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Children in the New York Inner City Have High Rates of Food Allergy and IgE-Sensitization to Common Foods

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Short summary

IgE-mediated food sensitization and allergy are common in inner city children, even in the absence of reported clinical reactivity. Clinicians caring for this population should maintain a high index of suspicion for food allergy.

Keywords

food allergy; sensitization; inner city

To the Editor

Food allergy affects approximately 6% of children in the US.(1) Inner city children have high rates of asthma and allergic rhinitis,(2,3) but little is known about food allergy. Only one study to date examined the prevalence of IgE- sensitization to foods in asthmatic inner city children and found that food sensitization may be considered a marker for increased asthma severity.(4) Analysis of the NHANES 2005–2006 data indicated that African-American boys of low socioeconomic status were at highest risk for food sensitization.(5)

We explored IgE-sensitization and allergy to foods in inner-city children (>95% insured with Medicaid) from the Mount Sinai Allergy Clinic that serves East Harlem, New York. Records from January 2000 to August 2004 were reviewed for demographics, food-related reactions, allergic rhinitis (AR), asthma, and atopic dermatitis (AD).

Children evaluated for food allergy were classified as those with a history of reaction to specific foods (Group A) and those without a clear history of reaction to foods (Group B). Group B had one or more of the following: 1). moderate-severe persistent AD or asthma not controlled with optimal therapy; 2). failure to thrive; 3). family history of food allergy and avoiding foods as a precaution.

Food allergy was diagnosed if there were convincing immediate symptoms and evidence of IgE-sensitization to the particular food that caused the reaction (positive skin test or specific

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IgE (sIgE) $>0.35\text{kU}_A/\text{L}$, UniCAP, Phadia, Michigan, US) or sIgE at the 95% predictive decision point (95PDP) for food allergy. (6)

We used descriptive statistics to analyze demographic data; Fischer exact test and multiple logistic regression were used to compare two groups (SAS® 9.2 (Cary, NC, USA)).

This study was approved by the Institutional Review Board at Mount Sinai School of Medicine, New York, NY.

Four hundred ninety-three patients were seen in the allergy clinic during the study period; of those, 228 (46%) underwent food allergy evaluation. Thirty-eight percent of patients evaluated for food allergies (87/228) had a history of a food-induced allergic reaction (Group A). Of these, 13.8% (12/87) described symptoms consistent with anaphylaxis; peanuts, tree nuts and shellfish were the most common triggers. The remaining 141 patients (Group B) had no history of clinical reactivity, but underwent food allergy evaluation for reasons as outlined above.

Overall, 71% of the 228 patients (Groups A and B) evaluated for food allergy for any reason had evidence of IgE-sensitization to one food; 45% had sensitization to multiple foods. Sensitization occurred with the following frequencies: peanut 36%, egg 32%, milk 28%, tree nuts 22%, soy 18%, shellfish 18%, seeds 14%, wheat 13%, and fish 10%. Twenty-eight percent had food allergy (egg 18%, peanut 15%, milk 11%). Group A had significantly higher rate of sensitization to one or more foods (adjusted for AD and AR, $P=.02$); the rates of sIgE at the 95PDP for milk, egg or peanut allergy were not different between groups (Table 1).

Children with AD had significantly higher rates of IgE-sensitization (87%) and 95PDP IgE levels to egg, milk, and peanut (41%) when compared with those without AD (58% and 16%, respectively; $P < .001$ for both comparisons). There were no significant differences in food sensitization or allergy in regard to asthma status (data not shown).

Both food IgE-sensitization and food allergy are common in the inner city pediatric allergy clinic population, consistent with NCICAS and NHANES reports. (4,5) High rates of food sensitization and allergy are seen in children for whom acute allergic reactions may not be the chief complaint. It is possible that history of acute reactions was not elicited due to fragmented childcare leading to the guardian being unaware of exposures and reactions, language barriers, or fragmented healthcare causing poor control of AD and/or asthma.

Children with AD are at higher risk for food allergy. (7) In up to 40% of children with moderate to severe persistent AD, ingestion of the offending foods may result in exacerbation of the existing skin lesions and or in acute allergic reactions. We also found that children with AD were at significantly higher risk for food allergy and sensitization when compared to those without AD.

The majority of children underwent food allergy evaluations for reasons other than clinical reactivity (Group B), suggesting that different racial groups may manifest food allergies with different symptoms. It has been reported that African American children have higher rates of AD. (8) Thus, AD may be a more common presenting symptom of food allergy in this population, especially if the children demonstrate skin symptoms early in life. Children with early onset severe AD are at higher risk of having elevated food-specific IgE levels. (9)

Limitations to our study include the retrospective design, and a study cohort that may not be representative of all inner city children. Double blind placebo-controlled food challenges (DBPCFC) were not conducted in the majority of children. Although DBPCFC is considered

the gold standard for food allergy diagnosis, it is not practical in the epidemiologic studies due to high cost and limited availability. Therefore, the acceptable substitute is the determination of sIgE to foods, particularly the use of established 95PDP. In the US, these diagnostic decision points are widely utilized and oral food challenges are usually not performed when specific sIgE exceed 95PDP. We limited our analysis to egg, milk, and peanut for which 95PDP are well-established, although the accuracy of 95PDP in children without clear history of clinical reactivity is uncertain (7) Finally, food allergy evaluations were performed if there was a suspicion for food allergy and therefore, exact prevalence of food sensitization in our clinic cannot be determined.

In spite of these limitations, our data clearly show a very high rate of IgE-sensitization to foods and IgE-mediated allergy to egg, milk, and peanut in the East Harlem inner city pediatric allergy clinic population. Clinicians should maintain a high index of suspicion for food allergy when evaluating inner city children with persistent AD and asthma resistant to standard medical therapies, even in the absence of definitive clinical reactions.

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Abbreviations

IgE	Immunoglobulin E
AD	Atopic Dermatitis
95PDP	95% Predictive decision point
sIgE	Serum-specific IgE

Reference List - 9 (max 9)

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TABLE 1

Characteristics of children from an inner city allergy clinic who underwent food allergy evaluation

	Group A (History of immediate symptoms upon food ingestion)	Group B ^{**} (No history of immediate symptoms upon food ingestion)
N	87	141
Male (%)	45 (52%)	81 (57%)
Median age (range), years	3 (0.25–18)	3 (0.25–17.0)
African-American	34 (39%)	62 (44%)
Hispanic	36 (41%)	68 (48%)
Asthma	40 (46%)	66 (47%)
Atopic dermatitis (AD)	33 (38%)	66 (47%)
Allergic rhinitis	41 (47%)	51 (36%)
Sensitized to any food [*]	55 (63%)	74 (52%)
Serum sIgE >95PDP for:		
Hen's egg white	12 (14%)	27 (19%)
Peanut	10 (11%)	22 (16%)
Cow's milk	8 (9%)	16 (11%)

* Statistically different rates of food sensitization between Group A and B, logistic regression model adjusted for AD and AR, $P=.02$.

** Group B had one or more of the following: 1). moderate-severe persistent AD or asthma not controlled with optimal therapy; 2). failure to thrive; 3). family history of food allergy and avoiding foods as a precaution.