

ABSTRAK

Latar Belakang: *Chronic kidney disease* (CKD) merupakan kondisi kerusakan ginjal jangka panjang yang dapat menimbulkan komplikasi seperti uremia yang memengaruhi sistem saraf otonom. *Heart-rate variability* (HRV) digunakan sebagai indikator non-invasif untuk menilai fungsi otonom, sedangkan risiko malnutrisi pada pasien hemodialisis dapat dievaluasi melalui *nutritional risk index* (NRI). Hubungan antara HRV dan NRI pada pasien hemodialisis masih jarang diteliti.

Tujuan: Mengetahui hubungan antara HRV dengan NRI pada pasien hemodialisis rutin.

Metode: Penelitian ini merupakan studi observasional dengan desain *cross-sectional* menggunakan data sekunder pasien hemodialisis di RSUP Dr. Sardjito. Subjek dipilih dengan purposive sampling sesuai kriteria inklusi-eksklusi. HRV diukur menggunakan *finger plethysmograph*, sedangkan NRI dihitung dari kadar serum albumin dan parameter antropometri berbasis *bioelectrical impedance analysis*. Analisis meliputi uji univariat, uji chi-square, regresi logistik bivariat dan multivariat, serta analisis *receiver operating characteristic* (ROC).

Hasil: Beberapa parameter HRV menunjukkan kecenderungan hubungan dengan risiko malnutrisi, namun hanya *root mean square of successive differences* (RMSSD) yang signifikan dalam analisis multivariat ($p = 0,033$). ROC menunjukkan kemampuan prediksi RMSSD rendah (AUC 0,589), namun meningkat pada model multivariat (AUC 0,648).

Kesimpulan: Terdapat hubungan antara HRV dan NRI pada pasien CKD yang menjalani hemodialisis, dengan RMSSD sebagai prediktor paling konsisten terhadap risiko malnutrisi.

Kata kunci: *chronic kidney disease*, hemodialisis, *heart-rate variability*, *root mean square of successive differences*, *nutritional risk index*.

ABSTRACT

Background: Chronic kidney disease (CKD) is a long-term condition characterized by kidney damage that may lead to complications such as uremia, which can affect autonomic nervous system function. Heart-rate variability (HRV) serves as a non-invasive indicator of autonomic balance, while nutritional status in hemodialysis patients can be assessed using the nutritional risk index (NRI). However, the association between HRV and NRI in hemodialysis patients remains underexplored.

Objective: To determine the association between HRV and NRI in patients undergoing routine hemodialysis.

Methods: This observational study employed a cross-sectional design using secondary data from hemodialysis patients at Dr. Sardjito General Hospital. Subjects were selected through purposive sampling based on predefined inclusion and exclusion criteria. HRV was measured using a finger plethysmograph, while NRI was calculated from serum albumin levels and anthropometric parameters obtained through bioelectrical impedance analysis. Data were analyzed using univariate analysis, chi-square tests, bivariate and multivariate logistic regression, and receiver operating characteristic (ROC) analysis.

Results: Several HRV parameters showed a tendency toward association with malnutrition risk, but only the root mean square of successive differences (RMSSD) demonstrated a significant relationship in multivariate analysis ($p = 0.033$). ROC analysis indicated low predictive ability of RMSSD alone (AUC 0.589), which improved when multiple HRV parameters were combined in a multivariate model (AUC 0.648).

Conclusion: There is an association between HRV and NRI in CKD patients undergoing routine hemodialysis, with RMSSD emerging as the most consistent predictor of malnutrition risk.

Keywords: chronic kidney disease, hemodialysis, heart-rate variability, root mean square of successive differences, nutritional risk index.