UNIVERSITAS ANDALAS

PENGARUH PEMILIHAN JENIS KENDARAAN TERHADAP RISIKO KESEHATAN PAJANAN PARTICULATE MATTER 2,5 MICRON ($PM_{2,5}$) PADA MAHASISWA UNIVERSITAS ANDALAS TAHUN 2026

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xiii + 120 halaman, 11 tabel, 35 gambar, 10 lampiran

ABSTRAK

Tujuan Penelitian

Penelitian ini bertujuan untuk mengetahui pengaruh jenis kendaraan terhadap konsentrasi, *intake*, dan risiko kesehatan pajanan $PM_{2,5}$ pada mahasiswa Universitas Andalas tahun 2026.

Metode

Penelitian ini menggunakan desain observasional analitik dengan metode Analisis Risiko Kesehatan Lingkungan. Penelitian dilaksanakan pada April sampai Juli 2026 di area Universitas Andalas. Pengukuran $PM_{2,5}$ dilakukan menggunakan *Particle Dust Meter* DAZ-400. Pengukuran dilakukan pada pagi dan sore hari di sepanjang rute Simpang Pasar Baru hingga Gedung I Universitas Andalas. Data penelitian terdiri atas 95 hasil pengukuran $PM_{2,5}$ serta data sekunder karakteristik antropometri mahasiswa. Data dianalisis secara univariat dan melalui tahapan identifikasi bahaya, analisis dosis-respons, analisis pajanan, serta karakterisasi risiko menggunakan nilai *Risk Quotien*t.

Hasil

Rata-rata konsentrasi $PM_{2,5}$ sebesar 9,67 µg/m³. Konsentrasi rata-rata tertinggi ditemukan pada Bus Trans Padang sebesar 13,42 µg/m³, diikuti angkutan kota 9,82 µg/m³, mobil 7,59 µg/m³, dan kendaraan roda dua 6,86 µg/m³. Konsentrasi maksimum sebesar 32 µg/m³ ditemukan pada angkutan kota. Seluruh nilai Risk Quotient pajanan *realtime* berada di bawah satu. Pada pajanan *lifetime*, nilai maksimum *Risk Quotient* pengguna angkutan kota sebesar 1,27 dan tergolong tidak aman.

Kesimpulan

Jenis kendaraan memengaruhi konsentrasi, *intake*, dan risiko pajanan $PM_{2,5}$. Bus Trans Padang memiliki pajanan rata-rata tertinggi, sedangkan angkutan kota memiliki konsentrasi maksimum dan risiko *lifetime* tertinggi. Pengendalian perlu dilakukan melalui pemantauan kualitas udara, uji emisi, perawatan kendaraan, perbaikan ventilasi, dan penggunaan masker partikulat.

Daftar pustaka : 47 (2012-2025)
Kata Kunci : $PM_{2,5}$, Jenis Kendaraan, Analisis Risiko Kesehatan Lingkungan, *Intake*, *Risk Quotient*

FACULTY OF PUBLIC HEALTH
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THE EFFECT OF TRANSPORTATION MODE SELECTION ON HEALTH RISKS FROM EXPOSURE TO PARTICULATE MATTER 2.5 MICRONS ($PM_{2.5}$) AMONG ANDALAS UNIVERSITY STUDENTS IN 2026

xiii + 120 pages, 11 tables, 5 figures, 10 appendices

ABSTRACT

Research Objective

This study aimed to determine the effect of transportation mode on $PM_{2.5}$ concentration, intake, and exposure-related health risks among Andalas University students in 2026.

Methods

This study employed an analytical observational design using the Environmental Health Risk Assessment method. The study was conducted from April to July 2026 within the Andalas University area. $PM_{2.5}$ concentrations were measured using a DAZ-400 Particle Dust Meter. Measurements were taken in the morning and afternoon along the route from Simpang Pasar Baru to Building I of Andalas University. The data consisted of 95 $PM_{2.5}$ measurements and secondary data on students' anthropometric characteristics. The data were analyzed using univariate analysis and the stages of hazard identification, dose-response assessment, exposure assessment, and risk characterization based on Risk Quotient values.

Results

The mean $PM_{2.5}$ concentration was 9.67 µg/m³. The highest mean concentration was recorded on Trans Padang buses at 13.42 µg/m³, followed by public minibuses at 9.82 µg/m³, private cars at 7.59 µg/m³, and motorcycles at 6.86 µg/m³. The maximum concentration of 32 µg/m³ was recorded on a public minibus. All Risk Quotient values for real-time exposure were below one. For lifetime exposure, the maximum Risk Quotient among public minibus users was 1.27, indicating an unacceptable health risk.

Conclusion

Transportation mode affected $PM_{2.5}$ concentration, intake, and exposure-related health risks. Trans Padang buses had the highest mean exposure, while public minibuses had the highest maximum concentration and lifetime health risk. Risk control measures should include air quality monitoring, vehicle emission testing, regular vehicle maintenance, improved ventilation, and the use of particulate-filtering masks.

Bibliography : 47 (2012–2025)
Keywords : $PM_{2.5}$, transportation mode, environmental health risk assessment, intake, Risk Quotient