

STUDI GEOSPASIAL DAN PREVALENSI *NON-TUBERCULOUS MYCOBACTERIA* : SKRINING AKTIF DI WILAYAH KERJA PUSKESMAS IMOIRI 2 BANTUL, YOGYAKARTA

RINGKASAN

Latar Belakang: Infeksi *Non-Tuberculous Mycobacteria* (NTM) terus meningkat secara global, termasuk di Asia, dengan pola distribusi yang dipengaruhi faktor geografis dan lingkungan. Di Indonesia, NTM semakin sering dilaporkan namun masih kurang teridentifikasi akibat tumpang tindih gejala dengan tuberkulosis, sehingga menyulitkan diagnosis. Keterbatasan data epidemiologi menegaskan pentingnya metode molekuler, khususnya PCR, untuk membedakan NTM dari *M. tuberculosis*. Penelitian ini bertujuan menggambarkan karakteristik klinis dan demografis individu dengan deteksi NTM serta menganalisis hubungan geospasial dan pola distribusinya di wilayah Puskesmas Imogiri 2.

Metode: Desain observasional deskriptif digunakan untuk menilai prevalensi temuan NTM melalui kegiatan skrining aktif berbasis komunitas.

Hasil: Penelitian ini bertujuan mengidentifikasi keberadaan NTM melalui skrining aktif berbasis *real-time quantitative* PCR (qPCR) di Wilayah Kerja Puskesmas Imogiri 2, Bantul, Yogyakarta. Dari 125 partisipan, sebanyak 85 mengumpulkan sputum, dan 9,41% sampel terdeteksi positif NTM dengan nilai CT >35. Partisipan positif didominasi usia lanjut dan perempuan, sebagian memiliki komorbid, namun mayoritas tanpa gejala respiratorik dan seluruh pemeriksaan BTA serta GeneXpert negatif. Pemeriksaan qPCR SYBR Green tidak mengidentifikasi spesies spesifik. Analisis spasial menunjukkan sebaran kasus dekat sungai, fasilitas umum, wilayah berkelembaban tinggi, serta area dengan variasi kepadatan bangunan dan vegetasi. Temuan ini menegaskan bahwa paparan NTM di komunitas lebih dipengaruhi faktor lingkungan daripada faktor klinis individu.

Kesimpulan: Penelitian ini menunjukkan bahwa temuan NTM di Wilayah Kerja Puskesmas Imogiri 2 terutama muncul pada partisipan usia lanjut dan perempuan, dengan mayoritas tanpa gejala respiratorik maupun kelainan radiologis. Analisis spasial menunjukkan faktor ekologis dalam distribusi NTM di komunitas.

Kata kunci: *nontuberculous Mycobacteria*, NTM, geospasial, skrining, PCR

GEOSPATIAL STUDY AND PREVALENCE OF *NON-TUBERCULOUS MYCOBACTERIA*: ACTIVE SCREENING IN THE WORKING AREA OF PUSKESMAS IMOIRI 2 BANTUL, YOGYAKARTA

ABSTRACT

Background: *Non-Tuberculous Mycobacteria* (NTM) infections have shown a marked global increase, including across Asia, with species distribution strongly influenced by geographic and environmental factors. In Indonesia, NTM is increasingly reported yet remains under-recognized due to its clinical overlap with tuberculosis, complicating diagnosis and case management. Limited national epidemiological data highlight the need for molecular methods, particularly PCR, to distinguish NTM from *Mycobacterium tuberculosis*. This study aimed to describe the clinical and demographic characteristics of individuals with NTM detection and to analyze geospatial relationships and distribution patterns within the Imogiri 2 Primary Health Care catchment area.

Methods: A descriptive observational design was applied to assess the prevalence of NTM findings through community-based active screening.

Results: This study identified the presence of NTM using real-time quantitative PCR (qPCR) based active screening in the Imogiri 2 area, Bantul, Yogyakarta. Of 125 participants, 85 submitted sputum specimens, and 9.41% tested positive for NTM with CT values >35. Positive subjects were predominantly older adults and women, some with comorbidities, yet most exhibited no respiratory symptoms and had negative smear microscopy and GeneXpert results. Species-level identification using SYBR Green qPCR was negative. Geospatial analysis indicated that NTM-positive locations were situated near rivers, public facilities, high-humidity zones, and areas with varied housing density and vegetation. These findings suggest that environmental factors play a more substantial role than host clinical characteristics in community-level NTM exposure.

Conclusion: This study shows that NTM findings in the Imogiri 2 Community Health Center work area primarily occurred in elderly and female subjects, with the majority asymptomatic and without respiratory symptoms or radiological abnormalities. Spatial analysis revealed ecological factors in the distribution of NTM in the community.

Keywords: *nontuberculous Mycobacteria*, NTM, geospatial analysis, screening, PCR