

# Profil Integritas Membran Sel Sebagai Prediktor Malnutrisi Awal Pada Penyakit Ginjal Kronik Stadium 3-5 Non-Dialisis Berdasarkan Phase Angle = Cell Membrane Integrity Profile as a Predictor of Early Malnutrition in Non-Dialysis Stage 3-5 Chronic Kidney Disease Based on Phase Angle

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## Abstrak

Latar Belakang : Malnutrisi energi protein sering terjadi pada penyakit ginjal kronik, terutama stadium lanjut (prevalensi 11-54% pada stadium 3 sampai 5). *Phase angle* (PA) pada BIA menggambarkan integritas membran sel yang nilai rendahnya dapat menjadi prediktor kuat malnutrisi di tingkat seluler.

**Tujuan** Mengetahui sebaran nilai *phase angle* pada masing-masing stadium lanjut PGK yaitu stadium 3-5 non-dialisis, mengetahui gambaran komposisi tubuh meliputi indeks massa lemak, indeks massa bebas lemak, cairan tubuh, dan indeks edema yang bermanfaat untuk deteksi dini malnutrisi dan kelebihan cairan.

**Metode** Penelitian ini menggunakan desain potong lintang di Rumah Sakit Cipto Mangunkusumo (RSCM), RSUP Fatmawati, dan RSUP Persahabatan pada Maret sampai Juli 2023. Pengambilan sampel menggunakan *consecutive sampling* pada pasien PGK stadium 3-5 non-dialisis, usia 18-60 tahun, tanpa keganasan, sirosis hati, infeksi, maupun autoimun, dengan ADL normal. Kemudian dilakukan pemeriksaan BIA dan SGA pada seluruh subjek.

**Hasil** Didapatkan 138 sampel, dengan dominasi wanita (58%) kategori obesitas derajat 1, dengan median eLFG 23,2 ml/menit. Proporsi malnutrisi berdasarkan SGA sebesar 19,5%. Profil *phase angle* mengalami tren penurunan seiring dengan meningkatnya stadium tanpa kemaknaan statistik ( $p=0,072$ ). Indeks massa lemak menurun dengan  $p=0,038$ . Sedangkan ECW dan TBW meningkat bermakna ( $p=0,001$  dan  $0,031$ ).

**Kesimpulan** Profil *phase angle* pada PGK non-dialisis cenderung sedikit menurun seiring dengan peningkatan stadium PGK. Profil ECW dan TBW mengalami peningkatan signifikan seiring dengan meningkatnya stadium PGK, tanpa disertai perubahan indeks edema (ECW/TBW). Profil FM dan FM-I mengalami penurunan seiring peningkatan stadium PGK.

**Background** Chronic kidney disease, especially in its advanced stages, often coincide with protein and energy malnutrition with a prevalence of 11-54% in stages 3 to 5. The *phase angle* (PA) in BIA describes the integrity of cell membranes whose low values can be a strong predictor of malnutrition at the cellular level.

**Objective** Firstly, to determine the distribution of *phase angle* values in each advanced stage of CKD, namely the non-dialysis stages 3-5. Secondly, to identify the profile of body composition including fat mass index, fat-free mass index, body fluids, and oedema index which are useful for early detection of malnutrition and fluid excess.

**Method** This research is a cross sectional study. It was carried out at Cipto Mangunkusumo Hospital (RSCM), Fatmawati Hospital, and Persahabatan Hospital between March and July 2023. *Consecutive sampling* method was used with non-dialysis stages 3-5 CKD patients, aged 18-60 years, without malignancy, liver cirrhosis, infection, nor autoimmune, with normal ADLs. Then BIA and SGA examinations were performed on all subjects.

**Results**

138 samples were collected, which dominated by women (58%) and stage 1 obesity with a median eGFR of 23.2 ml/minute. The proportion of malnutrition based on SGA is 19.5%. Phase angle profile shows a decreasing trend with increasing stage of CKD without a statistical significance ( $p=0.072$ ). Fat mass index decreased significantly ( $p=0.038$ ). ECW and TBW increased significantly ( $p=0.001$  and  $0.031$ ) as the increasing stage of CKD.

**Conclusion** The phase angle profile in non-dialysis CKD tends to decrease slightly with increasing CKD stage. ECW and TBW profiles increased as the CKD stage increased, but there was no change in oedema index (ECW/TBW). The FM and FM-I profiles decreased as the CKD stage increased.