

## The Effect of Undernutrition on Sputum Culture Conversion and Treatment Outcomes among People with Multidrug-Resistant Tuberculosis: A Systematic Review and Meta-Analysis

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**Abstract :** Background: Undernutrition is a risk factor for tuberculosis (TB), including poor treatment outcomes. However, evidence regarding the effect of undernutrition on TB treatment outcomes is not well understood. We aimed to evaluate the effect of undernutrition on sputum culture conversion and treatment outcomes among people with multi-drug resistance (MDR)-TB. Methods: We searched for publications in the Medline, Embase, Scopus, and Web of Science databases without restrictions on geography or year of publication. We conducted a random-effect meta-analysis to estimate the effects of undernutrition on sputum culture conversion and treatment outcomes. Two reviewers independently assessed the study eligibility, extracted the necessary information, and assessed the risk of bias. Depending on the nature of the data, odds ratio (OR) and hazard ratio (HR) with 95% confidence intervals (CIs) were used to summarize the effect estimates. Potential publication bias was checked using funnel plots and Egger's tests. Results: Of 2358 records screened, 59 studies comprising a total of 31,254 people with MDR-TB were included. Undernutrition was significantly associated with a lower sputum culture conversion rate (HR 0.7, 95% CI 0.6-0.9, I<sup>2</sup>=67.1%) and a higher rate of mortality (OR 2.9, 95%CI 2.1-3.8, I<sup>2</sup>=23.7%) and unfavourable treatment outcomes (OR 1.8, 95%CI 1.5-2.0, I<sup>2</sup>=72.7%). There was no statistically significant publication bias in the included studies. Three studies were low, forty-two studies were moderate, and fourteen studies were high quality. Interpretations: Undernutrition was significantly associated with unfavourable treatment outcomes, including mortality and lower sputum culture conversion among people with MDR-TB. These findings have implications for supporting targeted nutritional interventions alongside standardised second-line TB drugs.

**Keywords :** undernutrition, MDR-TB, sputum culture conversion, treatment outcomes, meta-analysis

**Conference Title :** ICADMIMT 2022 : International Conference on Antimycobacterial Drugs, Mycobacterial Infections and Mycobacterium Tuberculosis

**Conference Location :** Tokyo, Japan

**Conference Dates :** September 08-09, 2022