Air Pollution and Suicide in 10 Cities in Northeast Asia: A Time-Stratified Case-Crossover Analysis

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Table S1. Population, daily mean suicide (standard deviation) by subgroups, and weather factors in each city.

Table S2. Pearson correlation of air pollutants by city.

Figure S1. Lag structure of combined relative risks (RRs) and 95% confidence intervals of suicide for NO$_2$, SO$_2$, PM$_{10}$, PM$_{2.5}$ and PM$_{10-2.5}$ per interquartile range (IQR) increase in average concentration over multiple days from the current day up to 9 preceding days (i.e. 0–1 to 0–9 lag days) across the cities after adjusting for potential confounders (i.e., ambient temperature, sunshine duration, day-of-week, public holiday, seasonality, and long-term time trend) in single-pollutant models.

Figure S2. Combined and city-specific relative risks (RRs) and 95% confidence intervals of suicide stratified by sex (M, males; F, females) corresponding to an IQR increase in the average 0–1 day concentration of (A) NO$_2$, (B) SO$_2$, and (C) PM$_{10}$, (D) PM$_{2.5}$, and (E) PM$_{10-2.5}$ after adjusting for potential confounders (i.e., ambient temperature, sunshine duration, day-of-week, public holiday, seasonality, and long-term time trend) in single-pollutant models. Abbreviations: JP1, Tokyo; JP2, Nagoya; JP3, Osaka; KR1, Seoul; KR2, Busan; KR3, Incheon; KR4, Daegu; TW1, Taipei; TW2, Taichung; TW3, Kaohsiung.

Figure S3. Combined and city-specific relative risks (RRs) and 95% confidence intervals of suicide stratified by age groups (Y, 10–24 years; I, 25–64 years; E, ≥65 years) per an IQR increase in the average 0–1 day concentration of (A) NO$_2$, (B) SO$_2$, and (C) PM$_{10}$, (D) PM$_{2.5}$, and (E) PM$_{10-2.5}$ after adjusting for potential confounders (i.e., ambient temperature, sunshine duration, day-of-week, public holiday, seasonality, and long-term time trend) in single-pollutant models. Abbreviations: JP1, Tokyo; JP2, Nagoya; JP3, Osaka; KR1, Seoul; KR2, Busan; KR3, Incheon; KR4, Daegu; TW1, Taipei; TW2, Taichung; TW3, Kaohsiung.
**Figure S4.** Combined and city-specific relative risks (RRs) and 95% confidence intervals of suicide stratified by the method of suicide (V, violent suicide; N, non-violent suicide) per an IQR increase in the average 0–1 day concentration of (A) NO₂, (B) SO₂, and (C) PM₁₀, (D) PM₂.₅, and (E) PM₁₀–₂.₅ after adjusting for potential confounders (i.e., ambient temperature, sunshine duration, day-of-week, public holiday, seasonality, and long-term time trend) in single-pollutant models. Abbreviations: JP1, Tokyo; JP2, Nagoya; JP3, Osaka; KR1, Seoul; KR2, Busan; KR3, Incheon; KR4, Daegu; TW1, Taipei; TW2, Taichung; TW3, Kaohsiung.

**Figure S5.** Combined relative risks (RRs) and 95% confidence intervals for NO₂, SO₂, and PM₁₀ on suicide across the 10 cities based on two different functional forms of the weather factor adjustment (temperature and sunshine duration): 1) DLNM—the distributed lag nonlinear function consisting of a natural cubic spline with three internal knots at 25th, 50th, 75th, and a maximum lag of five days as natural cubic spline with two internal knots equally-spaced on a log scale and 2) MA model—the moving average of the weather variables over the current day to the preceding five days as a natural cubic spline with four degrees of freedom.

**Figure S6.** Combined relative risks (RRs) and 95% confidence intervals for NO₂, SO₂, and PM₁₀ on suicide across the 10 cities for different weather factor adjustment: a core model including temperature and sunshine duration (M1), adding relative humidity to the core model (M2), adding atmospheric pressure to the core model (M3), and adding precipitation to the core model (M4). Distributed lag nonlinear function was applied to all weather factors with a maximum lag of five days.

**Figure S7.** Combined relative risks (RRs) and 95% confidence intervals for NO₂, SO₂, and PM₁₀ on suicide across the 10 cities for different stratum length—a combination of year, month (mth), and day-of-week, every 3 weeks (3wk), or every 2 weeks (2wk) matched by day-of-week. The single pollutant models were used with the adjustment for temperature, sunshine duration, and public holidays.

**Figure S8.** Scatter plots of daily suicides against (A) PM₁₀, (B) PM₂.₅, and (C) PM₁₀–₂.₅ in Seoul to identify the extremely high concentrations, and (D) the combined relative risks (RR) and 95% confidence intervals of suicides associated with different PM sizes for an IQR increase across the cities based on the model including the days with extremely high concentrations. All effect estimates were adjusted for temperature, sunshine duration, day-of-week, public holiday, seasonality, and long-term time trend.