

## Abstract

**Background:** Climate change, in terms of increasing temperature, has been shown to initiate and aggravate allergic respiratory diseases. However, it is unclear whether changing temperature truly affects allergic rhinitis (AR), as currently available evidence focused on studying asthma more. The objective of this work was to systematically review and conduct meta-analysis of existing literature to determine the association between temperature and AR.

**Methods:** A detailed search of MEDLINE Complete, CINAHL Plus, Academic Search Complete, EMBASE, and PubMed databases was performed encompassing observational studies in the last 30 years across all age groups and geographical regions. Search terms including “allergic rhinitis”, “hay fever”, “nasal allergy”, “pollen allergy”, “perennial allergic rhinitis”, “seasonal allergic rhinitis”, “climate change”, “climate temperature”, and “air temperature” were used.

**Results:** 899 records were identified through initial database searches, it yielded 212 potentially eligible studies after elimination of duplicate records, screening of titles and abstracts, and omitting records not sought for retrieval of full-texts. Independent review of all the manuscripts identified 12 studies which were of time-series and cross-sectional study designs, considering 5,260,906 subjects (1,169,994 with AR). These studies contained data on clinically confirmed diagnosed AR and self-report AR. Meta-analysis of further selected five studies showed significant association between temperature with AR using crude odds ratio (OR) (OR=1.11, 95% confidence interval [CI]: 1.04 to 1.19, two studies, children, self-reported AR) and relative risk (RR) (RR=1.26, 95% CI: 1.16 to 1.38, three studies, all ages, diagnosed AR).

**Conclusion:** Although a statistically significant association was discovered between temperature and AR, it is inconclusive to support the definite relationship between them due to very low certainty of evidence. Further high quality research studies with appropriate settings should be conducted in the future.

**Keywords:** climate change; temperature; allergic rhinitis; systematic review; meta-analysis