

Allergic rhinitis in Korean immigrants to the United States

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ABSTRACT

The prevalence of allergic rhinitis among Korean immigrants to the United States is unknown. However, after arrival in the United States, many develop allergic rhinitis for the first time. This study is undertaken to investigate and establish some contributing environmental factors and the time until onset of allergic rhinitis in Korean immigrants to the United States living in Chicago. Information regarding 246 patients of Korean origin who presented to a Chicago allergy/immunology clinic from 1993 to 1998 were analyzed by retrospective chart review. The diagnosis of allergic rhinitis was established by history, physical examination, and skin testing for immediate hypersensitivity to airborne allergens. The mean residential time in the United States of our patients was 13.5 years (range, 2–38 years). The mean interval from arrival in the United States to onset of symptoms was 8 years (range, 0–24 years). The most commonly identified allergens were ragweed pollen (59%), cat pelt (44%), cocklebur pollen (41%), house-dust mite (35%), and Penicillium (29%). We conclude that the spectrum of responsible allergens in Korean immigrants closely resembles that seen in native citizens of the United States and that environmental factors play an important role in the pathogenesis of allergic rhinitis in this population. (Allergy Asthma Proc 27:59–62, 2006)

Allergic rhinitis is one of the most prevalent diseases in the United States. It is estimated that 9–40% of the U.S. population has some form of allergic rhinitis and it accounts for at least 2.5% of all physician visits.^{1–3} Allergic rhinitis also is responsible for significant morbidity and burden to the health care system. Each year, allergic rhinitis accounts for 2 million lost school days, 6 million lost workdays, and 28 million restricted workdays. Americans spend \$3.7 billion on outpatient services, \$0.7 billion on inpatient services, and \$2.4 billion on prescription and over-the-counter medications for a total direct and indirect cost of >\$7 billion per year.^{2,3}

The prevalence of allergic rhinitis among Korean immigrants to the United States is unknown. However, after arrival in the United States, many develop allergic rhinitis for the first time. Analysis of the responsible factors for the development of allergic rhinitis would better elucidate the role of environmental factors in allergic rhinitis in this population.

This study is undertaken to investigate and establish that many Korean immigrants develop new-onset allergic rhinitis once moving to the United States. Also, our investigation considers environmental factors that possibly could play a role in the development of allergic rhinitis in these patients.

OBJECTIVE

The objective of this study is to establish important contributing environmental factors and time until on-

set of development of allergic rhinitis in Korean immigrants to the United States.

STUDY DESIGN AND METHODS

Information regarding 246 patients of Korean origin who presented to a Chicago allergy/immunology clinic from 1993 to 1998 were analyzed by retrospective chart review. Inclusion criteria were (1) birth and former residence in Korea, (2) no history of allergic rhinitis by diagnosis or symptoms before immigration to the United States, (3) immigration from Korea directly to the United States, and (4) diagnosis of allergic rhinitis by history, physical examination, and skin testing for immediate hypersensitivity to airborne allergens. Smoking habits, duration of symptoms, seasonal variations, and history of pet ownership were recorded from the history taken at the first visit. Skin testing was performed by skin-prick testing method using a panel of inhalant allergens. The aeroallergen panel was obtained from Center Laboratory and included tree, grass, ragweed, cocklebur, mold, dust mite, cat, dog, feather, and cockroach allergens. Histamine was used as positive control and saline was used as negative control. Skin-prick testing was considered to be positive if the size of the wheal was 3 mm greater than the negative control. This study was approved by the Institutional Review Board.

RESULTS

Out of 246 Korean patients, 178 met the inclusion criteria. There were 91 male patients and 87 female patients. Among these patients, the mean age was 39.4 years (range, 10–83 years). When stratified by age, the highest prevalence of symptoms occurred in those patients between 30 and 39 (40%) years old, with a decrease in prevalence to 5% in patients >60 years old

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Table 1 Age Distribution and Number of Patients Meeting the Inclusion Criteria

Age (yr)	Number of Patients (%)
10–19	7 (3.9%)
20–29	26 (14.6%)
30–39	72 (40.4%)
40–49	42 (23.6%)
50–59	22 (12.4%)
60–69	6 (3.4%)
70–79	2 (1.1%)
80–89	1 (0.6%)
Total	178 (100%)

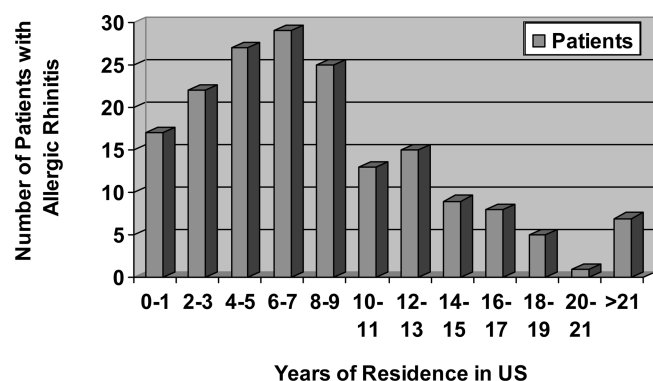


Figure 1. Correlation between number of patients developing allergic rhinitis and years of U.S. residency.

(Table 1). The mean residential time in the United States was 13.5 years (range, 2–38 years). The mean interval from arrival in the United States to onset of symptoms was 8 years (range, 0–24 years; Fig. 1). Seventy-one subjects had perennial allergies and 94 subjects were diagnosed with seasonal symptoms. Thirty-eight patients were smokers and 22 patients were pet owners (5 had cats and 17 had dogs). The most commonly identified allergens were ragweed pollen (59%), cat pelt (44%), cocklebur pollen (41%), house-dust mites (35%), and *Penicillium* (29%; Fig. 2). Fifty-eight of 71 (82%) patients with perennial allergic rhinitis were skin test positive to dust mites or *Penicillium* and 60 of 94 (64%) patients with seasonal allergic rhinitis were skin test positive to ragweed.

DISCUSSION

Environmental allergens and genetic factors have both been linked to the development of allergic rhinitis.⁴ Furthermore, studies have shown that environmental modifications may be helpful in controlling symptoms of allergic rhinitis.^{5,6} Because the United States is a new environment for the many immigrants from different countries, analysis of a large immigrant population allows an opportunity to conduct epidemi-

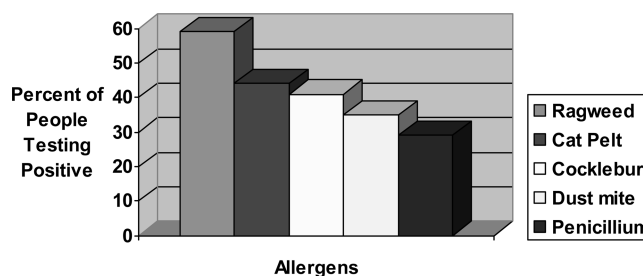


Figure 2. Commonly identified allergens by skin testing.

ological studies to see if there are developments of new diseases. A significant increase in the prevalence of a disease in the migrant population would suggest that the new environment has contributed to its pathogenesis. For example, a study from the United Kingdom in 1979 showed that Asian immigrants developed asthma symptoms for the first time several years after migration, suggesting that the new environment played an important role in its pathogenesis.⁷ Another study from Australia, which concentrated on asthma and allergic diseases in Asian immigrants to Melbourne, also reported strong environmental influence on asthma and allergy. In this study, researchers found that the prevalence of allergic rhinitis in Asian immigrants increases significantly with the length of stay in Australia so that after 10 years of residence, up to 60% of Asian immigrants developed allergic rhinitis.⁸

Since the United States eased its immigration laws in 1965, there has been a dramatic influx of Korean immigrants to the United States. Motivated by various factors, ~280,000 Koreans immigrated to the United States in the 1970s and 334,000 in the 1980s. The most recent data from the U.S. Census Bureau's Census 2000 summary file shows that there are now >1 million Korean Americans living in the United States; most live in metropolitan areas like Los Angeles, New York, and Chicago. (Census Summary File, 2000. Available at www.census.gov. Accessed June 2005).

In our study, we identified Korean immigrants without a prior history of allergic rhinitis who developed symptoms after an average of 8 years from their arrival in the United States. However, because we have no documentation of specific negative skin tests in these Korean immigrants before arrival to the United States, we cannot state with certainty that our patients did not have prior sensitization to these allergens. If so, they could now be manifesting allergic rhinitis symptoms due to a greater exposure to specific aeroallergens in the United States. We suspect, that a majority of our patients were not previously sensitized to these allergens due to the observation that most of them required at least 5 or 6 years of residency in the United States before the onset of symptoms. The few patients who developed symptoms within the first 1 or 2 years of arriving in the United States may indeed have been

sensitized previously to these allergens in Korea. The wide range of years before onset of symptoms (range, 0–24 years) also may be contributed by atopic status of the individuals. For example, it is more likely that patients with personal or family history of atopic diseases such as asthma or atopic dermatitis develop earlier onset of allergic rhinitis symptoms than those without preexisting atopic diathesis.

A complete detailing of environmental differences in Korea compared with that in the United States is not provided by our research. For example, interesting and important differences such as type of house, carpet, and water damage leading to mold would better elucidate possible etiologies into development of new-onset allergic rhinitis in these patients. Also, hobbies and occupational differences, which were not documented, account for as much as 15% of triggers for allergic rhinitis. We had to omit these differences largely because of a great variability in the living conditions among our patients. In addition, there were numerous relocations by our patients even while in Korea and in the United States, causing such analysis to be overcome with too many factors that could not be analyzed adequately. We have assumed that, in general, most of our patients come from living in apartments or small houses with wooden floors while in Korea. Carpets and venting systems also are not used widely in Korea. Most of the immigrants come from a mountainous climate in Korea where there is not significant ragweed pollen.

Of the different environmental allergens to which our patients were sensitized, the most commonly identified allergen was ragweed pollen. This result is consistent with previous studies linking ragweed pollen and development of allergic rhinitis in immigrants to the United States. An Ohio study observed that there is a “period of sensitization,” which is the interval of time required for the development of ragweed pollinosis.⁹ This term was defined as the number of ragweed pollen season exposures required for immigrant patients to become sensitized. The study found that the majority of the immigrant patients developed ragweed pollinosis after a period of sensitization of six or less ragweed season exposures. The assumption from this study is that these individuals have never been previously exposed to ragweed pollen before coming to United States. When reviewing the worldwide distribution of ragweed pollens, various authorities indicate that *Ambrosia elatior* (short ragweed) and *Ambrosia trifida* (giant ragweed) grow abundantly in the North American continent, albeit with some geographical variations.¹⁰ On the contrary, a 1994 study from Korea, which reported the results of a 2-year study of pollen counts in Seoul’s atmosphere using a Rotorod sampler, reported very little concentration of ragweed in Seoul, Korea.¹¹ The pollen counts of ragweed in this report

were not high, with the maximum count of ragweed pollen to be 19 grains/m³. Studies have shown that allergic symptoms could be provoked in ragweed-sensitive patients if the pollen counts were higher than 20 grains/m³.¹²

There is a possibility that there are other weeds and pollens in Korea that could cross-react with ragweed found in the Chicago area. However, one study showed no cross-antigenicity between ragweed pollen and mugwort pollen, which is considered one of the most significant pollen allergens in Korea.¹³ In addition, another study that examined cross-reactivity between weed pollens did not note any relationship with ragweed and mugwort pollen by skin-prick testing.¹⁴

Differences in outdoor pollution also may contribute to the new-onset allergic rhinitis. However, outdoor air pollutants such as sulfur dioxide, nitrogen dioxide, and the ozone in Korea could not be assessed adequately because of our patients coming from many regional areas in Korea where there are vastly different levels of pollutants. For example, many came from cities in Korea where there are many factories and automobiles, and others came from the countryside where air pollutants would be presumably much less.

Epidemiological studies show the prevalence of allergic rhinitis in Korea is low when compared with other countries.¹⁵ The prevalence of allergic rhinitis in Korean immigrants in the United States is unknown at this time. However, after an average of 8 years of immigration, the spectrum of responsible allergens in Korean immigrants closely resembles that seen in native citizens of the United States. The observation that allergic rhinitis develops in Koreans who were previously asymptomatic supports the idea that the new environment contributed to the development of allergic rhinitis in this population. Because it appears that environmental factors play an important role in the development of allergic rhinitis in Korean immigrants, further research and education regarding specific environmental factors and applicable environmental modifications may minimize the impact of these allergens and prevent long-term morbidity in this population.

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