Attention deficit hyperactivity disorder (ADHD) is the most common childhood neurodevelopmental disorder and substantially affects the social and behavioral development of children. Allergic rhinitis (AR) is the most common chronic condition in pediatric populations. Characteristic symptoms of AR can interrupt daily activities and disturb sleep, causing daytime inattention, irritability, and hyperactivity, which are also components of ADHD.

Recent evidence has suggested that sleep disturbance, poor school performance, and hyperactivity in AR children may be related to nasal allergies. In addition, an increased prevalence and odds ratio of ADHD in AR patients was also observed in a study using the National Health Insurance Research Database (NHIRD) in Taiwan. However, the registries in the NHIRD claims primarily serve the purpose of administrative billing, and they are not verified for scientific purposes. Contacting the patients directly to obtain further information is not possible, because of the anonymity assured by scrambled identification numbers. Therefore, investigating inattention and hyperactivity in AR children by using objective and scientific measurements is required.

Yang et al investigated whether attention and impulsivity control in AR children differed from those of a control group. They used the AR symptom score, ADHD symptom scale, and computerized continuous performance test (CPT) to study the attention and impulsivity of AR children, age-matched controls, and ADHD children. They observed that AR children scored higher in the ADHD symptoms questionnaire and made more commission errors in the CPT than did the control children.

Both AR and ADHD are highly heritable disorders; however, no known gene involving both AR and ADHD has been observed. The pathogenesis of the relationship between ADHD and AR remains unknown. First, immune and nervous systems exhibit delicate, complex, and dynamic interactions, in both healthy and diseased people. Mounting evidence has suggested that in addition to affording communication between immune cells, specific cytokines play a role in signaling the brain to produce neurochemical, neuroendocrine, neuroimmune, and behavioral changes. Cytokines may act as neuromodulators and immunomodulators; the signaling may be part of a generalized and comprehensive mechanism to mobilize resources during physical and psychological stress, as well as to maintain homeostasis. At the clinical level, advances in cytokine research have facilitated the understanding of the pathophysiology of medical conditions and identification of novel treatments. These developments are particularly relevant to immune-related disorders, such as infections, allergies, autoimmune diseases, and cancers. Second, other possible explanations for the association between AR and ADHD in previous reports have included shared symptoms, behavioral complications caused by annoying AR symptoms, and associated sleep disturbances caused by AR, causing daytime fatigue, inattention, and impulsivity.

Interpretations of the study presented several limitations. Children diagnosed with ADHD often suffer from concomitant psychopathologies, such as mood disorders, episodic outbursts, learning difficulties, sleep disturbance, and other behavioral problems. The clinical impact on affected patients is substantial, and patients presumably receive more attention in their care and pediatric visits, compared with control patients. The risk of controls developing allergic disorders might have been underestimated, because children suffering from minor allergic disorders might not visit pediatric clinics.

In conclusion, the study suggests that pediatricians caring for AR children should not only treat their allergies, but also the possible comorbid impulsivity and inattention. In addition, in children exhibiting impulsivity and inattention, allergic diseases, particularly AR, should be considered in addition to ADHD. Although the precise mechanism remains largely unknown, evidence indicates that allergic diseases affect people diagnosed with ADHD.
large-scale longitudinal studies could provide definite answers to this crucial topic.

**Conflict of interest**

The author states that there is no conflict of interest regarding the publication of this article.

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