

ABSTRACT

Background: *Extrapulmonary tuberculosis (EPTB) is a disease that is difficult to diagnose and treat, with high morbidity and mortality rates, making accurate diagnosis crucial. This study aims to evaluate the effectiveness of molecular and non-molecular examination methods in EPTB diagnosis and identify types of non-tuberculosis mycobacterium (NTM) that infect extrapulmonary organs in humans.*

Methods: *This study employed a systematic review methodology following PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines in the identification, screening, eligibility, and inclusion processes. Literature searches were conducted on electronic databases including Google Scholar, PubMed, and Science Direct, using keywords: "extrapulmonary tuberculosis", "molecular diagnostic", "non-molecular diagnostic", and "non-tuberculosis mycobacterium". Inclusion criteria included articles in English and Indonesian, studies with primary data, and EPTB diagnostic studies. Study quality assessment was performed using the QUADAS-2 (Quality Assessment of Diagnostic Accuracy Studies) instrument. Data were extracted independently and analyzed descriptively.*

Results: *From 222 identified studies, 15 studies met the inclusion criteria and were analyzed in this review. Results showed that in order from most effective to less effective were GeneXpert, culture, and microscopic. Among identified NTM cases, Mycobacterium avium and Mycobacterium kansasii were the most commonly found species infecting human organs.*

Conclusion: *GeneXpert is the most accurate diagnostic method for EPTB with the highest sensitivity and specificity, followed by culture, histopathology, and microscopic examination. M. avium and M. kansasii are the most prevalent NTM species in extrapulmonary infections. Study limitations include methodological heterogeneity across studies and variations in operational definitions used.*

Keywords: *Extra-pulmonary tuberculosis, mycobacterial nontuberculosis, molecular diagnostics, non-molecular diagnostics.*

ABSTRAK

Latar Belakang: Tuberkulosis ekstra paru (TBEP) adalah penyakit sulit di diagnosis dan diobati dengan angka kesakitan dan kematian tinggi, sehingga diagnosis akurat sangat penting. Penelitian ini bertujuan untuk mengevaluasi efektivitas metode pemeriksaan molekuler dan non-molekuler dalam diagnosis TBEP serta mengidentifikasi jenis nontuberkulosis mikobakteria (NTM) yang menginfeksi organ ekstra paru pada manusia.

Metode: Penelitian ini menggunakan metode tinjauan sistematis (*systematic review*) dan mengikuti pedoman PRISMA (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) dalam proses identifikasi, penyaringan, kelayakan, dan inklusi. Pencarian literatur dilakukan pada basis data elektronik Google Scholar, PubMed, dan Science Direct, menggunakan kata kunci: "*extrapulmonary tuberculosis*", "*molecular diagnostic*", "*non-molecular diagnostic*", dan "*non-tuberculosis mycobacterium*". Kriteria inklusi meliputi artikel berbahasa Inggris dan Indonesia, penelitian dengan data primer, dan studi diagnostik TBEP. Penilaian kualitas studi menggunakan instrumen QUADAS-2 (*Quality Assessment of Diagnostic Accuracy Studies*). Data diekstraksi secara independen dan dianalisis secara deskriptif.

Hasil: Dari 222 studi yang diidentifikasi, 15 studi memenuhi kriteria inklusi dan dianalisis dalam tinjauan ini. Hasil menunjukkan bahwa secara berurutan dari efektivitas terbaik hingga kurang efektif adalah GeneXpert, kultur, dan mikroskopis. Dari kasus NTM yang teridentifikasi, *Mycobacterium avium* dan *Mycobacterium kansasii* merupakan spesies yang paling sering ditemukan menginfeksi organ manusia.

Kesimpulan: GeneXpert merupakan metode diagnostik paling akurat untuk TBEP dengan sensitivitas dan spesifisitas tertinggi, diikuti oleh kultur, histopatologi, dan mikroskopis. *M. avium* dan *M. kansasii* adalah spesies NTM yang paling prevalent dalam infeksi ekstra paru. Keterbatasan penelitian ini meliputi heterogenitas metodologi antar studi dan variasi dalam definisi operasional yang digunakan.

Kata kunci: Tuberkulosis ekstra paru, nontuberkulosis mikobakteria, diagnostik molekuler, diagnostik non-molekuler.