

# Hubungan antara kadar logam berat Cd, Cr, Pb, dan Hg dalam tubuh dengan fungsi ginjal pada masyarakat usia produktif di Daerah Aliran Sungai (DAS) Citarum Kelurahan Gajahmekar dan Andir, Kabupaten Bandung, Jawa Barat, Indonesia = The relationship between Cd, Cr, Pb, and Hg levels in the body and kidney function in working age in Gajahmekar and Andir area of Citarum Watershed, Bandung Regency, West Java, Indonesia

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## Abstrak

Logam berat seperti kadmium (Cd), merkuri (Hg), timbal (Pb), dan kromium (Cr) bersifat toksik dan tidak dapat terurai secara hayati. Kemampuan ginjal untuk menyerap dan menumpuk logam divalen membuatnya menjadi organ target utama toksisitas logam berat. Sungai Citarum adalah salah satu tempat pembuangan limbah pabrik tekstil yang mengandung logam berat tersebut, padahal Sungai Citarum masih dimanfaatkan oleh warga sekitar dalam kegiatan sehari-hari. Penelitian ini berfokus untuk mengetahui kadar logam berat (Cd, Hg, Cr, dan Pb) dalam tubuh masyarakat usia produktif (15-64 tahun) yang tinggal di sekitar DAS Citarum dan hubungannya dengan kejadian gangguan fungsi ginjal. Penelitian ini menggunakan desain potong lintang (*cross-sectional*) dengan analisis hipotesis menggunakan SPSS *for Mac 20.0* dan uji statistik perbedaan dua proporsi (uji mutlak Fisher). Dari tiap 166 sampel, 14 sampel (8.4%) terdeteksi kadmium, 2 sampel (1.2%) terdeteksi kromium, 14 sampel (8.4%) terdeteksi timbal, dan 4 sampel (2.4%) terdeteksi merkuri. 24.3% sampel ( $n = 25$ ) responden Kelurahan Andir dan 14.3% ( $n = 9$ ) responden Gajahmekar terdeteksi kadar logam berat (Cd/Cr/Pb/Hg). Untuk sebaran fungsi ginjal, dari 166 responden, 160 memiliki fungsi ginjal yang normal (97.6%). Hanya 2.4% responden (4 orang) yang berada pada kategori probable/gagal ginjal. Gangguan fungsi ginjal (probable/gagal ginjal) terjadi pada responden yang terdeteksi Pb (7.1%) serta pada responden yang tidak terdeteksi Hg, Cd, dan Cr (2.5%, 2.6% dan 2.4%). Secara statistik, hubungan antara kadar kadmium, kromium, timbal, dan merkuri dalam tubuh dengan fungsi ginjal tidak bermakna ( $p = 1.000$ ). Penelitian selanjutnya dapat dilakukan dengan desain penelitian yang berbeda untuk melihat hubungan kausalitas. Pengambilan data primer untuk penelitian lanjutan juga dapat dipertimbangkan. Selain itu, penelitian selanjutnya dapat mempertimbangkan untuk menggunakan parameter lain untuk uji fungsi ginjal, agar penurunan fungsi ginjal tahap awal dapat diamati.

.....Heavy metals such as cadmium (Cd), mercury (Hg), lead (Pb), and chromium (Cr) are toxic and not biodegradable. The ability of the kidneys to absorb and accumulate divalent metals makes them a prime target organ for heavy metal toxicity. Citarum River is one of the disposal sites for textile factory waste which contains heavy metals, meanwhile, Citarum River is still used by local residents in their daily activities. This study focuses on determining the levels of heavy metals (Cd, Hg, Cr, and Pb) of productive age (15-64 years) who live around the Citarum watershed and their relationship with the incidence of impaired kidney function. This study used a cross-sectional design with analysis using SPSS for Mac 20.0 and a statistical test of the difference between two proportions (Fisher's exact test). Of each 166 samples, 14 samples (8.4%) were detected with cadmium, 2 samples (1.2%) were detected with chromium, 14 samples

(8.4%) were detected with lead, and 4 samples (2.4%) were detected with mercury. 24.3% of the sample (n = 25) of respondents from Andir and 14.3% (n = 9) of Gajahmekar were detected with heavy metal levels (Cd/Cr/Pb/Hg). For the distribution of kidney function, out of 166 respondents, 160 had normal kidney function (97.6%). Only 2.4% of respondents (4 people) were in the probable/kidney failure category. Impaired kidney function (probable/kidney failure) occurred in respondents who were detected with Pb (7.1%) and in respondents who were not detected with Hg, Cd, and Cr (2.5%, 2.6% and 2.4% consecutively). Statistically, the relationship between levels of cadmium, chromium, lead, and mercury in the body and kidney function was not significant ( $p = 1,000$ ). Further research can be carried out with different research designs to see the causality relationship. Primary data collection for further research can also be considered. In addition, future studies may consider using other parameters for renal function test, so that early kidney function decline can be observed.