Roles of Pharmacist in Tuberculosis: A Narrative Review

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ABSTRACT

Tuberculosis (TB) is a disease resulting from infection with bacteria known as, Mycobacterium tuberculosis. It usually affects the respiratory system. Pharmacists can significantly contribute to ensuring effective routes for the care of patients with tuberculosis. The objective of this narrative review is to identify the possible roles of different types of pharmacists (mainly industrial, hospital, community, and clinical pharmacists) in prevention, diagnosis, and treatment of tuberculosis. This review is divided into four sections: (1) role of pharmacists in tuberculosis medication management; (2) their role in tuberculosis patient support and education; (3) public health collaboration; and (4) role of the pharmacists in resource-limited settings. The first part of the review outlines the responsibilities undertaken by pharmacists in medication management, like dispensing, preventing drug-resistant TB, and promoting medication adherence. The second section describes role of pharmacists in counseling, and diagnosis. The third section includes public health responsibilities, including the prevention of TB transmission and involvement in DOTS (Directly Observed Therapy Short-Course). Finally, the role of pharmacists in settings with limited resources, such as in low- and middle-income countries and other roles are described, along with strategies to enhance the involvement of pharmacists in tuberculosis. Professional assistance, enhanced patient care in the public sector, and promotional efforts in the media could contribute to reinforcing the role of pharmacists in tuberculosis. For aligning with the WHO's new End TB Strategy 2016–2035, health systems should consider utilizing pharmacists to improve tuberculosis identification, diagnosis, and treatment to prevent morbidity and mortality.

Keywords: Mycobacterium tuberculosis, pharmacist, medication management, narrative review, role.

BACKGROUND

Tuberculosis (TB) is an illness caused by an infection with bacteria known as Mycobacterium tuberculosis [1]. Typically, it impacts the respiratory system. The 2016–2035 "End TB Strategy" by the World Health Organization strives to eradicate the worldwide tuberculosis epidemic by 2035. This initiative outlines goals to achieve a 95% reduction in absolute mortality and a 90% decrease in incidence from 2015 to 2035. Additionally, the strategy aims to eliminate the burden of catastrophic tuberculosis-related costs on affected families by 2030 [2].

Pharmacists can significantly contribute to ensuring effective routes for the management of tuberculosis, an illness that impacts more than 9 million people annually [3]. Tuberculosis is an illness that can be transmitted from person to person via airborne particles. When an individual with tuberculosis in their respiratory system coughs, sneezes, or spits, they expel minuscule germs into the surrounding air. Inhaling even a small number of these germs can result in infection. In the year 2020, approximately 1.5 million individuals lost their lives due to TB, with 214,000 of them also co-infected with HIV [4]. Pharmacists are healthcare professionals who specialize in knowing how to properly use, store, protect, and provide medicine [5]. Until now, pharmacists have primarily been limited to their conventional function as mere 'dispensers' when it comes to their involvement in tuberculosis.

Tuberculosis stands as the 13th primary cause of mortality globally and is the second most significant cause of death attributable to an infectious disease, with COVID-19 ranking first (preceding HIV/AIDS) [6]. However, pharmacists can contribute to the management and regulation of tuberculosis in various ways. They can have a significant impact on preventing and treating tuberculosis by encouraging people to take their medicine as prescribed, checking if patients have any factors that could make their disease harder to treat, giving advice on how to control and prevent the spread of the disease, and keeping an eye on how well the medicine is working, any negative effects it may have, and if it interacts with other drugs [7].

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Thus, the goal of this narrative review is to depict the multiple roles of pharmacists in tuberculosis. It analyses the role of various types of pharmacists in the measures to prevent, diagnose, and treat tuberculosis. This narrative review is structured into four primary segments: (1) the pharmacist's involvement in managing tuberculosis through medication; (2) the pharmacist's contributions to supporting and educating tuberculosis patients; (3) collaborative efforts in public health; and (4) role of the pharmacist in resource-limited settings. Although the literature lacked a systematic approach, it involved looking through various sources, like asking experts for advice and checking the references of the sources found. It also included searches in online databases (PubMed, Medline, ISI Web of Knowledge and Google Scholar). The databases were searched using terms related to pharmacy, pharmacist roles, and tuberculosis. The inclusion criteria encompassed only papers written in English.

1. Role of the Pharmacist in medication management

Dispensing

A well-recognized domain of the pharmacist's responsibilities lies in the dispensing of anti-TB medications. It is crucial to administer these medicines precisely according to the prescribed instructions, with the right amount and for the recommended time. Pharmacists can identify any possible mistakes in prescriptions for TB medicines, and they should reach out to the doctor who prescribed them to clarify any concerns [7].

DOTS centers in Nepal lack pharmacist involvement in dispensing anti-TB medication posing potential risks to medication safety and patient care. Integrating pharmacists into these centers is essential to ensure accurate drug dispensing, enhance treatment adherence, and mitigate the risk of medication-related issues. Addressing this gap will optimize the DOTS strategy, promoting a more comprehensive and effective approach to tuberculosis treatment in Nepal.

Community pharmacies provides a readily accessible and acceptable – although not economically feasible – service for numerous tuberculosis patients in developing nations such as Nepal. A considerable quantity of anti-TB medications is retailed in private pharmacies. Pharmacists have the potential to play a role in collaborative initiatives between the private and public sectors to combat tuberculosis. Pharmacists can play a pivotal role in dispensing antitubercular drugs with their counseling and interpersonal skills [8].

Prevent Drug Resistant TB

The overuse of antitubercular medications can cause delay in tuberculosis diagnosis and lead to the development of drug-resistant tuberculosis. For instance, it has been found that the overuse of fluoroquinolones hinders prompt diagnosis of tuberculosis and cause drug-resistant tuberculosis. Pharmacists can monitor the overuse of such medication directly and prevent drug-resistant TB [9]. The bactericidal activity of fluoroquinolones against Mycobacterium tuberculosis delay tuberculosis diagnosis. Thus, addressing the overuse of antitubercular medications is vital in preventing delays in diagnosis and the emergence of drug-resistant strains. Pharmacists, through their expertise in medication management and patient education, can play a pivotal role in promoting responsible prescribing practices and safeguarding the efficacy of the treatment regimens.

Role in Medication Adherence

A 2012 study in Philadelphia, USA, involving 436 refugees assessed the impact of a pharmacist-run clinic on completing latent tuberculosis infection (LTBI) treatment. Of the 103 referred to the clinic, 94% completed their LTBI treatment, with 40% requiring pharmacist assistance for treatment adherence [10]. The integration of clinical pharmacists into interdisciplinary healthcare teams can boost medication adherence and completion rates among refugee populations, resulting in enhanced public health outcomes.[9] When pharmacists educate patients about how to use their medications and address any concerns related to pharmaceutical care, it can enhance patients' adherence to tuberculosis treatment [11]. Thus, pharmacists can promote adherence to antitubercular medicine.

2. Patient support and education

Counseling

Ensuring adherence is difficult due to the extended duration of the treatment, a large quantity of pills, and possible side effects (some of which might be concerning to the patients, such as the discoloration of urine and tears to orange or red). Furnishing comprehensive information about the anticipated experiences during such treatment is crucial to empower patients and support them in achieving successful outcomes. Tubercular patients should be informed about crucial medication details, such as the importance of persisting with the treatment even after symptoms improve, and the necessity to assess potential interactions before consuming additional medications. For instance, rifampicin diminishes the efficacy of oral contraceptives. It is also essential to inform patients about the necessity of restricting alcohol consumption, the likelihood of encountering various side effects, and the importance of promptly reporting any symptoms suggestive of toxicity, such as alterations in vision or yellowing of the skin. In these aspects, pharmacists can play a vital role. Although pharmacists are at risk of tuberculosis infection by transmission from patients when counseling, they could play a pivotal role in counseling patients who are taking antitubercular medicines [12].

Diagnosis

Studies conducted in many countries with a high prevalence of tuberculosis indicate that individuals exhibiting indistinct symptoms such as a persistent cough, often initially search for medical help at private pharmacies. However, diagnosis of tuberculosis patients exceeds the boundaries of a pharmacist's knowledge and proficiency, individuals with suspected tuberculosis should be directed for testing instead. Pharmacists, utilizing their clinical skills can refer individuals experiencing a cough lasting two weeks or more to a designated microscopy center nearby for sputum testing that helps in prompt diagnosis of tubercular patients and prevents transmission to others. Conducting and interpreting tubercular skin tests necessitates training, resources, and a brief time commitment, all of which the pharmacist can manage and integrate into their daily routines [13].

In March 2011, pharmacists in New Mexico were granted the capability to prescribe, administer, and interpret tuberculin skin tests (TSTs) to enhance the accessibility of the testing. The implementation of TB testing by pharmacists was identified as a valuable public health asset. This

initiative could prove particularly advantageous in states facing shortages of healthcare professionals or encountering access challenges in rural regions [14]. So, pharmacists mainly community pharmacists can help in detecting undiagnosed cases of tuberculosis as they are the initial point of contact for numerous sick individuals.

Referral

A new intervention for TB screening and referral was tested for 18 months, involving the enlistment of 105 pharmacies in Patna, India. The intervention resulted in a substantial increase in both patient enrollment into the TB care cascade and the diagnosis of TB. Therefore, involving pharmacies in TB screening and referral endeavors is both viable and effective, particularly when integrated into established public-private mix (PPM) programs. This approach appeals to the business-oriented mindset of pharmacies, especially those embedded in robust community networks [15]. Thus, pharmacists especially community pharmacists can refer patients with TB-like symptoms to doctors for TB testing which could assist in the timely identification and treatment of individuals with tuberculosis.

Public health collaboration

Pharmacists have the potential to transition beyond mere product retailing and assume a significant public health role, encompassing promotion, prevention, and the management of tuberculosis [9]. Thus, pharmacists have the capacity to advocate for the well-being of the entire population, guarantee safety, and safeguard against the transmission of tuberculosis. They can also contribute to ensuring the populace's access to secure and high-quality anti-tuberculosis care.

Prevent antibiotic resistance

Pharmacists can monitor the safe and effective use of first-line and second-line antitubercular medications by patients. Use of a specified drug regimen along with following a complete duration of treatment helps to prevent antibiotic resistance. The pharmacist plays a pivotal role in this aspect. Pharmacists play a crucial role in preventing symptomatic but undiagnosed TB patients from receiving potentially harmful medications, such as antibiotics [9]. In this way, pharmacists can prevent resistance to antibiotics and antitubercular medicines.

Prevent tuberculosis transmission

A qualitative study comprising focus group discussions with pharmacy owners was conducted in Cambodia. Many owners expressed great concern over the risk of TB infection in pharmacies to other customers, themselves, and their families. Despite this, Cambodian pharmacy owners were committed to reducing TB transmission and were willing to acquire further knowledge in pursuit of this goal. Community pharmacists are usually the first people that tuberculosis patients and their families reach out to for help [12]. Thus, the pharmacists could raise awareness among tubercular patients, their families, and community about the prevention of its transmission.

Involvement in Directly Observed Therapy Short course (DOTS)

The study conducted in Tamil Nadu, India, examined the understanding of pharmacists regarding tuberculosis treatment, the National Tuberculosis Control Programme (NTCP), and the directly observed therapy short-course (DOTS) strategy. The researchers also assessed the pharmacists' willingness to actively engage in the NTCP. Results suggested that there is potential to engage private pharmacies as DOTS providers and advocates for treatment completion within the RNTCP. Additionally, there is an opportunity to raise awareness about tuberculosis and DOTS in the community through such involvement. So, pharmacists can enhance the quality of DOTS and NTCP through their involvement. The government should proactively encourage private pharmacies to participate in the National Tuberculosis Programme by promoting, training, and instilling a sense of ownership [8].

3. Role in low- and middle-income countries

In low- and middle-income countries (LMICs), community pharmacists have traditionally been primarily involved in dispensing and selling medications, with limited involvement in other aspects of healthcare. In the realm of tuberculosis (TB) care, this limited emphasis confines the involvement of pharmacies to merely dispensing prescriptions for anti-TB medications [9]. In many countries with a significant burden of tuberculosis, individuals with TB symptoms and those already identified as TB patients often prefer seeking care from private providers, including pharmacists, despite the presence of national TB programs offering free testing and treatment services. The accessibility of private providers, characterized by abundant numbers, extended operating hours, walk-in services without appointments, absence of user fees, and a robust community presence, makes them attractive points of care, especially in communities with limited access to more specialized or qualified medical services [16]. Studies conducted in India, Vietnam, Uganda and Tanzania reveal that 40–60% of individuals with tuberculosis first consult pharmacies before seeking assistance from a diagnostic facility or medical professional [14,17,18]. In low- and middle-income countries, such as Nepal, where a significant proportion of tuberculosis patients seek care in the private sector, particularly in urban areas, pharmacies play a crucial and varied role in providing health services related to tuberculosis. Thus, the engagement of pharmacists becomes pivotal in contributing to the management and care of tuberculosis patients in these regions [19].

4. Other roles

Pharmacists helping with TB services can offer more chances to educate patients and help them manage their medications if they have the disease. Pharmacists can help to ensure TB medicine availability and Industrial pharmacist could ensure TB medicine quality helping prevent the administration of substandard and falsified anti-TB drugs to patients. Also, the clinical pharmacist could play a vital role in prescribing and deprescribing of antitubercular medicines, and pharmacists involved in the research could promote drug discovery and development of antitubercular medicines [3].

CONCLUSION

In conclusion, involving pharmacists in the distribution of anti-TB drugs at DOTS centers in Nepal is essential for ensuring safe and effective treatment. Community pharmacies, with pharmacist involvement, can offer accessible services for tubercular patients, contributing to better outcomes. Pharmacists play critical roles in preventing drug-resistant tuberculosis, promoting adherence, and raising awareness about its transmission. In low- and middle-income countries, where private providers, including pharmacists, are often the first point of contact for TB care,

their engagement is crucial. Furthermore, pharmacists can enhance public health efforts, collaborate with TB programs, and contribute to research and drug development, emphasizing their versatile role in tuberculosis management. Overall, integrating pharmacists into TB care is vital for optimizing treatment, preventing resistance, and improving the well-being of individuals affected by this global health challenge.

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