



## **SLCO1B1 Gene Polymorphisms in Pulmonary Tuberculosis Patients of Papuan Ethnicity in Jayapura City**

### **ABSTRACT**

**Background:** Tuberculosis (TB) remains a public health concern globally. Rifampicin is the key drug in TB treatment. The metabolism of rifampicin involves the *OATP1B1*. The *SLCO1B1* gene encodes this protein. Studies conducted in Africa have shown that genetic variations in *SLCO1B1*, particularly at the SNPs rs4149056 and rs2306283, can reduce the activity of the OATP1B1 transporter, leading to delayed sputum conversion (>2 months) among African TB patients compared to non-African populations. Genetically, the Papuan ethnic group shares similarities with African populations. Therefore, this study was conducted among TB patients of Papuan ethnicity.

**Objective:** This study aims to identify variations in the *SLCO1B1* gene at SNPs rs4149056 and rs2306283 and to analyze their association with second-month sputum conversion outcomes among TB patients of Papuan ethnicity in Jayapura City.

**Methods:** A cross-sectional study was conducted in Jayapura City. Blood samples were collected from 97 patients. The SNP rs4149056 was identified using the ARMS-PCR method, while SNP rs2306283 was analyzed using the RFLP-PCR method.

**Results:** The study found allele variations at SNP rs4149056, with 42 (43.3%) exhibiting the wild-type variant and 55 (56.7%) showing the heterozygous variant. For SNP rs2306283, three genotypes were observed: 54 (55.7%) had the wild type, 31 (32%) were heterozygous, and 12 (12.4%) were homozygous mutants. The presence of allele variations in the *SLCO1B1* gene did not affect second-month sputum conversion. Additionally, demographic factors such as age, sex, treatment adherence, diabetes mellitus, and hypertension were not significantly associated with sputum conversion ( $p > 0.05$ ). Binary logistic regression analysis indicated no significant association between genetic or sociodemographic factors and sputum conversion outcomes ( $OR < 1$ ).

**Conclusion:** We found genetic variation in the *SLCO1B1* gene for SNP sr4149056 and rs2306283. However, there is no association between *SLCO1B1* gene polymorphism and second-month sputum conversion outcomes among Papuan PTB patients.

**Keywords:** Genetic variation; *SLCO1B1*; Tuberculosis; Sputum; Papuan Ethnicity



## **Polimorfisme Gen SLCO1B1 pada Pasien Tuberkulosis Paru Etnik Papua di Kota Jayapura**

### **INTISARI**

**Latar Belakang:** Tuberkulosis (TB) masih menjadi masalah kesehatan utama pada masyarakat hingga saat ini. Rifampisin merupakan salah satu jenis obat yang penting dalam pengobatan TB. Proses metabolisme rifampisin melibatkan protein OATP1B1 sebagai transporter yang dikode oleh gen SLCO1B1. Penelitian di Afrika menemukan bahwa adanya variasi gen SLCO1B1 pada SNP rs4149056 dan rs2306283 dapat menurunkan aktivitas transporter OATP1B1, sehingga menyebabkan kegagalan konversi dahak ( $> 2$  bulan) pada populasi TB ras Afrika dibanding non Afrika. Secara genetik, etnis Papua memiliki kesamaan dengan penduduk Afrika. Oleh sebab itu, penelitian ini dilakukan pada penderita TB etnis Papua.

**Tujuan:** Penelitian ini bertujuan untuk mengidentifikasi variasi gen SLCO1B1 SNP rs4149056 dan rs2306283 serta menganalisis pengaruhnya terhadap hasil konversi dahak bulan kedua pasien TB etnis Papua di Kota Jayapura.

**Metode:** Penelitian ini merupakan penelitian observasional analitik dengan desain studi potong lintang. Pengambilan sampel *whole blood* untuk analisis variasi gen SLCO1B1, kemudian identifikasi SNP rs4149056 menggunakan metode ARMS PCR dan SNP rs2306283 menggunakan PCR-RFLP.

**Hasil:** Hasil penelitian menemukan adanya variasi alel pada SNP rs4149056 dengan varian wild type sebanyak 42 (43.3%) dan heterozigot 55 (56.7%). Sedangkan pada SNP rs2306283 ditemukan 3 (tiga) varian yaitu wild type sebanyak 54 (55.7%), heterozigot 31 (32%) dan homozigot mutan 12 (12.4%). Meskipun demikian, 99% subyek mengalami konversi dahak pada bulan kedua. Adanya variasi alel pada gen SLCO1B1 tidak berpengaruh terhadap konversi dahak bulan kedua. Faktor demografi seperti usia, jenis kelamin, kepatuhan minum obat, penyakit diabetes, dan hipertensi tidak berpengaruh terhadap konversi dahak bulan kedua ( $p$  value  $> 0.05$ ). Hasil uji regresi logistik biner menunjukkan tidak ada pengaruh antara faktor genetik dan faktor sosiodemografi dengan konversi dahak ( $OR < 1$ ).

**Kesimpulan:** Meskipun terdapat variasi gen SLCO1B1 SNP rs4149056 dan rs2306283 pada subyek TB etnis Papua namun hal itu tidak berpengaruh dengan hasil konversi dahak bulan kedua.

**Kata kunci:** Polimorfisme genetik, SLCO1B1, tuberkulosis, konversi dahak, etnis Papua