

## **ABSTRACT**

**Objective:** *This research analyzed the effects of Lead (Pb), Interleukin-6 (IL-6), and Tumor necrosis factor alpha (TNF- $\alpha$ ) levels on Preterm birth (PTB) in pregnant women in Central Java, Indonesia. The analysis was conducted by collecting samples of pregnant women's hair using a non-invasive technique.*

**Methods:** *The design of this research was case-control. This research was conducted on 72 pregnant women in Central Java. Data collection was done using questionnaire and medical records. Prenatal exposure of Pb was measured from maternal hair samples using Total Reflection X-Ray Fluorescence (TXRF). Serum IL-6 and TNF- $\alpha$  were examined using ELISA kit. Statistical analysis was done using SPSS.*

**Results:** *In this research, maternal hair Pb concentration was classified in the low category with a mean  $1.49 \pm 0.1$  ppm. Pb concentration in hair was slightly higher among women with PTB than among those without PTB; however, this difference was not statistically significant. Elevated hair Pb concentration was not associated with increased PTB risk (OR 24.69;  $p > 0.05$ ; CI 95% 0.93-653.82). TNF- $\alpha \geq 27$  pg/ml, IL-6  $\geq 9$  pg/ml, and spouse's smoking frequency were significantly associated with increased PTB risk (TNF- $\alpha$  OR 42.25;  $p < 0.05$ ; CI 95% 5.26-339.61; IL-6 OR 22.33;  $p < 0.05$ ; CI 95% 3.12-158.54; spouse's smoking frequency OR 1.28;  $p < 0.05$ ; CI 95% 1.09-1.5), respectively, while hemoglobin concentration significantly decreased PTB risk (OR 0.43;  $p < 0.05$ ; CI 95% 0.2-0.927).*

**Conclusion:** *This study demonstrates that maternal hair Pb concentration has no significant relationship with PTB. Serum TNF- $\alpha$ , IL-6, and spouse's smoking frequency potentially increased PTB risk, while maternal hemoglobin level acts as a protective factor.*

## ABSTRAK

**Tujuan:** Penelitian ini menganalisis pengaruh kadar Timbal (Pb), Interleukin-6 (IL-6), dan Tumor necrosis factor alpha (TNF- $\alpha$ ) terhadap persalinan prematur (PTB) pada ibu hamil di Jawa Tengah, Indonesia. Analisis dilakukan dengan mengumpulkan sampel rambut ibu hamil menggunakan teknik non-invasif.

**Metode:** Desain penelitian ini adalah *case-control*. Penelitian ini dilakukan terhadap 72 ibu hamil di Jawa Tengah. Pengumpulan data dilakukan dengan menggunakan kuesioner dan rekam medis. Paparan Pb prenatal diukur dari sampel rambut ibu menggunakan *Total Reflection X-Ray Fluorescence* (TXRF). Serum IL-6 dan TNF- $\alpha$  diperiksa menggunakan ELISA kit dan analisis variabel dilakukan dengan menggunakan SPSS.

**Hasil:** Pada penelitian ini, kadar Pb pada rambut ibu tergolong dalam kategori rendah dengan rerata  $1,49 \pm 0,1$  ppm. Pb rambut lebih tinggi pada ibu persalinan prematur dibandingkan dengan persalinan aterm, tetapi tidak ditemukan perbedaan yang signifikan. Peningkatan kadar Pb rambut tidak berhubungan dengan risiko PTB (Pb OR 24,69;  $p > 0,05$ ; CI 95% 0,93-653,82), TNF- $\alpha \geq 27$  pg/ml, IL-6  $\geq 9$  pg/ml, dan frekuensi rokok suami secara signifikan meningkatkan risiko PTB secara berurutan (TNF- $\alpha$  OR 42,25;  $p < 0,05$ ; CI 95% 5,26-339,61; IL-6 OR 22,33;  $p < 0,05$ ; CI 95% 3,12-158,54; frekuensi rokok suami OR 1,28;  $p < 0,05$ ; CI 95% 1,09-1,5) sementara hemoglobin menurunkan risiko PTB secara signifikan (OR 0,43;  $p < 0,05$ ; CI 95% 0,2-0,927).

**Kesimpulan:** Pada penelitian ini, kadar Pb dalam rambut ibu tidak berhubungan dengan kejadian PTB. Serum TNF- $\alpha$ , IL-6 dan frekuensi merokok berpotensi sebagai faktor risiko, sedangkan kadar hemoglobin ibu menjadi faktor protektif.