ORIGINAL ARTICLE

A retrospective analytical study of treatment outcomes among multi drug resistant tuberculosis patients

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Article Cycle

Abstract

Background: India is amongst one of the high multidrug resistant tuberculosis (MDR-TB) burden countries globally with a huge contribution given by the state of Uttar Pradesh. Programmatic Management of Drug Resistant Tuberculosis, initiated in 2007 has taken over the disorganized and unsupervised treatment practice in India. However, regular scrutiny is required which points out both its success and failure. **Aim & Objective:** This study was conducted to evaluate final treatment outcomes among MDR-TB patients on standard Category IV regimen **Settings and Design:** Retrospective analysis was done using secondary data from medical records of all patients. **Methods and Material:** Data of all MDR-TB patients registered under RNTCP at King George's Medical University, Lucknow from 2013 to 2016 was collected. Demographic details along with pre-defined treatment outcomes were recorded (cured, treatment completed, death, treatment failure, treatment default and transfer to higher centre). **Statistical analysis used:** Descriptive statistics using numbers and percentage. **Results:** The records of 3580 MDR tuberculosis patients registered at drug resistant tuberculosis centre in King George's Medical University from January 2013 to December 2016 were included which consisted of 67%males and 33%female. Mean age of presentation was 31.17 years (95% CI 30.75-31.59). Mean weight of patients was 40.16 kg (95% CI 39.89-40.43). Year wise distribution of registered cases from 2013 to 2016 was 611, 799, 984 and 1186 patients respectively. Amongst 3580 patients, 30.39% were declared cured, 25.50% completed treatment, 21.39% died, 0.84% showed treatment failure, 12.54% were defaulters, 2.35% were transferred out to higher centre, 6.5% were shifted to regimen for Extensive drug resistant (EDR) TB, 0.16% patients needed to stop treatment due to ADR and 0.33% patient were still on treatment. **Conclusion:** The treatment success rate of MDR-TB patients is still low. Measures to improve treatment adherence as in National tuberculosis elimination programme (NTEP) attempts to further improve the success rate.

Keywords

Introduction

Tuberculosis is a chronic granulomatous disease caused by Mycobacterium tuberculosis bacteria which typically affects lungs but can affect any organ of the body. It is amongst the top ten leading cause of death worldwide affecting approximately ten million people. India is amongst the top eight countries contributing nearly two thirds of the total global burden of tuberculosis.(1)

Multidrug resistant tuberculosis (MDR-TB) which is development of resistance to both rifampicin and isoniazid, the two powerful first line antitubercular drugs, is a big hurdle in achieving the aim of setting the nation as well as globe free from tuberculosis. Treating MDR tuberculosis by second line drugs is for a longer term, expensive and with more chances of adverse effects. Adherence to treatment and therefore treatment outcome is affected due to adverse drug reactions (ADRs) of second line anti tubercular drugs.(2,3) Despite the availability of efficacious anti tubercular drugs and various national and international programs, incidence of tuberculosis is still high.

India was amongst 30 high MDR-TB burden countries according to Global TB report 2017.(4) In 2020, India continues to be a high burden country with more than half of TB notification contributed by states of Maharashtra, Uttar Pradesh, Madhya Pradesh, Rajasthan and Bihar. Uttar Pradesh alone notifies around 20% TB cases.(5) The success rate of treatment of drug resistant tuberculosis does not meet the expected rate because of lack of notification of all the patients, loss to follow up due to longer duration of treatment (9 months to upto 20 months) and expensive second line antitubercular medications with higher incidences of adverse effects. However, measures are being taken to address these problems and shorter MDR-TB regimens have been introduced free of cost. India has decided to go on path of TB elimination by 2025 and MDRTB will be a big hindrance on that path. In order to assure success of any national program, regular monitoring and assessment of outcome is essential at regular time intervals. Therefore, this study was aimed to evaluate treatment outcome of MDR-TB patients registered at drug resistant TB centre.

Aims & Objectives

To evaluate treatment outcomes among MDR-TB patients registered and treated at drug resistant tuberculosis

Material & Methods

Ethical approval was obtained from the Institutional Ethics Committee of K.G.M.U. A retrospective analytical study was carried out and data was collected from medical records of MDR-TB patients registered at drug resistant TB centre at King George's Medical University from January 2013- December 2016 that included all the MDR-TB cases diagnosis by WHO-recommended Intermediate Reference Laboratory certified by the NTEP. MDR patients included were those whose sputum culture was positive for *mycobacterium tuberculosis* with resistance to both H and R and R-R alone on DST (drug susceptibility testing) results. These patients were started on standardized category IV regimen for MDR-TB. Demographic details were collected for all patients and different outcomes were evaluated as per NTEP -PMDT guidelines.(6) These include cure rate, treatment completion, death, treatment failure, defaulters, transferred out patients,

treatment stopped due to adverse drug reaction and patients switched to XDR-TB regimen. Data was entered in Microsoft excel 2007 and analysis was done using descriptive statistics. [Figure 1]

Results

The total number of MDR-TB patients registered at drug resistant tuberculosis centre in King George's Medical University from January 2013 to December 2016 were 3580. The cases included 67% males and 33% female. Mean age of presentation was 31.17 years (95% CI 30.75-31.59). Mean weight of patients was 40.16 kg (95% CI 39.89-40.43). Total numbers of HIV reactive cases were 1%. Rifampicin resistance was seen in 99.6% whereas isoniazid resistance seen in 51% [Table 1]. Year wise distribution of registered cases from 2013 to 2016 was 611, 799, 984 and 1186 patients respectively [Figure 2]. Amongst 3580 patients, 1088 (30.39%) were declared cured, 913 (25.50%) completed treatment, 766(21.39%) died, 30 (0.84%) showed treatment failure, 449(12. 54%) were defaulters, 232 (6.5%) were shifted to regimen for XDR-TB (Extensive drug resistant TB), 84 (2.35%) were transferred out to higher centre, 6 (0.16%) of the patients required discontinuation of treatment due to ADR and other reasons and 12 (0.33%) patient were still on treatment at the time of evaluation [Figure 3].

Discussion

There has been a progress in diagnosis and notification of tuberculosis including drug resistant TB cases. Anti-tubercular treatment averted around 49 million deaths around the globe between 2000 and 2015.(7) The number of bacteriologically confirmed cases increased from 41% in 2017 to 51 % in 2018. Similar trend was seen in this study where the registered cases increased from 611 in 2013 to 1186 in 2016. Tuberculosis is common in both sexes with higher incidence in males as compared to female. This trend is seen in this study also with higher cases of males (n=2391, 67%) as compared to females (n=1189, 33%). The mean age of presentation in this study was around 31 years (31.17±12.68) which includes most productive members of the society yet with major tuberculosis burden. As per the Global TB report in 2018, India (27%) was amongst top three countries to have the largest share of MDR-TB burden and out of these around 3.4% were new cases of MDR and 18% were those who were previously treated for TB.(8) The cure rate of MDR-TB varies from 38% to 55% in other parts of India (4,5,6) with failure rate ranging from 5-16% (9, 10, 11) and death around 10-16% (9, 11). The data from systematic review gives cure rate around 55% with death around 12%.(12)

The results of our study shows cure rate of 30.39%, which is still low than other parts with a high death rate of around 21.39% and failure rate of 0.84% and only 25.50% patients completed their treatment. This may be correlated with multidimensional poverty in Uttar Pradesh as compared with other states. Study by Dehury

and Mohanty (2015) revealed multidimensional poverty index of 0.256 in Uttar Pradesh which was higher than all India (0.207).

The incidence rates for TB is falling owing to new strategies globally and at national level but this fall in rate is not fast enough to achieve the goal of reaching the milestone of 20% decline by 2020. The overall reduction achieved was just 9% between 2015 and 2019.(1) According to TB India report 2018, states of Maharashtra, Rajasthan and Uttar Pradesh gave high MDRTB notification and treatment initiation rates in 2017. Culture conversion rates were found higher in Chandigarh, Himachal Pradesh, Sikkim, Mizoram, Telangana in 2016 as compared to other states. Between 2018 and 2019 the treatment rate of MDR-TB achieved was just 22% of the goal of 1.5million and rates of treatment amongst children were still lower amounting to just 8 %. There is a major gap seen between the number of cases being notified and number of cases actually enrolling and completing the treatment.(1) This may be due to loss to follow up due to longer treatment regimen, lack of knowledge and awareness and lack of laboratory facilities. These results are not satisfactory to meet current goal. Shorter regimen for TB and newer diagnostic modalities have been proposed by the WHO and has effectively started in many parts including ours. As youth is bearing the major burden of tuberculosis, proper counselling through social media and training and education will help to bring major change in eradication of disease from the society and country.

Latest strategies are being focused on expansion of testing for tuberculosis including drug resistance and providing treatment services towards the residence of the patients by decentralization of drug resistant TB services with a hope of increasing compliance and will also cut down indirect expenses of patient. Government of india (GOI) has introduced scheme of direct benefit transfer to support nutrition as Nikshay Poshan Yojana and provides Rs 500 per month till completion of treatment and is still considering to further increase this amount, GOI has also added incentives to treatment supporters, incentive for notification to private providers and travel incentive to tribals(5).

However, with ongoing Covid-19 pandemic there is a threat of recent progress so far achieved to get reversed owing to major impact on per capita GDP, under nutrition, increase dropouts, increase death due to TB and covid19 co-infection. On one hand increased mask use coupled with lockdown type restrictions have limited spread of infection but on other hand it has also disrupted access to TB services and reduction of resources due to reallocation towards covid-19. There has been a tremendous decrease in notification of TB in India (41%) between 2019 and 2020 which is alarming(13).

Conclusion

Treatment success rate of MDR-TB patients is still low. Measures to improve notification rate, treatment adherence and shorter regimen might further help to improve the success rate. Consistent efforts addressing the loopholes are required to tackle challenges of MDR-TB.

Recommendation

MDR-TB treatment strategies need revision on the basis of scientific evidences. This study produces evidences which can be utilized in revising the MD-TB treatment program.

Limitation of the study

All data regarding adverse effects and previous treatment and co-morbidities were not available. Socio economic status was not available for all patients.

Relevance of the study

This retrospective study produces information which can be utilized for better health care of MDR-TB patient

Authors Contribution

All authors have contributed equally.

Acknowledgement

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Tables

TABLE 1 PATIENT CHARACTERISTICS

Parameters	Total (3580)
Mean age in years	31.17 (95% CI 30.75-31.59)
Mean weight in kg (SD)	40.16 (95% CI 39.89-40.43)
Number of Males (%)	2391 (67%)
Number of females (%)	1189 (33%)
HIV reactive (%)	30 (1%)
Number of patients with R resistance (%)	3565 (99.6%)
Number of patients with H Resistance (%)	1825 (51%)

Figures

FIGURE 1 FLOW DIAGRAM

Drug resistant TB centre K.G.M.U

Total number of patients registered with demographic details

Cured
Treatment completed and three or more consecutive samples in continuation phase were negative including culture at the end of treatment

Treatment failure
Either treatment was terminatd or changed due to lack of culture conversion at the end of extended intensive phase or there was reversion in the continuous phase

Treatment completed
Completed treatment according to the protocol but there was no record of three or more culture negative after the intensive phase

Treatment Default
Treatment was interrupted for 2 or more consecutive months

Deaths during treatment
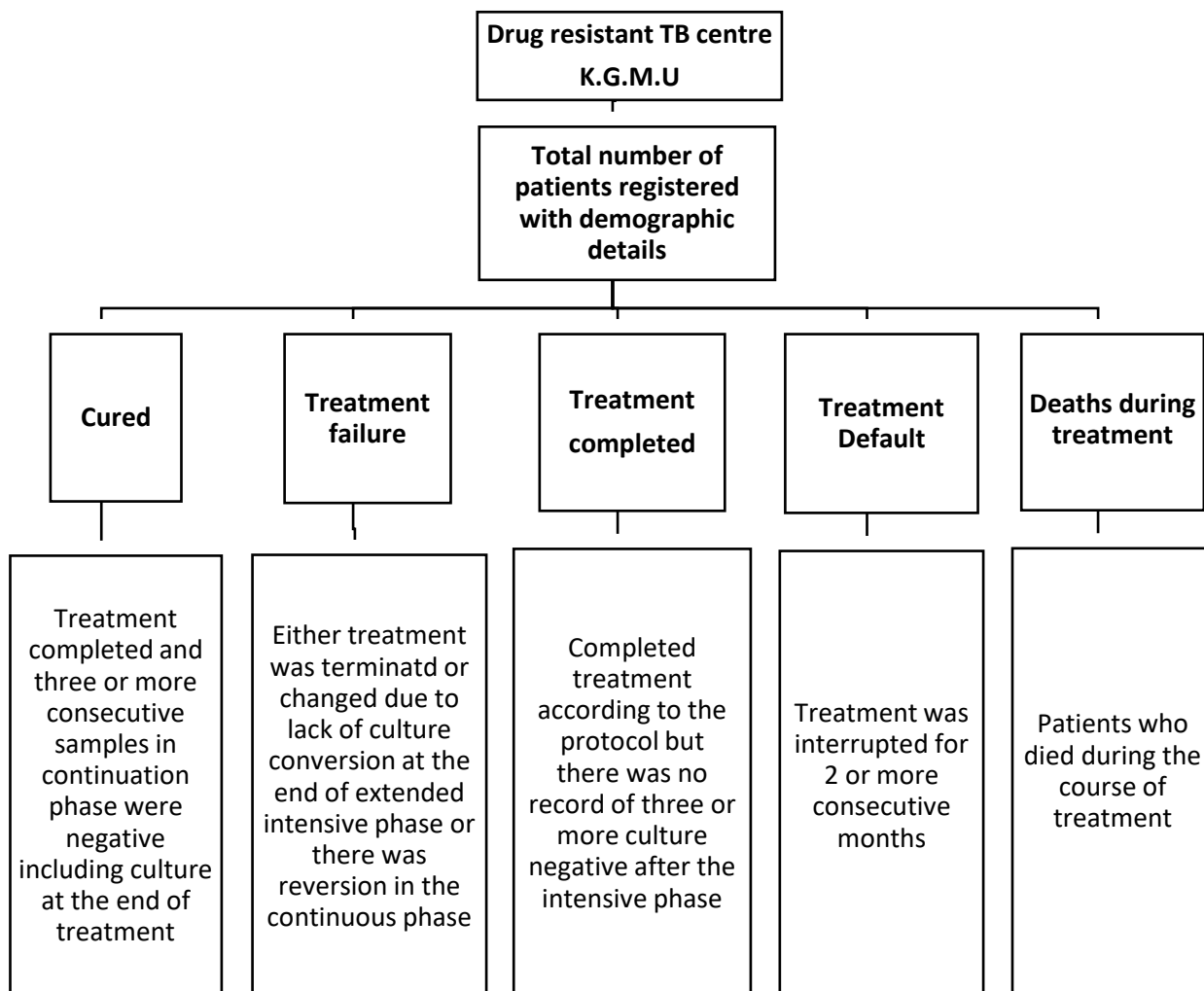Patients who died during the course of treatment
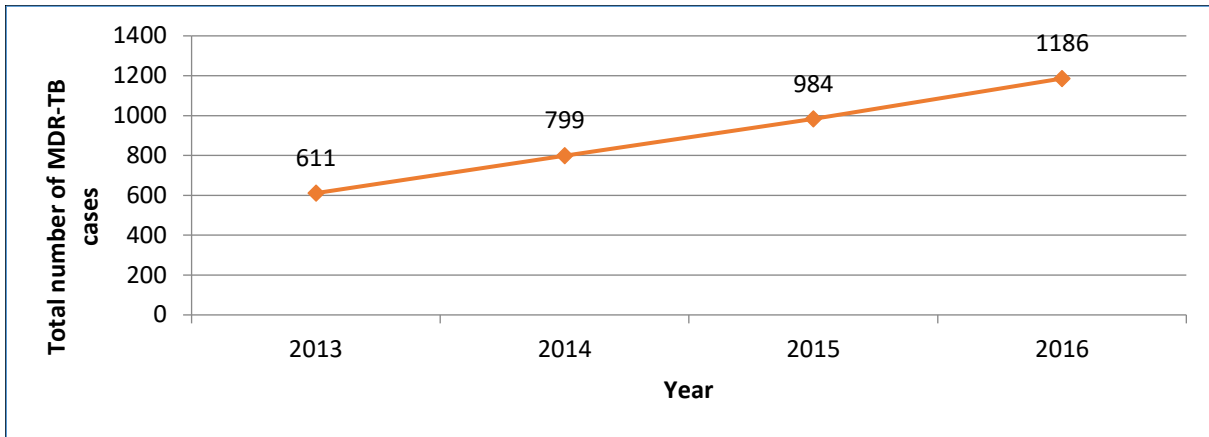
FIGURE 2 YEAR-WISE DISTRIBUTION OF MDR-TB CASES

FIGURE 3 TREATMENT OUTCOME OF MDR-TB PATIENTS FROM 2013-2016