Socio-demographic Profile of MDR-TB and XDR-TB Patients Admitted in DR-TB Centre, North India

Om Prakash Giri¹, Vishal Prakash Giri²*, Nishant Nikhil³

Abstract

Background: As per WHO Global TB report (2018), 10.0 million people developed TB in 2017. India accounted for 20 % of world cases. Globally, 3.5 % of new cases and 18% of previously treated cases had MDR-TB. Corresponding figures for India are 2.8 % and 12 %. Among cases of MDR-TB in 2017, 8.5% were estimated to have XDR-TB. Drug resistant TB cases are on rise and needs planning and research for its treatment and control.

Materials and Methods: A retrospective study was conducted on MDR-TB and XDR-TB patients to evaluate social and demographic profile of these patients in Bihar.

Results: A total of 700 (530 males and 170 females) MDR-TB and 51 (40 males and 11 females) XDR-TB patients were analyzed, which revealed 293 (41.86 %) patients of MDR-TB and 23 (45.10 %) patients of XDR-TB in the age group of 15 to 25 years. Mean age of MDR-TB patients in this age group was 20.52 years and for XDR-TB 21.17 years.

Conclusion: Drug Resistant Tuberculosis Control Programme should focus adequately on youth in state of Bihar, India.

Introduction

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis. It typically affects lungs (pulmonary TB) but can also affect other sites (extrapulmonary TB). A patient of TB, whose biological specimen is resistant to both Isoniazid (H) and Rifampicin (R), with or without resistance to other first-line anti-tuberculosis drugs is called Multi Drug Resistant Tuberculosis (MDR-TB). MDR-TB patients may also have additional resistance to any/all Fluoroquinolone (FQ) or any/all Second-line injectable (SLI) anti-TB drugs. Shorter MDR-TB regimen [(4-6) Mfx⁴ Km Eto Cfx Z H E / (5) Mfx Cfx Z E] is recommended for pulmonary and extra-pulmonary (pleural effusion and lymphnode) MDR-TB patients sensitive to both FQ and SLID. Patients who are not considered eligible for shorter MDR-TB regimen are recommended Conventional MDR-TB regimen. Pulmonary MDR-TB patients (aged >18 years), with additional resistance to FQ/SLI are prescribed, Bedaquiline / Delamanid containing regimen, provided they meet inclusion criteria. Delamanid, additionally, can be prescribed to 6 - 17 years age group patients wherein, Bedaquiline is currently not permissible. MDR-TB patients not suitable for Bedaquiline / Delamanid are prescribed Modified MDR-TB regimen. MDR-TB patient whose biological specimen is additionally resistant to at least a FQ (Ofx, Lfx, Mfx) and a SLI (Km, Am, Cm) is called Extensive Drug Resistant TB (XDR-TB). XDR-TB regimen also comprises of with/without new drug (Bedaquiline /Delamanid). The present study was planned with the aim to assess distribution of MDR-TB and XDR-TB among patients of DR-TB of different age groups, genders, weight bands, communities and districts in North Bihar.

Materials and Methods

The present retrospective record based study was conducted on patients admitted in DR-TB centre, Darbhanga, which attached with Department of Pulmonary Medicine, Darbhanga Medical College and Hospital, Darbhanga, between 15 June 2014 to 31 December 2016.

Patients of all age groups (children and adults) and genders (male and female) suffering from MDR-TB and XRD-TB were studied. Rapid molecular diagnostic tests (CBNAAT and LPA) were done in RNTCP certified Demian Foundation India Trust (DFIT) laboratory, situated in State TB Training and Demonstration Centre (STDC), Darbhanga and LC-DST was done at National Reference Laboratory (NRL) National Institute of Tuberculosis and Respiratory Diseases (NITRD), Delhi.

DR-TB Centre, Darbhanga admits MDR-TB and XDR-TB patients of six districts of Bihar: Darbhanga, Madhubani, Samastipur, Saharsa, Supaul, and Madhepura.

Data entered in the DR-TB Centre computer were analyzed using appropriate statistical software, SPSS version 20. Frequencies (number and percentage) were obtained using descriptive statistics.

Results

Total 700 patients of MDR-TB were admitted in DR-TB Centre, out of which 589 (84.14 %) were noted to be in the age group of 15 to 45 years and 89 (12.71 %) in age group 46 to 65 years. Patients aged less than 15 years and more than 65 years were least affected, 14 (2.0 %) and 8 (1.14 %) patients were observed in the corresponding age groups respectively (Table 1).

230 (32.85 %) patients of MDR-TB in the age group of 15 to 25 were noted to be males, while in the same age group the females comprised of 63 (9.0 %) patients. Similar was situation in the age group of 26 to 45 years, where males 210 (30 %) again outnumbered females 86 (12.28 %). Females were recorded to be minimally affected in the age group of 56 to 65 years, while males were so in the age group of less than 15 years. Females were not observed to be affected with MDR-TB in the age group
of more than 65 years. Total 530 (75.71 \%) patients of MDR-TB were males and 170 (24.28 \%) females, thus male to female ratio was noted to be 3.11 : 1 (Table 1) (Figure 1).

Total 51 patients of XDR-TB were admitted in DR-TB centre, out of which 48 (94.11 \%) were observed to be in the age group of 15 to 45 years and 3 (5.88 \%) belonged to the age group of 46 to 65 years. XDR-TB was not observed in the age groups of less than 15 years and more than 65 years (Table 2) (Figure 2).

18 (35.29 \%) patients of XDR-TB in the age group of 15 to 25 years were noted to be males, while in the same age group females comprised of 5 (9.80 \%) patients. Similar was situation in the age group of 26 to 35 years, where males 17(33.33 \%) again outnumbered females 3 (5.88 \%). Male and females were least affected in age group of 36 to 65 years, the corresponding figures observed were 5 (9.80 \%) and 3 (5.88 \%) respectively. No patient suffering from XDR-TB was noted to be in age group of more than 65 years. Total 40 (78.43 \%) patients of XDR-TB were males and 11 (21.56 \%) females, thus male to female ratio was noted to be 3.63 : 1 (Table 2).

Mean age of MDR-TB patients observed was 30.57 years (males 31.29 and females 28.37). Mean age of XDR-TB cases noted was 28.31 years (males 27.77 and females 30.27). Females were affected by MDR-TB at younger age than males, while males were affected by XDR-TB at an earlier age than females.

Pulmonary paediatric MDR-TB was observed in 14/ 700 (2\%) patients with female to male ratio 2.5 : 1. Extra-pulmonary paediatric MDR-TB, Pulmonary and Extra-pulmonary paediatric XDR-TB cases were not observed in the present study. Children up to 14 years age group were classified as paediatric (Tables 1 and 2).

Weight-band distribution of MDR-TB cases revealed that 14 (2\%), 495 (70.71 \%) and 191 (27.28 \%) patients had weight bands of 16 to 25 Kg, 26 to 45 Kg and 46 to70 Kg respectively. None of the MDR-TB patient had weight more than 70 Kg. Among XDR-TB patients, 36 (70.58 \%) cases had weight less than 45 kg and 15 (29.41 \%) more than 45 Kg. Total DR-TB patients less than 45 Kg comprised of 545/ 751 (72.56 \%) and more than 45 Kg 206/ 751 (27.43 \%) cases (Table 3).

Darbhanga district of North Bihar was observed to be affected by 267/ 700 (38.14 \%) MDR-TB and 25/ 51 (38.14 \%) XDR-TB cases. Madhubani occupied second position in terms of number and percentage of MDR-TB and XDR-TB patients, the figures noted were 173/ 700 (24.71 \%) and 16/ 51 (31.37 \%) respectively. Darbhanga district had 292/ 751 (38.88 \%) DR-TB patients, while rest five districts covered by DR-TB centre Darbhanga had total 459/ 751 (61.11 \%) patients (Table 4).

MDR-TB affected in 496/ 700 (70.85 \%) persons of Hindu community and 204/ 700 (29.14 \%) of Muslim community. The corresponding figures for XDR-TB were 36/ 51 (70.58 \%) and 15/ 51 (29.41 \%) respectively. DR-TB was noted in 532/ 751 (70.83 \%) individuals among Hindu community and 219/ 751 (29.16 \%) in Muslim community, with a Hindu to Muslim ratio of 2.42:1. Population wise Hindu to Muslim ratio in North Bihar is 5.2 :1. Thus, population and DR-TB ratio revealed Muslim community to be more affected with DR-TB than Hindu community in North Bihar. Males were observed to be comparatively more affected than females in both the communities with male to female ratio among Hindu community 3.45 : 1 and Muslim community 2.53 :1 (Table 5).

Extra-Pulmonary MDR-TB was observed in 8/700 (1.14 \%) cases. Distribution revealed, (A) Community - Hindu(6), and Muslims (2 ) ; (B) Gender- Males (7) and Female (1); (C) Site-Spinal TB with cold abscess (3), Sternal tuberculosis with cold abscess (1), Intracranial tuberculoma (1), Tuberculous empyema (2) and Cervical lymphnode TB with cold abscess (1) ; (D) Age group- 15 to 25 years (4), 26 to 35 years (2), 56 to 65 years (2) ; (E)

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**Table 1: Age group and gender distribution of MDR-TB patients admitted in DR-TB centre**

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>2014 n (%)</th>
<th>2015 n (%)</th>
<th>2016 n (%)</th>
<th>2014 n (%)</th>
<th>2015 n (%)</th>
<th>2016 n (%)</th>
<th>Total n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-14</td>
<td>1 (1.2)</td>
<td>1 (0.5)</td>
<td>2 (0.7)</td>
<td>2 (6.9)</td>
<td>1 (2.1)</td>
<td>7 (7.4)</td>
<td>14 (2.0)</td>
</tr>
<tr>
<td>15-25</td>
<td>39 (47.0)</td>
<td>67 (37.8)</td>
<td>124 (45.9)</td>
<td>91 (31.0)</td>
<td>21 (44.7)</td>
<td>33 (35.1)</td>
<td>293 (41.8)</td>
</tr>
<tr>
<td>26-35</td>
<td>18 (21.7)</td>
<td>60 (34.0)</td>
<td>68 (25.2)</td>
<td>11 (37.9)</td>
<td>18 (33.3)</td>
<td>33 (35.1)</td>
<td>253 (36.1)</td>
</tr>
<tr>
<td>36-45</td>
<td>13 (15.7)</td>
<td>23 (13.0)</td>
<td>28 (10.4)</td>
<td>5 (17.2)</td>
<td>6 (12.8)</td>
<td>10 (10.7)</td>
<td>85 (12.1)</td>
</tr>
<tr>
<td>46-55</td>
<td>7 (8.4)</td>
<td>14 (8.0)</td>
<td>18 (6.7)</td>
<td>23 (8.2)</td>
<td>2 (4.2)</td>
<td>3 (3.2)</td>
<td>45 (6.4)</td>
</tr>
<tr>
<td>56-65</td>
<td>3 (3.6)</td>
<td>11 (6.2)</td>
<td>25 (9.2)</td>
<td>4 (13.8)</td>
<td>5 (10.2)</td>
<td>10 (10.7)</td>
<td>44 (6.3)</td>
</tr>
<tr>
<td>65-75</td>
<td>2 (2.4)</td>
<td>1 (0.5)</td>
<td>5 (1.8)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>8 (1.1)</td>
</tr>
<tr>
<td>Total</td>
<td>83(100.0)</td>
<td>177(100.0)</td>
<td>270(100.0)</td>
<td>29(100.0)</td>
<td>47(100.0)</td>
<td>94(100.0)</td>
<td>700(100.0)</td>
</tr>
</tbody>
</table>

Males=530 (75.71 \%), Females= 170 (24.28 \%), Total cases= 700. Pulmonary MDR-TB 692/ 700 (98.85 \%), Extra-Pulmonary MDR-TB=8/700 (1.14 \%). STR for MDR-TB was started on 12 June 2014 in Darbhanga, DR-TB centre.
We observed DR-TB most prevalent in young people but is not consistent with al who also reported DR-TB common in both genders was 60 years.

19 years. Maximum age of XDR-TB in male and female MDR-TB patients noted in the age group of 15 to 25 years. Observed 316/ 751 (42.07 %) patients DR-TB (MDR-TB and XDR-TB) patients started on 15 January 2015 in DR-TB centre, Darbhanga.

The present study conducted on DR-TB (MDR-TB and XDR-TB) patients observed 316/ 751 (42.07 %) patients in the age group of 15 to 25 years. Males comprised of 570/ 751 (75.89 %) patients and females 181/ 751 (24.10 %). Male to female ratio observed was 3.14 :1. Minimum age of male and female MDR-TB patients noted in the present study was 14 and 10 years and maximum 76 and 66 years respectively. The minimum age of male and female XDR-TB patients observed was 15 and 19 years. Maximum age of XDR-TB in both genders was 60 years.

The present study observation is consistent with similar study conducted by Dholakia et al, Javia et al, Mukati et al who also reported DR-TB common in young people but is not consistent with them as regards to age group affected. We observed DR-TB most prevalent in comparatively lower age group (15 to 25 years) than reported by Dholakia et al (15 to 35 years), Javia et al (18 to 35 years), Mukati et al (31 to 40 years), Mukherjee et al (21 to 30 years), Gupta et al (21 to 40 years) and Munje et al (25 to 34 years). The present study is comparable with studies conducted by Javia et al (M:F=3:2), Mukati et al (2:3.3:1), Mukherjee et al (1.60:1), Kapadia et al (1.73:1), Gupta et al (1.67:1), Datta et al (1.26:1) and Munje et al (2:4:1) who have also reported males dominance but we have observed a comparatively higher (M:F=3:10:1) male dominance than previous published reports. The present study is not in line with study conducted by Dholakia et al, where gender distribution equality (M:F=1:1) has been reported among DR-TB patients. Males have been observed in the present study to be more affected than females in adult age groups. This finding is not consistent with similar studies conducted by Mukati et al, Mukherjee et al and Prakash et al where DR-TB affected females have been observed to be significantly younger than males.7-15

2.28 % of MDR-TB were noted to be co-infected with HIV infection. This figure is lower than reported by Dholakia et al (8.82%), Javia et al (5.2%), Mukherjee et al (2.9%) and higher than Mukati et al (1.5%) and Datta et al (1.9%).7-10,13

Young age group is developing, has highest social interaction and is productive. Their involvement with DR-TB is challenging because they act as source of spread of infection and their involvement also leads to damage of potential work force. Adolescent Friendly Health Services (AFHC) Clinic can include TB in its curriculum as it is already dealing with reproductive health care services, testing of HIV and other sexually transmitted diseases and mental health care services in adolescents. Adolescents could be provided professional assistance and guidance and referred back to TB health care system for needful.

Conclusion

The present study was conducted to know the population affected by DR-TB, so that more concentration could be directed towards the target and observed 293/700 (41.86 %) MDR-TB and 23/ 51 (45.10%) XDR-TB patients in the age group of 15 to 25 years.

Present study concludes that high percentage of youth affected by DR-TB in North Bihar is a matter of concern for all of us and should be addressed. It reflects change in pattern of age group involvement in DR-TB towards lower side. We recommend RNTCP PMDT to concentrate on youth and take it as challenge in delivery of DR-TB treatment services in this zone of Bihar state, India.

Percentage of Muslims among DR-TB cases is higher (29%) compared to Muslim population percentage (19%) in North Bihar. Either incidence of DR-TB is high in Muslims or Muslims are more conscious in taking treatment, this needs exploration. We suggest DR-TB prevention and control approach should focus adequately on Muslims.

Further, Darbhanga division of Bihar state (comprising three districts : Darbhanga, Madhubani and Samastipur) had maximum 672/ 751 (89.48 %) DR-TB patients, while Kosi division (comprising three districts Supaul, Madhepura and Saharsa) had minimum 79/751 (10.51%) DR-TB patients, this finding also needs exploration and research. We recommend strengthening of TB care system in Kosi division of Bihar state, India.

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References