

Analisis Pengaruh Antara Heat Stress Dengan Tingkat Dehidrasi Pada Pekerja Menara Telekomunikasi Di Pt X

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Abstrak

Paparan panas kerja (heat stress) merupakan risiko penting pada pekerjaan teknisi menara telekomunikasi, terutama pada aktivitas luar ruang yang terpapar panas lingkungan. Penelitian ini bertujuan menganalisis pengaruh paparan panas kerja yang diukur dengan Wet Bulb Globe Temperature (WBGT) terhadap tingkat dehidrasi yang diukur melalui urine specific gravity (USG), serta mengevaluasi peran suhu tubuh sebagai respons fisiologis dalam hubungan WBGT–USG. Penelitian menggunakan desain potong lintang (cross-sectional) pada pekerja PT X yang mencakup teknisi menara (outdoor) dan pekerja kantor (indoor) sebagai pembandingan, dengan total 76 responden; analisis indikator inti WBGT–suhu tubuh–USG dilakukan pada 67 responden dengan data lengkap (9 responden tidak lengkap). Hasil menunjukkan perbedaan paparan panas yang jelas antara kelompok: rerata WBGT outdoor 30,3°C (rentang 28,80–31,50°C) dan indoor 22,04°C (rentang 21,70–23,80°C), dengan perbedaan bermakna ($p < 0,001$). Suhu tubuh pekerja outdoor lebih tinggi (rerata 37,14°C) dibanding indoor (36,74°C) dan perbedaannya sangat bermakna ($p < 0,001$). Status hidrasi menunjukkan rerata USG keseluruhan 1,0146 (rentang 1,005–1,030); kelompok outdoor memiliki USG lebih tinggi (1,0157) dibanding indoor (1,0128) dan perbedaan rerata bermakna ($p = 0,012$). Mayoritas responden berada pada kategori dehidrasi ringan (USG 1,010–1,020) sebesar 92,5%. Pada analisis regresi linear, setiap kenaikan WBGT 1°C diikuti kenaikan USG sekitar 0,00059 ($p < 0,001$), mengindikasikan bahwa peningkatan paparan panas berasosiasi dengan meningkatnya kepekatan urin. Analisis mediasi menunjukkan efek total WBGT terhadap USG signifikan, namun jalur suhu tubuh → USG setelah mengontrol WBGT tidak bermakna; dengan demikian, peran suhu tubuh sebagai mediator dinyatakan eksploratif dan belum memberikan bukti mediasi yang kuat. Kesimpulannya, paparan panas kerja yang lebih tinggi berasosiasi dengan peningkatan kepekatan urin (USG) pada pekerja, terutama pada kelompok outdoor, sehingga diperlukan pengendalian paparan panas dan manajemen hidrasi yang lebih sistematis pada pekerjaan menara telekomunikasi.

Occupational heat exposure (heat stress) is an important risk in telecommunication tower technician work, especially for outdoor activities directly exposed to environmental heat. This study aimed to analyze the effect of workplace heat exposure measured by the Wet Bulb Globe Temperature (WBGT) on dehydration level measured by urine specific gravity (USG), and to evaluate the role of body temperature as a physiological response in the WBGT–USG relationship. A cross-sectional design was conducted among PT X workers, including outdoor tower technicians and indoor office workers as a comparison group, with a total of 76 respondents; the core WBGT–body temperature–USG analysis was performed on 67 respondents with complete data (9 had incomplete data). The results showed a clear difference in heat exposure between groups: the mean outdoor WBGT was 30.3°C (range 28.80–31.50°C) and the mean indoor WBGT was 22.04°C (range 21.70–23.80°C), with a significant difference ($p < 0.001$). Outdoor workers had a higher

mean body temperature (37.14°C) than indoor workers (36.74°C), and the difference was highly significant ($p < 0.001$). Hydration status showed an overall mean USG of 1.0146 (range 1.005–1.030); the outdoor group had a higher USG (1.0157) than the indoor group (1.0128), and the mean difference was significant ($p = 0.012$). Most respondents were classified as mildly dehydrated (USG 1.010–1.020), accounting for 92.5%. In linear regression analysis, each 1°C increase in WBGT was associated with an approximately 0.00059 increase in USG ($p < 0.001$), indicating that higher heat exposure is associated with more concentrated urine. Mediation analysis showed that the total effect of WBGT on USG was significant, but the body temperature $\rightarrow$ USG pathway after controlling for WBGT was not significant; therefore, the mediating role of body temperature was considered exploratory and did not provide strong evidence of mediation. In conclusion, higher occupational heat exposure is associated with increased urine concentration (USG), particularly among outdoor workers, highlighting the need for systematic heat-exposure control and hydration management in telecommunication tower work.