ABSTRACT

EFFECT OF EXPOSURE HEXSAVALEN KROMIUM (Cr (VI)) IN THE AIR ON THE IMPROVEMENT OF 8-HYDROXYDEOXYGUANOSINE (8-OHdG) IN URINE, IMPROVEMENT Cr IN BLOOD, AND HEALTH COMPLAINTS OF HOME WORKERS IN THE INDUSTRIAL METAL COATING IN SUGIHWARAS VILLAGE, CANDI SUBDISTRICT, SIDARJO

Cr electroplating uses Cr (VI) as a dye and anticorrosive agent. Cr (VI) has high toxicity compared to Cr in other valences such as Cr (III). Cr Very toxic by inhalation, cronic exposure to inhalation in humans causes lung cancer. One of the DNA damage biomarkers is 8-OHdG which can be excreted in urine and can be used as a DNA damage biomarker. The purpose of this study was to analyze the effect of exposure to hexavalent chromium Cr (VI) exposure in the air to an increase in 8-Hydroxydeoxyguanosine urine and health complaints of metal coating home industry workers. This research is an observational analytic study with cross-sectional approach in 2 populations. The population of the study was two groups namely the exposed and unexposed groups for comparison with a large sample of both groups of 44 people. Measurement of Cr (VI) levels in the air using PVC filters, 8-OHdG levels in urine using ELISA KIT, and blood Cr levels using AAS. The results showed that the average of 8-OHdG in urine of exposed group was 51.29 ng / mL higher than that of the untreated group of 23.62 ng / mL. The Cr concentration in exposed and non-exposed blood group exceeds the WHO limit of 0.5 µg / L. Respondent characteristics (age, work time, length of work, use of personal protective equipment, and smoking habits) together affect the rate of 8-OHdG in urine p = 0.000. And there was no effect of Cr (VI) levels in the air on workers' health complaints p = 0.082. The conclusion of this study was that there were higher levels of 8-OHdG in the urine of the exposed group than in the unexposed group, and the characteristics of the workers simultaneously influenced an increase in 8-OHdG in the urine. It is recommended that home industry owners install exhaust fans at the location of immersion and provide a complete PPE for workers.

Keywords: Hexavalent Chromium, 8-OHdG, Metal Coating

ABSTRAK

PENGARUH PAPARAN KROMIUM HEKSAVALEN (Cr (VI)) DI UDARA TERHADAP PENINGKATAN *8-HYDROXYDEOXYGUANOSINE* (8-OHdG) URINE, PENINGKATAN Cr DALAM DARAH, DAN KELUHAN KESEHATAN PEKERJA *HOME INDUSTRY* PELAPISAN LOGAM DI DESA SUGIHWARAS KECAMATAN CANDI KABUPATEN SIDOARJO

Elektroplating Cr menggunakan bahan baku Cr (VI) sebagai pewarna dan agen antikorosif. Cr (VI) mempunyai daya racun tinggi dibandingkan Cr pada valensi lain misalnya Cr (III). Cr Sangat beracun jika terhirup, paparan kronis inhalasi pada manusia menimbulkan kanker paru. Salah satu biomarker kerusakan DNA adalah 8-OHdG yang dapat tereksresikan melalui urine dan dapat digunakan sebagai biomarker kerusakan DNA. Tujuan dari penelitian ini untuk menganalisis pengaruh paparan paparan kromium heksavalen Cr(VI) di udara terhadap peningkatan *8-Hydroxydeoxyguanosine*urine, peningkatan Cr dalam darah,dan keluhan kesehatan pekerja *home industry* pelapisan logam. Peneltian ini adalah penelitian analitik observasional dengan pendekatan *cross sectional* pada 2 populasi. Populasi penelitian ada dua kelompok yaitu kelompok terpapar dan tidak terpapar sebagai pembanding dengan besar sampel kedua kelompok adalah 44 orang. Pengukuran kadar Cr(VI) di udara menggunakan filter PVC, kadar 8-OHdG di urine menggunakan ELISA KIT, dan kadar Cr dalam darah menggunakan AAS. Hasil penelitian menunjukkan rata-rata kadar 8-OHdG di urine kelompok terpapar 51,29 ng/mL lebih tinggi daripada kelompok yang tidak terpapar 23,62 ng/mL. Kadar Cr dalam darah kelompok terpapar dan tidak terpapar melebihi batas WHO yaitu 0,5 µg/L. Karakteristik responden (umur, masa kerja, lama kerja, penggunaan APD, dan kebiasaan merokok) secara bersama-sama memmengaruhi kadar 8-OHdG di urine p=0,000. Serta tidak ada pengaruh kadar Cr(VI) di udara terhadap keluhan kesehatan pekerja p=0,082. Kesimpulan dalam penelitian ini adalah ada kadar 8-OHdG di urine kelompok terpapar lebih tinggi daripada kelompok tidak terpapar, dan karakteristik pekerja secara bersamaan memengaruhi peningkatan kadar 8-OHdG di urine. Disarankan pemilik *home industry* memasang *exhaust fan* pada lokasi pencelupan dan menyediakan APD secara lengkap bagi pekerja.

Kata Kunci : Kromium Heksavalen, 8-OHdG, Pelapisan Logam