

## ABSTRAK

**Latar Belakang:** *Frailty* merupakan sindrom multidimensional yang ditandai dengan penurunan cadangan fisiologis dan peningkatan kerentanan terhadap stresor, yang sering ditemukan pada pasien penyakit ginjal kronik (PGK) yang menjalani hemodialisis (HD). *Frailty* berhubungan dengan peningkatan morbiditas, mortalitas, dan penurunan kualitas hidup. Identifikasi faktor-faktor yang berhubungan dengan kejadian *frailty* pada pasien geriatri yang menjalani HD penting untuk mendukung deteksi dan intervensi dini.

**Tujuan:** Mengetahui faktor-faktor yang berhubungan dengan kejadian *frailty* pada pasien geriatri dengan PGK yang menjalani hemodialisis kronik di RSUP Dr. Kariadi Semarang.

**Metode:** Penelitian ini merupakan penelitian observasional analitik dengan desain potong lintang (*cross-sectional*) yang dilakukan pada pasien geriatri dengan PGK yang menjalani HD kronik di Unit Hemodialisis RSUP Dr. Kariadi Semarang pada Februari–April 2026. Sebanyak 60 subjek penelitian dipilih sesuai kriteria inklusi dan eksklusi. *Frailty* dinilai menggunakan *Frailty Index* (40 item). Variabel bebas yang diteliti meliputi jumlah skor *Charlson Comorbidity Index*, malnutrisi, depresi, dan aktivitas fisik. Analisis bivariat menggunakan uji *Chi-square* dengan *continuity correction*, sedangkan analisis multivariat menggunakan regresi logistik biner. Nilai  $p < 0,05$  dianggap bermakna.

**Hasil:** Prevalensi *frailty* pada penelitian ini sebesar 53,3%. Analisis bivariat menunjukkan hubungan bermakna antara aktivitas fisik rendah ( $p < 0,001$ ; PR=9,435; 95%CI:1,412–63,038), jumlah skor CCI  $\geq 5$  ( $p = 0,011$ ; PR=2,333; 95%CI:1,145–4,754), dan malnutrisi ( $p = 0,025$ ; PR=1,894; 95%CI:1,278–2,807) dengan kejadian *frailty*. Status depresi tidak menunjukkan hubungan yang bermakna ( $p = 0,083$ ). Analisis multivariat menunjukkan aktivitas fisik rendah ( $p = 0,008$ ; OR=23,506; 95%CI:2,241–246,536), malnutrisi ( $p = 0,047$ ; OR=6,811; 95%CI:1,027–45,173), dan jumlah skor CCI  $\geq 5$  ( $p = 0,030$ ; OR=5,086; 95%CI:1,166–22,197) merupakan faktor independen yang berhubungan dengan *frailty*. Aktivitas fisik rendah merupakan faktor yang paling dominan.

**Kesimpulan:** Aktivitas fisik rendah, malnutrisi, dan jumlah skor CCI  $\geq 5$  berhubungan secara bermakna dengan kejadian *frailty* pada pasien geriatri dengan PGK yang menjalani hemodialisis kronik. Aktivitas fisik rendah merupakan faktor yang paling dominan. Intervensi berbasis peningkatan aktivitas fisik dan perbaikan status nutrisi berpotensi mencegah dan memperbaiki *frailty* pada populasi ini.

**Kata kunci:** *frailty*, penyakit ginjal kronik, hemodialisis, geriatri, aktivitas fisik, malnutrisi

## ABSTRACT

**Background:** Frailty is a multidimensional syndrome characterized by reduced physiological reserve and increased vulnerability to stressors, commonly observed in patients with chronic kidney disease (CKD) undergoing hemodialysis (HD). Frailty is associated with increased morbidity, mortality, and reduced quality of life. Identification of factors associated with frailty among older adults receiving hemodialysis is important to support early detection and intervention strategies.

**Objective:** To determine factors associated with frailty among geriatric patients with CKD undergoing maintenance hemodialysis at Dr. Kariadi General Hospital, Semarang, Indonesia.

**Methods:** This analytical observational study employed a cross-sectional design and was conducted at the Hemodialysis Unit of Dr. Kariadi General Hospital, Semarang, Indonesia, between February and April 2026. A total of 60 geriatric patients undergoing maintenance hemodialysis were enrolled according to predefined inclusion and exclusion criteria. Frailty was assessed using a 40-item Frailty Index (FI). Independent variables included total Charlson Comorbidity Index, malnutrition, depression, and physical activity level. Bivariate analysis was performed using Chi-square tests with continuity correction, whereas multivariate analysis was conducted using binary logistic regression. A  $p$ -value of  $<0.05$  was considered statistically significant.

**Results:** The prevalence of frailty in this study was 53.3%. Bivariate analysis demonstrated significant associations between low physical activity ( $p<0.001$ ;  $PR=9.435$ ; 95% CI: 1.412–63.038), total CCI  $\geq 5$  ( $p=0.011$ ;  $PR=2.333$ ; 95% CI: 1.145–4.754), malnutrition ( $p=0.025$ ;  $PR=1.894$ ; 95% CI: 1.278–2.807), and frailty. Depression status was not significantly associated with frailty ( $p=0.083$ ). Multivariate analysis showed that low physical activity ( $p=0.008$ ;  $OR=23.506$ ; 95% CI: 2.241–246.536), malnutrition ( $p=0.047$ ;  $OR=6.811$ ; 95% CI: 1.027–45.173), and total CCI  $\geq 5$  ( $p=0.030$ ;  $OR=5.086$ ; 95% CI: 1.166–22.197) were independently associated with frailty. Low physical activity emerged as the strongest associated factor.

**Conclusions:** Low physical activity, malnutrition, and a greater comorbidity burden were significantly associated with frailty among geriatric patients with CKD undergoing maintenance hemodialysis. Low physical activity was identified as the most dominant factor. Interventions aimed at increasing physical activity and improving nutritional status may have potential roles in preventing and reducing frailty in this population.

**Keywords:** frailty; chronic kidney disease; hemodialysis; older adults; physical activity; malnutrition