THE RELATIONSHIP BETWEEN THE PHYSICAL HOME ENVIRONMENT AND PM2.5 CONCENTRATIONS IN REJOWINANGUN URBAN VILLAGE, KOTAGEDE, YOGYAKARTA CITY

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ABSTRACT

Background : Indoor air quality is an important aspect of environmental health and is influenced by physical conditions of the house. *Particulate matter* (PM2.5), is one of the indoor air pollutants that requires attention.

Objective : This study aimed to determine the relationship between the physical home environment and indoor PM2.5 concentrations in Rejowinangun Urban Village, Kotagede, Yogyakarta City.

Method : This quantitative study employed a cross-sectional design. A total of 30 houses were selected households using simple random sampling. The independent variables included floor type, wall type, ventilation area, roof type, residential density, temperature, and humidity, while the dependent variable was indoor PM2.5 concentration. Data were analyzed using univariate and bivariate analyses.

Results : The study showed that the average PM2.5 concentration was 21.87 µg/m³, with a range of 3.33 µg/m³-104.33 µg/m³. and standard deviation of 18.80 µg/m³, The bivariate analysis showed no statistically significant relationships between PM2.5 concentration and floor type (p = 0.511), wall type (p = 0.184), ventilation area (rho = −0.248; p = 0.187), roof type (p = 0.528), residential occupancy density (rho = −0.009; p = 0.964),. Indoor air temperature showed a moderate negative and statistically significant correlation with PM2,5 concentration (rho = −0.486; p = 0.007) whereas relative humidity showed a week positive but statistically non significant correlation (rho = 0.338; p = 0.068).

Conclusion : Indoor air temperature was the variable most strongly associated with PM2,5 concentration in the study sample, showing a statistically significant relationship.

Keywords: physical home environment, PM2.5 concentration, indoor air quality, Indoor Air Quality Surveillance

HUBUNGAN LINGKUNGAN FISIK RUMAH DENGAN KONSENTRASI PM2,5 DI KELURAHAN REJOWINANGUN, KOTAGEDE, KOTA YOGYAKARTA

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ABSTRAK

Latar belakang : Kualitas udara dalam ruang merupakan aspek penting dalam kesehatan lingkungan, yang dipengaruhi oleh kondisi fisik rumah. *Particulate Matter* 2,5 (PM2,5) merupakan salah satu pencemar udara dalam ruang yang perlu diperhatikan

Tujuan : Mengetahui hubungan lingkungan fisik rumah dengan konsentrasi PM2,5 di Kelurahan Rejowinangun, Kotagede, Kota Yogyakarta.

Metode : Penelitian ini menggunakan metode kuantitatif dengan desain *cross-sectional*. Sampel penelitian sebanyak 30 rumah yang dipilih menggunakan teknik *simple random sampling*. Variabel bebas meliputi jenis lantai, jenis dinding, luas ventilasi, jenis atap, kepadatan hunian, suhu, dan kelembapan, sedangkan variabel terikat adalah konsentrasi PM2,5 dalam ruang. Analisis data dilakukan secara univariat dan bivariat.

Hasil : Penelitian menunjukkan rata-rata konsentrasi PM2,5 sebesar 21,87 µg/m³ dengan rentang nilai 3,33 µg/m³-104,33 µg/m³, standar deviasi 18,80 µg/m³, Hasil analisis bivariat menunjukkan tidak terdapat hubungan signifikan antara jenis lantai ($p = 0,511$), jenis dinding ($p = 0,184$), luas ventilasi ($rho = −0,248$; $p = 0,187$), jenis atap ($p = 0,528$), kepadatan hunian ($rho = −0,009$; $p = 0,964$) dengan konsentrasi PM2,5. Suhu udara dalam ruang menunjukkan hubungan negatif dengan kekuatan korelasi sedang dan signifikan ($rho = −0,486$; $p = 0,007$), sedangkan kelembapan menunjukkan hubungan positif lemah yang tidak signifikan ($rho = 0,338$; $p = 0,068$) dengan konsentrasi PM2,5.

Kesimpulan : Suhu udara merupakan variabel yang paling dominan berhubungan signifikan dengan konsentrasi PM2,5 pada sampel penelitian.

Kata kunci: lingkungan fisik rumah, konsentrasi PM2,5, kualitas udara dalam ruang, SKUDR.