

Research Article



An Assessment of the Contact History of Multi-Drug Resistant Tuberculosis Patients from Sindh: A Gender based comparison

Muhammad Yahya Noori^{1*}, Saharish Rizwan², Zaheer Ali³ and Shaheen Sharafat⁴

¹Assistant Professor Pathology, Dow International Medical College, Dow University of Health Sciences, Karachi, Pakistan;

²Voluntary Research Officer, Provincial Tuberculosis Reference Laboratory, Dow University of Health Sciences, Karachi, Pakistan;

³Microbiologist, National TB Control Program, Provincial Reference Laboratory for Tuberculosis Sindh, Dow University of Health Sciences, Karachi, Pakistan; ⁴Professor of Pathology, Director Dow Diagnostic Research Laboratories, Dow International Medical College, Dow University of Health Sciences, Karachi, Pakistan.

Abstract | The purpose of this project was to evaluate the pattern of transmission in patients suffering from Multidrug resistant (MDR) Tuberculosis by assessing their contact information. Data were obtained and analyzed from 164 individuals suffering from MDR TB. Records were scanned to evaluate the presence of a close contact with known history of Tuberculosis. Tabulations and analysis were performed in Microsoft Excel® and online calculators. Analysis of contact data showed that only 36% of the patients had a close contact with a known Tuberculosis patient. Chi-square test did not show any association between history of presence of a contact and the patients' gender ($p > 0.5$). Among the cases with established exposure with a TB patient among close contacts, 17.5% females and 12.5% males reported exposure with a contact outside the close family. Majority of patients were unaware of the presence of a known contact in their vicinity. There was no association between knowledge about exposure and patients' gender. The study shows that efforts of active case finding should be employed to find the hidden cases of Tuberculosis in the society to stop the spread by those patients, who are unaware of their disease.

Received | May 13, 2017; **Accepted** | November 02, 2017; **Published** | December 20, 2017

***Correspondence** | Muhammad Yahya Noori, Assistant Professor Pathology, Dow International Medical College, Dow University of Health Sciences, Karachi, Pakistan; **Email:** yahyanoori@gmail.com

Citation | Noori, M.Y., S. Rizwan, Z. Ali and S. Sharafat. 2017. An assessment of the contact history of multi-drug resistant tuberculosis patients from sindh: A gender based comparison. *Annals of King Edward Medical University*, 23(4): 473-476.

DOI | <http://dx.doi.org/10.17582/journal.akemu/2017/23.473-476>.

Keywords | Multidrug-resistant tuberculosis, Contact-surveillance, Tuberculosis spread, Tuberculosis diagnosis

Introduction

Infectious diseases cause considerable morbidity and mortality in developing world and Tuberculosis is a common ailment in these countries. Tuberculosis has a strong association with overpopulation, poverty, malnutrition and lack of quality healthcare^{(1), (2)}. It is a bacterial infection caused by an interplay between *Mycobacterium Tuberculosis* and the immune system. It is transmitted from person-to-person through coughing and other aerosol generating activities and

is highly infectious. It mostly affects those who are living in close proximity of the patient, due to which the prevalence of TB is high among close contacts of the patient⁽²⁾. If the patient is suffering from drug-resistant TB, the situation becomes more critical as the strain of *Mycobacterium Tuberculosis* may develop further resistance and become extensively or completely drug resistant⁽³⁾. According to the report of the National Tuberculosis Control Program, the number of enrolled MDR-TB patients in Pakistan was 4617 by the end of 2014 in Pakistan, which rose to approxi-

mately 8000 by the end of 2015^{(4), (5)}. The estimated number of new cases of MDR in 2015 was reported to be 26000 by the World Health Organization⁽⁶⁾, which is quite alarming as these cases are substantially difficult to treat, however the spread of TB can be slowed down using proper education and counseling of the patient and his family⁽⁷⁾.

Since Pakistan is considered among those countries, which have been classified as “high-burden” by WHO, patients can contract TB from sources, which may not be known to them and may not be traced^{(8), (9)}. This project was designed with the purpose to evaluate the pattern of transmission among MDR patients by assessing their history of contact with other TB patients.

Materials and Methods

This study comprised of 164 patients classified as having MDR (MDR) Tuberculosis (Having resistance to Isoniazid and Rifampicin) at Tuberculosis Laboratory of Dow University of Health Sciences using Mycobacterial Drug Sensitivity Testing Procedures. The sample was selected using non-probability purposive sampling technique and all MDR patients were included who attended the lab for diagnosis or follow-up during April to July 2014. Patients with conventional or extra-pulmonary TB were excluded. Departmental approval for ethical concerns was obtained. Patient records were obtained from the records to assess the presence of a known TB patient among the house-hold and close contacts of the patient. Data were de-identified during compilation and tabulated and analyzed using Microsoft Excel^{®(10)} according to age, gender, and knowledge about the presence of an established Tuberculosis case in the contacts.

Results and Discussion

Data tabulations were performed on MS Excel[®]. Among 164 patients, there were 71 males and 93 females. Among all patients, 64% (n=104) could not identify their source of infection and did not know anyone who had Tuberculosis among their household or close contacts (n=47 M and 57 F). Exposure status is pictorially summarized in Figure 1.

Z test for proportions did not show any difference among the proportions of exposed and unexposed patients among both the genders ($p > 0.5$), which was further confirmed using chi-square test of association,

which did not show any association between gender and exposure ($p > 0.5$, $X^2 0.42$). Among those cases where exposure was established, in 17.5% females and 12.5% males among their respective groups, the most probable sources were identified to be other than the close family. When data were stratified, no significant differences were observed regarding known or unknown sources among males and females (Table 1), except in childhood group, where females had a higher proportion as compared to males for unknown infection sources.

Table 1: Age-wise stratification of male and female MDR patients.

	<18	18-45	>45	Total
Males	2	28	17	47
Females	10	30	17	57
Totals	12	58	34	104

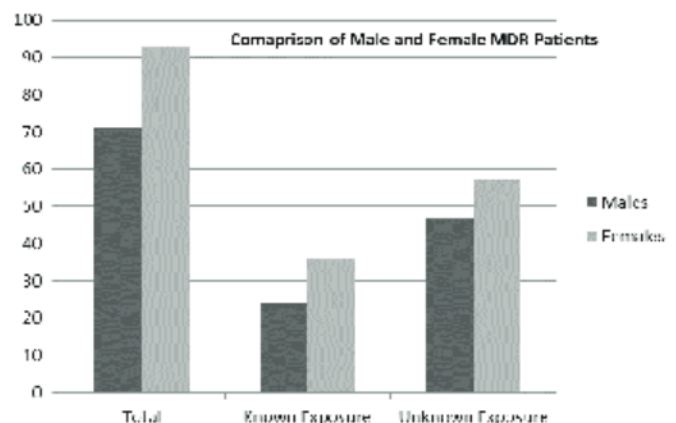


Figure 1: Gender-based comparison of MDR Patients, with and without a known TB patient among household and close contacts.

The results showed that most of the patients were unaware of the source of their infection, which implies that the source might have not been detected among the close contacts, who could be suffering from the disease and transmitting it to the people around him. This is apparently the most salient finding of this study, as it can be assumed that the number of unknown sources of MDR TB are quite present undetected in the society, which should be traced and enrolled for treatment, otherwise, the efforts to control TB would end up in vain. This is specially a matter of concern for those living in close contact of MDR TB patients, as familial spread was reported to be considerably high among the MDR TB patients in various studies^{(12), (15)}.

Females had a relatively higher ratio of contracting disease from unknown sources of infection (38.7%) in

comparison with males (33.8%). Our previous studies have shown some gender disparities in TB diagnosis in Pakistan⁽¹⁶⁾ and being from female gender has been reported as higher risk for MDR in some studies⁽¹⁷⁾, though some consider being a male is to be at higher risk⁽⁸⁾, however, our study did not find any significant statistical difference among males and females in MDR TB patients, but in younger age group below 18 years of age, where more females were found as compared to males (Table 1).

Consequently, our findings also show considerable person-to-person transmission of MDR-TB in the society, so efforts should be directed, to prevent transmission and improving health literacy about the symptoms of disease, to improve patient awareness, knowledge, attitudes and behavior about their health and disease. Besides, there should be a focus on early case detection and active case finding so that timely diagnosis can prevent the spread of disease in the society. Efforts should be made to focus on patient centered care and patient engagement, so that patients themselves can actively participate in the prevention of transmission of disease.

Conclusion and Recommendations

Majority of patients were unaware of the presence of a known contact in their vicinity, which indicates that the sources of infection largely remain unknown and unnoticed in the community. There was no association between knowledge about exposure and patients' gender suggesting that both males as well as females are at equal risk for developing the disease due to exposure with unknown sources of infection.

Since Tuberculosis is an insidious disease and even patients come to know after they develop noticeable symptoms, it is important that efforts of active case finding and screening for latent Tuberculosis should be under taken to find the hidden cases of Tuberculosis in the society so that the spread through unidentified sources could be stopped.

References

1. Dye C, Scheele S, Dolin P, Pathania V, Ravigli-

- one MC. Global burden of Tuberculosis: Estimated incidence, prevalence, and mortality by country. *JAMA*. 1999; 282(7):677-86. <https://doi.org/10.1001/jama.282.7.677>
2. Narasimhan P, Wood J, MacIntyre CR, Mathai D. Risk factors for Tuberculosis. *Pulmonary medicine*. 2013; 2013: 1-11. <https://doi.org/10.1155/2013/828939>
3. Hanekom M, Van Der Spuy GD, Streicher E, Ndabambi SL, McEvoy CRE, Kidd M, et al. A recently evolved sublineage of the *Mycobacterium Tuberculosis* Beijing strain family is associated with an increased ability to spread and cause disease. *Journal of clinical microbiology*. 2007; 45(5):1483-90. <https://doi.org/10.1128/JCM.02191-06>
4. National Tuberculosis Program Control Program. Annual Report 2014. Islamabad; Ministry of National Health Services Regulations & Coordination; 2015. 74p.
5. National Tuberculosis Program Control Program. Annual Report 2015. Islamabad; Ministry of National Health Services Regulations & Coordination; 2016. 76p.
6. World Health Organization. Global Tuberculosis Report 2016. Geneva; WHO Press; 2017. 214p.
7. Gibson N, Cave A, Doering D, Ortiz L, Harms P. Socio-cultural factors influencing prevention and treatment of Tuberculosis in immigrant and Aboriginal communities in Canada. *Social Science & Medicine*. 2005; 61(5): 931-42. <https://doi.org/10.1016/j.socscimed.2004.10.026>
8. Ahmad AM, Akhtar S, Hasan R, Khan JA, Hussain SF, Rizvi N. Risk factors for multidrug-resistant Tuberculosis in urban Pakistan: A multicenter case-control study. *International Journal of Mycobacteriology*. 2012; 1(3):137-42. <https://doi.org/10.1016/j.ijmyco.2012.07.007>
9. Behr MA, Warren SA, Salamon H, Hopewell PC, de Leon AP, Daley CL, et al. Transmission of *Mycobacterium Tuberculosis* from patients smear-negative for acid-fast bacilli. *The Lancet*. 1999; 353(9151): 444-9. [https://doi.org/10.1016/S0140-6736\(98\)03406-0](https://doi.org/10.1016/S0140-6736(98)03406-0)
10. Microsoft. Microsoft Excel (2010) Washington; Microsoft.
11. Stangroom J. Social Sciences Statistics. 2014 [updated 2014; cited 2015 3/4/15]; Available from: <http://www.socscistatistics.com>.
12. Grandjean L, Gilman RH, Martin L, Soto E, Castro B, Lopez S, et al. Transmission of multi-

- drug-resistant and drug-susceptible Tuberculosis within households: A prospective cohort study. *PLoS Med.* 2015; 12(6):e1001843. <https://doi.org/10.1371/journal.pmed.1001843>
13. Tang TQ, Fu S-C, Chen Y-H, Chien S-T, Lee J-J, Lin C-B. Outbreak of multidrug-resistant Tuberculosis in an aboriginal family in eastern Taiwan. *Tzu Chi Medical Journal.* 2014.
 14. Teixeira L, Perkins MD, Johnson JL, Keller R, Palaci M, do Valle Dettoni V, et al. Infection and disease among household contacts of patients with multidrug-resistant Tuberculosis. *Int J Tuberc Lung Dis.* 2001; 5(4):321-8.
 15. Yan LP, Qin LH, Zhang Q, Sun H, Han M, Xiao HP. Transmission of extensively drug-resistant and multidrug resistant *Mycobacterium Tuberculosis* in families identified by genotyping. *Chinese medical journal.* 2013; 126(3): 521-5.
 16. Noori MY, Ali Z, Mughal MN, Sharafat S, Masroor M, Khanani R. Gender distribution of smear positive Tuberculosis cases at a tertiary care chest diseases centre in karachi. *Journal of Dow University of Health Sciences.* 2015; 9(1):17-9.
 17. Repossi A, Delmastro M, Ferrarese M, Ferrara G, Murgia N, Codecasa L. Gender and other risk factors for multidrug-resistant (MDR) Tuberculosis (TB) among migrants to Milan, Italy. *European Respiratory Journal.* 2011 September 1, 2011; 38(Suppl 55).