Annals of Community Health • Apr-Jun 2019 • Vol 7 • Issue 2

Socioeconomic Burden of Multidrug-Resistant Tuberculosis Patients at Ballari District – A Cross-sectional Study

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INTRODUCTION

Tuberculosis (TB) is a chronic infectious disease caused by bacteria of the *Mycobacterium tuberculosis* complex commonly known as Koch’s bacillus, tubercle bacillus, and acid-fast bacillus. It is one of the oldest diseases known to affect humans and a major cause of death worldwide.¹ TB is one of the main causes of deaths related to antimicrobial resistance and the leading killer of people living with HIV. Most multidrug-resistant TB (MDR-TB) patients remain undetected and untreated exposing their families and communities to the risk of acquiring MDR-TB strains transmitted through the air, especially in high-density communities and among people with HIV/AIDS.² The emergence of strains with MDR-TB has led to a resurgence of TB as a major public health menace worldwide. Treating MDR-TB is more complicated than treating drug-sensitive TB, as second-line TB drugs are more difficult to acquire, often require intravenous administration, and are more toxic and less effective than first-line TB drugs, and patients with MDR-TB also require longer courses of

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more costly treatment and experience higher mortality than those infected with drug-sensitive TB.[]

As per the Global TB report 2017, the estimated incidence of TB was 10.4 million, mortality due to TB was 1.3 million, incidence of MDR-TB/rifampicin resistant was 0.6 million, and almost half of these cases were in India, China, and the Russian Federation.[]

It has been seen that apart from physical symptoms, TB patients face various problems that are social, economic, and psychological in nature. Therefore, for the assessment of patients’ health status, it is necessary to consider the overall effect of TB on health and patients’ perception of well-being, besides routine clinical, radiological, and bacteriological assessments.[]

Unfortunately, it remains as a global public health challenge even today, despite enormous advances in medicine and rapid expansion of health system, to document and explore the burden of MDR-TB on the social, economic, and psychological well-being of the patients, and the present study titled “Socioeconomic Burden of MDR-TB Patients at Ballari District – A Cross-sectional Study” was undertaken.

METHODS

A cross-sectional study conducted between January 2017 and December 2017, 79 MDR-TB cases were registered at DR-TB center during study period, and residing in Ballari district are included in our study. A pre-designed pre-tested semi-structured questionnaire to collect data on the required variables was designed based on the previous literature. The questionnaire was tested in one study sample as a pilot study, in DR-TB center, Ballari. Necessary changes were made based on the feedback of study participants and the difficulties encountered. With permission of District Tuberculosis officer, Ballari District and Superintendent of Government wellness TB and Chest diseases hospital, VIMS, Ballari, the information regarding the details of MDR-TB patients were first collected from DRTB center, and then, home visits were planned according to their residing place. After obtaining informed and written consent, MDR-TB patients are interviewed by administering pre-designed pre-tested semi-structured questionnaire, to collect information to assess socioeconomic burden.

RESULTS

Among 79 patients in our study, 14 (17.7%) patients changed their job because of disease, 8 (10.1%) patients lost their income-earning job, 32 (40.5%) patients voluntarily discontinued their income-earning job because of physical weakness due to disease, and only 6 (7.6%) patients are able to continue the same job which they used to do previously. Out of 60 patients, 41 (68.3%) patients became unemployed because of disease [Table 1].

The mean total cost incurred per patient is ₹58,061.99 (USD 855), with minimum expenditure of ₹2,200 and maximum expenditure of ₹1,04,900. The mean total direct cost incurred per patient is ₹21,318.8 (USD 314) with minimum cost incurred being ₹1,500 (USD 22) and maximum being ₹2,84,100 (USD 4184). The mean total indirect cost incurred per patient is ₹36,743 (USD 514), with minimum expenditure of ₹0 and maximum of ₹10,00,000 [Table 2].

In total direct cost, the mean pre-diagnosis and diagnosis cost per patient is ₹11,628 (USD 171). Guardian cost is incurred only to 31 (39.2%) patients; among them mean guardian cost per patient is ₹3,991.3 (USD 59). Direct hospitalization cost is incurred to 79 (100%) patients, among them the mean hospitalization cost per patient is ₹6,315 (USD 93). Cost for follow-up is incurred to 5 (6.3%) patients; among them, the mean cost per patient is ₹600 (USD 9). Cost for picking up drugs is incurred to 49 (62%) patients; among them, the mean cost incurred for picking up drug per patient is ₹448.41 (USD 7). Injection cost is incurred to 23 (29.1%) patients. Among them, the mean cost incurred for injection per patient is ₹2,728.26 (USD 36). Food supplement cost is incurred in 15 (18.9%) patients, and the mean cost incurred for food supplement per patient is ₹260 (USD 4). In total indirect cost, the mean indirect guardian cost per patient for diagnosis and treatment is ₹334.84 (USD 5). The mean indirect cost per patient during hospitalization is ₹1,510.13 (USD 22.2). The mean money lost due to selling of assets per patient is ₹1,27,500 (USD 1878).

57% of total direct pre-diagnosis and diagnosis cost is incurred for drugs, 17% for laboratory test, 8% travel, 7% for administrative cost, 5% for food, and 3% is incurred each for accommodation and X-ray cost.

Table 1: Distribution of patients according to their job-related social burden

<table>
<thead>
<tr>
<th>Impact on job</th>
<th>Number of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changed job</td>
<td>14 (17.7)</td>
</tr>
<tr>
<td>Lost job</td>
<td>8 (10.1)</td>
</tr>
<tr>
<td>Discontinued job</td>
<td>33 (41.8)</td>
</tr>
<tr>
<td>Continuing same job</td>
<td>5 (6.3)</td>
</tr>
<tr>
<td>Unemployed before MDR-TB</td>
<td>19 (24.1)</td>
</tr>
<tr>
<td>Total</td>
<td>79 (100)</td>
</tr>
</tbody>
</table>

MDR-TB: Multidrug-resistant tuberculosis
Table 2: Distribution of patients according to their community-related social burden

<table>
<thead>
<tr>
<th>Community-related social burden</th>
<th>Number of patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees looking down on them (n=60)</td>
<td>19 (31.7)</td>
</tr>
<tr>
<td>Fear of rejection (n=79)</td>
<td>60 (75.9)</td>
</tr>
<tr>
<td>Depend on others/family members (n=79)</td>
<td>62 (78.5)</td>
</tr>
<tr>
<td>Not revealed their disease status to partner (n=54)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Not revealed their disease status to family members (n=79)</td>
<td>3 (3.8)</td>
</tr>
<tr>
<td>Fear of discrimination (n=79)</td>
<td>55 (69.6)</td>
</tr>
<tr>
<td>Worried or had mental anguish (n=79)</td>
<td>69 (87.3)</td>
</tr>
<tr>
<td>Participating in public gatherings (n=79)</td>
<td>18 (22.8)</td>
</tr>
<tr>
<td>Neighbors looking down on them (n=79)</td>
<td>46 (58.2)</td>
</tr>
</tbody>
</table>

Out of 79 patients, 29 (36.7%) patients have spent less than ₹10,000, 26 (32.9%) patients have spent between ₹10,000 and ₹25,000, 17 (21.5%) patients have spent between ₹50,000 and ₹1,00,000, and 7 (8.9%) patients have spent >₹1,00,000 during their entire illness.

Out of 79 patients, 51 (64.6%) patients have spent ≤25% of their annual income for MDR-TB, 5 (6.3%) patients have spent 26–50% of their annual income, 7 (8.9%) patients have spent 51–75% of their annual income, 2 (2.5%) patients have spent 76–100% of their annual income, and 14 (17.7%) patients have spent >100% of their annual income.

When assessed for the impact of MDR-TB on socioeconomic status of patients, we can see from the above table and graph that before illness (disease), 10 (12.7%) patients were in Class 1 (upper class) and after illness (disease), only 6 (7.6%) patients are in Class 1, i.e., 4 (40%) patients from Class 1 are shifted to lower class; before illness, 13 (16.5%) patients were in Class 2 (upper middle class) and after illness (disease), only 7 (8.9%) patients are in Class 2, i.e., 6 (46.2%) patients from Class 2 are shifted to lower class; before illness, 17 (21.5%) patients were in Class 3 (middle class) and after illness (disease), only 13 (16.5%) patients are in Class 3, i.e., 4 (23.5%) patients from Class 3 are shifted to lower class; before illness, 31 (39.2%) patients were in Class 4 (lower-middle class) and after illness (disease), 38 (48.1%) patients are in Class 5.
are in Class 4, i.e., 7 (18.4%) patients from higher class are shifted to Class 4; and before illness, 8 (10.1%) patients were in Class 5 (lower class) and after illness (disease), 15 (19%) patients are in Class 5, i.e., 7 (46.7%) patients from higher class are shifted to Class 5.

From the above table and graph, we can say that 60 (75.9%) patients have stopped working/doing household work because of MDR-TB for more than equal to 6 months, 9 (11.4%) patients have stopped working for <1 month, 6 (7.7%) patients have stopped working for 4–6 months, and 2 (2.5%) patients each have stopped working for 1 month and 2–3 months.

**DISCUSSION**

In the present study, out of 79 MDR-TB patients, 41.8% of patients discontinued their jobs, 17.7% of patients changed their jobs, 10.1% of patients lost their jobs, whereas only 6.1% of patients are continuing same job which they previously used to do. A study done by Van Den Hof et al.\(^6\) shows that 72%, 53%, and 41% of MDR-TB patients from Ethiopia, Indonesia, and Kazakhstan, respectively, lost their job. Another study done by Thomas et al.\(^2\) reported that 5 out of 10 patients had not resumed work even after 1 year of treatment, and at times, caregivers also had to stop going to work for months at a time.

In our study, 60 (75.9%) patients expressed that they have fear of rejection from family members. 62 (78.5%) patients are depending on others/family member for their daily routine work. A study conducted by Yadav et al.\(^5\) showed that 77.9% of MDR-TB patients had good and harmonious
relation with family members before being diagnosed with TB. Whereas after being diagnosed with TB, approximately 50% of MDR-TB patients felt that their relation with family members has declined and became worsened, and another study conducted by Morris et al.[7] shows that majority of participants noted the stigma of MDR-TB and isolation from family and friends.

In our study, the mean total cost incurred per patient is ₹58,061.9 (US$ 855), the direct cost incurred per patient is ₹21,318.8 (US$ 314), and total indirect cost incurred per patient is ₹36,743 (US$ 514).

A study done by Rouzier et al.[9] shows that the mean total cost for 14 MDR-TB patients is US$6880.

Another study conducted by Fitzpatrick and Floyd[9] shows that the cost per patient for MDR-TB treatment in Estonia, Peru, the Philippines, and Tomsk was US$10880, US$2423, US$3613, and US$14657, respectively.

In a study conducted by Yadav et al.[5] when they assessed economic impact, before getting MDR-TB, 39.7% of patients expressed that their income is good, 58.8% told that their income is neutral, and 1.5% of patients told that their income is bad, whereas after getting MDR-TB, only 1.5% of patients expressed that their income is good, 44.1% told that their income is neutral, 51.5% of patients told that their income is bad, and 2.9% of patients expressed that their income is very bad.

CONCLUSION

Being diagnosed with MDR-TB and undergoing treatment imposes significant Social, and economic psychological stress on patients, almost all patients experienced substantial socioeconomic impact of disease, most importantly due to inability to work and job loss. If the patient is the bread winner of the family the combination of lost income and extra costs are generally catastrophic, which may cause patients to not get diagnosed, to not start treatment, or to default from treatment because of financial constraints. Majority of patients suffered economical burden either in the form of direct expenditure incurred for diagnosis and treatment, for travelling, for care takers, for follow up, for hospitalization etc, or in the form of indirect costs due to loss of job, guardian’s loss of pay, emergency selling of assets to less value and loan. Economic burden pushed many families from Upper and middle socio-economic status to lower classes.

ACKNOWLEDGMENTS

I extend my deep sense of gratitude to my respected guide and teacher Dr. S. Basavaraj, Professor, Department of Community Medicine, VIMS, Ballari. It gives me immense pleasure to thank Dr. T. Gangadhar Goud, Professor and Head, I thank all the staff Mr. K.S. Sridhara, Dr. B. Raghavendra, Dr. Ramesh K, Dr. Sameena A.R.B, Dr. Suresh C.M, Dr. Neeta P.N, Mrs. Vasantha S.C, Dr. Aneesur Rehman and Dr. Jayashree B.K et al. Dr. K Pavan Kumar, Dr. Pavithra B.M and Dr. Saraswathi. V. Sajjan, Dr. Chetana Singode and Dr. Priyanka. A.

I would like to express my special thanks to my parents Dr. Sudhakar B Padmashali, Mrs. B Arundhati Sudhakar, my dear wife Dr. Shraddha Bharath Padmashali and dear brothers Mr. Pavan Padmashali B.S and Mr. Suman Padmashali B.S, for their moral support, patience and constant encouragement throughout this work.

REFERENCES