

## Studi tentang hubungan pemaparan fume kadmium dan penggunaan alat pelindung diri dengan kadar kadmium dalam darah pekerja di Bagian Pengelasan P.T. YIMM

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### Abstrak

Penelitian ini bertujuan untuk mengetahui deskripsi konsentrasi Kadmium di udara bagian pengelasan, kadar Kadmium dalam darah pekerja las dan penggunaan Alat Pelindung Diri, untuk mengetahui hubungan pemaparan konsentrasi Kadmium di udara dan penggunaan Alat Pelindung Diri dengan kadar Kadmium dalam darah pekerja di bagian pengelasan. Mengambil lokasi penelitian di P.T. YIMM pada bagian welding plant tahun 2004.

Metoda penelitian ini adalah cross sectional hanya melihat pada waktu tertentu. Sampel diambil sebanyak 40 orang pekerja las. Instrumen pengumpulan data adalah personal sampling untuk mengetahui konsentrasi Kadmium di udara dan kuesioner sebagai pengumpul data penggunaan Alat Pelindung Diri serta pengambilan darah sebagai sampel biologi untuk mengetahui kadar Kadmium dalam darah pekerja. Teknik analisis data digunakan korelasi product moment dan uji t-test.

Hasil yang diperoleh konsentrasi Kadmium di udara terendah 0,003210 mg/m<sup>3</sup>, tertinggi 0,013780 mg/m<sup>3</sup> dengan konsentrasi rata-rata 0,007158 mg/m<sup>3</sup> dan standar deviasi 0,002384. Dari 40 lokasi pengelasan 5 lokasi ditemukan melebihi NAB. Kadar Kadmium dalam darah terendah 1,28 µg/L dan tertinggi 43,33 µg/L, sedangkan rata-rata sebesar 14,29 µg/L dengan standar deviasi 10,17 µg/L. Dari 40 orang 31 orang atau 77,5 % kadar Kadmium dalam darah mereka melebihi Indeks Pemaparan Biologi.

Ada hubungan bermakna antara pemaparan fume Kadmium dengan kadmium dalam darah dan hubungan bermakna antara penggunaan Alat Pelindung Diri dengan kadar Kadmium dalam darah, hal ini diperoleh persamaan regresi  $Y = 3349,1 \times X - 9,593$  dengan harga  $r_{xy} = 0,6164$ , dan persamaan regresi  $Y = 3726 \times X - 82142$  dengan harga  $r_{xy} = 0,567$ . Konsultasi dengan harga kritis  $r$  pada taraf kepercayaan 95 % diperoleh harga  $r$  tabel = 0,312 berarti keduanya lebih besar dari harga  $r$  tabel.

Kelompok pengguna alat pelindung diri kategori baik cenderung mempunyai kandungan kadar Kadmium dalam darah relatif lebih rendah dibanding kelompok pengguna kategori tidak baik. Hal ini diperkuat hasil uji t test yang menunjukkan harga t analisis 4,344 > t tabel sebesar 2,0252 dengan kadar Cd rata-rata kelompok kategori baik 8,71 µg/L, sedangkan kelompok kategori tidak baik 20,87 µg/L.

Kadar Kadmium dalam darah kelompok perokok relatif lebih besar dibanding dengan kelompok bukan perokok. Diperoleh rerata bagi kelompok perokok sebesar 18,83 µg/L sedangkan bukan perokok sebesar 12,12 µg/L. Hasil uji t test menunjukkan harga t analisis 2,253 > dari t tabel sebesar 2,0252. Penggunaan Alat Pelindung diri bagi kelompok pernah training K3 relatif sedikit lebih baik dibanding kelompok belum training K3, Skor rerata kelompok pernah training K3 sebesar 25,81, sedangkan kelompok belum training

K3 sebesar 26,0.

Daftar bacaan: 24 ( 1975- 2004)

This study was aimed at discovering descriptive Cadmium concentration in the air of the welding plant and in the blood of welders as well as the use of personal protective equipment in order to know correlation between exposure of Cadmium in the air of workplace and use of personal protective equipment with Cadmium in the blood of welders. This research was conducted in 2004 having location at the welding plant of P.T. YIMM.

The study adopted cross sectional method during a specific period with 40 welders being taken as sample. Personal samplers technique was used to measure Cadmium concentration in the air; questionnaire as data collection on the use of personal protective equipment and biological monitoring for Cadmium in blood. Data analysis applied simple linear regression and t-test.

Result showed that the lowest Cadmium concentration in the air of welding plant was 0.003210 mg/m<sup>3</sup>, while the-highest one was 0.013780 mg/m<sup>3</sup> with average concentration of 0.007158 mg/m<sup>3</sup> and the standard deviation of 0.002384. From 40 welding areas being monitored, it found 5 locations were exceeding TLV of Cadmium concentration in the air. The lowest Cadmium in the blood was 1.28 µg/L and the highest one was 43.33 µg /L with average content of 14.29 µg/L and standard deviation of 10.17 µg/L. From 40 welders being sampled, 31 persons or 77.7 % of Cadmium content in their blood exceeded Biological Exposure Indices.

There was significant correlation between exposure of Cadmium fume and Cadmium content in the blood as well as significant correlation between the use of personal protective equipment and Cd content in the blood, which resulted in regression equation  $Y = 334.9 x X - 9.593$  with value  $r_{xy} = 0.6164$  and regression equation  $Y = 3726 x X - 82142$  with  $r_{xy} = 0.567$ . Consultation with critical value  $r$  at level of significance of 95 % obtained  $r_{table} = 0.312$ , meaning that both values were higher than  $r_{table}$ .

In case of personal protective equipment, good users group tended to have relatively lower Cadmium in their blood than the poor ones. This was confirmed by t-test resulting in value of t analysis of 4.344 > t table of 2.0254 with average Cd content of 8.71 µg/L for good users and 20.87 µg/L for poor ones.

Cadmium content in the blood of smokers was higher than those of non smokers, it was found that average Cadmium content in the blood of smokers was 18.83 µg/L and those of nonsmokers was 12.12 µg/L. T-test resulted in value of t analysis of 2.253 > 2.0252. Use of personal protective equipment for the group that ever had Occupational Health and safety (OHS) training was relatively better than those never had OHS training. Average score of the group that ever had OHS training was 25.81 while those never had OHS training was 26.0

Bibliography : 24 ( 1975-2004 )