Optimizing outcomes for drug resistant tuberculosis patients through provision of a comprehensive care package

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Abstract

Background: The paper presents the salient features of a comprehensive treatment package for drug resistant tuberculosis (DR-TB), its adaptation and implementation in two indoor care hospital settings in Pakistan, and lessons learned from this implementation.

Methods: A pilot study was undertaken on a group of 100 patients at two Programmatic Management of Drug-Resistant TB (PMDT) sites. Fifty patients each were selected from the Samli Sanatorium Murree and the Lady Reading Hospital, Peshawar by the National Tuberculosis Control authorities, and delivered a comprehensive package of services, including psychosocial and food support. Data were collected using standard TB tools and surveillance indicators. The results were compared between intervention and a historical cohort of DR-TB patients.

Results: Among the total 100 patients, the treatment success rate was 88%, the failure rate was 4%, while there were 7% deaths. A patient was transferred out while none were lost to follow-up, indicating much improvement over the historical cohort. Patients ranked the economic support, free medicines and nutritional support as most helpful, while majority of providers found the intervention sustainable.

Conclusion: A comprehensive package including the psychosocial support can be crucial in enhancing DR-TB outcomes. Regular interaction with patients and improved nutrition leads to improved treatment adherence, while capacity building of psychologists and home visits can further benefit the DR-TB patients leading to their cure.

Keywords: DR-TB, Pakistan, drug resistance, Comprehensive care package, PMDT, NTP, USAID, STP, second line TB drugs, side effects

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Introduction

The Sustainable Development Goals (SDGs) target 3.3 calls for ending the tuberculosis (TB) epidemic by 2030, aiming that compared to 2015, a 90% reduction in TB deaths and 80% reduction in TB incidence will have occurred (1). However, more than 10 million cases of active tuberculosis were reported in 2018, 80% of which emerged from Asian and African countries. The Stop TB Partnership has predicted an additional 6.3 million cases of TB and 1.4 million deaths due to tuberculosis between 2020-2025 (2). The disease is closely linked to malnutrition, poverty, and overcrowding, making it one of the deadliest combinations of disease and death (2).

A major issue that TB programs face is the poor adherence to treatment and delay in the initiation of treatment, leading to drug-resistant TB (DR-TB) and high mortality (3). Drug-resistant strains of TB are more difficult to treat than drug-sensitive cases, and pose a threat to the global progress towards World Health Organization (WHO) End-TB strategy (4). With 600,000 deaths attributed to DR-TB worldwide, it is considered a significant warning to global economy and security. In low- and middle-income countries, the case of DR-TB becomes more complex as it requires good diagnostic facilities with advanced testing and individualization of drugs; components that are usually weak in the public sector (5).

Pakistan ranks fifth among the high burden countries for DR-TB; it has an annual incidence of 27,000 DR-TB cases resistant to first-line TB drugs (6). A 2017 study conducted in Pakistan showed that nearly a quarter (24.3%) of relapse and retreatment cases were suffering from DR-TB and among them, nearly half (47%) were also resistant to ofloxacin – a second-line drug (7). Previously treated TB patients, particularly the young patients in the age group of 10-25 years, are at higher risk of DR-TB (8). Studies have documented that adverse drug reactions are not the major obstacle in DR-TB treatment, whereas adding psychosocial component to drugs may prove beneficial for treating DR-TB (9).

To solve the issue of DR-TB at a bigger scale, the global partners of Stop-TB have agreed on the National Action Plan (NAP) including DR-TB, put forth by the USA Government to focus treatment of DR-TB. The plan incorporates prevention of MDR-TB transmission as well as enhancing the treatment

adherence for Tuberculosis (including multidrug resistant Tuberculosis) by adding ancillary care and psychosocial support, as required. The framework is meant for assessing gaps in the existing supportive services, and developing plans for bridging the identified gaps without affecting the existing services. Only a handful of studies have been done on adaptation of this framework in local settings (10).

The national TB control section in the Common Management Unit (CMU), Islamabad implemented an adapted version of the NAP-based care package, with the support from USAID. This study assessed the effects of supportive interventions including the psychosocial component on patients' compliance to treatment and its outcomes. In this paper, we report the process and outcomes of our study that aimed at improving DR-TB care by adapting the framework for TB care in Pakistan.

Methodology

It was a mixed-methods study involving quantitative measurements with some qualitative explorations. For incorporating the additional (intervention) component to the existing TB care package, we carried out a detailed review of literature, held discussions with DR-TB patients, frontline health providers, TB control managers, and other stakeholders and donors to address the challenges faced by the people having DR-TB. In addition to the standard care, the intervention group received updated health education, nutritional and psychosocial support, monthly economic support as well as a reimbursement of travel expenditures.

The intervention (pilot) cohort patients were selected based on the following criteria:

- Laboratory-confirmed RR- or MDR-TB in the six identified pilot sites
- On a treatment regimen aimed at cure (not palliative care only)
- Have received treatment for less than 12 months (ideally) at the time of initiation of package services
- Are not in prison
- Will receive at least six months of supportive care package services by March 2018 (end of pilot data collection)

The enhanced services under the care package (Table 1) addressed some of the gaps in patient support that the NTP identified as Global Fund policies changed and funding decreased for social support particularly around the provision of social support to patients with DR-TB in the form of direct financial assistance, transportation subsidies, payment for ancillary tests, and nutritional support. Some supportive care was part of the standard approach, while the project augmented those services to meet patient needs.

Once the intervention component was finalized, we tested it on a group of 100 randomly selected patients, 50 each from the two Programmatic Management of Drug-Resistant TB (PMDT) sites namely Samli Sanatorium Murree

and the Lady Reading Hospital, Peshawar. Most patients visit the PMDT sites every month, while those with complications are admitted. Patients were provided with the DR-TB comprehensive care package services and they were followed in the community through a patient navigator.

Table 1: The components of standard care and the comprehensive care package (11)

Package of services for MDR- TB patients in 2014 that form the historical cohort for comparison	2017 – Currently being offered to all patients as part of standard care	2017 – Services provided to the patients in the evaluation population
1. Clinical evaluation 2. Bacteriological monitoring 3. Audiometry 4. Other labs as needed 5. Psychological counseling 6. Social support to patient and treatment supporter US$38 to patient and US$38 to treatment supporter (monthly basis) 7. Travel reimbursement US$ 7 to patient (monthly basis)	1. Clinical evaluation 2. Bacteriological monitoring 3. Audiometry 4. Other labs as needed 5. Psychological counseling 6. Social support to patient and treatment supporter PKR 2247 to patient and PKR 2247 to treatment supporter (monthly basis) 7. Travel reimbursement PKR 600 to patient (monthly basis)	Same services as standard care plus: • Updated health education package • Patient package enhanced to PKR 6,000 (which also contains PKR 1,000 for ancillary medicine and tests) • Food supplement to patient • Travel reimbursement increased to PKR 1,500 each to patient and treatment supporter • Updated and standardized psychological support • Patient support in community through patient support navigator and meetings

The objectives of this study were:

1. To see the role of supportive care result in better treatment outcomes for DR-TB patients.
2. To know the satisfaction level with their care when they receive these supportive services.
3. To see the benefits for frontline providers in providing these services.
4. To see care package implementation as feasible, and will they support it going forward.
5. To assess the cost to implement, and what is the incremental cost-benefit of providing supportive care services.

Data were collected using standard indicators obtained from the national TB surveillance system; through patient satisfaction surveys administered to individual patients in the evaluation (pilot) group as well as to contemporary controls who did not receive services. We compared results from our evaluation (pilot) cohort of patients who received the supportive care package to a historical cohort of patients who did not receive the full supportive services. A questionnaire was also

administered to providers and managers, while the cost element was calculated from the Excel spreadsheets of the financial component of the project.

The pilot timeframe was short, and data were collected covering a period of approximately six months of implementation during April 2018 till September 2018, allowing only for interim treatment outcomes to be collected to date for the evaluation (pilot) cohort of patients. The historical cohort to which we compared results included confirmed DR-TB patients diagnosed during 2014 and treated in the two pilot facilities. We compared results from our evaluation (pilot) cohort of patients with a historical cohort who did not receive the full supportive services.

Results

This was a prospective study in which 100 patients from the intervention group were followed compared to 293 patients in the historical cohort (Table 2). One patient from the intervention cohort dropped out (1%) as compared to seven (2%) patients dropping out in the comparison group. A total of 88 patients (88%) in the intervention group were cured from DR-TB compared to 216 (74%) in the comparison group. Treatment failure occurred in four patients (4%) in the intervention and five patients (2%) in the comparison group. A much higher number of deaths i.e., 57 (19%) occurred in the historical cohort compared to seven deaths (7%) in the intervention group.

Table 2: Final Treatment Outcomes for the Historical and Intervention (pilot) Cohorts

Treatment status	Historical Cohort (2014) N=293		Evaluation Cohort N=100	
	DR-TB patients	Percentage	DR-TB patients	Percentage
Treatment success	216	74%	88	88%
Treatment Failed	5	2%	4	4%
Died	57	19%	7	7%
Lost to follow-up (LTFU)	8	3%	0	0%
Not Evaluated/Transferred out	7	2%	1	1%
Total	293	100%	100	100%

The top three care package (Table 3) services that the patients felt were most useful to the treatment adherence services were social and economic assistance (93%), free TB second line drugs (74%) and nutritional support (57%). The mental health status of DR-TB patients considerably improved after receiving psychosocial support services.

There was an increase in the patient satisfaction towards care provided to them from 4% to 93% at the end of the study. About one-third of the patients were not satisfied with the cleanliness of the facility whereas, the vast majority were satisfied with the hours of operation, location, and waiting times. Psychological assessment of the patients was conducted to determine the signs of depression or anxiety. In April 2018, 32 patients out of 100 had depression and 27 were suffering from anxiety. The number steadily decreased each month and by September 2018 only 2 patients had anxiety while only 4 were left with depression.

Table 3: Care Package Services that the patients felt were most helpful to treatment adherence

Services offered	Proportion of respondents rating this service
Social-economic assistance	93%
Free TB drugs	74%
Nutritional Support	57%
Medical staff one-on-one counseling	46%
Free lab tests/investigations	17%
Psychology assistance	12%
Free tests to detect or free drugs to treat side effects	6%

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A total of 26 health providers and managers were also included in the study for their feedback. Out of them 13 (50%) reported that they had more face-to-face time with the patients before the start of treatment, 46% reported they spent the same face-to-face time with the patient while 4% of staff reported spending less time with the patients. Seventeen (65%) of the staff reported that they spent more time on paperwork than they did previously. In the qualitative discussions, the providers shared their perception that the package was beneficial for the treatment adherence of patients. According to them, the resources and time for implementation of the care package was reasonable and a significant majority (77%) of the staff believed that the activities for care could be sustained in the future using cost-effective means.

Discussion

The study was conducted using a combination of intervention elements including psychosocial support, food support, and the application of a patient-centered approach to enhance and sustain the adherence to TB treatment. The treatment success rate (TSR) in the intervention cohort (88%) was higher than the historical cohort (74%), with a treatment failure rate of 4%, one patient transferred out and no case lost to follow up. A similar study conducted in Eastern Taiwan demonstrated a TSR of 78.4% with a failure

rate of 21.6% and loss to follow up at 1.2% (12). In Morocco, Handouni et al showed a TSR of 53.5%, with a failure rate reaching up to 34.6% (13). The findings suggest that implementation of the package provided relatively better treater outcomes in Pakistan's settings.

The experience of DR-TB can be stressful for the patients because of several reasons, and programs need to be sensitive to this aspect of the problem. During the course of our study, 32 patients showed clinical depression while another 27 showed signs of anxiety. This means a total of 59 (about 60%) patients had some form of psycho-emotional problems. Over the course of time, however, their psychological situation improved and after six months, only four patients had clinical depression while two had signs of anxiety. Interestingly, the psychological component of our intervention received a low ranking by the patients. About 17% found it helpful compared to proportions for economic assistance, free TB medicines, and nutritional support liked by 93%, 74%, and 57% respectively. This reinforces the assertions from past studies that to achieve better treatment adherence in DR-TB, programs need to focus on the behavioral, social and structural needs of the patients, with psychosocial support provided as part of the package (14).

The financial assistance receiving a higher ranking in our study needs a special attention. We feel that economic stress has a significant contribution to psychological distress, therefore, addressing the distress requires economic assistance, in addition to psychological support. An earlier study from China has also recommended that financial risk protection is needed for achieving universal access to DR-TB care (15). We also feel that provision of nutritional support to the patients served a two-fold benefit. First, malnutrition further increases the susceptibility of TB patients to all infections and improving the nutritional status decreases this likelihood and improves the outcomes of DR-TB (16). Secondly, the provision of food support on a monthly basis also improved treatment adherence as it induced the patients to report for follow-up care regularly.

Certain challenges encountered during the research included selecting the patients for the care package as this could create inequity among the patients. Developing transparent mechanisms for transferring funds to patients receiving financial support consistent with government rules, the long distances patients often had to traverse to reach the PMDT care sites, and facilitating community outreach to support the patients concerned were additional, real-life challenges. In providing financial support to patients, the project had to deal with cash transfers. At first this was done through a bank transfer, but this did not provide the necessary degree of transparency nor speed necessitating an alternative mechanism to be developed and employed.

Another challenge was the long distances that patients had to travel to reach DR-TB care. The number of sites in the country are limited and insufficient to cater to the growing need for DR-TB care. It also significantly increases the financial burden for patients who must travel long and sometimes hazardous distances and stay far from home while they receive treatment. Devolving care to lower levels of the health system will decrease the cost and increase accessibility of care for patients. In trying to provide more localized care, the project also encountered difficulties in doing outreach in the community. Working through local government structures to establish relationships with and provide information to the community was helpful in reaching the target populations.

Several data limitations also require consideration. First, this DR-TB care package was only implemented in two tertiary care facilities offering the highest, most specialized care in the country. Consequently, all outcomes may represent best possible case scenarios in the country making replication in other care settings difficult and onerous. Similarly, the populations of patients and healthcare workers surveyed were small, 100 and 26 respectively, so all data and associated trends may not apply more broadly across the country.

The short duration of the six-month pilot also made it necessary to rely on interim outcomes instead of final treatment outcomes for the intervention (pilot) cohort. Lastly, the pilot was conducted under programmatic conditions and not as a clinical research trial. Consequently, there were varying and/or overlapping services offered at some sites and comparator groups were best available options which did not provide "clean" control groups for each comparison. Specifically, since the comparison cohort from 2014 also received a similar level of financial support, they did not provide a true baseline cohort.

Conclusion

This highly successful supportive care package needs to be expanded to the whole of Pakistan, with creation of additional PMDT sites to reduce the traveling time of patients. The steps necessary for such an undertaking would entail national and provincial ownership for these interventions, engaging community advocates in the planning phase for making supportive services available to all DR-TB patients with the development and use of standardized tools and counseling materials.

The provision of psychosocial, economic and food support bring a concrete meaning to the human-centered approach. The positive results of this comprehensive package are not surprising and the package can be replicated at a large scale. Considering the low case notification rate of DR-TB in the country and the fact that TB is essentially a disease of poverty with patients likely to face catastrophic health costs, such implementation at scale is highly warranted and recommended.

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