

Improving Tuberculosis Treatment Outcomes in Somalia: A Narrative Review of Strategies, Challenges, and Policy Recommendations

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Abstract: Tuberculosis (TB) remains a major public health concern in Somalia, driven by prolonged conflict, population displacement, fragile health systems, and adverse social determinants of health. Although Somalia has made progress in expanding TB services and achieving favourable treatment outcomes for drug-susceptible TB, the country continues to experience a high TB burden and emerging drug-resistant tuberculosis (DR-TB). Persistent challenges include delayed diagnosis, treatment interruption, catastrophic patient costs, paediatric TB care gaps, and reliance on external donor funding. This narrative review synthesizes evidence from peer-reviewed articles, programmatic reports, and international guidelines to examine TB treatment outcomes, key challenges, and current strategies in Somalia. Literature was searched in PubMed, Google Scholar, and Scopus databases, as well as relevant grey literature from the World Health Organization and humanitarian organizations. Publications between 2010 and 2024 were considered, and 35 studies were identified, of which 15 met the inclusion criteria and were included in the final synthesis. The findings highlight the importance of decentralized and community-based care, rapid molecular diagnostics, multimodal adherence support, shorter all-oral DR-TB regimens, and integration of TB services with nutrition and humanitarian support. Strengthening health system resilience and prioritizing vulnerable populations are essential for sustaining improvements in TB treatment outcomes in Somalia and other fragile settings.

Keywords: tuberculosis, treatment outcomes, drug-resistant tuberculosis, Somalia

Introduction

Tuberculosis (TB) continues to be a major public health challenge in Somalia, where fragile governance, protracted conflict, and recurrent humanitarian crises undermine health systems and impede disease control efforts.¹ Globally, tuberculosis remains one of the leading infectious causes of death. According to the World Health Organization (WHO), approximately 10.6 million people developed TB and 1.3 million deaths were reported in 2022, predominantly in low- and middle-income countries.^{2,3}

Despite global progress in tuberculosis control, major challenges remain in reducing transmission and improving treatment outcomes, particularly in resource-limited and fragile settings. Comprehensive global analyses highlight that delayed diagnosis, treatment interruption, and social determinants such as poverty and malnutrition continue to drive TB transmission worldwide. Furthermore, reflections on recent global tuberculosis reports indicate that many high-burden countries still experience significant gaps in case detection and treatment coverage, slowing progress toward the targets of the End TB Strategy.⁴ The COVID-19 pandemic further disrupted TB services globally, leading to declines in TB notifications and delays in diagnosis and treatment, which may have long-term consequences for TB control efforts.⁵

In Somalia, the TB burden is significantly higher than the global average, with estimated incidence rates of approximately 246 cases per 100,000 population, reflecting persistent transmission and substantial unmet needs for effective case detection and treatment of the disease.² The country has made incremental progress over time; WHO and partner reports indicate a 14%



reduction in TB incidence since 2010, alongside an expansion of treatment facilities from under ten to more than 100 sites over the past two decades, demonstrating the resilience and adaptability of national TB efforts despite ongoing instability.⁶

Evidence from facility-based studies indicates that TB treatment outcomes in Somalia are generally favourable when patients are retained in care settings. A retrospective cohort study conducted at Bosaso TB Hospital reported an overall treatment success rate of nearly 90%, with unsuccessful outcomes significantly associated with retreatment status, older age, and extrapulmonary TB.⁷ Similar findings from programmatic and humanitarian settings suggest that treatment success for drug-susceptible TB in Somalia frequently meets or exceeds the WHO target of 85%, underscoring the effectiveness of standardized regimens when uninterrupted treatment and follow-up are ensured.⁸

Beyond entrenched endemic transmission, multidrug-resistant TB (MDR-TB) poses an escalating threat in Somalia. The World Health Organization classifies Somalia as a high-burden MDR/RR-TB country, with a notable prevalence of rifampicin resistance among TB cases and persistent challenges in ensuring timely diagnosis and appropriate management of drug-resistant disease.⁹ Experience from Médecins Sans Frontières (MSF) programmes highlights that insecurity, delayed diagnosis, and treatment interruptions contribute to poor MDR-TB outcomes and increased risk of resistance amplification.¹⁰ Underlying determinants such as widespread displacement, malnutrition, poverty, and limited health infrastructure further compound TB treatment challenges by delaying diagnosis, limiting access to care, and increasing loss to follow-up.^{1,11} Children, internally displaced persons (IDPs), and nomadic populations carry a particularly high share of the TB burden, often facing barriers to diagnosis and comprehensive care.¹⁰ Diagnostic challenges are especially pronounced among pediatric cases due to difficulties in sputum collection and low clinical suspicion in resource-limited settings.¹² At the same time, national TB programmes and implementing partners have increasingly emphasized expanding access to rapid molecular diagnostics, strengthening community-based case finding, and improving patient-centered treatment support.² The introduction of shorter, all-oral MDR-TB regimens has shown promise in improving adherence and treatment completion in Somalia's humanitarian context.¹⁰ However, these efforts remain constrained by systemic weaknesses in health financing, workforce capacity, and supply chain reliability.¹³

Recent surveillance data indicate persistent tuberculosis transmission in Somalia. According to estimates from the World Health Organization, TB incidence declined gradually from approximately 270 cases per 100,000 population in 2019 to about 246 cases per 100,000 population in 2022. Despite this modest improvement, Somalia remains among the high TB burden countries in the Eastern Mediterranean Region, with ongoing challenges in case detection and treatment completion.¹⁴

Taken together, Somalia's epidemiological and programmatic context highlights the complexity of improving TB treatment outcomes in fragile settings. Persistent high incidence, emerging drug resistance, sustained barriers to early diagnosis and treatment completion, and adverse social determinants of health converge to maintain TB as a leading public health priority.⁸ Addressing these interrelated challenges requires a multifaceted, patient-centered approach that strengthens health systems while adapting TB strategies to Somalia's unique socio-political and humanitarian landscape. This narrative review therefore synthesizes evidence from published studies, program reports, and global guidance to examine current TB treatment strategies, key challenges, and actionable recommendations for strengthening TB treatment outcomes in Somalia and similar fragile settings.

Methods

This study used a narrative review approach to synthesize available evidence on tuberculosis treatment outcomes and control strategies in Somalia. A structured literature search was conducted using PubMed, Scopus, and Google Scholar databases. Additional grey literature, including reports from the World Health Organization (WHO), Médecins Sans Frontières (MSF), and national tuberculosis programme documents, was also reviewed. Search terms included combinations of "tuberculosis," "treatment outcomes," "drug-resistant tuberculosis," "MDR-TB," and "Somalia." Publications published between 2010 and 2024 were considered. The time frame of 2010 to 2024 was selected to capture contemporary evidence aligned with recent global tuberculosis control strategies, including the WHO End TB Strategy, and to reflect recent programmatic developments in Somalia such as the expansion of diagnostic technologies and updated treatment approaches. Studies were included if they reported tuberculosis epidemiology, treatment outcomes, programmatic experiences, or policy interventions relevant to Somalia or comparable fragile settings.

Publications were excluded if they were not directly relevant to TB treatment outcomes or strategies, were not applicable to Somalia or similar fragile settings, lacked empirical or programmatic data, were duplicates, or fell outside the specified timeframe. Of the 35 identified records, 20 were excluded during screening for these reasons. The remaining 15 studies were included in the final synthesis and analyzed thematically to identify key challenges and strategies for improving tuberculosis control in Somalia. The mapping of strategies, challenges, and recommendations to individual sources is presented in [Table 1](#).

Table 1 Mapping of Included Studies to Identified Strategies, Challenges, and Policy Recommendations for Tuberculosis Treatment Outcomes in Somalia

No	First Author, Year	Strategies	Challenges	Recommendations
1	Coninx, 2007	Emergency-adapted TB care	Conflict, disrupted services, displacement	Maintain context-adapted TB services in fragile settings
2	WHO, 2023	Service expansion, diagnostics, program strengthening	High burden, delayed diagnosis, treatment gaps	Strengthen case detection and national TB systems
3	Furin, 2019	Comprehensive TB care approaches	Ongoing global TB mortality and care limitations	Integrate diagnosis, treatment, and prevention
4	Chakaya, 2021	Renewed TB control efforts	Delayed diagnosis, interruption, poverty, malnutrition	Intensify action toward End TB targets
5	Migliori, 2010	DR-TB management approaches	MDR/XDR-TB burden, weak systems	Improve detection and management of resistant TB
6	WHO EMRO, 2024	TB service scale-up in Somalia	Instability affecting implementation	Sustain political and programmatic commitment
7	Said, 2025	Standardized treatment and cohort follow-up	Retreatment, older age, extrapulmonary TB	Closer monitoring of high-risk patients
8	Liddle, 2013	TB treatment delivery in emergencies	Insecurity, interruptions, humanitarian constraints	Adapt care models to chronic emergencies
9	ReliefWeb/WHO, 2023	MDR/RR-TB burden tracking	Rifampicin resistance, ongoing program gaps	Strengthen surveillance and DR-TB response
10	MSF, n.d.	Shorter all-oral DR-TB regimens	Delayed diagnosis, insecurity, interruption	Scale up shorter patient-friendly DR-TB regimens
11	Lönnroth, 2009	Risk-factor-informed TB control	Poverty, malnutrition, social determinants	Address social determinants in TB policy
12	Jenkins, 2016	Pediatric TB recognition	Underdiagnosis, sputum difficulty, low suspicion	Strengthen pediatric diagnosis and treatment
13	Tanimura, 2014	Financial/social support in TB care	Catastrophic costs, adherence barriers	Add social protection and patient support
14	WHO, 2023	Epidemiologic monitoring	Persistent transmission, incomplete control	Improve surveillance and treatment completion
15	Subbaraman, 2019	Care cascade monitoring	Losses from diagnosis to completion	Use routine data for quality improvement

Key Challenges Limiting Treatment Outcomes

Tuberculosis (TB) control in Somalia is shaped by a complex interplay of structural, social, and health system challenges that are characteristic of fragile and conflict-affected settings. Chronic insecurity and population displacement disrupt continuity of care and limit access to health services, contributing to delayed diagnosis and treatment interruptions. Despite the free provision of TB medicines, indirect and catastrophic patient costs remain a major barrier to treatment adherence, particularly among socioeconomically vulnerable groups. The growing burden of drug-resistant TB further threatens progress, driven by delayed diagnosis, inconsistent drug supply, and treatment interruption. Persistent gaps in pediatric TB diagnosis and access to child-friendly formulations hinder effective care for children, while heavy reliance on external donor funding exposes TB services to financing shocks that can undermine diagnostic capacity, follow-up, and patient support. Collectively, these challenges highlight the need for patient-centered, resilient, and context-adapted TB strategies to improve treatment outcomes in Somalia.

Treatment Cascade Gap: Another critical issue is the treatment cascade gap, which refers to losses occurring between TB diagnosis, treatment initiation, and treatment completion. In fragile settings such as Somalia, patients may be lost at multiple points along this cascade due to delayed diagnosis, mobility among displaced populations, financial barriers, and health system limitations. Addressing these gaps requires improved case finding, streamlined referral systems, and strengthened patient follow-up mechanisms.¹⁵

Strategies Used to Improve TB Treatment Outcomes

Current efforts to improve tuberculosis (TB) treatment outcomes in Somalia focus on strengthening early diagnosis, supporting treatment adherence, addressing drug-resistant TB (DR-TB), and integrating TB care with humanitarian services. The expansion of rapid molecular diagnostics has improved timely case detection and facilitated the earlier identification of drug resistance, enabling more appropriate treatment initiation in settings where delayed diagnosis has historically undermined outcomes. National TB strategies also prioritize widening access to services for both drug-susceptible and drug-resistant TB while promoting locally appropriate, patient-centered approaches to care.

Treatment adherence remains a central determinant of TB control, and Somalia has increasingly adopted digital adherence technologies alongside community-based support mechanisms to reduce missed doses and loss to follow-up (LTFU). To address persistently low DR-TB treatment success rates, shorter and more tolerable all-oral regimens have been introduced, with early programmatic experience suggesting improved treatment completion in insecure and displacement-affected populations.

In recognition of the strong interaction between TB, malnutrition, and food insecurity, TB services in Somalia are increasingly linked to nutrition and humanitarian support programs. Integrated care packages that include nutritional supplementation and social support are particularly important during periods of acute crisis, as they help stabilize patients, improve adherence, and enhance treatment outcomes in the most vulnerable populations. Together, these strategies reflect a shift toward more resilient, patient-centered TB care models that are better aligned with Somalia's fragile humanitarian context.

Recommendations to Improve TB Treatment Outcomes in Somalia

Decentralized and patient-centered tuberculosis (TB) care: Improving tuberculosis (TB) treatment outcomes in Somalia requires scaling decentralized and patient-centered models of care that can function effectively in insecure and hard-to-reach settings. Community-based treatment support, mobile outreach services, and flexible medication refill and referral systems are critical for maintaining continuity of care among rural, nomadic and displaced populations.

Multimodal adherence support: Treatment adherence should be supported through flexible, multimodal approaches rather than uniform ones. Combining digital adherence tools with direct human support from community health workers and peer supporters can help address the diverse needs of high-risk groups, including previously treated patients, adolescents and internally displaced persons.

Timely diagnosis and appropriate treatment initiation: Expanding access to rapid diagnostic testing and ensuring efficient clinical pathways from diagnosis to treatment initiation are essential for reducing delays and inappropriate therapies.

Strengthening drug susceptibility testing and supply chain reliability is particularly important for improving outcomes in patients with suspected drug-resistant TB.

Improved management of drug-resistant TB: Scaling up shorter and better-tolerated regimens for drug-resistant TB, alongside close clinical monitoring and patient support, can reduce the treatment burden and improve completion rates. These approaches are particularly relevant in contexts where prolonged treatment increases the risk of interruption.

Integration of TB care with nutrition and social support: Integrating TB services with nutrition screening and social protection interventions is vital in settings affected by food insecurity and poverty. Coordinated care models that address both medical and social needs can enhance adherence and improve overall treatment outcomes of patients.

Strengthening pediatric TB care: Closing gaps in pediatric TB care requires the consistent availability of child-friendly formulations, improved diagnostic capacity, and practical training for healthcare providers. Strengthening the implementation of existing guidelines is essential to reduce underdiagnosis and improve outcomes in children.

Protecting TB services from funding disruptions: Building resilience against funding volatility is necessary to ensure the continuity of essential TB services. Contingency planning, maintenance of buffer stocks, and prioritization of core TB activities can help mitigate the impact of financial shock.

Use of routine data for quality improvement: Routine TB programme data should be systematically used to identify gaps along the care cascade and inform targeted quality-improvement efforts. Cohort reviews and analyses of treatment outcomes can guide resource allocation and improve program performance.

Limitations

This narrative review has several limitations. First, the analysis relied primarily on secondary data from published studies and international reports, which may not fully capture local variations in tuberculosis epidemiology across Somalia. Second, the limited number of recent Somalia-specific studies restricts the availability of comprehensive data on treatment outcomes and drug-resistant TB trends. Third, the humanitarian and security context may contribute to underreporting of cases and incomplete surveillance data. Despite these limitations, the review provides a synthesis of available evidence to inform policy and programmatic interventions for improving TB treatment outcomes in fragile settings.

Conclusion

Tuberculosis remains a major public health challenge in Somalia due to fragile health systems, population displacement, and persistent socioeconomic vulnerabilities. Although the country has achieved encouraging treatment success rates in many program settings, important gaps remain in early diagnosis, treatment adherence, pediatric TB care, and drug-resistant TB management. Strengthening decentralized and patient-centered models of care, expanding access to rapid molecular diagnostics, and improving adherence support systems are critical for sustaining treatment outcomes. Future efforts should also prioritize closing gaps in the TB treatment cascade, strengthening surveillance systems, and ensuring sustainable financing for national TB programmes. Lessons from Somalia's experience provide valuable insights for improving tuberculosis control strategies in other fragile and conflict-affected settings.

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Author Contributions

All authors made a significant contribution to the work reported, whether in the conception, study design, data acquisition, analysis and interpretation, drafting, or critical revision of the manuscript; gave final approval of the version to be published; agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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