

UNIVERSITI TEKNOLOGI MARA

**CHARACTERISTICS, SURVIVAL
TIMES AND PROGNOSTIC
FACTORS OF TB LOSS TO
FOLLOW UP (LTFU) IN MALAYSIA
– A 5-YEAR RETROSPECTIVE
COHORT FROM 2014 TO 2018**

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ABSTRACT

The increasing prevalence of tuberculosis (TB) loss to follow-up (LTFU) remains a significant challenge in Malaysia's TB control efforts. TB patients who become LTFU contribute to prolonged disease transmission, increased drug resistance, and higher healthcare costs. This study aims to determine the prevalence, characteristics, and prognostic factors of TB LTFU in Malaysia from 2014 to 2018, using data from the MyTB (National TB Registration). It also investigates the mean/median time to LTFU to identify critical periods for targeted interventions. A retrospective cohort study was conducted on the 97,542 selected samples, focusing on sociodemographic, treatment duration, comorbidity, and treatment-related factors. Kaplan-Meier methods were applied to assess the survival times (time-to-event) and risk of LTFU among different patient groups. Cox Proportional Hazard analysis was applied to determine the prognostic factors of TB LTFU. The findings reveal that the highest LTFU rates occurred among previously treated TB patients and those with comorbidities, such as HIV. Overall TB LTFU prevalence was 6.7%, with yearly prevalence reduce from 7.09% to 5.71%. The median time to LTFU was within the continuation phase of treatment, emphasizing the importance of sustained follow-up during this period. Prognostic factors identified include age, gender, nationality, ethnicity, residential area, education, employment status, DM, HIV, smoking, treatment place, TB anatomical location, TB category, healthcare worker status, chest x-ray severity, and DOT status. Further subgroup analysis shows changes of prognostic factors behaviour when stratified by DOT status. These results underscore the need for a holistic and strategic approach to TB management, including enhanced adherence counselling, patient education, and resource allocation for high-risk groups. This study aligns with Malaysia's National Strategic Plan to End TB and the global targets for TB elimination by 2030, offering insights to policymakers and healthcare professionals to reduce LTFU and improve TB treatment outcomes.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction to Tuberculosis (TB)

Tuberculosis (TB) is a chronic infectious disease caused primarily by the bacterium *Mycobacterium tuberculosis*. The history of TB dates back thousands of years, with evidence of the disease found in ancient Egyptian mummies and in the writings of Hippocrates (Morse et al., 1964). The causative agent, *Mycobacterium tuberculosis*, was first identified in 1882 by Robert Koch, marking a significant milestone in the understanding of infectious diseases. Koch's discovery not only provided a scientific basis for the diagnosis and treatment of TB but also catalysed public health initiatives aimed at controlling its spread (Gradmann, 2001). The bacterium is an aerobic organism that primarily affects the lungs but can also impact other parts of the body, including the kidneys, spine, and brain (Churchyard et al., 2017).

Transmission of TB occurs primarily through airborne particles expelled when an infected person coughs, sneezes, or talks. These droplets can remain suspended in the air for extended periods, making crowded and poorly ventilated spaces particularly conducive to the spread of the disease. Symptoms of TB include a persistent cough, chest pain, weight loss, fever, and night sweats. Importantly, the disease can remain latent in individuals who do not exhibit symptoms, yet they can still transmit the infection to others (Churchyard et al., 2017).

Common risk factors for TB include close contact with infected individuals, compromised immune systems (such as those with HIV/AIDS), malnutrition, and living in crowded or unsanitary conditions. Certain populations, including healthcare workers, the homeless, and individuals in correctional facilities, are at heightened risk due to their increased exposure to TB (Joshi et al., 2006; Kranzer et al., 2010). The resurgence of TB in recent decades has been exacerbated by the HIV epidemic and the emergence of drug-resistant strains of the bacterium, which complicate treatment and control efforts (Auld et al., 2017; Borgdorff & Soolingen, 2013).

Standard treatment for TB involves a regimen of antibiotics, typically including isoniazid, rifampicin, ethambutol, and pyrazinamide, administered over a period of six