Pengaruh pajanan kronis karbon monoksida (Co) terhadap gangguan fungsi kognitif pada pekerja di lokasi parkir dalam gedung = Effect of chronic carbon monoxide exposure on cognitive function among basement parking lot workers

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Abstrak

Karbon monoksida merupakan senyawa gas yang tidak berbau, tidak berwarna dan tidak berasa tetapi sangat beracun. Karbon monoksida terutama berasal dari asap hasil pembakaran mesin dan kendaraan bermotor. Keracunan terutama terjadi karena proses inhalasi dan melalui mekanisme hipoksia, selanjutnya dapat menimbulkan gangguan sistem saraf pusat dengan gejala gangguan neurobehavioral dan fungsi kognitif. Penelitian ini mengkaji hubungan antara pajanan kronis karbon monoksida dengan gangguan fungsi kognitif pada pekerja di lokasi parkir dalam gedung. Penelitian ini menggunakan desain cross sectional, melibatkan 93 pekerja di lokasi parkir dalam gedung rumah sakit dan hotel di Jakarta pada tahun 2015. Pengukuran kadar karbon monoksida di udara lingkungan kerja dilakukan 1 kali menggunakan metode spektrofotometri dengan iodida pentoksida. Pengukuran kadar COHb dilakukan dengan metode kromatografi gas melalui udara CO ekshalasi, sedangkan fungsi kognitif dinilai menggunakan kuesioner Montreal Cognitive Assessment. Prevalensi gangguan fungsi kognitif pada populasi pekerja di lokasi parkir dalam gedung 22,58%. Gangguan fungsi kognitif memiliki hubungan bermakna (p<0,05) berturut-turut dengan kadar CO ruang (ORcr=4,28; 95% CI = 1,15-15,86), kadar COHb (ORcr=6,5; 95% CI = 2,21-19,10) dan kebiasaan merokok (ORcr=6,81; 95% CI = 1,98-23,42).
Hasil analisis multivariat menunjukkan faktor risiko utama yang berhubungan dengan gangguan fungsi kognitif adalah kadar COHb 5% (ORadj=4,47; 95% CI = 1,23-16,25). Disimpulkan pajanan kronis CO di udara lingkungan kerja dapat menimbulkan gangguan fungsi kognitif yang ditandai dengan peningkatan kadar COHb dalam darah. Kebiasaan merokok merupakan faktor perancu utama, karena dapat secara langsung meningkatkan kadar COHb dalam darah dan menimbulkan gangguan fungsi kognitif melalui mekanisme kerusakan sel syaraf. Pemerintah perlu menyusun regulasi terkait pembangunan fasilitas parkir dalam gedung untuk menjamin kesehatan dan keselamatan pekerja.
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Carbon monoxide (CO) is a colorless, nonirritating, odorless and tasteless gas. The most important human-made source of CO arises from the exhaust of automobiles. Carbon monoxide chronic intoxication mostly occurs from an inhalation process and can cause brain damage due to its sensitivity over hypoxia, and leads to various neural defects including neurobehavioral and cognitive function disturbance.
This study aimed to determine the relationship between chronic CO exposure and cognitive function among basement parking lot workers. This study used a cross-sectional design, involving 93 people age 20-40 years who work in a hospital or hotel basement parking lot in Jakarta on 2015. Carbon monoxide air levels in workplace were measured using iodine pentoxidespectrophotometric method, while COHb levels were measured once using Gas Chromatography through a CO exhalation procedure. Cognitive function was determined using the Montreal Cognitive Assessment (MoCA) questionnaire.
Study result showed the CO air levels were all below threshold limit value (TLV) of 29 mg/m3. The

prevalence of impaired cognitive function among basement parking lot workers was 22,58%. Carbon monoxide air levels, COHb levels and smoking habit factors were statistically significant related to impaired cognitive function, with ORcr 4.28 (95% CI = 1,15-15,86); ORcr 6.5 (95% CI = 2,21-19,10); and ORcr 6.81(95% CI = 1,98-23,42). Logistic regression method shows COHb levels is the only predictive factor of cognitive function with ORadj 4.47 (95% CI = 1,23-16,25). Therefore, it is concluded that chronic exposure of CO in the air workplace can cause cognitive function impairment, marked by a significant increase of COHb levels. Smoking habit is the main confounding factor, for it can directly increase COHb levels and impair cognitive function. Government should establish a punctual and effective regulation on how to build a basement parking lot facility regarding the safety of the workers.