

Model Faktor Risiko Stres Oksidatif (Kadar MDA) dan Kejadian Hipertensi pada Petani Terpajan Organofosfat di Kecamatan Dempo Utara Pagar Alam Sumatera Selatan Tahun 2024

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Abstrak

ABSTRAK Paparan organofosfat memicu peningkatan spesies oksigen reaktif, yang menyebabkan stres oksidatif. Stres oksidatif sistemik ini memicu respon peradangan, yang pada gilirannya berkontribusi terhadap patogenesis hipertensi. Penelitian ini bertujuan menganalisis hubungan paparan organofosfat dengan stres oksidatif dan kejadian hipertensi pada petani di Kecamatan Dempo Utara Pagar Alam. Desain penelitian ini adalah cross sectional, menggunakan metode analisis risiko kesehatan lingkungan dan epidemiologi kesehatan lingkungan. Sampel petani diambil secara simple random sampling, sebanyak 116 orang. Pemeriksaan residu organofosfat menggunakan LC-MS/MS, dialkil fosfat dengan GC-MS, malondialdehid dengan Spektro UV-Vis, serta tekanan darah menggunakan sphygmomanometer. Pengumpulan data karakteristik perilaku melalui wawancara menggunakan kuesioner. Analisis data menggunakan chi-square dan regresi logistik ganda. Hasil penelitian menunjukkan terdapat residu organofosfat pada beberapa sampel cabai dan tomat, namun belum menimbulkan risiko kesehatan berdasarkan hasil karakterisasi risiko. Terdapat interaksi keberadaan dialkil fosfat dan lama menyemprot terhadap stres oksidatif (OR pada ≤ 4 jam/hari=0,73; OR pada ≥ 4 jam/hari= 0,83). Terdapat interaksi keberadaan dialkil fosfat dan frekuensi menyemprot terhadap stres oksidatif (OR pada ≤ 2 kali/minggu=0,73 dan OR pada ≥ 2 kali/minggu=0,045). Terdapat interaksi keberadaan dialkil fosfat dan lama menyemprot terhadap hipertensi (OR pada ≤ 4 jam/hari=2,57; dan OR pada ≥ 4 jam/hari=0,16). Stres oksidatif tidak berkorelasi dengan kejadian hipertensi, namun terdapat faktor konfounding yaitu lama menyemprot (OR:3,69(1,46-9,36) dan umur (OR:3,54(1,39-9,07). Kesimpulan penelitian ini adalah lama dan frekuensi menyemprot menjadi effect modifier korelasi keberadaan dialkil fosfat dengan stres oksidatif, sementara lama menyemprot menjadi effect modifier korelasi keberadaan dialkil fosfat dengan kejadian hipertensi. Lama menyemprot dan umur menjadi confounder dalam hubungan stres oksidatif dengan kejadian hipertensi pada petani. Kata kunci : dialkil fosfat, hipertensi, organofosfat, model faktor risiko, risk quotient, stres oksidatif

Exposure to organophosphates triggers an increase in reactive oxygen species, which causes oxidative stress. This systemic oxidative stress triggers an inflammatory response, which in turn contributes to the pathogenesis of hypertension. This study aimed to analyze the relationship between organophosphate exposure, oxidative stress, and the incidence of hypertension among farmers in the Dempo Utara subdistrict of Pagar Alam. The study design is cross-sectional, employing methods of environmental health risk analysis and environmental health epidemiology. A sample of 116 farmers was selected using simple random sampling. Organophosphate residues were analyzed using LC-MS/MS; dialkyl phosphates using GC-MS; malondialdehyde levels were determined using UV-Vis spectroscopy; and blood pressure using a sphygmomanometer. Behavioral characteristics were collected through interviews using a questionnaire. Data analysis was performed using the chi-square test and multiple logistic regression. The results revealed the presence of organophosphate residues in some chili and tomato samples; however, these did not pose a

health risk based on the risk characterization findings. There was an interaction between the presence of dialkyl phosphates and spraying duration regarding oxidative stress (OR for ≤ 4 hours/day = 0.73; OR for ≥ 4 hours/day = 0.83). There was an interaction between the presence of dialkyl phosphates and spraying frequency regarding oxidative stress (OR for ≤ 2 times/week = 0.73 and OR for ≥ 2 times/week = 0.045). There was an interaction between the presence of dialkyl phosphates and duration of spraying on the risk of hypertension (OR for ≤ 4 hours/day = 2.57; and OR for > 4 hours/day = 0.16). Oxidative stress was not correlated with the incidence of hypertension; however, there were confounding factors, namely spraying duration (OR: 3.69 [1.46–9.36]) and age (OR: 3.54 [1.39–9.07]). The conclusion of this study is that spraying duration and frequency act as effect modifiers for the association between the presence of dialkyl phosphates and oxidative stress, while spraying duration acts as an effect modifier for the association between the presence of dialkyl phosphates and the incidence of hypertension. Spraying duration acts as a confounder in the relationship between oxidative stress and the incidence of hypertension among farmers. Keywords: dialkylphosphate, hypertension, organophosphate, oxidative stress, risk quotient, risk factor model
