

## **Abstract**

**Background:** Several studies have shown associations between respiratory allergies in children and climate variables such as temperature and relative humidity. However, the effects of average temperature and relative humidity on different types of children's allergic diseases have not been comprehensively evaluated so far. This study aims to assess the impact of temperature and relative humidity variability on children's allergic diseases and to identify the critical time window.

**Methods:** We collected outpatient data on allergen testing in children between July 2020 and January 2022 from the Affiliated Children's Hospital of Nanjing Medical University. Logistic regression was used to evaluate the effect of temperature and relative humidity on allergic diseases. Subgroup analysis by gender was conducted in different types of allergic diseases, among which propensity score matching was performed for digestive allergies, and age-specific analysis was performed to identify the critical time window.

**Results:** We found that total allergies and skin allergies were negatively associated with temperature and positively associated with relative humidity. While digestive allergies were positively associated with temperature and negatively associated with relative humidity. Children under 5 years were more susceptible to the effect of temperature and relative humidity. However, we did not find any association between temperature and relative humidity with respiratory allergies.

**Conclusions:** Our study provides evidence that temperature and relative humidity variability may have a greater risk for the occurrence of allergic diseases in children, especially skin allergies and digestive allergies. Children under 5 years were more susceptible to the effect of temperature and relative humidity.