

## Penanda stres oksidatif saliva (GSH Dan MDA) dan pajanan pencemar udara (PM2.5 Dan NO2) pada siswa sekolah dasar negeri sekitar ruas jalan Jakarta Barat = Salivary oxidative stress biomarkers (GSH and MDA) and exposure to air pollutants (PM2.5 and NO2) in public elementary school students around West Jakarta roadway

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### Abstrak

Pencemaran udara ruang kelas terkait beberapa gangguan pernapasan pada anak usia sekolah. Stres oksidatif telah dilaporkan sebagai salah satu mekanisme penting dalam dampak kesehatan tersebut. Penelitian ini bertujuan mengetahui pajanan pencemar udara PM2.5 dan NO2 di lingkungan sekolah dan hubungannya dengan penanda stres oksidatif GSH dan MDA saliva siswa sekolah dasar. Pengukuran pajanan PM2.5 dan NO2 dilakukan di tiga sekolah dasar negeri Jakarta Barat serta pengambilan sampel saliva dari 76 siswa pada tiga sekolah tersebut untuk pengukuran penanda stres oksidatif GSH dan MDA. Data diolah secara statistik untuk menguji hubungan pajanan dan penanda stres oksidatif. Penelitian ini menemukan pajanan di ketiga sekolah yaitu PM2.5 ruang rata-rata  $102,19 \pm 86,91 \hat{I}^{1/4}g/m^3$  dan median  $81,50 \hat{I}^{1/4}g/m^3$ ; PM2.5 lapangan rata-rata  $82,31 \pm 36,56 \hat{I}^{1/4}g/m^3$  sedangkan rata-rata pajanan NO2 ruang kelas  $90,37 \pm 84,97 \hat{I}^{1/4}g/m^3$ ; NO2 lapangan  $116,83 \pm 83,58 \hat{I}^{1/4}g/m^3$ . Sedangkan rata-rata konsentrasi penanda stres oksidatif GSH  $0,70 \pm 0,07 \hat{I}^{1/4}g/mL$  dan MDA  $1,63 \pm 1,06 \text{ nmol/mL}$ . Rata-rata konsentrasi GSH antara sekolah terpajan rendah dan tinggi tidak berbeda signifikan namun rata-rata konsentrasi MDA berbeda signifikan. Kenaikan PM2.5 ruang  $1 \hat{I}^{1/4}g/m^3$  maka konsentrasi GSH akan naik sebesar  $0,001 \hat{I}^{1/4}g/mL$ , kenaikan PM2.5 ruang  $1 \hat{I}^{1/4}g/m^3$  berhubungan dengan kenaikan GSH  $0,003 \hat{I}^{1/4}g/mL$  dan MDA  $0,035 \text{ nmol/mL}$ . Penelitian ini menyimpulkan terdapat hubungan antara konsentrasi GSH saliva dengan pajanan PM2.5 ruang dan lapangan, tidak ada hubungan antara konsentrasi MDA saliva dengan PM2.5 ruang namun berhubungan dengan PM2.5 lapangan. Tidak ada hubungan antara konsentrasi GSH dan MDA saliva dengan pajanan NO2.

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Classroom air pollution is associated with several respiratory disorders in school-age children. Oxidative stress has been reported as one of the important mechanisms in this health impact. This study aims to determine the exposure to air pollutants PM2.5 and NO2 in the school environment and their relationship with markers of oxidative stress GSH and MDA saliva of elementary school students. Measurements of PM2.5 and NO2 exposure were carried out in three public elementary schools in West Jakarta and saliva samples were taken from 76 students at these three schools to measure oxidative stress markers GSH and MDA. The data were statistically processed to examine the relationship between exposure and markers of oxidative stress. This study found that the exposures in the three schools were PM2.5 with an average of  $102.19 \pm 86.91 \text{ g/m}^3$  and a median of  $81.50 \text{ g/m}^3$ ; PM2.5 in the field averaged  $82.31 \pm 36.56 \text{ g/m}^3$  while the average NO2 exposure in the classroom was  $90.37 \pm 84.97 \text{ g/m}^3$ ; NO2 field  $116.83 \pm 83.58 \text{ g/m}^3$ . Meanwhile, the average concentration of oxidative stress markers GSH was  $0.70 \pm 0.07 \text{ g/mL}$  and MDA  $1.63 \pm 1.06 \text{ nmol/mL}$ . The average GSH concentration between low and high exposed schools was not significantly different, but the average MDA concentration was significantly different. An increase in PM2.5

room 1 g/m then the concentration of GSH will increase by 0.001 g/mL, an increase in PM2.5 space 1 g/m<sup>3</sup> is associated with an increase in GSH 0.003 g/mL and MDA 0.035 nmol/mL. This study concludes that there is a relationship between salivary GSH concentrations with room and field PM2.5 exposure, there is no relationship between salivary MDA concentration and room PM2.5 but it is associated with field PM2.5. There was no relationship between salivary GSH and MDA concentrations with NO<sub>2</sub> exposure.