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Letter

No association between allergy history and adult height: a nationwide Korean survey

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An increase in the prevalence of allergic diseases in recent decades has resulted in a significant economic burden and deteriorated health-related quality of life. Impairment of physical development because of allergic diseases is critical for both children and adolescents, and multiple factors contribute to the pathophysiology of growth impairment in allergic diseases. First, food allergies severely limit nutritional element consumption. Moreover, chronic allergic inflammation with increased metabolic demand may reduce growth. Second, the long-term use of corticosteroids, the cornerstone of treatment options for allergies, potentially reduces the growth rate and final height of children. Third, allergic diseases are also associated with poor mental health and can affect growth.

Growth impairment has been reported in infants and children with allergies; however, studies on whether it persists and affects the final attainment of adult height remain limited,[1,2] and various factors should be considered to address these long-term effects. First, the timing between disease onset and puberty is crucial, as catch-up growth may occur. Second, socioeconomic status is conversely associated with allergies and growth. Notably, many children with allergies have parents with high earnings and extensive knowledge of proper childcare, and tall height is often observed in children in this population.[3] In the present study, various tests were performed involving adults who had already reached their final height and had passed their growth phase. Therefore, their body height was a result of their lifestyle throughout childhood and youth. This study aimed to compare height according to the history of allergic diseases among

Korean adults.

This cross-sectional study used data from the 2016-2020 Korean National Health and Nutrition Examination Survey, a nationally representative survey performed annually by the Korea Centers for Disease Control and Prevention. We first identified 15,209 participants aged 19-50 years who had already reached their final height and did not exhibit an age-related decline in height. Of all, we analyzed the data of 14,354 participants for whom height information was available.

Allergic diseases, including atopic dermatitis, allergic rhinitis, and asthma, as diagnosed by the physician, were assessed via self-reported responses. Height and body weight were measured to the closest 0.1 cm and 0.1 kg, respectively, with the participants dressed in a light gown according to standardized protocols. The body mass index was calculated as the weight divided by the square of the height. Data on household income, cigarette smoking status, and residential location were obtained using a health interview questionnaire. Household income was categorized into quartiles, and the participants were divided into two groups: highest quartile and lower than third quartile. The participants who smoked cigarettes during the survey period were classified as current smokers. Residential areas were classified as urban or rural, based on the administrative district. A multivariate regression analysis was employed to examine the factors associated with height. All statistical tests were two-sided and $P<0.05$ was considered statistically significant. All participants signed an informed consent form, and the study protocol was approved by the Institutional Review Board of Gachon University Gil Medical Center (No. GFIRB2020-204).

Approximately 23% of the participants had a history of allergic diseases, with most of them more likely to be young, female, lean, shorter, and not current smokers than those without an allergy history (Table 1). However, a stepwise multivariate regression model revealed that a history of allergy was not associated with short stature (Table 2).

To the best of our knowledge, little is known about the long-term relationship between allergy and final height. A

Table 1. Characteristics based on allergy history

Characteristic	Allergy history		*P*-value
	No (n=11,027)	Yes (n=3,327)	
Age (years)	37.0±8.8	34.2±9.1	<0.001
Female sex	5,833 (52.9)	2,055 (61.8)	<0.001
Lowest economic status	796 (7.2)	274 (8.2)	0.050
Current smoker	2,553 (23.2)	613 (18.4)	<0.001
Rural area	1,533 (13.9)	425 (12.8)	0.097
Body mass index (kg/m^2)	23.9±4.0	23.5±3.9	<0.001
Height (cm)	167.0±8.7	166.3±8.6	<0.001

Values are presented as mean±standard deviation or number (%).

Table 2. Factors associated with height (n=14,352)

Factor	95% confidence interval			*P*-value
	β*	Lower limit	Upper limit	
Age per 1 year	-0.12	-0.13	-0.11	<0.001
Female sex	-13.13	-13.32	-12.95	<0.001
Low economic status	-1.41	-1.76	-1.06	<0.001
Rural area	-0.51	-0.78	-0.25	<0.001

*Regression coefficient of height (cm) from a stepwise multivariate regression model with adjustments for age, sex, economic status, current smoking status, urban status, body mass index, and allergic history. Allergy history includes atopic dermatitis, allergic rhinitis, and asthma.

small cross-sectional study with selected students (n=678) reported that young adults with a diagnosis of allergies were shorter than those without allergies.[4] However, our nationwide study did not confirm any association between allergy history and short stature, thus warranting additional investigation.

The primary limitation of this study was its cross-sectional design, owing to which we could not examine growth patterns throughout childhood. Furthermore, the possibility of reverse causality cannot be ignored, as allergy occurrence can be a consequence of rapid physical development with a short period of immunological maturation. Another limitation was the lack of detailed clinical data that could affect the growth of children. Several variables used in this study did not reflect those in the growth period (e.g., economic status and residency). Moreover, environments during childhood (e.g., nutritional, economic, and psychosocial), familial history of allergy, and parental height, which may impact growth, were not assessed. Therefore, in the future, well-designed prospective studies, such as a Mendelian randomization study, are required to confirm a causal effect and elucidate the underlying mechanisms.

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