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A Population Investigation of Allergy Prevalence and Cross-sensitization in China

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To the Editor,

Food allergy is a global public health problem, and its prevalence continues to increase yearly[1]. According to epidemiological data, up to 10% of the world's population suffers from food allergies[2]. Until now, there has identified more than 200 kinds of food allergens, with varying prevalence rates by specific food and population affected[3]. However, geographical variability in the incidence, major food allergens, and clinical presentation of food allergy as well as variations in symptoms and clinical phenotypes due to race,dietary habit, age, and coexisting allergic diseases exist[4]. The Codex Alimentarius Commission has identified eight major food allergens, but their prevalence trend in China is not clear. At present, some countries have already established allergen lists according to their national conditions [5]. However, national epidemiological surveys of food allergy are limited in China, and the food allergen list hasn't been established yet. Therefore, we focused on the population of 32 different regions in China.The study collected 12,505 self-reported data and 5360 clinical diagnosis data. Sample size stratified in 5 intervals (0-81 years old) was estimated. A questionnaire plus skin prick tests (SPT) with food allergens were carried out. Descriptive analysis and X^2 test were made.

The result of our study showed that the proportion in the third age interval (18-44 years old) accounted for the largest, peaking to 51%. And the SPT positivity to egg and milk in the first and second age interval (0-17 years old) decreased over age while crustaceans became the first major allergen in the adult group ([?]18years old). No significant variation over gender was observed in the skin test response to all kinds of foods. At the same time, the prevalence of food allergens showed certain regional differences. For example, the prevalence of insect allergy such as cicadas pupae in Yunnan province was higher than that in other places. Most allergic symptoms were mild. More than half of the allergic symptoms belonged to Grade 1. Especially, Grade 3 symptoms were the highest in the egg, accounting for 18% while Grade 4 symptoms were the most in the mango, accounting for 1%. In addition, Grade 5 reaction (anaphylactic shock) occurred in patients with crustaceans, milk, egg, peanut, and soybean allergies while the soybean accounted for the highest proportion (0.62%). The results of severe allergic reactions were consistent with that of the WHO. Severe allergic reactions occurred in the milk, peanut, crustacean, egg, and soybean allergies with the proportion increasing successively. Of total population, the 56% was positive to only one allergen, while 21% to two allergens, 11% to three allergens and 12% to more than three allergens. Further analysis demonstrated that partial cross-reactivity among the food involved. For example, beef - lamb, beef - milk, beef - crustaceans, milk - lamb, milk - crustaceans, wheat - buckwheat, peanut - soy, egg - milk, egg - wheat, egg - crustacean allergies were all significantly associated. Expecially, we found that cross-sensitization between egg and crustaceans.

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In summary, with reference to the standards of WHO and FAO, we have established a list of food allergens that is more suitable for the actual situation in China. The top eight food allergens in China are crustaceans, milk, egg, beef, peanut, soybean, mango, and mutton. Then, we confired partial cross-sensitization among the food involved.

Reference

1. S.T. Sigurdardottir, K. Jonasson, M. Clausen, et al. Prevalence and early-life risk factors of school-age allergic multimorbidity: the EuroPrevall-iFAAM birth cohort[J]Allergy, 2021, 76: 2855-2865.
2. YANG H, QU Y Z, GAO Y R, et al. Role of the dietary components in food allergy: A comprehensive review [J]. Food Chemistry, 2022, 386.
3. Warren, C.M., Jiang, J. & Gupta, R.S. Epidemiology and Burden of Food Allergy[J]. Curr Allergy Asthma Rep, 2020, 20, 6.
4. C.M. Warren, A.G. Brewer, B. Grobman, et al. Racial/ethnic differences in food allergy[J]. Immunol Allergy Clin North Am, 2021, 41: 189-203.
5. THOMPSON T, KANE R R, HAGER M H. Food allergen labeling and consumer protection act of 2004 in effect [J]. Journal of the American dietetic association, 2006, 106(11): 1742-4. AUTHOR

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CONFLICT OF INTEREST STATEMENT

No author has any competing interests to declare.