on the basis of Marital Status.*

Table 6. *Prevalence of Tuberculosis associated with home condition.*

Home Condition	TB				Total
	TB Positive	% of Positive	TB Negative	% of Negative	
Muddy	202	35.56%	366	64.43%	568
Concreted	138	33.49%	274	66.50%	412

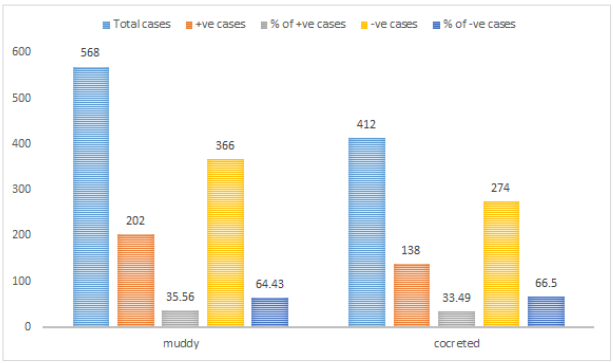

Figure 7. *Prevalence of Tuberculosis associated with home condition.*

The overall 980 samples 382 applicants were educated in which 75 are TB positive with the percentage of 19.63, and 307 are negative with the percentage of 80.36%, despite the fact 598 applicants are un educated in which the 196 people undertook from TB with the percentage of 32.77, and 402 people are unrestricted from TB with the percentage of 67.22% as shown in the Figure 8 and Table 7.

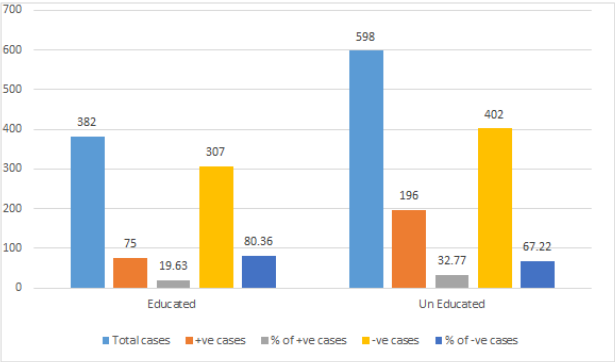

Figure 8. *Prevalence of Tuberculosis associated Education.*

Table 7. *Prevalence of Tuberculosis associated with education.*

Education	TB				Total
	TB Positive	% of +ve	TB Negative	% of -ve	
Educated	75	19.63%	307	80.36%	382
Un Educated	196	32.77%	402	67.22%	598

Discussion

TB is one which caused by a pathogen known as *Mycobacterium tuberculosis*. TB mainly attacks on lungs but leads infection can also involve vital body organs such as kidney, spine and brain. Upon coughing or sneezing, the TB patient expels small aerosol droplets in air that carry infectious bacteria. In this way, a TB carrier can contaminate the healthy surrounding and inducts his fellows on the risk of being infected by TB [21]. Every year, around 9 million new TB cases are reported and approximately 2 million of these patients die. Universally, there were an assessed 9.27 million instance cases of TB in 2007. This is an upturn from 9.24 million cases in 2006, 8.3 million cases in 2000 and 6.6 million cases in 1990. Utmost of the assessed number of cases in 2007 were in Asia (55%) and Africa (31%), with small percentage of cases in the eastern mediterranean region (6%), the European region (5%) and the region of Americas (3%) [22]. Pakistan is a developing country and TB has posed a serious health challenge. Pakistan ranked 6th amongst the 22 High Burden Countries (HBCs) and estimated to have 4th highest prevalence of multidrug resistance (MDR) TB [23]. In Pakistan, 420,000 new TB cases appear each year and mortality rate is 39 per 100,000 people [24]. Most Pakistani population belong to lower middle class thus direct and indirect costs associated with TB treatment may appears to be a key concern for them. In Pakistan, 75% TB patients have age between 19 to 50 years who are mostly responsible for earning family livelihood [25]. Thus, TB could have far-reaching economic and social consequences for the infected individuals, their families and communities. The majorities of TB patients were poor and consulted conventional health care professionals initially. The correct diagnosis of TB was discovered only after repeated visits. This resulted in advancement of illness which tends to increase the cost of treatment by many folds [26]. Pakistan has four provinces in which KPK is suffered from extraordinary burden of TB. In KPK there is many populated area in which Mardan is one of the highly TB infected area. The study is concerned with the prevalence of tuberculosis in suspected patient of district Mardan Khyber Pakhtunkhwa, Pakistan. WHO report show in 1992 that TB is a worldwide health disaster in all over the world and 7th leading cause of death worldwide. According to WHO 9.27 million of fresh cases were estimated in 2007 worldwide. WHO also predicted 181/100,000 and 223/100,000 prevalence found in Pakistan. On the bases globally incidence cases in 2007, TB is the worst disease and it can affect any part of human body [25]. The TB are commonly found in urban areas where people are live in congested houses, unhealthy and dirty environment, week food for eating, illiteracy and down condition of economy is the basic factor of spreading the TB.

In the present study, the medical records of patients were studied to investigate the prevalence of tuberculosis in suspected patient who were visited the hospital of district Mardan. Total of 980 samples have been collected in district Mardan during the period of October to December 2017. In 980 sample 340 (34.69%) patient have pulmonary TB while the other 640 (65.30%) were negative TB. Therefore the overall prevalence in the study is 34.69%. This shows that the prevalence rate in district increase annually. The result of the study is much more similar with the [27], who investigated in the sub division of Sheringal Barawal, Wari, Dir upper the occurrence of TB in KPK province of Pakistan from January 2013 to December 2013 from the district upper Dir. In that survey the data was collected. The reports of 380 patients showed that 25.78% were positive and 74.21 were negative. Presented Gender wise prevalence of tuberculosis out of 980 positive cases 155 (31.89%) were male and 185 (37.44%) were female. This study express that the spreading of TB rate is more in female than male. According to report of sultan [28]153 cases were studied from Khyber teaching hospital Peshawar KPK, in which 49 (32.02%) were positive and remaining were negative. In this report male were (30.66%) while female 33.33%. in this report the female rate of TB positive is high and the male is less. In the perspective of different research it's proved that the female is highly suffering from TB because of the poor houses, deficiency of nutrition's, illiteracy, scarcity of early treatment and poor economic conditions.

According the occurrence of TB with respect to age from 15-34 year, 625 patient were studied in which 201 (32.16%) were positive and 424 (67.84%) were negative. In this range the prevalence rate of TB positive is very less as compare to other ones. While 35-54 year, 241 subject were collected in which 91 (37.75%) positive and 150 (62.24%) found negative tuberculosis. In age of 55 and above the patient rate were 114. In which 48 (42.10%) subject have suffer from TB 66 (57.89) were found negative. The highest rate of prevalence found in this range. Same to this work [29] according to his study report in Dir Lower at the majority (82.73%) effected people from TB belong with productive aged 15-64 years. According to his study the problem was quite same, where 464 cases of TB patient are studied in which 74.2% concerned with the productive aged people 15-64 years. Ullah S et al. [30]

investigate another study which done in the LRH Peshawar the patient who were study in the age range of different group. TB in the mean age of 35 years that the two third of the study population 70.28% belongs in the age range of 15-45 years. Strangely, this study also shows that female were also victim of the TB.

In the present study education is the most important aspect in prevalence of tuberculosis. The result showed that the prevalence of literate person is 75/382 (19.63%) while the prevalence of illiterate person is 196/598 (32.77%) which showed that the prevalence is so more in uneducated person because many population of the district is unaware about the spreading of PTB molecule and their treatment. The results were similar with that of Hussain H et al [31]. Lack of education is the main cause of TB, uneducated and those who have less income are commonly effect from TB. Beside its they cannot able to maintain the quality of life in Pakistan due to low income such like to care of their diseases, the female who were effected from TB, mostly they were uneducated.

In the study I have noted the fresh and old cases of TB in range of 55 and above 42.10% in which most of the people comes from the poor families, they were mostly un educated, suffered from poverty, having no any positive resources of income, their houses were congested and muddy, these all are the main factor of TB. In the comparison of male and female, male have more chances in treatment while female have deficiency. Due to the unfair nutrition also affects the immunity system in old age.

The study rate of infection of TB is higher (35.82%) in married persons than unmarried persons which are less (32.40%). The result might be because of ladies expected to preserve badly by way of the in-legal guidelines and in excessive cases to be kicked out of the house. Present results are in settlement with finding of [32] that conducted study on TB and its effect on social stigmatization, remedy rate and pregnancy on defaulting. The present study shows that prevalence of tuberculosis infection is higher (37.13%) in rural area than urban area which is (30.60%). The main reasons of high prevalence in rural areas are poor hygiene, less access to formal education and unawareness about health related issues. A report published by [33] also show high infection of TB in rural area than urban. That reduced in size the ignition of non-renewable strength resources like coal, petroleum, and different factory combustibles is vast purpose of pulmonary tuberculosis.

Conclusion

The parasite of the TB is very successive pathogen which adjusts to persist in the host and finally cause inflammation. The examination report display that the TB infection is high in the population of the district Mardan. So must need to control those factors which are the initiator of tuberculosis infection such like, definite high-risk professional groups prohibited drug consumers, closed contact with TB patient and low income family. Other reason of spreading for this disease is unfavorable living condition, malnutrition, and congested houses. It is also observed that the female are mostly suffered as compared to male. Treatment charges were the financial distressful constrictions challenged by TB patients therefore the role of government must be positive to provide TB drugs and perform many seminars for the people awareness. In this way the people get sufficient knowledge about the parasite of tuberculosis.

Recommendation

On the base of current study it was confined many recommendation for the upcoming generation as well as the present generation. One should provide all fact about pathogenicity of TB, all the information and awareness about in care of TB disease. Advancement in education about TB and suitable environment must be given to the upcoming generation. If accidently a person getting TB then the duration of treatment should be completed. The patient of TB is a great risk of TB to healthy person therefore we should care about our self as well as our colleagues and family member to prevent from the TB infection in a specific way. Health care employer must aware about the transmission of TB and prevent you by the use of mask, gloves and other preventable technique.

References

1. World Health Organization. Global tuberculosis control: surveillance, planning, financing: WHO report 2008. WHO 2008; 393.
2. Walls T, Shingadia D. Global epidemiology of pediatric tuberculosis. J Infection 2004;48:13-22.
3. Daniel TM. Captain of death: the story of tuberculosis. Rochester, NY: University of Rochester Press. 1997;134-16.
4. Brown L. The story of clinical pulmonary tuberculosis. Baltimore: Williams & Wilkins 1941;441.
5. Koch R. A further communication on a remedy for tuberculosis. Br Med J 1890;2:1193.
6. WHO/UNICEF Joint Water Supply and Sanitation Monitoring Programme. Progress on drinking water and sanitation: 2014 Update. WHO 2014.
7. Kochi A, Vareldzis B, Styblo K. Multidrug-resistant tuberculosis and its control. Res Microbiol 1993;144:104-10.
8. www.mmcckp.com power by directorate of information technology Khyber Pakhtunkhwa 2017
9. Javaid A. Over view of tuberculosis problem in Pakistan. Pak J 1997.
10. Wood R, Morrow C, Barry III CE, Bryden WA, Call CJ, Hickey AJ, et al. Real-time investigation of tuberculosis transmission: developing the respiratory aerosol sampling chamber (RASC). PloS one 2016;11:e0146658.
11. Lai KM, Bottomley C, McNerney R. Propagation of respiratory aerosols by the vuvuzela. PloS one 2011;6:e20086.
12. Lawn SD, Zumla AI. Diagnosis of extra pulmonary tuberculosis using the Xpert® MTB/RIF assay. Expert Rev Anti-infect Ther 2012;10:631-5.
13. Cole ST, Brosch R, Parkhill J, Garnier T, Churcher C, Harris D, et al. Deciphering the biology of Mycobacterium

tuberculosis from the complete genome sequence. Nature 1998;393:537-44.

14. WHO, UNICEF. Towards universal access: scaling up priority HIV/AIDS interventions in the health sector. WHO 2009.
15. Burman WJ, Gallicano K, Peloquin C. Therapeutic implications of drug interactions in the treatment of human immunodeficiency virus-related tuberculosis. Clin Infect Dis 1999;28:419-29.
16. Sulochana S, Rahman F, Paramasivan CN. In vitro activity of fluoroquinolones against Mycobacterium tuberculosis. J Chemotherap 2005;17:169-73.
17. Yew WW, Chan CK, Leung CC, Chau CH, Tam CM, Wong PC et al. Comparative roles of levofloxacin and ofloxacin in the treatment of multidrug-resistant tuberculosis: preliminary results of a retrospective study from Hong Kong. Chest 2003;124:1476-81.
18. Cek M, Lenk S, Naber KG, Bishop MC, Johansen TEB, Botto H, et al. EAU guidelines for the management of genitourinary tuberculosis. Eur Urol 2005;48:353-62.
19. Colditz GA, Brewer TF, Berkey CS, Wilson ME, Burdick E, Fineberg HV, et al. Efficacy of BCG vaccine in the prevention of tuberculosis: meta-analysis of the published literature. Jama 1994;271:698-702.
20. Pakistan Bureau of Statistics 2018.
21. Chandir S, Hussain H, Salahuddin N, Amir M, Ali F, Lotia I, et al. Extrapulmonary tuberculosis: a retrospective review of 194 cases at a tertiary care hospital in Karachi, Pakistan. JPMA. J Pak Med Assoc 2010;60:105
22. World Health Organization. WHO Report 2009-Global tuberculosis control epidemiology, strategy, financing. WHO 2009.
23. National TB Control Program Pakistan/About NTP. 2006 http://www.ntp.gov.pk/about.htm.
24. Üstün TB, Ayuso-Mateos JL, Chatterji S, Mathers C, Murray CJ. Global burden of depressive disorders in the year 2000. Br J Psychiatry 2004;184:386-92.
25. World Health Organization. Diet, nutrition and the prevention of chronic diseases: report of a joint WHO. WHO 2003.
26. Zil-E-Ali A, Aadil M, Abbas SA, Ahmad A, Rehman SU, Zil-E-Ali F, et al. Cross-Sectional Survey of Healthcare Provisions for Female Tuberculosis Patients in Specialized Pulmonary Division from Low Socioeconomic Class in Lahore, Pakistan. Cureus 2017;9.
27. Akhtar NAVEED, Khan BT, Khan J, Saeed K, Khan S, Ahmad ZAHEER. Prevalence of TB: Current Status in Manglawar District Swat, KPK, Pakistan. Eur Acad Res 2014;1:5160-6.
28. Ayaz S, Nosheen T, Khan S, Khan SN, Rubab L, Akhtar M. Pulmonary TB: still prevalent in human in Peshawar, Khyber Pakhtunkhwa, Pakistan. Tuberculosis (TB) 2012;10:39-41.
29. Ahmad T, Haroon H, Nouroz F, Nath A, Sabihuddin S, Ejeta E. Prevalence of sputum smear positive pulmonary tuberculosis among the suspected visited patients in selected area of District Malakand, Pakistan. Sci Technol Arts Res J 2015;4:184-6.
30. Ullah S, Shah SH, Rehman A, Kamal A, Begum N, Khan G. Extrapulmonary tuberculosis in Lady Reading Hospital Peshawar, NWFP, Pakistan: survey of biopsy results. J Ayub Med Coll Abbottabad 2008;20:43-46.
31. Hussain H, Akhtar S, Nanan D. Prevalence of and risk factors associated with Mycobacterium tuberculosis infection in prisoners, North West Frontier Province, Pakistan. Int J Epidemiol 2003;32:794-9.
32. Lee BY, Horwitz MA. Identification of macrophage and stress-induced proteins of Mycobacterium tuberculosis. J Clin Invest 1995;96:245-9.
33. Shams S, Haq A, Hassan H, Afridi SG, Wadood A. Prevalence of Tuberculosis in District Khar Bajaur Agency, Khyber Pakhtunkhwa Pakistan. Biochem Anal Biochem 2014;3:1.

*Correspondence to:

Muhammad Shabbir lalokhil

Government Post Graduate College Mardan

Pakistan

E-mail: muhammadshabbir925@gmail.com