The Journal of Community Health Management 2023;10(1):21–24

Content available at: https://www.ipinnovative.com/open-access-journals

The Journal of Community Health Management

Journal homepage: https://www.jchm.in/

Original Research Article

Employer led model for TB and diabetes care in BEST, Mumbai, India

Anilkumar Singal[1], **Rachana Vishwajeet**[2,*]

[1]*Brihanmumbai Electric Supply and Transport Undertaking (BEST), Mumbai, Maharashtra, India*
[2]*National TB Elimination Project, WHO Technical Support Network, Mumbai, Maharashtra, India*

ARTICLE INFO

Article history:
Received 17-01-2023
Accepted 17-02-2023
Available online 28-04-2023

Keywords:
Tuberculosis
TB
Diabetes Mellitus
DM
Workplace intervention
Employer led model

ABSTRACT

Introduction: BEST is a public sector enterprise in Mumbai providing transportation and electric supply services. Its 30000 employees receive health services from its network of dispensaries. Regular preventive and curative services are offered according to guidelines. It also runs all public health programs including National TB Elimination Program. It is established that Diabetes increases risk of TB and negatively impacts treatment outcomes.
Objective: To demonstrate Employer led model and intensified collaborative activities for TB and Diabetes care in BEST, Mumbai
Methodology: The is a description study with cross sectional design. All Diabetic employees were given awareness talks of benefits of early diagnosis and treatment of TB along with the risks and benefits of tests. 1127 Diabetic employees volunteered after verbal consent for clinical evaluation and Xray and participated in the study.
Results: Of the 1127 diabetics screened for TB through clinical examination and Xray, abnormality was detected in 11 patients. The sputum sample of these patients was sent for NAAT of which 1 patient came positive. Another patient whose sample was negative, demonstrated active signs of TB on further clinical evaluation. 2 patients were put on treatment and both patients have favourable outcome.
Conclusion: An integrated approach for TB-DM, implemented by the employer, where all DM patients were screened for TB has shown a significant impact on reduction in number of TB cases. BEST promotes organisations and advocates for policy to adopt their models and screen all diabetic patients for TB through clinical examination and X ray.

1. Introduction

TB is considered a social disease and has a devastating psychosocial and economic effect on affected people. It is a disease of international concern and a public health emergency. The Hon. Prime Minister of India has expressed a vison to eliminate TB from India by 2025, 5 years ahead of the United Nations Sustainable Development Goals of 2030. To fulfil PM's auspicious desire, in 2017 Central TB Division of India launched the National Strategic Plan 2017-2025, achieving a goal of "TB free India", with strategies under the broad themes of "Prevent, Detect, Treat and Build pillars.[1] To achieve this target in short span of time, it is required to explore new innovative approaches for early diagnosis.

It is established that Diabetes increases the risk of Tuberculosis[2] and negatively affects the treatment outcomes.[3] It also has a negative impact on immune response of TB patients[4] and mortality.[5] In 2019, WHO has prepared a collaborative framework for care and control of TB in Diabetes particularly for high burden diabetic countries. After China, India stands second for the

* *Corresponding author*.
E-mail address: rachana.vishwajeet@gmail.com (R. Vishwajeet).

https://doi.org/10.18231/j.jchm.2023.005

prevalence of Diabetes.[6,7] Mumbai is a major metropolitan city in India and is densely populated. It showcases huge burden of Diabetes as well as TB. Mumbai has reported more 60000 cases of TB in 2021, making the burden of TB more than 400 cases per lakh.[8]

Brihanmumbai Electric Supply and Transport Undertaking (BEST) is one of the largest public sector companies of India, serving people of Mumbai city since 1874. It provides safe, affordable, and efficient bus services to more than 3 million commuters on daily basis and provides un-interrupted power supply to more than 1 million consumers. BEST has deployed a team of more than 30,000 employees, majority of whom are working on field with direct contact and exposure from people, putting them at additional risks for infectious diseases. About 1400 employees of BEST are diabetic, aggravating the risk of developing active TB disease further.

To mitigate the impact of TB on employees, BEST has started "Standard of TB Care"[9] initiative since 2011 and has exhibited rigorous and sustainable efforts to screen and treat TB patients. The Central TB division has also established the Employer Led Model for Tuberculosis Care and Prevention in 2019 to alleviate occupational risks.[10] BEST has adopted, implemented, and demonstrated Employer led Model for TB care and embraced WHOs recommendations for screening and diagnosis. This study aims to demonstrate implementation of Employer led model for TB and intensified collaborative activities for TB and Diabetes care.

2. Methodology

It is a descriptive study with cross-sectional design. A comprehensive intensified case finding was planned by BEST under WHO's aforesaid recommendations[11] with support from Mumbai District TB Control Society of MCGM, between November 2021 to June 2022. 1400 Diabetic employees were counselled about importance of pulmonary health and regular screening of infectious diseases. They were given awareness talks of benefits of early diagnosis and treatment of TB and about National TB Elimination Program. They were made to understand the risks and benefits of tests. Out of 1400 employees, 1127 diabetic employees gave verbal consent to undergo clinical evaluation and Xray. All 1127 employees participated in the study. No sampling was done amongst the consented employees. Data was collected in predesigned pretested questionnaire. TB screening by clinical evaluation and Xary was carried at all 26 depots for the employees of BEST. Screening of TB was part of regular medical activity and was voluntary after consistent advocacy amongst employees. All employees showing abnormal lesions were further subjected to detailed clinical examination and sputum examination through NAAT. Data analysis was done using appropriate statistical software.

3. Result

BEST has more than 30000 employees who are given benefit of employer's medical dispensaries spanned across Mumbai. There are around 1400 employees of BEST who are diabetic. They are eligible to seek treatment from any of the BEST dispensary. All diabetic employees were counselled about importance of pulmonary health and regular screening for infectious diseases. A total of 1127 diabetic employees volunteered for screening including clinical examination, and Xray chest PA view. There were 11(1%) diabetic employees whose Xray showed abnormality. All employees with abnormal Xray were followed up and their sputum samples was collected for CBNAAT. The employees were also clinically evaluated to rule out any other respiratory disease. Of the 11 samples 10 samples came negative for Mycobacterium TB. 1 patient came positive for Mycobacterium TB and was put on treatment immediately.

On detailed exploration of medical history, 9 of 10 diabetic employees with abnormal Xrays gave previous history of TB disease. On further evaluation they did not show any signs and symptoms of active TB disease, nor did it indicate any evidence of reactivation. These employees were counselled for diet, lifestyle, and importance of control of Diabetes. They were also instructed about signs and symptoms of TB and seeking immediate medical advice if any associated symptoms of TB or any infectious disease develops. These employees are regularly monitored at BEST dispensaries. One diabetic employee with abnormal Xray did not give any history of TB. The Xray of this employee showed lower lobe lesions in the lung along with exhibition of active signs of TB. On further careful evaluation and ruling out other differential diagnosis this patient was put of empirical Anti TB treatment and is closely followed up. (Figure 1)

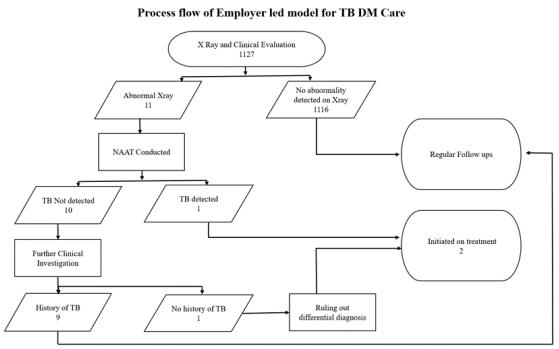

Fig. 1: Process flow of Employer led model for TB DM care in BEST, Mumbai

A total of 2 patients were put on Anti TB treatment immediately after diagnosis and closely monitored. Sound advice on diet, lifestyle, positive thinking, and counselling

was provided to these patients. They were also given benefit of sick leave of 180 days under the protocol followed by BEST. The patients demonstrated good adherence to treatment and showed significant improvement clinical and radiologically. One patient was considered cured as his microbiological confirmation was possible, while the other was considered as Completed treatment according to predefined definition of NTEP making both outcomes favourable at the end of treatment.

4. Discussion

BEST has a presence of medical officers in 26 depots. Most of the employees of BEST seek treatment at these dispensaries for their ailments. BEST runs all the national programs through these dispensaries. Medical facilities at BEST follow an integrated approach, where all diseases are treated under one roof. BEST has a close collaboration with Brihanmumbai Mahanagar Palika. If a patient requires further investigation or specialised treatment, they are further referred to any Brihanmumbai Mahanagar Palika Medical college or hospital. BEST has adopted many public health programs and implemented it for its employees. It has further promoted workplace interventions. It promotes well being of its employees and conduct routine screening camps for early diagnosis and treatment. Diabetes is one of the diseases which is managed at BEST dispensaries. A holistic approach is adopted by BEST for management of diabetes, which also includes prevention and treatment of infectious diseases including Tuberculosis as per National framework for joint TB-Diabetes collaborative activities.[12]

BEST has a total of 1400 diabetic employees, who are on treatment. WHO recommendations[11] of intensified screening of these employees was planned at their respective workplaces spanned across Mumbai over the period of November 2021 to June 2022. After repeated counselling 1127 employees volunteered for Xray and further clinical evaluation for lung health. Standard of TB care in India and PMDT guidelines 2021 highlighting the integrated diagnostic and treatment algorithm[13] were carefully followed for appropriate diagnosis and treatment of TB. 1127 diabetics volunteered for screening is credited to the fact that BEST has implemented workplace intervention and as employer led model successfully consistently for TB diagnosis and care.

From the entire exercise 2 diabetic employees were diagnosed as TB and immediately started on treatment. Both these employees had not sought active medical care as they did not have any symptoms of TB, thus their diagnosis was purely attributed to the screening activities of BEST.

With intensified case finding of BEST, 2 TB patients were diagnosed, who would have gone undiagnosed otherwise. As one of them was bacteriologically confirmed pulmonary, it posed to be of infectious potential.[14] Early diagnosis has potential to not only help the TB patient with initiation of appropriate regimen but also restricts the spread of infection further. Both these employees demonstrated successful outcomes, and this is also attributed to early diagnosis and treatment initiation.[15] Metanalysis has shown that diabetic people have a 1.5-fold increased risk of developing active TB vs. those without DM.[16]

In the entire exercise only 2 patients came positive for TB, among 1127 diabetics, which when roughly generalised to one lac diabetics comes to 177. The burden of TB in Mumbai in general population is 400 per lac.[8] Through 2015 to 2021, BEST identified a total of 395 TB cases and has shown a 55% reduction in incident cases. However, the percentage of TB patients having Diabetes has increased from 2015 to 2021 from 28% to 51%. (Figure 2) This low number of TB patients amongst diabetes patients is credited of the rigorous, regular, and sustained medical services provided by BEST. A holistic workplace intervention with integration of TB-Diabetes collaborative activities has successfully affected the incidence of TB in diabetic BEST employees.

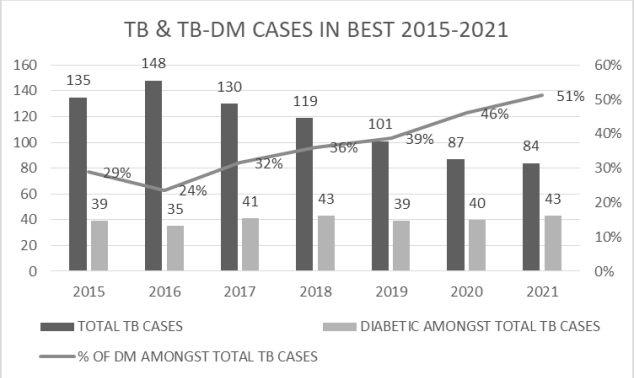

Fig. 2: Trend of TB and TB-DM cases in BEST, 2015-2021

5. Conclusion

BEST model for TB-DM collaboration has demonstrated successful reduction of TB cases amongst their employees. It has also demonstrated the success of an employer led model and showcased that if organisations take up the health aspect of its employees, especially infectious disease like TB amongst its vulnerable groups, then the incidence of TB significantly reduces and improves outcome of diagnosed patients. BEST promotes other organisations to adopt the Employer led model, TB-DM collaborative activities. It also advocates undiluted implementation of Standards of TB care of India and strategies documented in National Strategic Plan 2017-2025. In the backdrop of aforesaid observation, it is suggested to screen TB among Diabetic patients with clinical examination, X-ray/ Sputum examination/ IGRA Test at regular intervals to accelerate National TB Elimination Program 2025.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. National Strategic Plan for Tuberculosis Elimination 2017–2025. New Delhi: Central TB Division; 2017. Available from: https://tbcindia.gov.in/WriteReadData/NSP%20Draft%2020.02.2017%201.pdf.
2. Jeon CY, Murray MB. Diabetes mellitus increases the risk of active tuberculosis: A systematic review of 13 observational studies. *PLoS Med*. 2008;5(7):e152.
3. Baker MA, Harries AD, Jeon CY, Hart JE, Kapur A, Lönnroth K, et al. The impact of diabetes on tuberculosis treatment outcomes: A systematic review. *BMC Med*. 2011;9(1):81. doi:10.1186/1741-7015-9-81.
4. Wei R, Li P, Xue Y, Liu Y, Gong W, Zhao W. Impact of diabetes mellitus on the immunity of tuberculosis patients: A retrospective, cross-sectional study. *Risk Manag Healthc Policy*. 2022;15:611–27.
5. Mave V, Gaikwad S, Barthwal M, Chandanwale A, Lokhande R, Kadam D, et al. Diabetes mellitus and tuberculosis treatment outcomes in Pune, India. *Open Forum Infect Dis*. 2021;8(4):ofab097.
6. Mohan V, Pradeepa R. Epidemiology of type 2 diabetes in India. *Indian J Ophthalmol*. 2021;69(11):2932–8.
7. Mathur P, Leburu S, Kulothungan V. Prevalence, awareness, treatment and control of diabetes in India from the Countrywide National NCD Monitoring Survey. *Front Public Health*. 2022;10:748157.
8. Nearly 60,000 TB cases recorded in Mumbai in 2021; marginal decline from pre-COVID days; 2022. Available from: https://economictimes.indiatimes.com/industry/healthcare/biotech/healthcare/nearly-60000-tb-cases-recorded-in-mumbai-in-2021-marginal-decline-from-pre-covid-days/articleshow/90444714.cms?from=mdr.
9. Standards of TB care in India. New Delhi, India: WHO; 2014. Available from: https://tbcindia.gov.in/showfile.php?lid=3061.
10. Employer Led Model for Tuberculosis Care and Prevention, Operational Guidelines. New Delhi: Central TB Division; 2019. Available from: https://tbcindia.gov.in/WriteReadData/Reach%20ELM%20Operational%20Manual.pdf.
11. WHO operational handbook on tuberculosis: module 2: screening: systematic screening for tuberculosis disease. Geneva: World Health Organization; 2021. Available from: https://www.who.int/publications/i/item/9789240022614.
12. National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS). National framework for joint TB-Diabetes collaborative activities; 2017. Available from: https://main.mohfw.gov.in/sites/default/files/National%20Framework%20for%20Joint%20TB-Diabetes%20Collaborative%20Activities_1.pdf.
13. Guidelines for Programmatic Management of Drug Resistant Tuberculosis in India. New Delhi: Central TB Division; 2021. Available from: https://tbcindia.gov.in/showfile.php?lid=3590.
14. Acuña-Villaorduña C, Ayakaka I, Schmidt-Castellani LG, Mumbowa F, Marques-Rodrigues P, Gaeddert M, et al. Host determinants of infectiousness in smear-positive patients with pulmonary tuberculosis. *Open Forum Infect Dis*. 2019;6(6):ofz184.
15. Maitra A, Kamil TK, Shaik M, Danquah CA, Chrzastek A, Bhakta S, et al. Early diagnosis and effective treatment regimens are the keys to tackle antimicrobial resistance in tuberculosis (TB): A report from Euroscicon's International TB Summit. *Virulence*. 2016;8(6):1005–24.
16. Hayashi S, Chandramohan D. Risk of active tuberculosis among people with diabetes mellitus: Systematic review and meta-analysis. *Trop Med Int Health*. 2018;23(10):1058–70.

Author biography

Anilkumar Singal, Chief Medical Officer https://orcid.org/0000-0002-5146-2833

Rachana Vishwajeet, Medical Consultant (Field) https://orcid.org/0000-0003-4451-7397

Cite this article: Singal A, Vishwajeet R. Employer led model for TB and diabetes care in BEST, Mumbai, India. *J Community Health Manag* 2023;10(1):21-24.