

Behavioral risks associated with food allergy management in an urban pediatric population



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Clinical Implications

- Food allergy (FA) is prevalent among urban children, and they experience higher rates of severe reactions. FA-related management and risk-taking behaviors were examined in an urban pediatric population, and barriers to allergen avoidance and emergency preparedness were identified.

TO THE EDITOR:

In the United States, the prevalence of food allergy (FA) amongst children and adolescents is estimated at 8%¹ and 38.7% report a history of severe reactions.² The mainstay of effective FA management includes allergen avoidance and emergency preparedness for allergic reactions.³ Despite these efforts, unexpected allergic reactions can still occur in children diagnosed with FA. Studies examining disparities amongst food-allergic children in urban settings have been published⁴; however, few have characterized FA management behaviors and attitudes within this population, which was the aim of this study.

To assess FA management behaviors, this cross-sectional study utilized a 44-question written survey administered to English-speaking parents/legal guardians of children aged 6 months to 18 years who were previously diagnosed with FA at the Mount Sinai hospital-based pediatric Allergy clinic (New York, NY) and returned for a follow-up visit between August 2013 and September 2014. Only governmental insurance plans are accepted. As a standard practice, patients with FA are educated on FA avoidance, including food-label reading and cross-contamination issues, and management of allergic reactions, including written emergency action plans and prescriptions for epinephrine autoinjectors (EAI) along with teach-back training. Medical records were reviewed for response validation. A research coordinator verified EAI carriage. Frequencies of categorical responses were presented descriptively, and statistical analysis was performed with GraphPad Software (La Jolla, Calif). A comparison of categorical data was performed with Fisher's exact test (2-tailed, $P < .05$). This study was approved by the institution's review board.

Of the 113 families approached, 100 participants completed the survey (response rate = 88%). Descriptive characteristics of the participants' children are presented in Table I. This predominantly minority population was highly atopic, with more than half reporting a diagnosis of asthma, atopic dermatitis, and/or allergic rhinitis. Multiple FAs were reported for 80%. Food-allergen avoidance was based on either the history of clinical reactivity or positive testing. The majority of children (72%) had FA reactions in the past year, with 38% reporting ≥ 3 reactions. Reaction rates were similar across age groups ($P = .13$). There

was no correlation between having a history of asthma ($P = .81$), atopic dermatitis ($P = .57$), or allergic rhinitis ($P = .44$) and having at least 1 allergic reaction within the past year. Twenty-seven percent of children were ever treated with epinephrine for a past reaction, 34% were treated in the emergency department, and 5% of participants reported that their child was hospitalized at least once in their lifetime for a food-related allergic reaction.

FA management behaviors were assessed, including adherence to allergen avoidance and EAI carriage. Forty-four percent of responders were identified as practicing at least 1 risky behavior. Reasons identified for noncompliance are listed in Table II. There was no difference between age groups and report of at least 1 risky behavior ($P = .84$). There was a correlation between risky behavior and having reported at least 1 food-induced allergic reaction in the past year ($P < .05$), but there was no significant difference between those with one versus multiple reactions within a year. Those with multiple FA were more likely to report risky behavior ($P = .03$) compared with those with single FA. All patients with FA were previously prescribed an EAI. Fifty-seven respondents reported EAI carriage at all times; however, only 41 had the EAI present during the visit (Table II). There was a difference amongst age groups and those having the EAI at the visit ($P = .02$). Amongst those who were identified as practicing risky behavior, there was no correlation between risk-taking behavior and reported ($P = .22$) or actual EAI carriage at the visit ($P = .11$). Table II lists the responses given for noncompliance with EAI carriage.

Regarding risky behaviors, 11% exposed their child to food allergens because of not having time to review ingredient labels. Seven percent of respondents reported that the cost of buying food for their child was a barrier to FA avoidance. Notably, over half reported a single-provider household and having at least 1 additional child. In addition, 49% reported that an additional household member had FA. Twenty-three percent reported intentionally exposing their child to an avoided food to see if their child was still allergic or to help "treat" his or her underlying allergy. This has been previously reported,⁵ and it is possible that reports of promising advancements in FA treatment may contribute to the belief that allergen exposure may be beneficial. Knowledge gaps in management were identified where several caregivers reported that having emergency medications available or lack of severe reaction history negated the need for strict avoidance. Similar to previous studies,⁵ more than half of the participants did not have their EAI available at the time of the study visit. Although all participants had verified EAI prescriptions, actual prescription filling or refill rate could not be verified. These findings identify several areas of focus for improved counseling.

Few studies have examined factors associated with FA-related management and risk-taking behaviors among caregivers of FA children. In this highly atopic, urban pediatric FA population, high rates of reported allergic reactions, and risky behavior were seen. Risk-taking behaviors are likely due to knowledge gaps and misconceptions, as well as possible financial barriers. We identified an association between risky behavior and having reported at least 1 allergic reaction in the past year.

TABLE I. Characteristics of the 100 participants from urban hospital allergy clinic with food allergy

N = 100	
Survey completed by	
Child's mother	85%
Child's father	11%
Other legal guardian	4%
Reported household demographics	
Single-provider household	55%
At least 1 additional child in the household	56%
Additional household member with FA	49%
Age, median (range)	5.3 y (2 mo to 19.8 y)
Group 1: 0 mo to 5 y	48%
Group 2: >5 y	52%
Gender, male	59%
Ethnicity	
Hispanic	39%
Non-Hispanic	49%
No response	12%
Race	
White	20%
Black	37%
Asian	9%
American Indian/Alaskan native	5%
Other	6%
Avoiding a single FA	20%
Avoiding multiple FA	80%
Median number of foods avoided	3 (1-10)
Food allergens	
Tree nuts	69%
Peanuts	68%
Egg	51%
Shellfish	41%
Milk	34%
Fish	33%
Wheat	22%
Soy	17%
Other	16%
Comorbid allergic disorders	
Asthma	57%
Allergic rhinitis	58%
Eczema/atopic dermatitis	78%
Food allergic reactions in the past year?	
None	23%
1 reaction	21%
2 reactions	13%
3 or more reactions	38%
Unsure/no response	5%
Ever used EAI for FA reaction?	27%
Ever ER for FA reaction?	46%
Ever hospitalized* for FA reaction?	17%

EAI, Epinephrine autoinjector; ER, emergency room; FA, food allergy.

*Hospitalization includes all overnight admissions that include intensive care unit admissions.

TABLE II. Food allergy management behaviors including reasons for noncompliance of food allergen avoidance, rates of epinephrine autoinjector (EAI) carriage, and reasons reported for not having an EAI available during the visit

Reasons for noncompliance of food allergen avoidance		Yes
We give the allergic food to my child because I am not sure how to eliminate the allergic foods from his/her diet (N = 100)		10%
We give the allergic food to my child because I get confused about what foods he/she should avoid (N = 100)		14%
We give the allergic food to my child because I do not have time to check all the food ingredients (N = 100)		11%
We give the allergic food to my child because it is too expensive to buy special food for my child (N = 100)		7%
We give the allergic food to my child because he/she has never had a bad reaction (N = 99)		17%
We give the allergic food to my child because the allergy medication will fix any problem (N = 100)		7%
We give the allergic food to my child to see if he/she is still allergic (N = 100)		21%
We give the allergic food to my child to help treat the allergy (N = 99)		12%
Rates of EAI carriage		N = 98
Reported EAI available at all times		57 (58%)
Had EAI during clinic visit		41 (42%)
Reported always having EAI, but EAI was not brought to the visit		27 (47%)
Reasons reported for not having EAI available during the visit		N = 83
Forgot EAI		21 (25.3%)
EAI too bulky to carry		1 (1.2%)
Not necessary to bring EAI everywhere		20 (24.1%)
EAI kept at home only		N = 10
EAI kept at school only		N = 5
EAI kept both at home and school		N = 4
EAI kept at other parent's home		N = 1
Never had to use EAI		4 (4.8%)
No response given		37 (44.6%)

This study is limited by the self-reported data, which is subject to recall and social desirability bias. Despite nonanonymous reporting, a notable percentage of participants reported risky behaviors related to FA management. Generalizability of these results is limited as this study was conducted at a single referral site. Strengths included the high response rate, and all children had physician-documented FA. Electronic medical records were used to verify FA and other allergic history.

Despite these limitations, the high rate of allergic reactions and risky behaviors noted in this study support the need to identify misconceptions of FA management, risk-taking behavior, and understand barriers families face in practicing proper allergen avoidance and preparedness with emergency medications. We highlight additional psychosocial and economic factors that may impede FA management. Our findings point to

areas of future research regarding FA management behaviors in this population as well as important factors that should be addressed by providers to improve patient outcomes.

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