

Kadar S-phenylmercapturic acid (S-PMA) dalam urin sebagai biomarker paparan benzena dan leukosit pada pekerja industri sepatu informal di kawasan Cibaduyut Bandung

Wulandari, Putri

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Abstrak

Pajanan kronis benzena di lingkungan kerja selalu dihubungkan dengan gangguan hematologi. Hal ini dikarenakan sistem hematologi adalah jaringan target yang paling kritis terhadap paparan benzena melalui rute inhalasi dan diketahui sebagai penyebab pansitopenia. Penelitian ini bertujuan untuk menganalisis hubungan antara kadar S-PMA urin dengan leukosit pada pekerja industri sepatu informal yang terpajan benzena. Penelitian menggunakan desain cross sectional di enam industri sepatu informal yang berada di kawasan Cibaduyut dengan jumlah sampel 64 pekerja. Sampel urin dan darah diambil pada masing-masing sampel untuk menilai kadar S-PMA urin dan jumlah leukosit. Kadar S-PMA urin diukur dengan menggunakan alat LC-MS/MS dan leukosit diukur menggunakan alat Automated Hematology Analyzer. Data karakteristik individu diperoleh melalui wawancara langsung. Konsentrasi benzena di udara menggunakan data sekunder dari penelitian sebelumnya. Hasil penelitian menunjukkan bahwa terdapat hubungan yang signifikan antara kadar S-PMA dengan leukosit (p value: 0,048) dan kadar S-PMA urin dengan jenis pekerjaan (p value: 0,004). Sebanyak 31,3% pekerja memiliki kadar S-PMA urin melampaui BEI ACGIH ($>25 \mu\text{g/g}$ kreatinin). Semakin tinggi konsentrasi benzena di udara ruang kerja, semakin banyak pekerja yang memiliki kadar S-PMA urin $>25 \mu\text{g/g}$ kreatinin. Hasil uji regresi linear ganda menemukan bahwa ada kecenderungan asosiasi antara kadar S-PMA urin dengan leukosit, setelah dikontrol dengan variabel jenis pekerjaan, jam kerja per hari, dan kebiasaan berolahraga. Hasil penelitian dapat disimpulkan terdapat asosiasi antara kadar S-PMA urin dengan penurunan jumlah leukosit. Kata kunci: benzena, S-phenylmercapturic acid, leukosit, industri sepatu informal

Benzene high exposure in working is environment always connected to hematology disorders. This is caused by hematology system is the most critical target network toward benzene exposure through inhaling route. This study aims to analyze the relation between urinary and leukocytes S-PMA level of informal shoes industrial workers exposed to benzene. This study uses cross sectional design in six informal shoes industries which are located in Cibaduyut with the number of sample of 64 workers. Urinary and blood samples are collected on each sample to measure urinary S-PMA level and the number of leukocytes. Urinary S-PMA level is measured using Automated Hematology Analyzer. Individual characteristic data are obtained through direct interview. To measure benzene concentration, secondary data of previous study is used. The result of the study indicates that there is significant correlation between S-PMA level with leukocytes (p value: 0.048) and urinary S-PMA level with the type of job (p value: 0.004). By 31.3% workers have urinary S-PMA level more than BEI ACGIH ($>25 \mu\text{g/g}$ creatinine). The higher the benzene concentration of indoor air, the more workers have urinary S-PMA level $>25 \mu\text{g/g}$ creatinine. The result of double linear regression test finds that there is association tendency between urinary and leukocytes S-PMA level, after it is controlled by type of job, time of work per day, and exercising habit variables. It can be concluded that there is association between urinary S-PMA level and the number of leukocytes decrease. Keywords: benzene, S-phenylmercapturic acid, leukocytes, informal shoes industries