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Perspective

Enhancing health literacy and meaningful involvement of tuberculosis patients with multimorbidity in high burden settings: a call to action for India

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Abstract
Improvements in living conditions, changing lifestyles, and healthcare advancements have led to an increased prevalence of non-communicable diseases (NCDs) globally, especially in low- and middle-income countries (LMICs). This dual burden of chronic communicable diseases, such as tuberculosis (TB), and NCDs results in multimorbidity—the coexistence of two or more chronic conditions. In India, which contributes 28% of the global TB burden, TB multimorbidity is particularly challenging, with conditions like diabetes, HIV, and depression frequently co-occurring with TB. Effective management of TB multimorbidity necessitates enhancing health literacy, which is foundational for chronic disease self-management. Limited health literacy significantly hinders patients' ability to understand and manage their conditions, exacerbating health inequalities. This perspective paper examines the critical role of health literacy in TB multimorbidity management, emphasizing community-based interventions such as TB champions, who play a pivotal role in peer education, addressing misconceptions, and fostering patient empowerment. By making medical information more accessible and culturally relevant, these interventions can enhance treatment adherence and health outcomes. Furthermore, policy efforts must prioritize health literacy and multimorbidity management, fostering interdisciplinary collaboration among healthcare professionals, community stakeholders, policymakers, researchers, and patients. Such a multi-stakeholder approach is essential to develop integrated, patient-centered care models that improve the long-term well-being and outcomes of TB patients with multimorbidity.

Keywords Tuberculosis · Multimorbidity · Health literacy · Tb champions

Improvements in living conditions, changing lifestyles, and advancements in healthcare have led to an increase in the prevalence of non-communicable diseases (NCDs) globally, especially in low- and middle-income countries (LMICs) [1]. However, these regions continue to experience a persistent burden of chronic communicable diseases, leading to an increasing prevalence of multimorbidity—the coexistence of two or more chronic conditions [2]. Among the many infectious diseases interacting with NCDs, TB presents one of the most pressing public health challenges due to its high burden and complex disease [3].

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Improvements in living conditions, changing lifestyles, and advancements in healthcare have led to an increase in the prevalence of non-communicable diseases (NCDs) globally, especially in low- and middle-income countries (LMICs) [1]. However, these regions continue to experience a persistent burden of chronic communicable diseases, leading to an increasing prevalence of multimorbidity—the coexistence of two or more chronic conditions [2]. Among the many infectious diseases interacting with NCDs, TB presents one of the most pressing public health challenges due to its high burden and complex disease [3].

TB multimorbidity, defined as the coexistence of TB with one or more chronic conditions, is an emerging public health issue in LMICs [4]. A meta-review by Alexander and colleagues found a high prevalence of multimorbid conditions such as diabetes mellitus (DM), depression, and HIV among TB patients [5]. This is particularly concerning in high TB-burden countries like India, which accounts for more than one-fourth of the global TB burden and is simultaneously experiencing a rise in NCDs [4, 6]. The bidirectional relationship between TB, HIV and certain NCDs, such as diabetes mellitus (DM), further complicates disease management, as these conditions increase susceptibility to TB while TB itself worsens metabolic and immune dysfunction [5]. Various studies in India confirm that TB frequently coexists with DM, HIV, and depression among primary care patients, contributing to poorer health outcomes and increased healthcare costs.[4] Given the overburdened healthcare system, traditional disease-specific approaches fail to address the complexities associated with multimorbidity, including disease interactions, polypharmacy, and fragmented care delivery [1]. This underscores the urgent need for integrated, patient-centered models that go beyond treatment to empower patients and encourage active participation in care.

Self-management is central to multimorbidity care, enabling patients to actively participate in disease management and make informed health decisions [9]. For TB patients, this includes adhering to daily medication regimens, recognizing symptoms of treatment failure or drug side effects, making dietary modifications to improve immunity, and seeking timely medical care for complications [4]. In multimorbid patients, self-management may also involve monitoring blood sugar levels in diabetes or adhering to antiretroviral therapy in HIV-TB co-infection [10]. However, effective self-management requires active patient engagement, where individuals are not just passive recipients of care but are equipped with the skills and confidence to navigate their health challenges [11].

A critical factor influencing self-management and patient engagement is health literacy—the ability to obtain, process, and understand health information to effectively navigate healthcare services [10]. Without adequate health literacy, patients struggle to interpret medical advice, adhere to complex treatment regimens, and engage meaningfully with healthcare providers [4]. Low health literacy exacerbates health inequalities, limiting patients' ability to seek timely care, adhere to treatment, and engage with healthcare services, particularly among marginalized populations with lower socioeconomic status and education [4]. Chauhan et al. reported that 55% of TB patients with multimorbidity in India have limited health literacy, posing a significant barrier to self-management and effective disease control [10]. Further, evidence suggests that individuals with low health literacy are more likely to experience delayed sputum conversion, indicating poorer treatment outcomes [12] Moreover, Liu et al. emphasize that health literacy plays a crucial role in preventing comorbidities, reinforcing the need for structured interventions to improve TB outcomes [13]. Strengthening health literacy enhances patients' understanding of self-management strategies, healthcare navigation, and access to community support [4].

To better understand how different factors influence health literacy and patient empowerment, we can examine a hierarchical framework that categorizes these determinants. As illustrated in Fig. 1, health literacy follows a hierarchical framework, progressing from basic determinants—such as financial stability, access to healthcare, and a stable living environment—toward advanced self-management and empowerment [11]. Each level builds upon the previous one, reinforcing a comprehensive understanding of TB multimorbidity care and treatment adherence [11]. However, beyond financial and healthcare access barriers, socioeconomic disparities, gender norms, migration, and limited awareness further hinder TB patients' engagement with health information [14, 15]. Social stigma associated with TB exacerbates these challenges, leading to delayed diagnosis and treatment non-adherence, particularly among marginalized populations [10]. Women, in particular, face greater stigma, reducing their likelihood of seeking timely care [16]. Addressing these barriers requires a shift beyond healthcare accessibility toward community-driven health literacy interventions that challenge stigma, cultural norms, and patient-specific obstacles to engagement. For instance, a study by Mindlis et al. (2015) in rural Gujarat demonstrated that grassroots initiatives can be highly effective in reducing stigma, transforming community attitudes, and fostering greater acceptance of individuals with depression. Their findings underscore the potential of localized, community-based interventions in breaking down stigma-related barriers and improving health outcomes in stigmatized conditions [17].

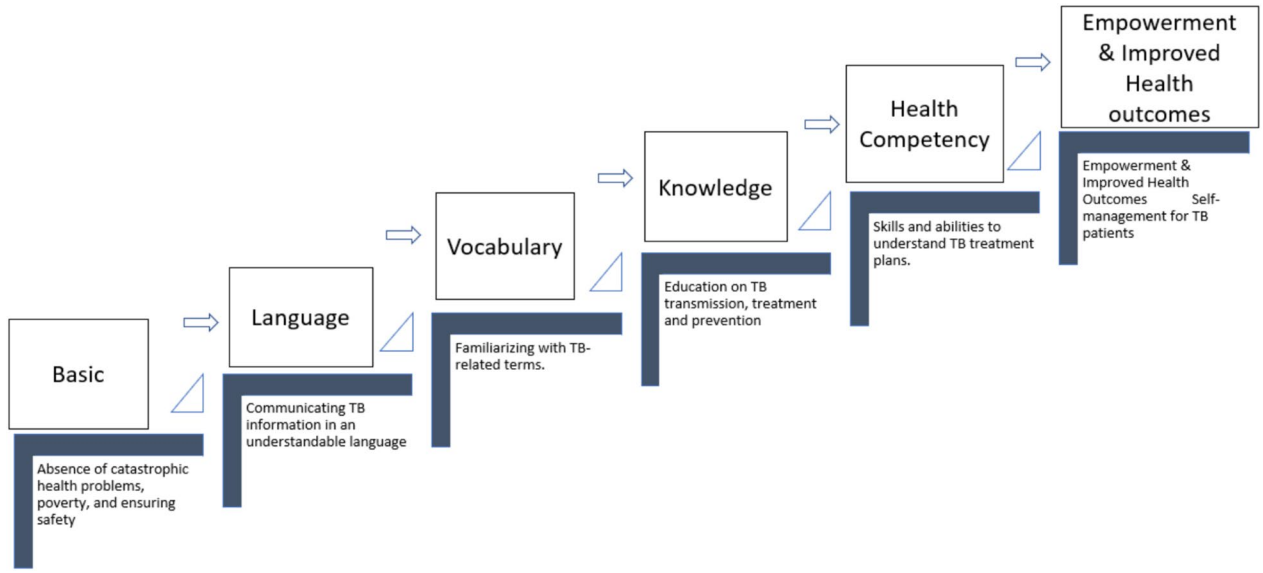

Fig. 1 Health literacy framework for Tuberculosis patients

At the language and communication level, overcoming medical jargon and complex terminology is essential. Many TB or multimorbidity related terms, such as drug resistance, latent TB, and treatment adherence, can be difficult to understand for patients with limited literacy [10]. Patients must develop essential health competencies, allowing them to interpret treatment plans, monitor symptoms, and navigate healthcare services [10]. At the highest level of the framework, empowerment is achieved, enabling TB multimorbidity patients to actively manage their condition, adhere to treatment, and even participate in peer education or advocacy efforts, leading to improved health outcomes [11].

Health literacy deficits not only hinder medical understanding but also create systemic barriers in healthcare navigation, from scheduling appointments to accessing specialized care [10]. These challenges contribute to delays in medical attention, missed appointments, and discontinuity of care, negatively impacting TB treatment outcomes [4]. Addressing these issues requires targeted interventions focusing on medical terminology comprehension, healthcare navigation skills, and critical analysis of health information. A study by Yeung et al. demonstrated that health literacy interventions, such as literacy flash cards and mobile video reinforcement enhance medication adherence in multimorbid patients, emphasizing the importance of patient-centered education. Implementing similar strategies for TB multimorbidity could improve adherence, reduce complications, and enhance overall patient outcomes [18].

Given the persistent health literacy challenges, primary care settings play a crucial role in bridging these gaps by assessing literacy levels and implementing targeted interventions [19]. Primary care practices, as the main entry point into the healthcare system, provide an ideal platform for improving, self-management, and patient outcomes in TB multimorbidity [4]. A review conducted by Chauhan et al. highlights two principal challenges faced by TB patients: analyzing and applying health-related information effectively [10]. While these individuals may not encounter significant obstacles in accessing and utilizing healthcare information, they often grapple with analyzing and applying that information effectively [10]. This struggle is particularly evident when attempting to decode medical jargon and navigate the intricacies of the healthcare system [10]. Such barriers prevent patients from grasping medical advice, treatment plans, and provider instructions, further complicating TB management and disease elimination efforts.

To mitigate these barriers, community-based approaches have emerged as an effective strategy to enhance patient engagement and improve TB literacy [20]. One such approach involves TB champions, often former patients or community health workers, who play a crucial role in peer education and support by sharing their personal stories and experiences and have also proven effective in peer-led interventions across India [20]. By sharing personal experiences, TB champions transform medical information into practical, culturally relevant narratives, making it more relatable and actionable. This peer-driven approach enhances patient motivation, dispels misinformation, and reinforces treatment adherence [20]. Their first-hand knowledge allows them to explain TB and coexisting conditions in a way that resonates with patients, directly addressing fears and misconceptions [21]. By actively involving TB champions in the planning and implementation stages of health literacy interventions, their insights can ensure that the content and delivery methods resonate with the target audience [21]. By tailoring interventions to patient's linguistic, cultural, and socio-economic

context, TB champions ensure that health literacy efforts relate to diverse populations and address key barriers to engagement [21]. Health literacy to a larger extent is influence by cultural beliefs, practices, and values which in turn impacts the health-seeking behaviors, making the role of TB champions especially significant in improving health literacy among TB multimorbid patients [11, 21].

Furthermore, TB champions can serve as advocates within their communities, promoting the importance of health literacy and encouraging participation in intervention programs [21–23] Their credibility and relatability can significantly enhance the reach and effectiveness of these initiatives, leading to better engagement and outcomes among TB patients with multimorbidity [21–23]. Nabunya et al. (2015) demonstrated the benefits of peer mentorship in improving health literacy among individuals with HIV [24]. A similar approach can be adapted for TB multimorbidity by utilizing TB champions as peer mentors to simplify complex medical concepts, improve TB multimorbidity management understanding, and empower individuals to take an active role in their health [24]. Importantly, the involvement of TB champions in the design process also fosters ownership and sustainability [21–23]. For instance, in Ghana, TB champions, as key stakeholders in the fight against TB, played a crucial role in active case finding and linking individuals to treatment [25]. Their efforts, particularly in high-burden and hard-to-reach communities, demonstrate the impact of community-driven TB interventions in improving health outcomes.[25] When community members actively participate in shaping interventions, they are more likely to feel invested in the success of these programs and continue to support and champion them in the long term [21–23]. This can lead to sustainable improvements in health literacy and overall health outcomes within TB-affected communities, improving their overall management of other chronic conditions leading to a better quality of life [11, 21]. While TB champions strengthen peer support and community engagement, effective provider-patient communication, e.g. using pictograms (Braich 2011) remains essential within formal healthcare settings to reinforce these efforts [24]. By fostering a more patient-centered approach, providers can build trust, encourage open dialogue, and empower patients to take an active role in their treatment journey [26].

While the involvement of TB champions and community-based interventions provides crucial ground-level support, sustainable improvement in health outcomes requires systematic changes at the policy level. Therefore, effective policy and advocacy efforts are essential to establish a supportive framework prioritizing health literacy and multimorbidity management among TB patients in India. In low-resource settings, leveraging cost-effective, community-driven health literacy initiatives can maximize healthcare impact with minimal investment. Additionally, a multi-stakeholder approach—integrating healthcare professionals, policymakers, researchers, and community representatives—is essential to developing and implementing sustainable, patient-centric care models that enhance TB outcomes in multimorbidity settings. Alongside policy efforts, future research should explore the scalability, cost-effectiveness, and long-term impact of health literacy interventions to ensure their adaptability and effectiveness across diverse healthcare contexts. Strengthening health literacy at every stage of the healthcare journey is essential for improving TB treatment adherence, multimorbidity management, and overall health outcomes. Addressing these disparities through targeted interventions and community-based models presents an opportunity for transformative change in TB care, particularly for patients with multimorbidity.

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Declarations

Competing interests The authors declare no competing interests.

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