

**PROGRAM STUDI S1 KEBIDANAN DAN PENDIDIKAN PROFESI BIDAN
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**Analisi Faktor Risiko Preeklampsia Dalam Pengembangan Model Prediksi Berbasis
Machine Learning di RSUD Arifin Achmad**

Xii + 68 Halaman + 7 Tabel + 5 Lampiran

ABSTRAK

Preeklampsia (PE) merupakan penyebab utama morbiditas dan mortalitas ibu serta perinatal di Indonesia. Identifikasi dini faktor risiko merupakan kunci pencegahan. Penelitian ini bertujuan untuk menganalisis faktor risiko maternal yang signifikan terhadap kejadian PE dan mengidentifikasi kandidat variabel prediktor untuk pengembangan model *machine learning* (ML). Metode: Penelitian *case-control* retrospektif ini menggunakan data rekam medis 284 ibu bersalin (142 kasus PE dan 142 kontrol normotensif) di RSUD Arifin Achmad dari Januari 2021 hingga Desember 2024. Analisis statistik deskriptif, bivariat (uji Mann-Whitney, Chi-square), dan korelasi dilakukan untuk mengidentifikasi faktor risiko signifikan dan kekuatan asosiasinya dengan PE. Hasil: Terdapat perbedaan signifikan antara kelompok PE dan normotensif dalam hal Mean Arterial Pressure (MAP) (124,83 vs 88,67 mmHg; $p < 0,001$), Indeks Massa Tubuh (IMT) (24,85 vs 21,79; $p < 0,001$), usia ibu (31 vs 28 tahun; $p = 0,005$), dan berbagai parameter hematologi (hemoglobin, trombosit, indeks trombosit, dan limfosit). Analisis korelasi mengidentifikasi MAP sebagai prediktor terkuat ($r = 0,856$), diikuti oleh riwayat penyakit ibu ($r = 0,399$) dan IMT ($r = 0,322$). Luaran perinatal (berat badan lahir, panjang badan lahir, nilai Apgar) secara signifikan lebih buruk pada kelompok PE. Kesimpulan: MAP, IMT, usia maternal, dan parameter hematologi tertentu merupakan prediktor kuat PE. Kombinasi variabel-variabel ini, yang mudah diperoleh dari rekam medis rutin, membentuk dasar yang kuat untuk pengembangan model prediksi PE berbasis ML yang andal dan dapat diimplementasikan secara klinis.

Kata Kunci: *Preeklampsia*, Faktor Risiko Maternal, *Machine Learning*, Prediksi, Mean Arterial Pressure, Hematologi.

***S1 MIDWIFERY STUDY PROGRAM AND MIDWIFE PROFESSIONAL EDUCATION
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***Analysis of Preeclampsia Risk Factors in the Development of a Machine Learning-Based
Prediction Model at Arifin Achmad Regional Hospital***

Xii + 68 Pages + 7 Tables + 5 Appendices

ABSTRACT

Preeclampsia (PE) is a leading cause of maternal and perinatal morbidity and mortality in Indonesia. Early identification of risk factors is key to its prevention. This study aimed to analyze significant maternal risk factors for PE and identify candidate predictor variables for the development of a machine learning (ML) prediction model. Methods: This retrospective case-control study utilized medical records of 284 delivering mothers (142 PE cases and 142 normotensive controls) at Arifin Achmad Hospital from January 2021 to December 2024. Descriptive, bivariate (Mann-Whitney test, Chi-square), and correlation analyses were performed to identify significant risk factors and their strength of association with PE. Results: Significant differences were found between the PE and normotensive groups in Mean Arterial Pressure (MAP) (124.83 vs. 88.67 mmHg; $p < 0.001$), Body Mass Index (BMI) (24.85 vs. 21.79; $p < 0.001$), maternal age (31 vs. 28 years; $p = 0.005$), and various hematological parameters (hemoglobin, platelets, platelet indices, and lymphocytes). Correlation analysis identified MAP as the strongest predictor ($r = 0.856$), followed by maternal medical history ($r = 0.399$) and BMI ($r = 0.322$). Perinatal outcomes (birth weight, birth length, Apgar scores) were significantly worse in the PE group. Conclusion: MAP, BMI, maternal age, and specific hematological parameters are strong predictors of PE. The combination of these variables, which are easily obtained from routine medical records, provides a robust foundation for developing a reliable and clinically implementable ML-based prediction model for PE.

Keywords: Preeclampsia, Maternal Risk Factors, Machine Learning, Prediction, Mean Arterial Pressure, Hematology.