

ABSTRACT

The Correlation Between PM₁₀ Dust Exposure and Individual Factors with Respiratory Function Disorders Among Palm Oil Production Workers at CV. Bumi Waras Way Lunik Bandar Lampung

By

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Background: The palm oil processing industry produces PM₁₀ dust that can exceed occupational air quality standards and trigger respiratory function disorders such as cough, shortness of breath, and excessive phlegm, with obstructive, restrictive, or mixed patterns. In addition to dust exposure, individual factors such as age, years of service, and smoking habits also influence workers' lung function.

Objective: To determine the relationship between PM₁₀ dust exposure and individual factors (age, years of service, smoking habits, lung capacity) and respiratory function disorder symptoms among production workers at CV. Bumi Waras Way Lunik, Bandar Lampung.

Methods: This analytic observational study used a cross-sectional design involving 66 production-area workers selected through total sampling. PM₁₀ concentrations were measured using an Air Quality Monitor (AQM), lung function was assessed using a spirometer (FEV₁, FVC, FEV₁/FVC), and individual factors were obtained through questionnaires. Data were analyzed using univariate and bivariate methods with the *Chi-Square* test.

Results: Most of the respondents experienced respiratory disorder symptoms (51.5%) and had abnormal lung capacity (68.2%). The results of the bivariate analysis showed a significant relationship between PM₁₀ dust exposure ($p = 0.021$), smoking habits ($p = 0.028$), and vital lung capacity ($p = 0.043$) with respiratory disorder symptoms among workers. Meanwhile, the variables of age ($p = 0.149$) and working period ($p = 0.271$) showed no statistically significant relationship with respiratory disorders.

Conclusions: PM₁₀ exposure, smoking habits, and vital lung capacity were significantly associated with respiratory symptoms among production workers. Efforts to reduce exposure, improve compliance with personal protective equipment (PPE) use, and conduct regular lung function examinations are recommended to prevent work-related respiratory disorders..

Keywords: PM₁₀, dust, individual factors, lung capacity, respiratory symptoms, palm oil wor

ABSTRAK

Hubungan antara Paparan Debu PM₁₀ dan Faktor Individu dengan Gangguan Fungsi Pernapasan pada Pekerja Area Produksi Minyak Kelapa Sawit di CV. Bumi Waras Way Lunik Bandar Lampung

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Latar Belakang: Industri pengolahan kelapa sawit menghasilkan debu PM₁₀ yang dapat melebihi baku mutu udara kerja dan memicu gangguan fungsi pernapasan seperti batuk, sesak napas, dan dahak berlebih dengan pola obstruktif, restriktif, maupun campuran. Selain paparan debu, faktor individu seperti umur, masa kerja, dan kebiasaan merokok juga memengaruhi fungsi paru pekerja.

Tujuan: Mengetahui hubungan antara paparan debu PM₁₀ dan faktor individu (umur, masa kerja, kebiasaan merokok, kapasitas paru) dengan gejala gangguan fungsi pernapasan pada pekerja bagian produksi di CV. Bumi Waras Way Lunik Bandar Lampung.

Metode: Penelitian analitik observasional dengan desain *cross sectional* pada 66 pekerja area produksi yang dipilih secara total sampling. Kadar PM₁₀ diukur menggunakan *Air Quality Monitor* (AQM), fungsi paru diukur dengan spirometer (FEV₁, FVC, FEV₁/FVC), dan faktor individu diperoleh melalui kuesioner. Analisis dilakukan secara univariat dan bivariat dengan uji *Chi-Square*.

Hasil: sebagian besar responden mengalami gejala gangguan fungsi pernapasan (51,5%) dan memiliki kapasitas paru tidak normal (68,2%). Hasil analisis bivariat menunjukkan bahwa terdapat hubungan yang bermakna antara paparan debu PM₁₀ ($p = 0,021$), kebiasaan merokok ($p = 0,028$), dan kapasitas vital paru ($p = 0,043$) dengan gejala gangguan fungsi pernapasan pada pekerja. Sementara itu, variabel umur ($p = 0,149$) dan masa kerja ($p = 0,271$) tidak menunjukkan hubungan yang signifikan secara statistik dengan gangguan fungsi pernapasan.

Kesimpulan: Paparan PM₁₀, kebiasaan merokok, dan kapasitas vital paru berhubungan dengan gejala gangguan pernapasan pada pekerja. Perlu pengendalian paparan debu, peningkatan penggunaan APD, dan pemeriksaan fungsi paru secara berkala.

Kata Kunci: PM₁₀, debu, faktor individu, kapasitas paru, gejala gangguan pernapasan, pekerja kelapa sawit