

# Genetic predisposition to allergic rhinitis in relation to 11 psychiatric disorders

Xiaowen Zhang<sup>1</sup>, Wenjing Liao<sup>1</sup>, Lijuan Song<sup>1</sup>, Junyang Xie<sup>1</sup>, Gui Chen<sup>1</sup>, Tianhao Liang<sup>1</sup>, Ang Li<sup>1</sup>, Chunyi Zhang<sup>1</sup>, Meiqian Xu<sup>1</sup>, Hao Li<sup>1</sup>, Jianlei Xie<sup>1</sup>, Pingchang Yang<sup>1</sup>, Deming Han<sup>1</sup>, and Nanshan Zhong<sup>1</sup>

<sup>1</sup>First Affiliated Hospital of Guangzhou Medical University

April 16, 2024

## Abstract

**Background:** Growing evidence from observational studies suggests a link between Allergic [rhinitis](<https://www.sciencedirect.com/topics/neuroscience/allergic-rhinitis>) and psychiatric disorders; whether these associations represent causal relationships remains uncertain. **Methods:** We performed bi-directional two-sample mendelian randomization (MR) using summary statistics from European genome-wide association studies to examine evidence of causality, specificity and direction of association of AR with 11 different psychiatric disorders or relevant traits. MR was conducted using the inverse-variance weighted method (IVW), MR-Egger and weighted median methods. Sensitivity analyses included the MR-Egger regression and MR pleiotropy residual sum and outlier test. **Results:** AR from 2 different GWAS data was positively associated with bipolar disorder (OR=1.649, 95% CI: 1.077-2.526; P=0.021; OR=1.599; 95%CI 1.058-2.417; P=0.026). AR was also associated with major depressive disorder (OR=1.539; 95%CI 1.007-2.353; P=0.047). There were no significant association between AR and other 9 psychiatric disorders. Bidirectional analyses showed that bipolar disorder is negatively associated with AR (OR=0.964; 95%CI: 0.936-0.993; P=0.015). There was no evidence for potential causal schizophrenia and effects of attention deficit/hyperactivity disorder on risk of AR by MR method, but, MR pleiotropy residual outlier test suggested that attention deficit/hyperactivity disorder is negatively associated with AR after outlier correction (OR=0.976, 95%CI: 0.958-0.995, P=0.012). **Conclusions:** This MR study indicated that AR was a causal risk factor for bipolar disorder and major depressive disorder, but not for other psychiatric disorders. Bipolar disorder and attention deficit/hyperactivity disorder may be a protective factor for AR. Further studies could be carried out to leverage these new found insight into better clinical and experimental research in AR and psychiatric disorders.

## Hosted file

Genetic predisposition to allergic rhinitis in relation to 11 psychiatric disorders.docx available at <https://authorea.com/users/466545/articles/712163-genetic-predisposition-to-allergic-rhinitis-in-relation-to-11-psychiatric-disorders>

