



Public Health Strategy of Tuberculosis in Bangladesh: A Review Update



Rabeya Mashferat Mary¹, Jahid Hasan²

¹Medical Officer (Bangladesh Rural Advancement Committee, Bangladesh), Student, Masters of Public Health (University of Chester, United Kingdom), Mental Health Support Worker, Meadow Park Independent Hospital, United Kingdom; ²Student, Bachelor of Medicine & Bachelor of Surgery (Uttara Adhunik Medical College & Hospital, Bangladesh), Mental Health Support Worker, Alternative Futures Group, United Kingdom

Abstract

Tuberculosis is a major public health concern in Bangladesh. Government struggles financially to establish treatment centers despite getting financial aids from NGOs. The high number of tuberculosis deaths in Bangladesh results from delays in the treatment process. Increased funding to allow the purchase of more drugs is a vital requirement to be facilitated by the Government of Bangladesh treasury. Strong-collaboration with WHO and international NGOs offering to help the TB incidences treatment in Bangladesh. [*Bangladesh Journal of Infectious Diseases, December 2024;11(2):160-165*]

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Correspondence: Dr Rabeya Mashferat Mary, Medical Officer (Bangladesh Rural Advancement Committee, Bangladesh), Student, Masters of Public Health (University of Chester, United Kingdom), Mental Health Support Worker (Meadow Park Independent Hospital, United Kingdom); **Email:** drmary108@gmail.com; **ORCID:** <https://orcid.org/0000-0002-0348-7550>
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Introduction

The origins of tuberculosis in humans can be traced back 9,000 years to Atlit Yam, a city that is now submerged beneath the Mediterranean Sea off the coast of Israel. Dr. Robert Koch announced discovery of *Mycobacterium tuberculosis* on March 1882. Tuberculosis, usually abbreviated as tuberculosis, is an airborne disease. It is caused by a bacterium known as *Mycobacterium tuberculosis*. Exploring "Tuberculosis in Bangladesh" contributes to the existing knowledge of Tuberculosis as a prevalent disease in Bangladesh.

Tuberculosis is threat to Bangladesh's health and social-economic aspects. Bangladesh is ranked seventh in the 30 high tuberculosis burden countries. The research is educative to the

Bangladeshis and the global community in understanding the population in threat. The national tuberculosis program/schemes and WHO can find the discussion on this topic relevant in devising measures to stop tuberculosis. Symptoms including cough, which takes more than three weeks, bloody sputum, chest pain, Unintentional weight loss, fatigue, fever, loss of appetite.

Biomedical Features

Mycobacterium tuberculosis is spread through the air by aerosolized particles. If someone inhales droplet nuclei containing *Mycobacterium tuberculosis* and those droplet nuclei travel through the mouth or nasal passages, upper respiratory tract, and bronchi to reach the alveoli of their lung, they have contracted tuberculosis (TB). Mainly it attacks

the lungs and can spread to other parts of the body. There exist prevention and cures for tuberculosis. Bangladesh's situation has slow progress in reducing TB infection per year. Bangladesh was part of the United High-Level Tuberculosis Meeting (UNHLM) that sought to increase TB diagnosis and treatment within 2020-2035^{1,11}.

The UNHLM targets Bangladesh to increase the treatment of TB by 45.0% cases. Bangladesh has adopted the "End TB" goals aiming to reduce tuberculosis -related deaths by 95.0% cases. It may become a challenge to manage the mass population infected with tuberculosis, considering the population of Bangladesh is still growing. Taking a long to start treatment for tuberculosis as most of the patients are diagnosed at late stages. Rural people prefer the presence of informal healthcare services because of culture and beliefs. Awareness failure as there are few programs running tuberculosis treatment campaigns. Tuberculosis medication is free in Bangladesh but most of the people do not know about this and they think it is expensive treatment. As a result, they do not go to hospital and do not take treatment and it is one of the vital causes to increase tuberculosis infection. Bangladesh is one of the most densely populated country. Most of the people are living with congested area like Dhaka⁴. Because of the large number of patients, the limited number of available beds, the length of the treatment procedure, and the lack of patient monitoring tools, the hospital is experiencing significant strain.

General details of Bangladesh Demography

Bangladesh has a total population of 167 million people per the latest UN data/world meter. The Bangladesh population represents 2.11% of the total global population^{7,17}. The life expectancy is 73.57 years for both genders, while separately is 75.6 and 71.8 years for females and males, respectively. High adolescent fertility rates, poor usage of family planning programs are the major factors that contributed to the continued growth rate^{8,17}. 38.6% of the population live in urban areas. Dhaka is the most densely populated city with over 10 million residents, followed by Chittagong city. Globally, the Bangladesh population is ranked position 8.

Demographic Characteristics: Demography and Population Issues of Tuberculosis

The population of interest in this report is those in latent and active tuberculosis conditions in Bangladesh. climatic conditions, genetics, urban

settlements, economic classes, and social beliefs, among other, exposes some groups to higher vulnerability than others. In economic analysis, Bangladesh, 63.5% of its population are above 15 years and economically active^{9,28}. Any outbreak of diseases affecting the economically active group is a threat to Bangladesh's GDP^{12,13}. High congestion in towns makes the urban dwellers more vulnerable to airborne/infectious diseases¹⁵.

TB Demographic Factors in Bangladesh

People living in poverty are also a concerned group of the population because they live in congested poor conditions that increases chances of infecting and contracting tuberculosis. Bangladesh national data, people living in rural areas most of them are unemployed living within the poverty range¹⁶. The health systems in Bangladesh are insufficient and expensive to establish¹⁹. This poses a great challenge to epidemiology, especially with the outbreak of diseases. Children, due to poor immunity, are vulnerable to diseases. Proper care and early detection of tuberculosis are recommended for children to fight the disease. In this case, the use of congested public means of transport is a special concern and a characteristic of demographic concern.

Epidemiology for TB: Epidemiology for TB in Bangladesh

Bangladesh is among the High tuberculosis burden nations, with an incidence estimate of 221 per 100 000 and 24 per 100,000 persons with tuberculosis -related mortality rate. 360,000 people were infected with tuberculosis, of which 30,000 were children under 15 years^{10,21}. Annually above 75,000 tuberculosis deaths are recorded. 80.0% of the tuberculosis in Bangladesh is pulmonary tuberculosis. most deaths of tuberculosis patients are associated with underlying health issues of HIV, cancer, and kidney failure, among other chronic disease. Low funding for the health sector is the primary challenge to curb tuberculosis incidences.

Global Tuberculosis Epidemiology

According to 2019 WHO reports, about 10 million people are tuberculosis infected. Out of the population living with tuberculosis bacteria, around 79.0% cases are all from tuberculosis high burden nations. Bangladesh contributes 3.6% cases of the total tuberculosis infected population worldwide. About 95% of tuberculosis infections are from developing countries associated with poor health

Table 1: TB Disease Burden of Bangladesh, Indonesia and Philippines, 2017

Country	Prevalence all forms all of ages*	Prevalence of smear + TB 15+*	Prevalence of BCTB +*	Incidence all forms**	MDR/RR TB among Pulmonary**	Incidence Child TB (0-14)**
Bangladesh	429,800	134,000	340,900	364,000	5800	35,000
Indonesia	1,742,000	506,800	1,502,800	842,000	12,000	49,000
Philippines	1,018,000	305,300	815,300	581,000	20,000	71,000

Source: <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-08675-9/tables/1>

systems ⁶. Most tuberculosis cases are found in the East Asian region, the African continent. resistance cases are recorded, especially when the anti-tuberculosis drug is inappropriately administered.

Burden of TB in Bangladesh

Tuberculosis has great social, economic impacts on individuals, households, concerned countries, and the world. tuberculosis is among the top ten diseases with the highest-burden globally. The tuberculosis multi-drug resistant (MDR-TB) experience in Bangladesh increased the burden.

Economic Burden: Government struggles financially to establish treatment centers despite getting financial aids from NGOs. Families with TB incidences bear the cost burdens when maintaining the health conditions for tuberculosis patients. The Bangladeshi tax money goes to the NTP and DOT programs impacts both the individual economy and Bangladesh's GDP.

Social Burden: There is a stigma that psychologically deprives the patients. they are likely to isolate and fail to seek treatment as the tuberculosis treatment guidelines require. Some communities tend to discriminate the tuberculosis incidences since they are airborne. There is the burden of bereavement when a family loses a member from tuberculosis incidence.

Epidemiology and Causation

The tuberculosis epidemiology in Bangladesh is unique but similar to the burden- tuberculosis countries. The high number of tuberculosis deaths in Bangladesh results from delays in the treatment process. Adults are the most infected with tuberculosis because of exposure to transmission agents or environments^{14,24}. The means of transport, especially the public transport service (PSV), are the primary causation of the transmission of tuberculosis to Bangladesh. when many latent

tuberculosis lives untreated, there are high chances of transmission.

Health and Risk Determinants of Tuberculosis Epidemiology in Bangladesh

In urban areas such as Dhaka, tuberculosis incidences are high because of high congestion considering tuberculosis is airborne ^{3,25}. Like the Covid-19 pandemic, tuberculosis epidemiology is high in densely populated. There are challenges of the low turn up of dwellers seeking tuberculosis diagnosis. People living in poverty experience a great burden, and it is likely to lead to more deaths. This is because of lack of exposure, tuberculosis knowledge, and unaffordability to seek tuberculosis treatment.

It is observed that men are a high prevalence of tuberculosis in Bangladesh, and on the global level, which is epidemiology attributed to more men involved in smoking. Global tuberculosis experts confirm that smoking can trigger the tuberculosis burden because of the high level of exposure. Strong immune in adolescents and the youths in Bangladesh is causation to explain the tuberculosis epidemiology. The existence of an underlying health issue is a risk factor. proper treatment of the underlying health issues helps risk the risk factor.

Epidemiology Triad

Hosts: About 360 000 people in Bangladesh are hosts of the tuberculosis bacteria, and 30,000 are children^{23,26}. Around 75,000 deaths are recorded annually, meaning the rate of infection per year equals deaths. The severely affected are the low-income earners who lack knowledge and funds about tuberculosis treatment and the NTP scheme.

HIV and Diabetes populations have a high prevalence of tuberculosis infections as they have weak immunity^{22,27}. Smokers and people exposed to extreme cold conditions suffer from tuberculosis also hosts.

Agents: Tuberculosis is an airborne prevalence caused by bacteria, and the lung is the major human host. It is transmitted through the air where tuberculosis infected person can infect others when they cough and germs spit out⁵. It is revealed that a third of the world's population lives with tuberculosis but is in a latent state. There exist prevention and cure measures approved by WHO.

Antimicrobial medicines are used to treat tuberculosis where the patient requires to take 6 months' dosage. However, there are cases of multi-resistant tuberculosis, where the bacteria develop resistance to the available drugs.

Environment: Urban areas lead by Dhaka city are among the major environmental factors contributing to the spread of tuberculosis because of the congestion²⁰. Cold weather, especially in highlands are primary environment favorable for tuberculosis spreading. A weak immune system and underlying health issues like HIV and Diabetes constitute the biological environment that triggers the growth and host of tuberculosis in Bangladesh.

Poverty and poor healthcare amenities accompanied by high treatment costs for pulmonary diseases are social-economic environments associated with tuberculosis in Bangladesh.

Public Health Intervention for TB in Bangladesh

Both national and global agencies are available to fight against tuberculosis in Bangladesh. NTP is the government-funded Bangladesh national scheme to deal with tuberculosis. It also keeps a consistent supply of tuberculosis drugs and manages MDR-TB cases².

Direct Observed Treatment Short-course (DOTS)

This program endorsed by WHO to help in the intervention of TB. It creates awareness of TB and its public health threats, urging people to check and immediately start treatment. DOTS is available in all public healthcare facilities to promote social-economic understanding of TB.

Bangladesh Rural Advancement Committee (BRAC)

This is a community-oriented program affiliated with TB interventions. Primary objective is offering social-economic support to the rural dwellers through donations collected¹⁸.

Policy and Strategic analysis for TB in Bangladesh

The government of Bangladesh (GoB) is the patron of the strategic health policies in Bangladesh. The GoB initiated NTP as the national program to deal with tuberculosis incidences. NTP further established a National strategic plan (NSP) specifically to deal with tuberculosis. NSP is a visionary strategic plan to run from 2021-to 2025 and develop innovative measures to curb the spread of tuberculosis. GoB, together with USAID, are the primary financiers. There is also a policy on MDR-TB medication that Bangladesh has championed to delocalize the MDR- tuberculosis treatment. The MDR-TB strategy seeks to ensure the availability of tuberculosis drugs and establish an electronic reporting system. WHO has a strategy reached during the UNHLM to stop the existing tuberculosis partnerships. UNHLM is a long-term strategic vision seeking to decrease tuberculosis deaths by 95% by 2035.

Policy and Strategy Analysis

NSP uses the BRAC programs to sensitize the community about TB and its related burdens. UNHLM is working on its goals, but the emergency of the Covid-19 pandemic diverted its goals. There is still sufficient time to reorganize, considering it is a long-term strategy. GoB is still playing its role in the implementation and facilitation of monitoring of the NTP programs. There are limitations of funds and the community's resistance to TB treatment due to fear of stigma or discrimination.

Limitation of this Research: This research is based on valid data sourced from the WHO, NTP website and reviewed article journals. Multiple data have been compared when presenting these findings. The NTP website and WHO are the primary source of data used throughout this report. All the researchers who authored issues about tuberculosis agree it is a communicable disease posing a global threat to the health sector. The existing literature shows many programs to deal with tuberculosis. The research also banked on data from the 30-burden- tuberculosis countries, which have the same characteristics as Bangladesh.

Primary Challenges Encountered

There is a slight variation in the data available in WHO and NTP but not in all the cases. This report covers only tuberculosis research. Hence, it cannot be used in deriving policies and deciding on other

diseases cases such as Covid-19 and malaria. The report findings do not apply to other countries like the USA and European countries because they are tailored for Bangladesh. Some published academic materials are not reviewed despite appearing in international professional journals.

Discussion

It is necessary to tap the current technology and introduce quick equipment to diagnose tuberculosis in all types of healthcare. Increasing its budget to support the purchase of tuberculosis detecting machines in all rural hospital facilities. BRAC and NTP can use local media to orchestrate a tuberculosis campaign that should run for a long period. Introducing an electronic tuberculosis data system can help to improve the timely data of tuberculosis. The government can impose mandatory medication for all tuberculosis cases. Introducing tuberculosis -centered hospitals.

Recommended Vital Changes Bangladesh to Adopt

Increased funding to allow the purchase of more drugs is a vital requirement to be facilitated by the Gob treasury. Increasing tuberculosis medication centers, including the MDR-TB, is a positive approach in the fight against tuberculosis in Bangladesh. The GoB introduced a policy to exempt tax levies for the tuberculosis drugs imported by private practitioners. Embracing the public-private partnership in tuberculosis programs. Increase counselling to mid-level health workers (BRAC health worker).

Recommendations

The tuberculosis strategies should be reviewed and evaluated to track the effectiveness. Therefore, frequent revision can help to identify the drawbacks. Strong collaboration with World Health Organization (WHO) and international NGOs offering to help the tuberculosis incidences treatment in Bangladesh. Decongestion of urban areas is recommended to avoid the spread of tuberculosis to slum dwellers. Telemedicine Consultation by health care workers (BRAC health care worker has done a great job during COVID-19). Creating patient profile and updating the data.

Conclusion

Bangladesh is among the 30 high burden-tuberculosis countries, contributing 3.6% of

tuberculosis incidences. Tuberculosis incidence in Bangladesh is not a health threat but also negatively affects the social-economic aspects. Urban centers, particularly Dhaka, have the largest tuberculosis incidence caused by high congestion. Poverty contributes to growth and resistance in the fight against tuberculosis cases because live in congested and poor conditions that exposes to contraction of tuberculosis. NTP and WHO are the primary national and international bodies, respectively, intervening in Bangladesh's tuberculosis incidences.

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Conflict of Interest

We do not have any conflict of interest.

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ORCID

Rabeya Mashferat Mary: <https://orcid.org/0000-0002-0348-7550>
Jahid Hasan: <https://orcid.org/0009-0004-8283-1226>

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