

**RINGKASAN**

**Latar belakang:** Anemia merupakan komplikasi penyakit ginjal kronik (PGK) yang sering ditemukan pada anak dan meningkatkan angka morbiditas, mortalitas dan progresivitas penyakit. Inflamasi dan gangguan fungsi ginjal akan meningkatkan kadar hepsidin, menyebabkan absorpsi besi di usus dan release di makrofag menurun. Hepsidin merupakan regulator utama homeostasis besi tubuh. Hepsidin tinggi berperan penting terhadap kejadian anemia pada PGK pre-dialisis. Namun, bagaimana hubungan hepsidin terhadap kejadian anemia pada anak dengan PGK pre-dialisis belum banyak dijelaskan.

**Tujuan:** Menganalisis hubungan antara kadar hepsidin terhadap kejadian anemia pada anak dengan PGK pre-dialisis.

**Material & Metode:** Penelitian observasional analitik dengan desain *cross sectional* dilakukan di bagian anak RSUD. Dr. Soetomo selama bulan Desember 2018 - Februari 2019. Sampel dipilih berdasarkan *consecutive random sampling* sampai jumlah sampel terpenuhi. Kriteria inklusi anak PGK derajat 1-5 pre-dialisis berusia 3 bulan – 18 tahun dan bersedia mengikuti penelitian, kriteria eksklusi yaitu tidak mendapatkan EPO, transfusi darah dalam 3 bulan terakhir, tidak mendapatkan suplementasi besi dan infeksi akut. Dilakukan pemeriksaan darah lengkap, sérum hepsidin, interleukin-6 (IL-6), saturasi transferrin dan ferritin. Data dianalisis dengan menggunakan uji korelasi Mann-Whitney U, Uji korelasi logistik regresi linier dan Uji korelasi logistik regresi ganda.

**Hasil:** Jumlah total subyek penelitian adalah 47 anak, laki-laki 27 (57.4%) dan perempuan 20 (42.5%). PGK anemia 26 (55.3%), PGK tidak anemia 21 (44.7%). Penyebab PGK terbanyak lupus nefritis 18 (38.3%), kemudian sindrom nefrotik 11 (23.4%), kelainan urologi 11 (23.4%), tubulopati 5 (10.6%), dan RPGN, HSP nefritis 2 (4.3%). Hasil analisis uji korelasi regresi logistik ganda antara ferritin, TSAT, IL-6 dan LFG terhadap hepsidin pada PGK pre-dialisis tidak signifikan (ferritin  $p=0.727$ , TSAT  $p=0.920$ , IL-6  $p=0.405$  dan LFG  $p=0.842(>0.05)$ ). Hasil uji korelasi Mann-Whitney U antara kadar hepsidin terhadap kejadian anemia tidak signifikan  $p=0.095$  ( $p>0.05$ ), begitupula Hasil uji korelasi regresi logistik linier antara hepsidin terhadap Hb tidak signifikan  $p=0.503$  ( $p>0.05$ ). Hasil analisis uji korelasi regresi logistik ganda terhadap Hb pada anak dengan PGK derajat 3-5 pre-dialisis terdapat 2 variabel yang signifikan, yaitu ferritin  $p=0,000$ , dan IL-6  $p=0,004$  ( $<0.05$ ) dan 2 variabel tidak signifikan, yaitu: TSAT  $p=0,597$  dan LFG  $p=0,760$  ( $>0.05$ )

**Kesimpulan:** Terdapat hubungan antara kadar ferritin dan IL-6 terhadap Hb pada anak dengan PGK derajat 3-5 pre-dialisis, namun tidak terdapat hubungan antara LFG, IL-6, TSAT dan ferritin terhadap hepsidin, maupun antara hepsidin terhadap anemia dan Hb pada anak dengan PGK derajat 1-5 pre-dialisis. Serum hepsidin memberikan informasi terhadap kadar dan ketersediaan besi selama inflamasi dan dapat digunakan dalam evaluasi anemia pada anak dengan PGK

**Kata kunci:** Penyakit ginjal kronik pre-dialisis, hepsidin, anemia.

**ASSOCIATION BETWEEN HEPCIDIN AND ANEMIA IN CHILDREN  
WITH PRE-DIALYSIS CHRONIC KIDNEY DISEASE**

**ABSTRACT**

**Introduction :** Anemia is a frequent complication of chronic kidney disease (CKD) in children and it causes an increase of morbidity, mortality and accelerates the rate of progression of CKD. In CKD, inflammation and impaired kidney clearance increase plasma hepcidin, inhibiting duodenal iron absorption and sequestering iron in macrophages. Hpcidin is the main regulator of iron in human body. High level of hepcidin has importance role to cause of anemia in children with predialysis chronic kidney disease. However, the influenced of hepcidin to increases risk of anemia in children with CKD not well investigated.

**Objective :** This study aimed to investigate the association of hepcidin level in pediatric CKD with anemia.

**Material & Methods :** A Cross sectional study was conducted in Dr Soetomo Academic Hospital from December 2018 to February 2019. Consecutive random sampling was done in this study. The population of this study was children with pre-dialysis CKD, about 3 months-18 years old. The exclusion criteria were no erythropoietin administration before, no history of blood transfusion within three months , no history of iron supplementation and acute infection. Laboratory tests including complete blood count, hepcidin, interleukin-6 (IL-6), transferrin saturation and ferritin serum were performed. The data were analyzed with Mann-Whitney U, linier logistic regression test and multiple logistic regression test.

**Results :** A Total of 47 children (27 (boys vs 20 girls). Anemia occurred in 26 patients (55.3%) and normal hemoglobin level in 21 patients (44.7%). The primary disease that causes of CKD were lupus nephritis (38.3%), nephrotic syndrome (23.4%), urologic disorder (23.4%) tubulopathy (10.6%) and others (4.3%). The result showed that there was no significant correlation between ferritin, TSAT, IL-6, and glomerular filtration rate (GFR) to hepcidin level (ferritin  $p=0.727$ , TSAT  $p=0.920$ , IL-6  $p=0.405$  and GFR  $p=0.842(>0.05)$ ). There was no significant correlation between hepcidin level and anemia  $p=0.095(>0.05)$ , and also between hepcidin and hemoglobin level  $p=0.503(>0.05)$  as well. In another results showed, that there was a significant result with multiple logistic regression test between ferritin level and hemoglobin  $p=0.000(<0.05)$  and between IL-6 and hemoglobin level  $p=0.004 (>0.05)$  in children with grade 3-5 of pre-dialysis CKD.

**Conclusions :** There were association between ferritin and IL-6 level to hemoglobin level of children with grade 3-5 pre-dialysis CKD, but there were no correlation among GFR, IL-6, TSAT and ferritin level to hepcidin level. Serum hepcidin provides useful information about the level and availability of iron during inflammation and could be used in the evaluation of anemia in pediatric CKD.

**Keywords :** Pre-dialysis chronic kidney disease, hepcidin, anemia.