

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

International Journal of Recent Innovations in Medicine and Clinical Research

Journal homepage: <https://www.ijrimcr.com/>**Review Article****The key factors influencing tuberculosis treatment outcomes: A literature review****Mohammed Elmuttalut** <sup>1\*</sup><sup>1</sup>Dept. of Community Medicine, Al Rayan National College of Medicine, Medina, Kingdom of Saudi Arabia**ARTICLE INFO***Article history:*

Received 16-06-2024

Accepted 09-07-2024

Available online 30-08-2024

*Keywords:*

Tuberculosis (TB) treatment

Medication adherence

Directly observed therapy (DOT)

Mobile health

Patient-centered care

**ABSTRACT**

Tuberculosis (TB) remains a pressing global health challenge, with treatment adherence playing a pivotal role in determining patient outcomes and public health impact. Despite the availability of highly effective treatment regimens, adherence to these lengthy protocols, often spanning six months or more, remains suboptimal. Non-compliance with TB medication can lead to treatment failure, prolonged infectiousness, and the emergence of drug-resistant strains, exacerbating the public health burden. This review critically examined recent literature to identify the multifaceted factors influencing TB treatment adherence, including patient knowledge and attitude, mental health, medical care, socio-economic, social support and healthcare-related determinants. It also evaluates current strategies designed to enhance adherence, ranging from patient-centered approaches, such as Directly Observed Therapy (DOT), to the integration of digital health technologies and community-based interventions. The findings underscored the importance of a tailored approach to TB treatment, considering the diverse barriers faced by patients in different settings. By optimizing adherence, healthcare providers can significantly improve treatment outcomes, reduce transmission rates, and contribute to global TB control efforts. The review findings will also inform future interventions and policies that support sustainable and effective TB management strategies.

This is an Open Access (OA) journal, and articles are distributed under the terms of the [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/), which allows others to remix, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: [reprint@ipinnovative.com](mailto:reprint@ipinnovative.com)**1. Introduction**

Tuberculosis (TB) remains a significant global health threat. Compliance with TB treatment is a crucial aspect of patient care, as it directly impacts treatment outcomes and patient health.<sup>1,2</sup> Despite the availability of effective treatments, TB patients often face challenges in adhering to their medication regimens, leading to treatment failure and increased transmission rates.<sup>2</sup> Effective treatment relies heavily on patient adherence to medication regimens, often lasting six months or more, based on the condition of the patient.<sup>2,3</sup> This review examines recent literature exploring factors influencing compliance with TB treatment and strategies to improve adherence and optimize the outcomes of TB patient care.

**2. Factors Influencing Adherence to Tuberculosis Treatment**

Adherence, often used interchangeably with compliance, to TB treatment is crucial for successful outcomes and preventing the development of TB drug-resistant strains.<sup>1,2</sup> However, completing the lengthy treatment regimen can be challenging for many patients due to a complex interplay of individual, social, economic, and healthcare system factors.

**2.1. Patient-centered factors**

1. *Knowledge and attitudes:* Patients with limited understanding of TB, its treatment, and the importance of completing the full course are more likely to discontinue treatment prematurely.<sup>3</sup> Educational interventions can improve knowledge and empower

\* Corresponding author.

E-mail address: [mutallat@gmail.com](mailto:mutallat@gmail.com) (M. Elmuttalut).

patients to take an active role in their treatment.

2. *Stigma*: The social stigma associated with TB can be a significant deterrent to adherence. Fear of discrimination or isolation from society may lead patients to avoid seeking treatment or conceal their diagnosis, jeopardizing their own health and potentially transmitting the disease to others.<sup>1</sup> Addressing stigma through awareness campaigns and promoting social support networks can be crucial in determining the treatment outcomes and preventing the spread of TB infection.
3. *Mental health*: Comorbid mental health conditions like depression, anxiety, or substance abuse can significantly impact adherence.<sup>1</sup> These conditions can make it difficult for patients to prioritize treatment or cope with the demands of adhering to a complex medication schedule. Integrating mental health support into TB treatment programs can be beneficial.
4. *Side effects*: TB medications can cause unpleasant side effects like nausea, fatigue, or peripheral neuropathy.<sup>2,3</sup> Patients experiencing these side effects may be tempted to stop treatment. Providing education on how to manage side effects and exploring alternative medication options, if necessary, can improve adherence.

## 2.2. Social and economic factors

1. *Socioeconomic status*: Poverty can create significant barriers to adherence. Patients may struggle to afford transportation to treatment centers, nutritious food to support recovery, or childcare to attend appointments.<sup>1,2</sup> Financial assistance programs and social support services can help alleviate these burdens.
2. *Social support*: A strong support network of family and friends can significantly improve a patient's adherence to treatment. Social support can provide encouragement, help manage treatment logistics, and reduce feelings of isolation.<sup>1</sup> Interventions that promote social support can be beneficial.
3. *Housing*: Unstable housing situations or crowded living conditions can increase the risk of transmitting TB to others and pose challenges in adhering to treatment protocols, such as proper ventilation.<sup>1</sup> Addressing housing needs can be crucial for successful TB control efforts.

## 2.3. Healthcare system factors

1. *Drug availability*: Stockouts or limited access to essential TB medications can disrupt treatment continuity and discourage patients from adhering to the regimen. Ensuring consistent drug availability is crucial for successful treatment programs.<sup>1,2</sup>

2. *Long treatment duration*: The lengthy treatment duration, often lasting 6 months or more, can be challenging for patients to maintain motivation and commitment.<sup>4</sup> Exploring options for shorter treatment regimens or developing strategies to enhance patient motivation are ongoing areas of research.

3. *Quality of care*: Limited access to healthcare facilities, long wait times for appointments, or a lack of patient-centered care can discourage patients from seeking and adhering to treatment.<sup>1,5</sup> Strengthening healthcare systems and promoting patient-centered care approaches can improve treatment experiences and adherence rates.

## 3. Strategies to Improve Adherence to Tuberculosis Treatment

Achieving successful outcomes in TB treatment relies heavily on patient adherence to medication regimens. This section explores various interventions designed to improve adherence rates, focusing on research published between 2018 and 2024.

### 3.1. Directly observed therapy (DOT)

DOT remains a cornerstone intervention for TB treatment adherence. A healthcare worker directly observes patients ingesting their medications, promoting accountability and ensuring proper medication intake.<sup>4,6</sup> However, DOT can be burdensome for patients and healthcare systems due to logistical challenges and potential stigma associated with requiring supervision.

### 3.2. Technological interventions

Mobile health (mHealth) technologies are increasingly being explored as potential tools to improve adherence. Text message reminders can prompt patients to take their medications and offer channels for communication and support.<sup>4</sup> Studies suggest that text message interventions can be effective, particularly in low- and middle-income countries (LMICs).<sup>7</sup> Additionally, smartphone apps can be used for medication tracking, educational resources, and appointment reminders, potentially enhancing patient engagement in their treatment journey.<sup>8–10</sup>

### 3.3. Patient-centered care

Shifting towards patient-centered care models that emphasize clear communication, shared decision-making, and addressing individual needs can significantly impact adherence.<sup>9,11</sup> This approach empowers patients to take an active role in their treatment and fosters a sense of trust and collaboration with healthcare providers.<sup>5</sup> Interventions like motivational interviewing can help address concerns, build motivation, and develop strategies for overcoming

challenges to adherence.

### 3.4. Social support interventions

Social support networks play a crucial role in adherence. Interventions that involve family members in treatment education sessions or connect patients with support groups can provide encouragement, logistical assistance, and a sense of community, ultimately improving adherence rates.<sup>12</sup> Additionally, addressing social determinants of health, such as poverty and housing instability, can indirectly improve adherence by alleviating burdens that may hinder treatment completion.

### 3.5. Financial incentives

Conditional cash transfers, where patients receive financial rewards for completing treatment milestones, have shown promise in some studies to improve adherence, particularly in populations facing financial hardship.<sup>13</sup> However, the long-term sustainability and ethical considerations of such interventions require further exploration.

### 3.6. Combination approaches

The most effective interventions often combine different strategies. For example, integrating mHealth reminders with adherence counseling or combining DOT with social support interventions may yield more robust results than single interventions.<sup>14–16</sup> Tailoring interventions to address the specific needs and circumstances of individual patients is crucial for maximizing the effectiveness of adherence support strategies.

## 4. Conclusion and Recommendations

By understanding these diverse factors influencing adherence, healthcare professionals and policymakers can develop comprehensive interventions to support patients throughout their TB treatment journey. Strategies addressing individual needs, providing social support, ensuring healthcare access, and optimizing treatment delivery can contribute significantly to improving adherence rates and ultimately achieving successful TB control. We recommend that healthcare professionals implement a combination of these interventions to create a comprehensive support system that empowers patients to adhere to their TB treatment regimen, ultimately contributing to successful treatment outcomes and reducing the burden of TB globally.

## 5. Source of Funding

None.


## 6. Conflict of Interest

None.

## References

1. Nidoi J, Muttamba W, Walusimbi S, Imoko JF, Lochoro P, Ictho J, et al. Impact of socio-economic factors on tuberculosis treatment outcomes in north-eastern Uganda: A mixed methods study. *BMC Public Health*. 2021;21(1):2167. Available from: <https://doi.org/10.1186/s12889-021-12056-1>.
2. Gebreweld FH, Kifle MM, Gebremicheal FE, Simel LL, Gezae MM, Ghebreyesus SS, et al. Factors influencing adherence to tuberculosis treatment in Asmara, Eritrea: A qualitative study. *J Health Popul Nutr*. 2018;37(1):1.
3. Nezenega ZS, Perimal-Lewis L, Maeder AJ. Factors influencing patient adherence to tuberculosis treatment in Ethiopia: A literature review. *Int J Environ Res Public Health*. 2020;17(15):5626.
4. Bediang G, Stoll B, Elia N, Abena JL, Geissbuhler A. SMS reminders to improve adherence and cure of tuberculosis patients in Cameroon (TB-SMS Cameroon): A randomised controlled trial. *BMC public health*. 2018;18(1):583.
5. Holzman SB, Zenilman A, Shah M. Advancing patient-centered care in tuberculosis management: A mixed-methods appraisal of video directly observed therapy. *Open Forum Infect Dis*. 2018;5(4):ofy046.
6. Abas SA, Ismail N, Zakaria Y, Ismail I, Zain NH, Yasin SM, et al. A Gamified Real-time Video Observed Therapies (GRVOTS) Mobile App via the Modified Nominal Group Technique: Development and Validation Study. *JMIR Serious Games*. 2023;11:e43047.
7. Barik AL, Indarwati R, Sulistiawati S. The effectiveness of using text messages reminder on adherence with tuberculosis patients: A systematic review. *Strada J Ilmiah Kesehatan*. 2020;9(2):751–60.
8. Mehraeen E, Safdari R, Alinaghi SA, Noori T, Kahouei M, Soltani-Kermanshahi M. A mobile-based self-management application-usability evaluation from the perspective of HIV-positive people. *Health Policy Technol*. 2020;9(3):294–301.
9. Ravenscroft L, Kettle S, Persian R, Ruda S, Severin L, Doltu S, et al. Video-observed therapy and medication adherence for tuberculosis patients: Randomized controlled trial in Moldova. *Eur Respir J*. 2020;56(2):2000493.
10. Wiecek E, Torres-Robles A, Cutler RL, Benrimoj SI, Garcia-Cardenas V. Impact of a multicomponent digital therapeutic mobile app on medication adherence in patients with chronic conditions: Retrospective analysis. *J Med Internet Res*. 2020;22(8):e17834.
11. Tran S, Smith L, El-Den S, Carter S. The use of gamification and incentives in mobile health apps to improve medication adherence: Scoping review. *JMIR Mhealth Uhealth*. 2022;10(2):e30671.
12. Dilas D, Flores R, Morales-García WC, Calizaya-Milla YE, Morales-García M, Sairitupa-Sanchez L, et al. Social support, quality of care, and patient adherence to tuberculosis treatment in Peru: The mediating role of nurse health education. *Patient Prefer Adherence*. 2023;17:175–86.
13. Carter DJ, Daniel R, Torrens AW, Sanchez MN, Maciel EL, Bartholomay P, et al. The impact of a cash transfer programme on tuberculosis treatment success rate: A quasi-experimental study in Brazil. *BMJ Glob Health*. 2019;4(1):e001029.
14. Do D, Garfein RS, Cuevas-Mota J, Collins K, Liu L. Change in patient comfort using mobile phones following the use of an app to monitor tuberculosis treatment adherence: longitudinal study. *JMIR Mhealth Uhealth*. 2019;7(2):e11638.
15. Abas SA, Ismail N, Zakaria Y, Yasin SM, Ibrahim K, Ismail I, et al. Enhancing tuberculosis treatment adherence and motivation through gamified real-time mobile app utilization: A single-arm intervention study. *BMC Public Health*. 2024;24:249.
16. Global tuberculosis report 2020. Available from: <https://www.who.int/publications/i/item/9789240013131>.

## Author biography

**Mohammed Elmuttalut**, Assistant Professor  <https://orcid.org/0000-0002-0677-6390>

**Cite this article:** Elmuttalut M. The key factors influencing tuberculosis treatment outcomes: A literature review. *Int J Recent Innov Med Clin Res* 2024;6(3):76-79.