



Yield of facility-based verbal screening amongst household contacts of patients with multi-drug resistant tuberculosis in Pakistan



Ejaz Qadeer^a, Razia Fatima^a, Mahboob Ul Haq^{a,*}, Aashifa Yaqoob^a, Nang Thu Thu Kyaw^b, Safieh Shah^c, Mrinalini Das^d, Petros Isaakidis^{c,d}

^a National Tuberculosis Control Program Pakistan (NTP), Islamabad, Pakistan

^b International Union Against Tuberculosis and Lung Disease (IUATLD), Myanmar

^c Médecins Sans Frontières – Operational Research Unit, Luxembourg City, Luxembourg

^d Médecins Sans Frontières, Delhi, India

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ABSTRACT

Background: Household contacts of multidrug-resistant tuberculosis (MDR-TB) patients are at a high risk of getting infected with TB/MDR-TB, therefore symptomatic or vulnerable individuals should be screened and treated early.

Methods: A cross-sectional study was conducted among household contacts of MDR-TB patients in three high-burden TB sites in Pakistan from July 2013 to June 2014. MDR-TB index patients were asked to provide a list of all members of their household and were asked whether any of them had TB symptoms such as productive cough, fever, weight loss and night sweat (“facility-based verbal screening”). Symptomatic contacts were defined as presumptive TB cases and were invited for investigations at the facility. Those who did not come were paid a home-visit. Confirmed TB/MDR-TB patients were registered in the nearest treatment facility.

Results: Of 209 MDR-TB index patients, 1467 household contacts were identified and screened, 95 of them children < 5 years. Of these 172 (12%) were symptomatic. Most common symptoms were cough 157 (91%) and fever 107 (62%). 58 (34%) presumptive TB contacts were not investigated. Of total contacts, 56 (3.8%) were diagnosed with TB, among them 54(96%) with MDR-TB and 2(4%) with drug-susceptible-TB. The number needed to screen (NNS) to identify a new MDR-TB case among adult household contacts was 27 and among presumptive adult and pediatric TB contacts was three. All 56 confirmed patients were registered for treatment.

Conclusion: Screening household contacts of MDR-TB index cases may be considered a feasible and high yield option, in high-burden, low-resource settings within Pakistan. The number of presumptive TB contacts required to screen to identify a new MDR-TB case was unusually low, indicating an effective strategy that could easily be scaled-up. The screening and management of vulnerable adults and children living with patients having TB of any form is a major priority in the combined efforts to end TB.

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Introduction

Tuberculosis (TB) remains a major global health problem, with an estimated 10.4 million new TB cases worldwide, most of whom live in low- and middle-income countries [1]. Globally, an estimated 3.9% of new TB cases and 21% of previously treated TB cases have multi-drug resistant tuberculosis (MDR-TB), a level that has changed little in recent years. In 2015, an estimated

250,000 people died of MDR/PR-TB. 30% of the 3.4 million new bacteriologically confirmed and previously treated TB cases notified globally were reported to have had drug susceptibility testing for rifampicin, with coverage of 24% for new TB patients and 53% for previously treated TB patients as compare to 58% and 12% respectively, in 2015 [1].

According to a Global TB Report published by the World Health Organization (WHO) in 2016, Pakistan ranks fifth in TB and fourth in MDR-TB among high burden countries (HBCs), contributing to approximately 60% of the tuberculosis burden in the Eastern Mediterranean Region (EMR) [1]. However, the TB burden may have silently risen, as the last nationwide population census was

* Corresponding author.

E-mail addresses: mahboob@ntp.gov.pk, mahboob0345@yahoo.com (M.U. Haq).

carried out in 1998. The first national anti-tuberculosis drug resistance survey conducted in Pakistan (2012–13) showed that the proportion of MDR-TB patients was 3.7% (95% CI, 2.5–5.0) among new and 18.1% (95% CI, 13.0–23.4) among previously treated cases [2]. Pakistan ranked 3rd among the countries with the highest number of estimated TB cases who were not notified (“missing”) [3]. In recent years, several studies have documented the overall trends of MDR-TB in Pakistan. A study has shown an almost consistent increase in the number of MDR-TB cases of tuberculosis from 1990 - 2007 with more than 15,000 isolates alone reported during that period [4]. This is not taking into account the cases in the unregulated private healthcare sector, although initiatives are being taken via technological innovations in TB control to further involve the private sector in surveillance [5].

Although estimates vary, systematic reviews conducted in 2008 and 2013 have shown that close contacts of TB and MDR-TB patients, especially children and people living in lower income countries are at increased risk of developing TB and MDR-TB [6–8]. No study from Pakistan was included in the systematic review on MDR-TB contacts. There is only one relatively small study conducted in Lahore, Pakistan in 2014, which showed that 0.5% of MDR-TB household contacts were diagnosed with rifampicin resistant TB.

WHO recommends contact investigation in ‘close contacts’ - defined as “living in the same household with TB index cases, either with drug-susceptible TB or with MDR-TB” [9]. Nevertheless, most national tuberculosis programs (NTPs) are often unable to conduct contact investigations due to inadequate investment in resources, staffing leading to unsustainable standardization of practices. Currently in Pakistan there is no standardized, routine implementation of household or community-based contact tracing. A pilot study in 2013 under the TB Reach Wave 3 project has detected more than 3000 TB cases including a significant number of MDR-TB cases during contact screening. These findings led the NTP to implement a new screening system, expanding the screening to household contacts of MDR-TB index patients. This strategy was piloted in three high burden Programmatic Management of Drug Resistant-TB (PMDT) sites.

This study aimed to assess the contact-tracing strategy and to determine the occurrence of new TB - drug susceptible and drug resistant - among adult and children (≤ 15 years) household contacts of MDR-TB patients in three PMDT sites in Pakistan from July 2013 to June 2014.

Materials and methods

Design

A facility based, cross-sectional study of household contacts screening of MDR-TB patients.

Setting

General setting

Pakistan is among one of the more diverse countries in the world in terms of ethnicity, culture, infrastructure, landscape, and climate. According to World Development Indicators (WDI, 2013) [10], 29.5% of Pakistan’s population are below national poverty lines. The population based on a recent projection was estimated to be over 178 million in 2011, making it the world’s sixth most-populous country [11,12].

Pakistan NTP

Pakistan’s mixed public-private healthcare system has vertical as well as horizontal components within the public sector and the largely unregulated private sector [13]. Despite the devolution

of the Ministry of Health (MoH), programs such as NTP comes under the Ministry of National Health Services Regulation and Coordination which is at the federal level, whereas the Provincial TB Control Program (PTP) covers TB managing sites at the provincial level. This has important implications for planning, sharing of resources, coordination and standardized implementation between the federal and provincial levels at a national scale in a sustainable manner. Although historically, the public sector has been the main source of TB directly observed therapy short course (TB-DOTS) care in the country, since 2010, efforts are being made to implement district-led public-private partnership models of care, with preliminary findings being reported in 2016 on how to involve the private pharmacies in early case detection as well [14].

The public sector TB care in a district is provided through a network of primary healthcare services; rural health centers (RHC), basic health units (BHU), and community-based Lady Health Workers (LHW). In most of the cases the first point of contact of presumptive TB cases is private providers who initially manage and those with partnerships refer these patients to public health care facilities (TB management units) for diagnosis. However, majority of the patients receiving care in private sector may not be notified to the national programme, with low microbiological diagnosis and low standards offered of drug-sensitivity tests (DST) leading to poor diagnosis of MDR-TB. TB-DOTS coverage was expanded at an accelerated pace to cover the public sector by May 2005, with the NTP being managed at 27 out of 30 PMDT sites.

On a national scale, TB case finding is primarily passive and standardized diagnosis is currently through sputum smear microscopy and chest radiography for pulmonary TB with specialized investigations for extra-pulmonary disease. All diagnosed patients are registered with a unique registration identification number; they are given standardized treatment and monitored for treatment outcomes according to national and international guidelines [15]. Public services including TB/MDR-TB diagnostic investigations and treatment are free of charge across the country.

MDR-TB contact tracing

In 2013, NTP Pakistan started active contact tracing of MDR-TB patients household in three high burden PMDT sites, namely; Ojha Hospital in Karachi, Gulab Devi Hospital in Lahore and Samli Sanatorium in Murree. The majority of cases chosen for this study were from the first two sites because these both are the highest burden, urban sites (most populated cities) in Pakistan and also patients prefer to seek treatment from these hospitals given they only deal with chest diseases. Furthermore Samli hospital had the lowest patients because of the cold weather, as it is located in Murree - which is a small, hill-station.

MDR-TB index patients were asked to provide a list of all members of their respective households’ contacts and indirect verbal screening (“facility-based verbal screening”) was done through a structured questionnaire of all households by trained research assistants. Any person with productive cough, fever, weight loss and night sweat was defined as presumptive TB case. Those found symptomatic were invited for diagnostic test (smear microscopy, X-ray and GeneXpert) and diagnosis at the facility. Those who did not come for investigations were paid a home visit and encouraged to undergo diagnostic tests at the facility, to ensure they could be assessed for TB. Confirmed TB/MDR-TB cases were registered at the Basic Health Management Unit (BMU) - which is a primary healthcare service delivery unit - nearest to them, for ease of treatment and monitoring.

Study population

The study population was all household contacts of MDR-TB patients registered for treatment from July 2013 to June 2014 in three selected PMDT sites of Pakistan.

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