

Management Practices and Treatment of Tuberculosis in Nigeria: A Review

Uzum, D.S., Oghene, U. J., Achuba, I and Efe-Eyefia K

Faculty of Science, Department of Biological Sciences, Dennis Osadebay University, Asaba, Delta State, Nigeria.

Corresponding address: abraham.iwegbu@dou.edu.ng

Abstract: Tuberculosis (TB) remains one of the leading causes of morbidity and mortality from infectious diseases in Nigeria and countries of the world. The disease is a serious burden and growing trend in Nigeria along with its population. Nigeria has the sixth highest TB burden globally, with an estimated 4.3 per cent multi-drug resistance in new cases. Despite the availability of effective chemotherapy, TB control continues to be challenged by HIV co-infection, socio-economic determinants, and the emergence of drug-resistant strains. The disease is caused by *Mycobacterium tuberculosis*. It primarily affects the lungs but may involve extra-pulmonary sites. This review critically examines contemporary strategies for the management and treatment of tuberculosis, emphasizing evidence-based pharmacological regimens, management of drug-resistant TB, treatment monitoring, and preventive interventions, in line with global guidelines as of 2023.

Keywords: Tuberculosis; TB management; multidrug-resistant TB; public health; interventions

1. Introduction

The foundation of the current global tuberculosis (TB) strategy was established in 1994 with the launch of the directly observed treatment short-course (DOTS) strategy after the declaration of tuberculosis as a global public health emergency by the World Health Organization in 1993. The main objective of the DOTS strategy was to it meets the global projection set in 1991 by a World Health Assembly resolution to cure 85% of smear-positive patients under treatment and detect 70% of cases by the year 2000. It is creating more global attention, and it is a research domain that is worth investigating (Sunday, et al. 2023). Tuberculosis remains a chronic air borne infectious disease transmitted through inhalation of droplet nuclei containing *Mycobacterium tuberculosis*. It has been a major health concern, particularly in low and middle-income countries. According to a recent study, a significant proportion of patients undergoing tuberculosis treatment experience such adverse events, including gastrointestinal disturbances (49.6%), psychiatric symptoms (39.3%), dermatological symptoms (27.7%), arthralgia (49.2%), headaches (24.8%), hyperuricemia (19%), the most serious being hepatotoxicity (Nwaolai and Omoruyi, 2025). These complications can increase the pill burden and further complicate treatment. However, while these adverse events occur in approximately 82% of patients, they do not necessarily impact the overall effectiveness of tuberculosis treatment (Shah et al., 2024). According to the World Health Organization (WHO), TB was responsible for over 1.3 million deaths globally in 2022, reaffirming its status as a leading cause of death from a single infectious agent (WHO, 2023). The persistence of TB is closely linked to HIV infection, malnutrition, poverty, overcrowding, and limited access to healthcare services. The disease mostly affects the lungs and could be fatal if not treated properly. It may also affect the bones, spines, brain, lymph glands and other part of the body.

With a 2017 estimated population of 182 million people, Nigeria is the most populous country in Africa (WHO, 2018). It ranks sixth among the countries with the highest TB burden in the world and is included in the three lists of 30 high burden countries (HBC) compiled by World Health Organization (WHO) for TB, TB/human immunodeficiency virus (TB/HIV), and multi-drug resistant TB (MDR-TB); for the period 2016–2020. Each of these lists accounts for about 90% of the global burden (WHO, 2018). Nigeria is one of the 14 countries that appeared in all the three lists. It reported 418,000 incident TB cases in 2017 (incidence rate: 219/100,000 population). TB was successfully treated in 86% of all cases registered in the country in 2016, and approximately 155,000 people died from it in 2017. The country has an MDR-TB/RR-TB prevalence of 4.3 and 25% among new cases and previously treated cases respectively (WHO, 2018).

About a quarter of the global population is estimated to have been infected with TB bacteria, however, most infected individuals show no disease symptoms and it is agreed by WHO that one third of the world population is said to have been infected. Many people with TB have inactive TB which means that the bacteria are in the body but not making them sick. Where there is no treatment, inactive TB can become very active later in life. Active TB disease can be life-threatening, , but it is curable when medication is taken as directed. Tuberculosis being an opportunist infection associated with HIV Aids can also be attributed to pathogens that cause mild illness in healthy individuals but lead to more serious illness when given the opportunity to take an advantage of a immune compromised host (Caballero and Polack, 2018). Tuberculosis are known to be associated with respiratory and central nervous system with opportunistic infection including meningitis, Human Immuno Virus as well as other numerous other infectious pathogens (Brunchfeld et al., 2015; Tenforde et al., 2018). In Nigeria despite a relatively wee funded and functional national control program, this infectious disease remains a pressing public health issue. The disease burden posed by the infectious pathogens in Nigeria is considerably high and the epidermic continues unabated; much of it is fuelled by high prevalence rate of HIV (Okpara, et

al., 2025). This review provides a high level insight synthesis of current knowledge on the management and treatment of tuberculosis, integrating clinical, pharmacological, and public health perspectives.

2. Etiology and Pathophysiology

Tuberculosis is caused by *Mycobacterium tuberculosis*, a slow-growing, acid-fast bacillus with a lipid-rich cell wall that contributes to its virulence and resistance to host defenses. Following inhalation, bacilli reach the alveoli, where they are phagocytosed by macrophages. In most immune-competent individuals, a cell-mediated immune response leads to containment of the infection, resulting in latent TB infection (LTBI). However, immune compromise ailments such as HIV infection and diabetes mellitus may allow progression to active TB disease characterized by granuloma breakdown, tissue necrosis, and systemic dissemination (Kumar et al., 2021). Abdulkadir et al. (2020) reported that besides mycobacteria, numerous studies report frequent isolation of common bacterial pathogens including *Streptococcus pneumoniae*, *Staphylococcal* species, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and even *Proteus* species from TB patients. These organisms complicate clinical management through various mechanisms of pathogenicity and antimicrobial resistance. One particular research strongly suggests a relationship between age distribution and co-infection rates, with older TB patients being more susceptible than their younger counterparts. Some disease conditions that create a florid atmosphere for TB disease to thrive are:

1) Diabetes [high blood sugar].

2) Weakened immune system (for example from HIV).

3) Undernutrition

4) Tobacco use

5) Harmful use of alcohol. Other prominent risk factors for TB include the following: people who recently spent time with someone who has active TB disease, people who were born in or frequently travel to countries where TB is common, including some countries in Asia, Africa and Latin America, people who live or used to live in groups settings where TB is more common, such as homeless shelters, prisons or jails, People who work or reside in facilities where TB is more likely to spread, such as hospitals, homeless shelters, correctional facilities, and nursing homes, people who have a weaker immune system because of certain medications or health conditions such as diabetes, cancer and HIV. Some people with weakened immune systems are at very high risk for developing active TB disease once infected with TB germs. It's important that these individuals receive treatment for inactive TB to prevent the development of active TB disease. Older men are reported to be more vulnerable, especially those with preexisting conditions like high blood pressure, exhibiting more severe lung damage visible on scans and worse breathing difficulties than COVID-only cases (Song et al., 2021).

In most cases, people with Tuberculosis infection don't feel sick and only a small fraction of person who got infected with TB will normally get TB disease and subsequent development of symptoms, but infants are at higher risk of subsequent development of the disease when infected. The disease occurs when bacteria multiply in the body and affect the functional capability of the organ. Its symptoms ranges from being mild for many months, hence it is easy to spread without the person knowledge and again symptom is dependent on the part of the body affected, The disease is commonly known to affect the lungs but it can also affect the brain, kidney and spine. Some persons do not exhibit symptoms but can spread the disease. Known symptoms of the disease include; prolonged cough (often with blood), chest pain, weakness, fatigue, weight loss, fever, night sweating etc (Okpara et al., 2025).

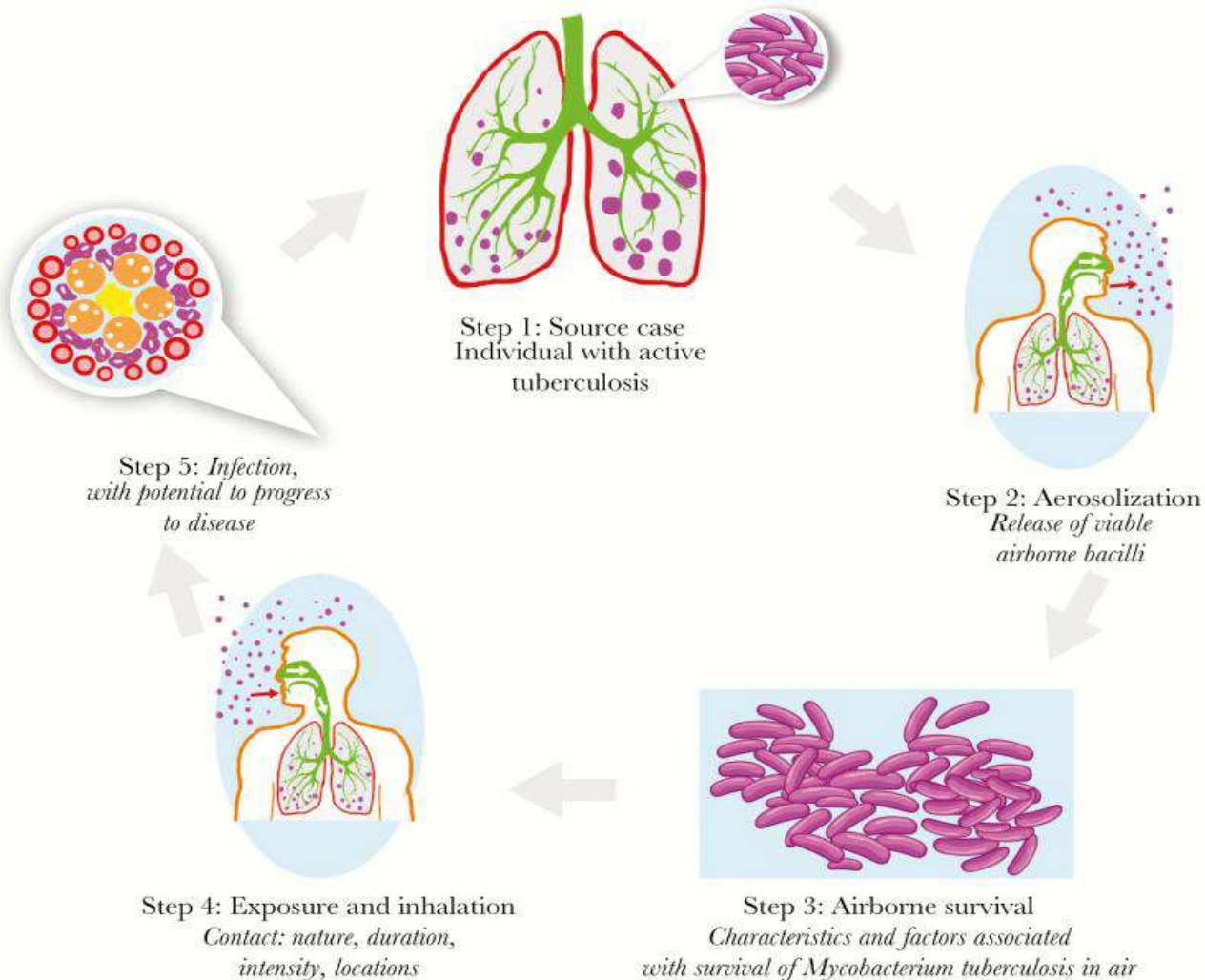


Figure 1: Transmission of Tuberculosis (Source: Churchyard et al., 2017).

3. Diagnosis of Tuberculosis

Timely and accurate diagnosis is central to effective tuberculosis management. Nigeria has the highest burden of tuberculosis (TB) in Africa and ranks 6th globally. The country has an estimated incidence rate of 219 cases per 100,000 population. Active efforts by the National Tuberculosis and Leprosy Control Program (NTBLCP) have significantly increased case detection, with over 510,000 cases reported recently. Current diagnostic modalities include:

- Sputum smear microscopy for acid-fast bacilli, which remains widely used in resource-limited settings (CDC, 2023).
- Molecular assays such as GeneXpert MTB/RIF, which enable rapid detection of *M. tuberculosis* and rifampicin resistance (WHO, 2023).
- Mycobacteria culture; the gold standard for diagnosis and drug susceptibility testing. Chest radiography to evaluate pulmonary disease extent and complications.
- Tuberculin skin test (TST) and interferon-gamma release assays (IGRAs) for the diagnosis of latent TB infection, Benito et al. (2012).

4. Management of Drug in Susceptible Tuberculosis

The treatment of drug-susceptible Tuberculosis relies on standardized combination chemotherapy to achieve bacteriological cure and prevent resistance.

4.1 Intensive Phase

The intensive phase consists of a four-drug regimen administered for two months – isoniazid, rifampicin, pyrazinamide and ethambutol.

This phase rapidly reduces the mycobacterial burden and decreases infectiousness (Longo et al., 2022).

4.2 Continuation Phase

The continuation phase involves isoniazid and rifampicin for an additional four months, targeting persistent bacilli and reducing relapse risk. Treatment adherence is critical, and the WHO-endorsed Directly Observed Treatment Short-Course (DOTS) strategy remains a cornerstone of Tuberculosis control (WHO, 2023).

5. Management of Drug-Resistant Tuberculosis

Drug-resistant TB, particularly multidrug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB), represents a significant clinical and public health challenge. MDR-TB is defined as the resistance to at least isoniazid and rifampicin. Current management strategies emphasize:

- All-oral regimens incorporating newer agents such as bedaquiline, linezolid, pretomanid, and fluoroquinolones.
- Individualized therapy guided by drug susceptibility testing.
- Treatment durations ranging from 6 to 20 months, depending on resistance patterns and clinical response.
- Intensive monitoring for adverse drug reactions, including cardiotoxicity and myelosuppression. (WHO, 2023).

Tuberculosis Medication Guides

It's important to continue taking your medication as prescribed for the entire time recommended by your health care provider. If you stop taking the medication too soon, you can become sick again and potentially spread the disease to others.

Establishing a routine can help ensure that you are taking your TB medication as directed. Here are some ways that could help you remember to take your TB medicine:

- 1) Medicine should be taken at the same time every day.
- 2) Set an alarm for the time that you need to take the medication.
- 3) Create a note and leave it in a common place like your bathroom mirror or refrigerator.
- 4) Note/Mark when the medicine has been taken on a calendar.
- 5) Use a weekly pill dispenser that has a section for each day of the week.
- 6) Ask your healthcare provider what you should do if you forget to take your medicine

6. Monitoring and Evaluation of Treatment

Treatment monitoring is essential to ensure therapeutic success and minimize complications. Recommended approaches include:

- Serial sputum smear and culture examinations to assess bacteriological conversion.
- Clinical evaluation of symptom resolution and weight gain.
- Laboratory monitoring for drug-induced toxicity, particularly hepatotoxicity associated with isoniazid and rifampicin.
- Adherence support through patient education, psycho-social interventions, and community-based care models (CDC, 2023).

7. Prevention and Control of Tuberculosis

Effective Tuberculosis control requires integration of preventive and therapeutic strategies. Key measures for prevention include:

- + seek medical attention when a prolonged cough with weight loss is noticed.
- + Get screened for TB when you feel at risk or have had contact with persons with TB.
- Bacille Calmette-Guérin (BCG) vaccination, which provides protection against severe forms of TB in children.
- Treatment of latent TB infection among high-risk populations.
- Infection prevention and control practices in healthcare and congregate settings.
- Active case finding, contact tracing, and public health education to interrupt transmission (Zumla et al., 2023).

8. Challenges in Tuberculosis Management

Despite advances in diagnosis and treatment, tuberculosis is still a major global health concern and the second leading cause of death due to an infectious agent worldwide. All the efforts geared towards ending the disease have resulted overall in rather slow decreases in TB incidence and mortality rates, which have been negatively affected by the ongoing coronavirus disease 2019 (COVID-19) pandemic. Treatment and TB management faces persistent challenges, including poor treatment adherence, stigma, adverse drug effects, HIV co-infection, and constrained healthcare resources. The rise of drug-resistant TB further complicates control efforts, underscoring the need for sustained investment in health systems, research, and policy implementation. To get back on track and get closer to ending TB, we need urgent, global, well-structured and committed multi-sectoral actions that go beyond national and global TB programs with the support of deep investments in research and facilitation of equitable and rapid implementation of innovation worldwide (Requel et al. 2023).

9. Conclusion

Tuberculosis poses a significant public health challenge in Nigeria. This is compounded by the high burden of associated co-infections such as HIV, hepatitis, and multidrug-resistant strains of bacteria. The management and treatment of tuberculosis require a multifaceted, evidence-based approach that combines effective chemotherapy, vigilant monitoring, and robust public health interventions. While global progress is steadily achieved, ongoing challenges particularly drug resistance and health inequities necessitate continued commitment to innovation, surveillance, and patient-centered care to achieve TB elimination targets.

References

- Abdulkadir, B., Abubakar, U., Abdullahi, B., Owuna, J. E., Murtala, R., Kabir, K., and Ibrahim, M.A. (2020). A survey of co-infection of some pathogenic bacteria with TB in patients attending Federal Medical Center Katsina, Nigeria: *Bayero Journal of Pure and Applied Sciences*, 12(1): 209–214.
- Aganam.O. (2002) International Law and communicable disease. Bull world Health Organ. 80; 946-51.
- Benito, N., Moreno, A., Miro, J. M., and Torres, A. (2012). Pulmonary infections in HIV infected patients; An updated in the 21st century. *European Respiratory Journal*, 39(3), 730 -745.
- Bektia, J., Lell, .C. P., Fuchs, A., Stoiber, H., Speth, C., et al. (2001). HIV protease inhibitors attenuate adherence of *Candida albicans* to epithelial cells in vitro FEMS Immunology and Medical Microbiology, 31(1), 65-71.
- Centers for Disease Control and Prevention (CDC). (2023). *Treatment of Tuberculosis: Guidelines and Recommendations*. CDC.
- Churchyard, G., Kim, P., Shah, N.S., Rustonjee, R., Gandhi, N., Mathema, B., Dowdy, D., Kasmar, A., and Cardenas, V. (2017). What we know about tuberculosis transmission: An overview. *The Journal of Infectious Diseases*, 216 (6): S629–S635.
- Handbook of Resolutions and Decisions of the World Health Assembly and the Executive Board. 3rd ed. Vol. 3. Geneva: World Health Organization; 1993. Resolution WHA44.8. Tuberculosis control programme; p. 116. (1985-1992)
- Kumar, V., Abbas, A. K., & Aster, J. C. (2021). *Robbins and Cotran Pathologic Basis of Disease* (10th ed.) Elsevier.
- Longo, D. L., Fauci, A. S., Kasper, D. L., Hauser, S. L., Jameson, J. L., & Loscalzo, J. (2022). *Harrison's Principles of Internal Medicine* (21st ed.). McGraw-Hill.
- Nature., 2026' World Health Organisation, Nov 2025; PMC, Feb 2025.
- Nwaolai, T.E and Omoruyi, I.M (2025). A Comprehensive Review On Tuberculosis and Its Associated Co-Infections in Nigeria. *Dutse Journal of Pure and Applied Sciences (DUJOPAS)*, Vol. 11 No. 3e September 2025
- Okpara, P. O., Uzum, D. S., Eberedu, I. F., Ozims, S. J., Nwoke, B. E/ B. (2025). Epidemiology of HIV/AIDS in Imo State, Nigeria, 12(15).<http://doi.org/10.51244/IJRSI.2025,1215.PH000177>.
- Olusola, A. A., Olusoji, J.D., Victor, A.A., Toriola, F., Bisola, I. A and Andrew, O.A (2020). Challenges of Tuberculosis Control in Lagos State, Nigeria: A Qualitative Study of Health-Care Providers' Perspectives. *Niger Med. Journal* 020 Mar 2;61(1):37–41. doi: [10.4103/nmj.NMJ_108_19](https://doi.org/10.4103/nmj.NMJ_108_19)
- Umeokonkwo C D, Okedo-Alex I N, Azuogu B N, Utulu R, Adeke A S, Disu Y O. Trend and determinants of tuberculosis treatment outcome in a tertiary hospital in Southeast Nigeria. *Journal of Infect Pub health*. 2020; 13 (7):1029–1033. doi: 10.1016/j.jiph.2019.10.012.
- Raquel, V. H., Arash, G and Olha K (2023). Tuberculosis: current challenges and beyond Breathe 2023 19 (1): 220166; DOI: <https://doi.org/10.1183/20734735.0166-2022>
- Shah, S.I., Ghafoor, A., Rahman, S.U., Abidullah, Ahmad, N., Al-Qaane, A.M., and Younis, F. (2024). Incidence, types and predictors of adverse events and their impact on treatment outcomes in multidrug/rifampicin resistant tuberculosis patients receiving all oral treatment regimens. *Journal of Evaluation in Clinical Practice*.
- Song, W., Zhao, J., Zhang, Q., Liu, S., Zhu, X., An, Q., Xu, T., Li, S., Liu, J., Tao, N., Liu, Y., Li, Y., and Li, H. (2021). Covid-19 and tuberculosis co-infection: An overview of case reports/case series and meta-analysis. *Frontiers in Medicine*, 8.
- Sunday, A.O., Oluwafemi, S.B and Frank, A.M (2023). Bibliometric Structured Review of Tuberculosis in Nigeria. *African Health Sciences* (2): 139-160. Doi: 10:4314/ahsv23i2.16.
- Van Lock, F. Rowland, M., Grein, T., Moreen, A. (2001). Intervention epidemiology training; a European perspective. *European surveillance*; 6: 37-43.

World health Organisation(1999). Removing obstacles to healthy development: Report on infectious diseases, Geneva.

World Health Organisation (1996). World Health Report(1996), fighting disease fostering development Geneva.

World Health Organization. Global tuberculosis report 2018. Geneva: WHO; 2018.

World Health Organization (WHO). (2023). *Global Tuberculosis Report 2023*. WHO.

Zumla, A., Chakaya, J., Centis, R., et al. (2023). Tuberculosis treatment and management: An update. *The Lancet*, 402(10398), 95–111

Tuberculosis: current challenges and beyond

- [Raquel Villar-Hernández](#)
- [Arash Ghodousi](#)
- [Olha Konstantynovska](#)

[Show More](#)

Breathe 2023 19(1): 220166; DOI: <https://doi.org/10.1183/20734735.0166-2022>