ABSTRACT

Particulate Matter Concentrations and Reported Acute Respiratory Infection Cases in Urban Berau

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Background : Ambient particulate matter is a potential respiratory health hazard. Describing particulate concentrations alongside routinely reported acute respiratory infection (ARI) cases may help characterize local environmental and health-service patterns.

Objective : To assess ecological correlations between particulate matter concentrations and reported ARI case counts across five community health center catchment areas in Berau Regency, Indonesia

Research Methods/ Implementation Methods : An ecological observational analysis used particulate matter measurements from five community health center areas on 16 dates between August 18 and September 21, 2026. Area-level mean $PM_{2.5}$ and PM_{10} concentrations were calculated from the recorded measurements. ARI counts were aggregated from routine health-service records labeled epidemiological weeks 33–37. Spearman's rank correlation was used to assess associations between area-level mean concentrations and total reported cases (n = 5 areas).

Results : Across 80 area-date observations, $PM_{2.5}$ ranged from 8 to 417 µg/m³ (mean 110.99 µg/m³), and PM_{10} ranged from 43 to 1,105 µg/m³ (mean 233.49 µg/m³). The five health centers reported 1,804 ARI cases. Area-level mean $PM_{2.5}$ was positively but not significantly correlated with reported ARI counts (Spearman's $\rho = 0.40$; $p = 0.505$). The corresponding correlation for PM_{10} was $\rho = 0.70$ ($p = 0.188$).

Conclusion/Lesson Learned : Neither particulate matter measure showed a statistically significant ecological correlation with reported ARI counts. Interpretation is limited by the small number of areas, potentially different population sizes, incomplete alignment of measurement and case-reporting periods, and the absence of individual exposure information. The findings do not establish a causal relationship

Keyword : particulate matter; $PM_{2.5}$; PM_{10}; acute respiratory infection; ecological study; Indonesia