中文題目：長期暴露懸浮顆粒和 eGFR 的退化: preESRD 的世代研究

英文題目：Long-term exposure to fine particulate matter and progression to eGFR Deterioration: A Cohort Study in patients with pre-ESRD

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Background*:* Limited literature explored the effect of air pollutants on chronic kidney disease (CKD) progression, especially for patients with pre-ESRD. In this study, we reported the linear and nonlinear relationships of $PM_{2.5}$ and NO_2 to eGFR deterioration after adjusting for smoking status and other traditional clinical factors.

Method: This study adopted a retrospective cohort of patients with stage 3B to stage 5 CKD (N=11,099) from Taichung Veterans General Hospital during August 2004 to December 2020. eGFR deterioration was defined as a decline in eGFR > 6 ml/min/1.73m^2/year for diabetic patients or > 4 ml/min/1.73m^2/year for patients without diabetes. Hybrid kriging/LUR models were used to estimate individual levels of $PM_{2.5}$ and NO_2. The relationship of air pollutants and eGFR deterioration was evaluated using Cox proportional hazard models.

Results: After adjusting for smoking status, baseline eGFR stages, and other traditional clinical factors, the risk of eGFR deterioration increased with increasing l$PM_{2.5}$ and NO_2 level (p= 0.0005 for $PM_{2.5}$ and p= 0.0214 for NO_2), especially for those exposed to $PM_{2.5} \geq 32.82$ μg/m^3 or $NO_2 \geq$ 16.44 ppb. Similar results were also found in the two-pollutant models. The non-linear patterns on eGFR deterioration had threshold concentrations of 31.38 μg/m^3 for $PM_{2.5}$ and 15.44 ppb for NO_2, but NO_2 became nonsignificant at above 25 ppb. After adjusting for smoking status, baseline eGFR stages, and other traditional clinical factors, the risk of eGFR deterioration increased with increasing l$PM_{2.5}$ and NO_2 level (p= 0.0005 for $PM_{2.5}$ and p= 0.0214 for NO_2), especially for those exposed to $PM_{2.5} \geq 32.82$ μg/m^3 or $NO_2 \geq 16.44$ ppb. Similar results were also found in the two-pollutant models. The non-linear patterns on eGFR deterioration had threshold concentrations of 31.38 μg/m^3 for $PM_{2.5}$ and 15.44 ppb for NO_2, but NO_2 became nonsignificant at above 25 ppb.

Conclusions: Linear and non-linear associations were observed between the levels of $PM_{2.5}$ and NO_2 and the incidence risk of eGFR deterioration.