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Research Article

Factors Associated with Multidrug-Resistant Tuberculosis (Tb) in Comparison with Pan-Sensitive Tb Patients in District Tharparkar, Pakistan

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ABSTRACT

Objective of this paper*: To analyse the factors associated with patients with multidrug-resistant tuberculosis (MDR) in comparison with pan-sensitive tuberculosis in district Tharparkar.*

Methods: *This is cross sectional study conducted during August to November 2018, in which 59 MDR TB patients and 63 pan-sensitive TB patients are assessed for associated factors like close contact of MDR, previous incomplete/inadequate pan-sensitive TB treatment, previous complete pan-sensitive TB treatment, nutritional status (assessed through BMI), IV drug abuse and HIV status.*

Results: *71.2% of MDR-TB and 68.2% pan-sensitive TB patients have close contacts with tuberculosis. 39% of MDR-TB patients has history of failed treatment with FLDs. 95% of patients in MDR group has BMI less than 18.*

Conclusion: *Close contacts contribute largely in spread of pan-sensitive and MDR TB among patients in Tharparkar. There is need of special emphasis on strategy and plan to block this chain of disease spread.*

INTRODUCTION

Drug resistant Tuberculosis is a deadly infectious disease, resulting increased mortality in developing countries like Pakistan. Multidrug-resistant TB (MDR-TB) remains a public health crisis and a health security threat around the globe[1] and specially developing countries like Pakistan, is facing tough situation to eradicate it. Multidrug resistant TB strains are resistant to a number of first line anti-tuberculosis drugs including at least isoniazid and rifampicin[2,4]. Pakistan, with an estimated 510000 new TB cases emerging each year and approximately 15000 developing drug resistant TB cases every year, is ranked fifth among B high-burden countries worldwide and it accounts for 61% of the TB burden in the WHO Eastern Mediterranean Region[3]. Pakistan is also estimated to have the fourth highest prevalence of multidrug-resistant TB (MDR-TB) globally[1].

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Approximately some 121,000 registered TB patients in Sindh have abandoned treatment in 2018 exposing themselves to high risk to multi drug resistance[8]. Key reasons for emergence of drug resistance form of TB include: delays in diagnosis, unsupervised, inappropriate and inadequate drug regimens, poor follow-up and lack of a social support program for high-risk populations[3].

MATERIAL AND METHODS

This cross sectional study carried out at Provincial TB Control Center at District Headquarter Hospital Mithi, Tharparkar during the period of August 2018 to November 2018. At this center 59 MDR TB patients are undergoing treatment. These patients are also receiving supervised ambulatory treatment with second line drugs along with travel incentives. We accessed them personally and through electronic medical record available there. We have also accessed the manually written record of 63 Pan-sensitive TB patients undergoing treatment at the same Hospital at separate tuberculosis clinic. We had medical record of all patients, so we carefully interviewed all patients on respective follow-up dates and treatment co-ordinator also visited homes and neighborhood of all patients to interview family members/close contacts personally. After obtaining informed consent, a standardized clinical form was filled out for all listed patients in study. Information about diagnosed MDR or Pan-sensitive TB history or active disease in household contacts was collected in these forms. We also enquired about cough, weight loss, fever, night sweats and anorexia to rule out undiagnosed TB patients in household contacts. We enlisted all relevant demographic information of patients like age, gender, occupation smoking etc. separately in Table-1. . Close contacts were defined as individuals who had shared the same kitchen and sleeping area with listed patient for at least 3 months before the diagnosis of the index case, and included spouses, children, parents, siblings and other relatives (uncles, grandfathers, cousins)[5]. Treatment failure of TB, which is defined as a patient who is sputum smear or sputum culture positive at 5 months or later after the initiation of anti TB treatment[7]. We carefully enquired about associated of factors and compared it with electronic medical record at mentioned center. End results are listed in table-2.

RESULTS

Demographic variants of this cross sectional study are enlisted in Table-1. Unemployment ratio was much higher (88%) in MDR TB patients. Whereas smoking ratio was also significantly higher (73%) in pan-sensitive TB patients. 01 child also had MDR TB.

Table 1: Demographic characteristics of MDR TB patients (n=59) and pan-sensitive TB patients (n=63)

Characteristics	Patients with MDR Tuberculosis (n=59)	Patients with Pan-sensitive Tuberculosis (n=63)
Gender		
Male	*26*	*36*
Female	*33*	*27*
Age		
0-14	*01*	*4*
15-44	*32*	*35*
≥ 45	*26*	*24*
Occupation		
Employed	*7*	*29*
Unemployed	*52*	*34*
Smoking status		
Smokers	*39*	*46*
Non-Smokers	*20*	*17*

In demographic Close contacts with MDR TB positive patients significantly linked to incidence of new MDR TB patients, enlisted in Table-2. 42(71.2%) patients have found close contacts of MDR TB patients. 11 (18.6%) MDR TB patients were also in close contact to Pan-sensitive TB patients. Whereas 43(68.2%) patients of pan-sensitive TB were in close contact with pan-sensitive TB patients. Previously incomplete pan-sensitive TB treatment with first line drugs (FLDs) less significantly linked to MDR TB patients. Only 4(7%) patients had history previous incomplete pan-sensitive TB treatment with FLDs drugs. 13(20.6%) pan-sensitive patients had also history of incomplete treatment with FLDs. Another important associated factor is previous failed treatment of pan-sensitive TB, 23(39%) patients had history of failed treatment with FLDs. Surprisingly no any patients in pan-sensitive group found to have history of failed treatment. 4 (6.8%) of patients in MDR group had history of previous complete TB treatment with FLDs. Whereas 2 (3.2%) of patients in pan-sensitive group had previous history of complete treatment with FLDs. 56 (95%) patients in MDR group had BMI<18. Whereas 17 (27%) patients in pan-sensitive group had BMI<18. 19 (32.2%) patients had history of intravenous drug abuse. Only 01 patient found HIV positive in whole study groups of MDR and pan-sensitive patients.

Table 2: Associated factors MDR TB patients (n=59) and pan-sensitive TB patients (n=63)

Associated factors	Patients with MDR Tuberculosis (n=59)	Patients with Pan-sensitive Tuberculosis (n=63)
Close contact to Pan-sensitive TB patients	*11*	*43*
Close contact with MDR TB Patients	*42*	*0*
Previously Incomplete/ inadequate Pan-sensitive TB treatment with FLDs[*]	*04*	*13*
Failed treatment of previously Pan-sensitive TB patients with FLDs	*23*	*0*
Previously complete Pan-sensitive TB treatment/Cured FLDs	*04*	*02*
BMI < 18	*56*	*17*
History of Intravenous Drug Abuse	*19*	*0*
HIV Status Positive	*01*	*0*

[*]*FLDs: First Line Drugs*

DISCUSSION

In Pakistan, National and Provincial TB control Programs cover the whole protocol of MDR-TB and Pan-sensitive TB patients including prevention, diagnosis, treatment, and overall monitoring with the planning to cover the entire nation in a phased manner[5,6,9]. The use of the rapid test Xpert MTB/RIF has expanded substantially since 2010, when WHO first recommended its use. The test simultaneously detects TB and resistance to rifampicin, the most important TB medicine. Diagnosis can be made within 2 hours and the test is now recommended by WHO as the initial diagnostic test in all persons with signs and symptoms of TB[1,4.] All MDR TB clinics in Pakistan use this method for diagnosis augmented by sputum culture. Pan-sensitive TB is usually diagnosed by sputum AFB and culture. However ideally MDR TB patients and pan-sensitive patients should be treated as inpatient in isolation rooms until it becomes non-contagious but here this protocol is not being followed. Which results in spread of disease in close contacts. Close contacts constitute a high-risk group for TB and MDR-TB, this study also reinforces this hypothesis, where 71.2% of patients has close contact of MDR TB. Another study in Karachi, Sindh showed 36% of the MDR patients had a close

contact with a known Tuberculosis patient[9]. In another study conducted in Peshawar, Pakistan in which 610 contacts studied, 41 (17.4%) contacts developed MDR-TB whereas 10 (4.2%) cases developed drug susceptible TB after the index case[5]. Although close contacts with MDR-TB may have acquired infection independently in high-incidence areas, there are no well-established estimates regarding the probability that two household members with multidrug-resistant TB share the same genotype and are members of the same transmission chain. Molecular epidemiologic data from households with more than one MDR-TB case can explain the transmissibility of highly drug resistant disease and also help guide public health policy. For instance, international guidelines for the management of known contacts of MDR-TB patients recommend conventional second line drug therapy based either on drug resistance pattern of an isolate from the suspected index MDR-TB case-patient or in accordance with the most commonly observed resistance strains in the community[5,10,11]. Assuming this limitation of all these studies including this one is genotype of close contacts of patients having MDR TB has not been determined so precisely we cannot determine the extent of transmission between close contacts. We here only hypothetically assume from the data of close contacts that they must have acquired infection from infected patients with resistant bacteria.

The study suggests that active tracing of close contacts of index MDR-TB cases could contribute to prompt identification and treatment of MDR-TB cases. Indeed this would be a more effective approach in saving more lives as well as in cutting the chain of the transmission in the community. This measure should be implemented broader for wider adoption and dissemination. Larger scale studies should be performed to know about the effectiveness and sustainability in similar settings.

CONCLUSION

This study has found high risk of MDR-TB and TB patients have close contacts of MDR-TB and TB patients. This emphasize the great need of focus to make strategy to ensure tracing of close contacts, treatment compliance, cure and timely diagnosis of MDR-TB patients.

Conflict of interest statement:

We declare that we have no conflict of interest.

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