

Correlation of lipopolysaccharide endotoxin level in cotton dust with the increase of TNF- γ level and the decline of lung function in cotton spinning factory workers

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Abstrak

Lipopolysaccharide (LPS) endotoxin contained in cotton dust may cause airway inflammation and decline of lung function when inhaled, which eventually leads to respiratory symptoms. The objective of this research is to analyze the correlation of the exposure of LPS endotoxin in cotton dust with the increase of TNF- γ level and the decline of lung function after one day's work. This study applied analytical observation method and prospective cohort approach. Main participants of this study were the workers of a cotton spinning factory located in Tulangan District, Sidoarjo Regency, East Java Province. Sixteen samples from cotton factory were taken as study group, and twenty three samples from village administrators were taken as control group. Data collection involves several techniques: spirometry, laboratory test, and interview. Results showed that concentration of personal dust has a significant relationship with the decline of FVC, %FVC, FEV1, and %FEV1, with Pearson correlation test showing $p < 0.05$. LPS endotoxin in personal dust samples has a significant relationship with the increase of blood serum TNF- γ ; and the decline of FEV1 and %FEV1, with Pearson correlation test showing $p > 0.05$. The research concludes that the level of LPS endotoxin was strongly related to the increase of blood serum TNF- γ ; and the decline of lung function. Development of more effective preventive measures such as stronger enforcement of worker's health maintenance regulations and use of personal protective equipment is needed to ensure the best protection of cotton workers' health.

Korelasi Kadar Endotoksin LPS Dalam Debu Kapas dengan Peningkatan TNF- γ ; Serum Darah dan Penurunan Faal Paru Pekerja Pemintalan Kapas. Endotoksin LPS yang terkandung dalam debu kapas dapat menimbulkan reaksi inflamasi pada saluran pernafasan apabila terhirup yang selanjutnya dapat mempengaruhi faal paru dan menimbulkan gangguan pernafasan. Penelitian ini bertujuan untuk menganalisis hubungan paparan debu kapas dan endotoksin LPS didalamnya, dengan peningkatan kadar TNF- γ ; serum darah dan penurunan faal paru setelah bekerja dalam sehari. Penelitian ini merupakan penelitian analitik observasional dengan pendekatan kohor prospektif. Penelitian dilakukan pada pabrik pemintalan kapas di Kecamatan Tulangan, Sidoarjo dengan responden pekerja pemintalan yang bekerja pada shift pagi sebanyak 16 orang. Sebagai kelompok pembanding adalah perangkat Desa Singopadu dan Kajeksan, Kecamatan Tulangan. Pengumpulan data dilakukan dengan cara pemeriksaan spirometri, laboratorium dan wawancara. Hasil penelitian menunjukkan bahwa terdapat hubungan yang signifikan (korelasi Pearson, $p < 0,05$) antara kadar debu kapas personal dengan penurunan FVC, %FVC, cFEV1, dan %FEV1. Kadar endotoksin LPS dalam debu kapas mempunyai hubungan yang signifikan terhadap peningkatan TNF- γ ; serum darah dan penurunan pada FEV1 dan %FEV1 (korelasi Pearson, $p > 0,05$). Untuk itu perlu adanya pelaksanaan program kesehatan dan keselamatan pekerja dengan benar oleh pemilik usaha untuk melindungi kesehatan pekerjanya.