

Factors Affecting Diagnostic Delay in Newly Diagnosed Pulmonary Tuberculosis Patients in the Modern Era: A Brief Review

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ABSTRACT

Tuberculosis (TB) is a major communicable disease that affects one-third of the world's population. The management, as well as prognosis, depends on the early identification and diagnosis. Delay in diagnosis leads to worsening of the patient's clinical condition and the emergence of resistant bacilli. The purpose of the review article is to describe the factors affecting delay in diagnosis in newly diagnosed pulmonary tuberculosis patients. For eight months, researchers searched PubMed, the WHO website, and Google Scholar for all materials pertaining to the topic. In total, 30 articles reflecting on the various causes of diagnosis delay were chosen and analyzed. The educational status, income status, distance to the healthcare facility, cost, initial consultation with the type of healthcare personnel in the healthcare system, and frequency of consultations were associated with the delays. A multimodal strategy is needed to alleviate the delay in diagnosing pulmonary tuberculosis.

Keywords: Diagnostic delay, Health system delay, Patient delay, Tuberculosis.

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INTRODUCTION

Tuberculosis (TB) is spread by mycobacterium tuberculosis through droplet infection. Tuberculosis (TB) infection is present in a quarter of the world population but not all of them are affected by the TB disease.¹ Delay in the diagnosis of tuberculosis is divided into patient delay, hospital delay, and diagnostic delay.² There are various causes for the delay of pulmonary tuberculosis in patients delays as age, female gender, difficulty to access the care center, employment status, presence of smoking and alcoholism, presence of other comorbidities like diabetes, negative attitude toward treatment and disease, consultation with multiple HCP's and in diagnostic delay like negative sputum smear, antibiotic use or immunosuppressive drug use during the time of contact, physician unable to guide and identify the nonconventional symptoms, inadequate referral or sputum smear examination.²⁻¹⁵ The goal of the study was to figure out what factors influence diagnostic delay in patients with newly diagnosed pulmonary tuberculosis.

REVIEW OF LITERATURE

A review of the literature of this study is discussed under the following headings:

- Delays in TB (newly diagnosed)
- Studies related to the topic

Delays in TB (Newly Diagnosed)

To understand the delay in diagnosis, the pathway of patient care needs to be understood. The factors affecting each phase during the continuum of care from the appearance of symptoms to the treatment completion constitute the pathway.¹⁶

The delays involved in the diagnosis of TB are, the time between the onset of the first symptom and the first visit to a skilled doctor or health facility was defined as the patient delay. The time

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between the initial visit to a skilled doctor/health facility and the diagnosis of pulmonary tuberculosis is referred to as the doctor's delay. Diagnostic lag is defined as the time between the onset of symptoms and the diagnosis of pulmonary tuberculosis. Treatment lag is defined as the time between diagnosis of pulmonary tuberculosis and the start of guideline-based care. The time lag between initial contact with a qualified doctor/health institution and the start of treatment is referred to as the health system delay. The total delay was referring to the time it took from the onset of the first symptom to the start of treatment.¹⁷

The Factors Affecting Delays

Individual delay: The factors affecting patients from not seeking the treatment at right time and from the right person. The factors can be

- **Sociodemographic factors**
 - **Increasing age**—As age progresses the features specific to TB become obscure and people will be more stigmatized to seek healthcare. Also, it is difficult to identify TB symptoms among other comorbidities, or less typical TB presentation.¹⁸⁻²⁰

- **Female gender**—Females are ostracized more in the household and are described as being more isolated, suffering from psychological consequences, dread of divorce, losing marriages, or having bargained marital chances for their children. Furthermore, due to stigma, women are more likely to conceal their illness or delay obtaining treatment. Limited knowledge and health-seeking also attribute more toward delay.²¹
- **Physical**—Proximity, travel constraints, and/or access to TB treatment facilities are all factors to consider.^{22–24}
- **Stigma**—Men described stigma in the job, community, and marital prospects, whereas women described stigma among family members, as well as psychosocial issues, feelings of loneliness, and a lack of good family care.^{25–27}
- **Health literacy**—Knowledge and education about tuberculosis.^{28,29}

Studies Related to the Topic

In 2000, Johansson et al. came to the conclusion that there are three key variables that cause delays in seeking medical help. First and foremost, TB stigma appeared to be mediated by disbelief and nondisclosure of diagnosis of the disease, resulting in a delay in seeking medical help—a trend identified particularly in women. Second, subjects who were afraid of high individual costs for therapy or avoided going to public health facilities altogether, especially among men, and third, hospital facilities, particularly at the community level, did not meet people's expectations of efficient and effective healthcare services in areas such as infrastructure and human skill.³⁰

Golub et al. in 2005 found that 25% of patients with smears positive for AFB and 45% of all TB patients in Maryland remained undiagnosed 30 days after first contacting a physician whereas 16% remained undiagnosed 90 days after their first healthcare visit. Of the 158 patients that visited a healthcare provider an average of 2.6 times before being diagnosed with TB, and of 398 healthcare visits made by symptomatic patients in this cohort, only 40% resulted in a TB diagnosis.³¹

In 2006, Tobgay et al. conducted research to determine the factors that influence the time between the onset of symptoms and the first consult to a treatment center (patient delay), as well as the time between a patient's first visit to a medical center and the diagnosis of TB disease (health system delay). The median delays for patients and health systems were 21 and 7 days, respectively. Patient delays of more than 30 days were reported by 17% of participants, and health system delays of more than 7 days were recorded by 49%. Patient delays were linked to self-medication, using government doctors as first contacts, using traditional healers, and treatment costs. The initial encounter with private providers and the expense of therapy were both significant factors in healthcare delays.³²

Cambanis et al. in a 2007 study in Cameroon, Cambanis et al. found that TB stigma was an important predictor of delays of more than 4 weeks, but the association disappeared with multivariate adjustment.³³

In 2008, Lacroix et al. conducted a study to characterize respiratory tuberculosis diagnosis delays, as well as to discover the features of patients and factors related to longer diagnosis delays, as well as the outcomes of these delays. The average time between diagnosis and treatment was 92.2 days. A longer diagnosis delay was linked to weight reduction and/or non-specific generalized discomfort.³⁴

In 2008, Gosoinu et al. conducted a study to determine the time between the onset of symptoms and the diagnosis of tuberculosis in men and women, as well as to quantify sociocultural and gender-related characteristics of sickness explaining the diagnostic delay. The research looked at TB control programs in Bangladesh, India, and Malawi. India had the longest median time between the onset of symptoms and diagnosis, while Malawi had the lowest. Delay was linked to female sex (Bangladesh) and being a homemaker (Malawi). Nonspecific symptoms such as chest discomfort (Bangladesh) and shortness of breath (Malawi) were also noteworthy. In India, the cough was associated with early detection of tuberculosis.

Machado et al. in 2011 did a study to estimate the overall period elapsed amid symptom beginning and analysis of pulmonary tuberculosis (delay from patient side plus delay in healthcare system) and to analyze the factors related to delayed diagnosis. From the onset of symptoms until diagnosis, the median period was 68 days. The median delay on the patient's part was 30 days, and also the median delay on the healthcare service's side was 21 days (from the earliest medical visit to analysis). The variables considerably related to patient delay were female gender, cough, and unemployment, whereas only the female gender was suggestively linked with healthcare system delay in healthcare system.³⁵

In 2012, Belay et al. published a study that looked at how long it took for TB to be diagnosed and treated. Patients and the health system had 20 and 33.5 days of median measure delay, respectively. The typical treatment delay was 1 day, while the median total delay was 70.5 days. Self-treatment and the first visit to a nonformal health provider were found to be major factors in the patients' delay after further investigation. Having extrapulmonary tuberculosis (TB) and making an initial visit to a medical center, or a private health facility was also revealed to be major variables in the health system's delay.³⁶

Luisgnani et al. in 2013 did a study to calculate the aspects of persuading the patient and the health system delay in TB judgement in Angola. The median measure of the total time elapsed from the start of symptoms to judgement was 45 days. The median measure of patient delay was 30 days, and the median measure of healthcare system delay was 7 days. Primary education and initial contact health center contradictory from the DOTS center were noteworthy predictors for the delay in patient >4 weeks. Living in a suburban area, having a delaying time in the center for more than 1 hour, and the initial contact health center contradictory from the DOTS center were factors persuading the delay in the system.⁴

Yimer et al. conducted a study in 2014 to examine the length of respondents' delays and analyze characteristics such as subject, health systems, and total delays. The median time of delay for patients was 21 days, the median time of delay for health systems was 27 days, and the total length of delay was 60 days. In comparison to patients in metropolitan regions, those in rural areas reported a threefold increase in delay. When compared to extrapulmonary TB cases, the majority of pulmonary cases were less likely to delay seeking treatment. In comparison to individuals who consulted hospitals first, those who sought medical clinics, private facilities, and health posts were more likely to experience a surge in health system delays.³⁷

In a study published in 2015 by Osei et al., the median overall delay in identifying new TB patients was 104 days. The median patient wait time was 59 days, and also the average wait time for healthcare services was 45 days. Not having medical insurance and having a negative perception of the patient were both significant

predictors of a long wait time. Multiple healthcare contacts after indications and symptoms were linked to a longer wait for healthcare services.³⁸

In 2015, Cai et al. conducted a study in Asia to investigate factors linked to patient and provider delays in TB diagnosis and treatment. Patient delay was consistently linked to joblessness, limited wage, hemoptysis, and abnormal sputum smears. Consultation in a government hospital was also linked to provider delays.³⁹

In 2017, Bogale et al. discovered that the average overall delay (in days) between tuberculosis diagnosis and treatment initiation was 41.6 days. The typical patient wait time was 33.9 days, whereas the median medical system wait time was 5 days. The total time it took to diagnose and cure tuberculosis was shorter among HIV-positive persons. Rural residents had a long patient wait time, while higher household income was linked to a shorter wait time. The use of multiple healthcare practitioners and pursuing initial care from primary-level healthcare facilities were both positively associated with health system delay.⁴⁰

In 2012, Hussen et al. discovered that the patient's gender, individualized stigma, reading level, and family size all played a role in the total delay. Furthermore, patients' understanding and awareness of tuberculosis are still lacking.⁴¹

In a study published in 2019, Christian et al. discovered that the deficiency of consultation for coughs lasting more than 2 weeks suggests that case-finding should be improved. These insights on the health-seeking activity should help policymakers create TB screening and effective case-finding strategies that are tailored to the features of chronic cough sufferers who do not seek medical attention.⁴²

CONCLUSION

In this study, 94 (81.7%), 69 (60%) and 100 (87%) subjects had patient, health system, and diagnostic delays, respectively. In the study, most of the subjects had diagnostic delays followed by patient and health system delays. The educational status, income status, distance to a healthcare facility, cost, initial consultation with the type of healthcare personnel in the healthcare system, and frequency of consultations were associated with the delays.

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