

Parent perspectives on food allergy management and safety during the COVID-19 pandemic

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ABSTRACT

Background: U.S. national emergency was declared in mid-March 2020 due to the coronavirus disease 2019 (COVID-19) pandemic. Subsequently, a period of stay-at-home orders, regulatory changes, evolving medical recommendations, and food supply chain disruptions occurred. There is little published research on how such changes affected food allergy management for children with this diagnosis.

Objective: The study goal was to identify parent perspectives with regard to if and/or how pandemic-related regulatory changes and evolving medical recommendations have affected food allergy management.

Methods: A survey was distributed to parents of children with food allergy. An electronic Internet forms survey link was available for completion during July 2020. Data were presented as descriptive statistics, cleaned, and coded into a spreadsheet before analysis. Frequencies and percentage were calculated to describe participants' characteristics and responses.

Results: Of 377 responses, 359 met inclusion criteria. Concerns about COVID-19 exposure were expressed in 65.7% about accessing an emergency department and 73.6% had school reentry concerns; 66% had not discussed recommended anaphylaxis management algorithm changes with a provider; 85.8% had not discussed the temporary U.S. Food and Drug Administration food labeling policy with a provider. Most (62%) reported shortages of preferred safe food brands. 62% spent more time cooking safe foods from scratch. With regard to the recommendation by the U.S. Centers for Disease Control and Prevention (CDC) for classroom dining, 57.7% planned to request modifications. With regard to the CDC's recommendation to use inhalers versus nebulizers, 37.7% had not discussed the topic with a provider. Ninety-two written comments were analyzed and grouped into seven themes.

Conclusion: New pandemic-related regulations, food supply chain disruptions, and evolving medical recommendations resulted in intensified burdens for respondents, including the increased time needed to complete food allergy management and school reentry concerns. Study results can inform clinical team members (e.g., physicians, nurses, dietitians) of effects that pandemic-related changes may have on this patient population, with subsequent consideration of patient-specific screening, education, and shared decision-making with regard to risk mitigation needs.

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After a declared U.S. emergency due to the coronavirus disease 2019 (COVID-19) pandemic in March

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2020, states issued stay-at-home orders and schools, universities, and businesses closed to comply.¹ Regulatory changes and evolving medical recommendations occurred with the potential impact on children with provider-diagnosed food allergy at risk for anaphylaxis. Food supply chain disruptions ensued, which jeopardized available quantities of preferred products.² The U.S. Food and Drug Administration (FDA) announced a policy that allowed food manufacturers to make certain temporary and minor ingredient formulation changes without conforming to food label changes.^{3,4} Individuals with food allergies must strictly avoid diagnosed food allergens. Reading food labels is critical to knowing the ingredients of the food before consumption.⁵ The FDA policy may alter the ease and safety of performing this daily management strategy.

A consensus-based expert panel of allergy/immunology specialists published guidance that suggests that a community-based anaphylaxis treatment algorithm be altered, suspending routine advice to call 911 for prompt transfer to the emergency department (ED) after

epinephrine administration.^{6,7} To avoid overwhelming EDs during pandemic surges, the panel recommended contacting 911 for ED transfer if anaphylaxis symptoms did not immediately resolve without recurrence after a single epinephrine dose.^{6,7} Altering long-held advice with regard to community anaphylaxis management may influence if and when parents seek emergency services that could affect patient outcomes.

U.S. Centers for Disease Control and Prevention (CDC) made recommendations with regard to asthma management tools and medication delivery systems.⁸ Asthma is a common comorbidity in those with food allergies and creates a higher risk for severe anaphylaxis.^{5,9} The CDC recommended inhaler use versus nebulizer use to avoid COVID-19 aerosolization.⁸ The CDC recommended peak flow meter avoidance, which involves forceful exhalation, which could trigger a cough and aerosolize COVID-19.⁸ These suggestions are supported by recommendations from allergists.⁶ Such guidelines alter routine community asthma management strategies.

The CDC's initial 2020 school re-opening guidelines recommend dining in classrooms versus cafeterias.¹⁰ The American Academy of Pediatrics (AAP) recommends classroom or outdoor dining, or additional lunch periods for smaller groups in cafeterias.¹¹ The CDC and AAP acknowledge food allergy safety needs (*e.g.*, clean hands before and after eating).^{10,11} Before the pandemic, some students with food allergies may have had accommodations, including food allergen-restricted or food-free classrooms.¹²⁻¹⁴ Adopting the CDC and AAP recommendations may influence dining modification requests by parents.

Little published research exists on how pandemic-related changes affect food allergy management. Thus, this study aimed to identify parental perceptions with regard to if and/or how pandemic-related regulatory changes and medical recommendations have affected food allergy management. Captured data can inform clinical teams of potential screening, patient education, and risk-mitigation decision-making needs.

METHODS

Study Design

This was a descriptive study by using an online survey to identify parental perceptions with regard to the effects of COVID-19 pandemic-related regulatory changes and evolving medical recommendations on food allergy management. This study was approved and deemed exempt on July 8, 2020, by the institutional review board of Molloy College (approval 1619562-1 exempt category). Informed consent was obtained before a participant could access the survey. A.F. Russell conceptualized the study; A.F. Russell and O.S. Kagan contributed to manuscript design, data

acquisition, and data analysis; O.S. Kagan assembled, cleaned, and performed the initial data analysis; all the authors contributed to the study survey design, review, and data interpretation; and all the authors contributed to manuscript drafting and revisions, gave final approval, and agreed to be accountable for all aspects of the work, ensuring integrity and accuracy.

Instrumentation

The initial survey was developed, which consisted of five domains. After development, advanced practice nurse researchers provided expert review and question refinement. The final survey had 23 questions, including multiple choice, "check all that apply," 5-point Likert type, and open-ended responses. Skip logic was used to advance the respondents to questions based on responses. Two screening questions determined participation eligibility by establishing age, U.S. residency, and provider-confirmed diagnosis. If they met inclusion criteria, then the participants were prompted to proceed.

Five questions collected demographic data about participant age, gender, education level, race, and zip code; two questions about the child's gender and age; four questions about awareness of recommended changes to anaphylaxis management algorithms; two questions about the FDA's temporary food labeling policy; one question about the CDC school dining guidelines; four questions about the CDC asthma management recommendations; one question with regard to presence of a school nurse; and one question on the level of concern about school reentry. The participants had an opportunity to include additional comments in a text format. The final version of the 5 minute Internet form survey was administered electronically.

Study Population

Parent recruitment was through U.S. food allergy support groups, the Food Allergy Anaphylaxis Michigan Association professional listserv, and Food Allergy and Anaphylaxis Connection Team. They distributed a survey web link to members *via* e-mail and/or social media platforms. The survey link included an embedded consent form that covered all applicable requirements and survey completion and submission constituted participation.

Molloy College Institutional Review Board granted study approval in the exempt category. Eligible participants were U.S. parents, English language proficient, of 5-18-year-old children with diagnosed food allergy. Respondents < 18 years old or those living outside the United States were excluded. Those with more than one child who met inclusion criteria were instructed to respond for each child separately. Respondents were not offered participation incentives.

Study Procedures

The survey opened July 9, 2020. Data were collected during a 3-week period. The survey closed on July 31, 2020. No identifying information was collected, and responses were kept confidential.

Statistical Analyses

Data were collected anonymously and presented as descriptive statistics, which were cleaned and coded into a spreadsheet data base before analysis. Frequencies and percentage were calculated to describe the participants' characteristics and responses.

RESULTS

The survey yielded a total of 376 responses. Of these 376, 17 (4.5%) did not meet inclusion criteria and were excluded, which left 359 total eligible responses (95.5%) for final analysis. Responses from parents who resided in 43 states were analyzed. No responses were received from seven states, including Alaska, Maine, Nebraska, North Dakota, Louisiana, Idaho, and Iowa. Most respondents were white (90% [$n = 323$]), women (98.3% [$n = 353$]), between ages 35 and 54 years old (94.7% [$n = 340$]), and with a bachelor's degree or higher (85.5% [$n = 307$]). The ages of the children were collected and reported in three age groups (1) 5–9 years (38.2% [$n = 137$]), (2) 10–14 years (41.5% [$n = 149$]), and (3) 15–18 years (20.3% [$n = 73$]). Of 359 responses about the child's gender, 43.2% ($n = 155$) were girls, and 56.8% ($n = 204$) were boys. The demographics are summarized in Table 1.

Of 359 responses to question-collecting data about parents' awareness of new recommendations for epinephrine autoinjector (EAI) administration algorithm and calling 911 during pandemic surges, 45 (12.5%) discussed it with providers and 77 (21.4%) were unaware. The allergic reaction incidence and management during the pandemic were reported by 14 (3.9%). Of these 14, 2 (14%) followed new recommendations, 11 (79%) followed their pre-pandemic algorithm, and 1 (7%) followed a different plan. Responses are summarized in Table 2. Of 359 responses to the Likert-type scale question that assessed parental concern of contracting COVID-19 in the ED during allergic reaction treatment, 235 (65.7%) expressed concern or extreme concern and 47 (13.1%) expressed minimum or no concern.

Responses to two questions that assessed the awareness of FDA's temporary food labeling policy and other changes are summarized in Tables 2 and 3. Of 359 responses with regard to policy awareness, 308 (85.8%) did not discuss it with their provider and 28 (7.8%) were unaware. Respondents indicated specific changes and/or actions taken to safeguard their children in response to pandemic-related changes (Table 3; Fig. 1). Of 359 responses to question with regard to the CDC's recom-

Table 1 Descriptive statistics: demographic data ($N = 359$)

Characteristic	Frequency, n (%)
Age of the parent	
25–34 y	10 (2.8)
35–44 y	196 (54.6)
45–54 y	144 (40.1)
≥ 55 y	9 (2.5)
Gender of the parent	
Women	353 (98.3)
Men	6 (1.7)
Race	
White	323 (90.0)
Black/African American	4 (1.1)
American Indian	3 (0.8)
Asian	17 (4.7)
Other	12 (3.3)
Level of education	
High school or less	19 (5.3)
Trade or vocational school	7 (1.9)
Associate's degree	26 (7.2)
Bachelor's degree	157 (43.7)
Graduate degree	150 (41.8)
Age of the child	
5–9 y	137 (38.2)
10–14 y	149 (41.5)
15–18 y	73 (20.3)
Gender of the child	
Girls	155 (43.2)
Boys	204 (56.8)

mendation to dine in classrooms versus cafeterias, 207 (57.7%) indicated this would influence requested dining modifications, 124 (34.5%) were not influenced, and 22 (6.1%) provided other responses (e.g., will homeschool, non applicable (n/a)). Findings are summarized in Table 2.

Of the 359 respondents, 183 (51%) had a child with provider-diagnosed asthma. Of those 183 children, 181 (99%) had a prescribed inhaler and 75 (41.5%) had a prescribed nebulizer. When asked if the parents discussed the CDC's recommendation to use inhalers versus nebulizers to avoid COVID-19 aerosolization, 38 (20.8%) were unaware of the guideline, 69 (37.7) did not discuss it with providers, and 65 (35.5%) chose nonapplicable. These descriptive statistics are summarized in Table 4.

The survey's final section asked about the presence of a school nurse to assist with allergy/asthma management and another question with regard to the level of concern about school reentry before an available COVID-19 vaccine. Of 359 responses, 278 (77.4%) had a school nurse, 19 (6.8%) had part-time or shared

Table 2 Descriptive statistics: anaphylaxis management during pandemic

Anaphylaxis Management Survey Questions	n (%)
Articles published in the <i>Journal of Allergy and Clinical Immunology: In Practice</i> included a recommendation on how to manage anaphylaxis during the COVID-19 pandemic at times when hospitals are overwhelmed with patients.* The suggested change is to give epinephrine, and, if symptoms do not immediately go away after a single dose of epinephrine, then call 911 to seek emergency care. Did you talk about this suggestion with your child’s health care provider?	
No	237 (66)
Yes	45 (12.5)
Not aware	77 (21.4)
Total	359 (100)
During the COVID-19 pandemic, has your child ever experienced food-induced anaphylaxis?	
No	345 (96.1)
Yes	14 (3.9)
Total	359 (100)
When your child experienced food-induced anaphylaxis, what statement best describes your actions?	
1. We followed the newly recommended change in the management plan for epinephrine administration and calling 911, and DID NOT require a visit to the emergency department.	2 (14)
2. We followed the newly recommended change in the management plan for epinephrine administration and calling 911 but still required a visit to the emergency department.	0 (0)
3. We DID NOT follow the recommended change in the management plan for epinephrine administration and calling 911, and instead followed our usual pre-COVID19 allergy action plan.	11 (79)
4. Other	1 (7)
Total	14 (100)
FDA temporary labeling changes	
Due to food ingredient supply disruptions during the COVID-19 pandemic, the FDA announced a temporary policy that allows food manufacturers to make minor ingredient changes without updating the labels. This temporary policy does not allow food manufacturers to use any of the major food allergens as substitutes. Did you discuss this with your child’s health care provider?	
Yes	23 (6.4)
No	308 (85.8)
Not aware	28 (7.8)
CDC in-class meals recommendation concerns	
Due to the COVID-19 pandemic, the CDC is recommending that students eat in classrooms to avoid large groups mingling in the cafeteria, which could increase the spread of the virus. If this advice is adopted by your school, will this influence the dining (lunch/snack) modifications you request of the school for your child?	
Yes	207 (57.7)
No	124 (34.5)
Homeschool or will homeschool	17 (4.7)
Not sure	5 (1.4)
Will start college	3 (0.9)
N/A	3 (0.9)
Total	359 (100)

COVID-19 = Coronavirus disease 2019; FDA = U.S. Food and Drug Administration; CDC = U.S. Centers for Disease Control and Prevention; N/A = not applicable.

*From Refs. 6 and 7.

Table 3 Descriptive statistics: food allergy management during the pandemic (N = 359)

Survey Questions	n (%)
What food allergy management changes or experiences have you had related to the ongoing COVID-19 pandemic?	
1. Had no food allergy management changes or experiences	65 (18)
2. Experienced shortages of preferred food brands that are regularly and safely consumed	221 (62)
3. Spent more time searching online for preferred food brands	169 (47)
4. Spent more time calling manufacturers to check ingredients or potential cross-contact with the purchase of new food brands	80 (22)
5. Spent more time cooking safe foods from scratch	221 (62)
6. Avoided restaurant meals/take out	202 (56)
7. Spent more time planning food allergy accommodations for the upcoming school year	72 (20)
8. Limited or restricted diet*	7 (1.9)
9. Stocked safe foods in advance/supplement with homegrown foods*	6 (1.7)
10. Unable to access ongoing therapies/medications (e.g., epinephrine)*	5 (1.4)
11. Lack of trust/increased anxiety*	2 (0.6)
12. Removed child from school/switched to homeschooling*	2 (0.6)
13. Other changes/experiences*	11 (3.1)

COVID-19 = Coronavirus disease 2019.

*Responses were added by the participants in addition to "check all that apply" statements.

nurse, 58 (16.2%) had no nurse, and 15 (4.2%) were unaware if the school had nurses. Responses to Likert-type scale question indicated that 265 (73.6%) expressed concern or extreme concern with regard to school reentry, whereas 42 (11.7%) had no or minimum concern (Table 4). The participants had a comment option at the conclusion of the survey. Of the 359 respondents, 92 commented. Written text comments were analyzed and grouped into seven major themes, noted in Fig. 2.

DISCUSSION

Context

Context with regard to pandemic highlights during the open survey is provided in the Online Supplemental Table 1. Four months into the pandemic, COVID-19 cases continued to rise, potential therapies were in development, vaccines were under study, states differed with regard to face mask usage, school re-opening guidelines were announced, supply chain disruptions continued, and public health emergency status was extended. Such occurrences may have influenced the study responses.

Anaphylaxis

Before study recruitment, Casale *et al.*⁷ and Shaker *et al.*,⁶ published guidance with regard to community-based anaphylaxis treatment algorithm modifications, suspending routine advice, which involves calling 911 after EAI administration to avoid overwhelming EDs during pandemic surges. Guidelines advise contacting 911 if anaphylaxis symptoms persist after a single

epinephrine dose.^{6,7} Most respondents had not discussed the guidelines with providers, whereas 25% were unaware of the recommendation. Notably, most respondents reported significant concern about COVID-19 exposure in EDs. Such apprehension and/or unawareness with regard to new guidance may adversely affect patient outcomes. Patients may not introduce such topics with providers. Clinical teams may proactively discuss the rationale for the new recommendations, address concerns with regard to COVID-19 exposure in EDs, and stress activating Emergency Medical Services (EMS) after EAI administration for prompt ED transfer with any severe, life-threatening reaction.¹⁵

Food Allergy Management

Daily vigilance is required for food-induced anaphylaxis prevention and preparedness. Management includes knowing all the ingredients before consumption, reading food labels, knowing the ways that food allergens are described on food labels, avoiding cross-contact, and contacting manufacturers about production processes or food label ambiguity.^{5,16} Caregivers regularly use safely consumed food brands.¹⁶ Food supply chain disruptions risk the ability to obtain preferred brands. The FDA's temporary policy that allows manufacturers to make minor ingredient changes without updating labels, exclusive of using major food allergens as substitutes, may disrupt routine management.^{3,4} Most respondents had not discussed the FDA policy with their providers. Clinical teams may offer a proactive discussion with families about the FDA

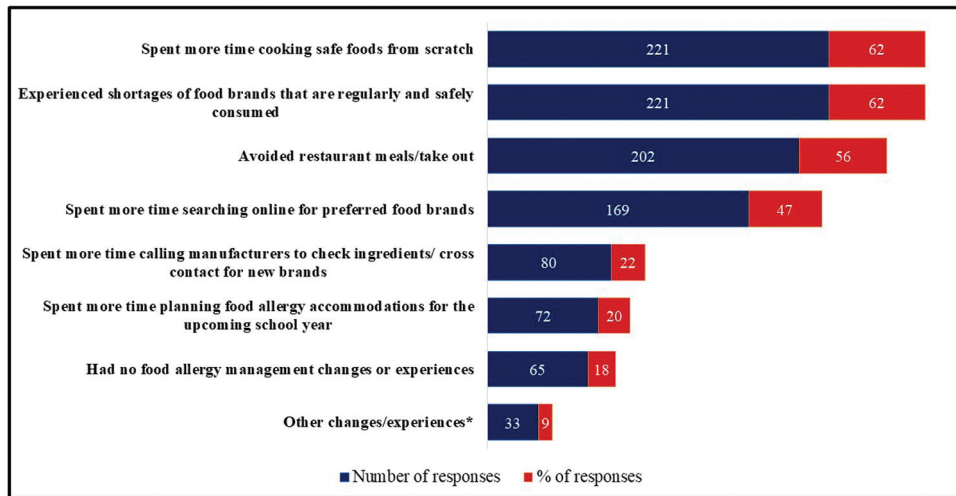


Figure 1. Food allergy management during the pandemic. Survey respondents were asked to check all statements that applied to their food allergy management experiences/changes and were given an option to write additional responses under “other changes/experiences.” *Note: “Other changes/experiences” comments consisted of 33 responses (9.2%), with the following breakdown: limited or restricted diet, n = 7 (1.9%); stocked safe foods in advance/supplement with homegrown foods, n = 6 (1.7%); inability to access ongoing therapies or medications, n = 5 (1.4%); lacked trust/experienced anxiety, n = 2 (0.6%); removed child from school/switched to homeschooling, n = 2 (0.6%); and other, n = 11 (3.1%). These responses are outlined in Table 3.

policy, potential labeling ramifications, and the need to contact manufacturers with food label questions.^{3,4}

Respondents reported pandemic-related burdensome effects on food allergy management, including spending even more time cooking safe foods, searching online for preferred food brands, and contacting manufacturers. The majority of respondents experienced shortages of preferred food brand. The inability to find safe brands may be a significant stressor. If shortages persist, then potential nutritional deficits could occur without safe alternatives. Children with food allergy in households who experience food insecurity may face additional shortages, risking adverse

health outcomes.¹⁷ Screening by physicians and nurses can assess the ability to obtain safe foods and the risk for nutritional deficits. Dietician or social worker referrals may be needed for additional assessment and resources.

Asthma

Most respondents reported that their child had diagnosed asthma, with a prescribed inhaler and a nebulizer. Thirty-eight percent of the parents had not discussed with their provider the CDC’s recommendation to avoid nebulizer use, whereas 21% were unaware of this guideline and may not raise the topic

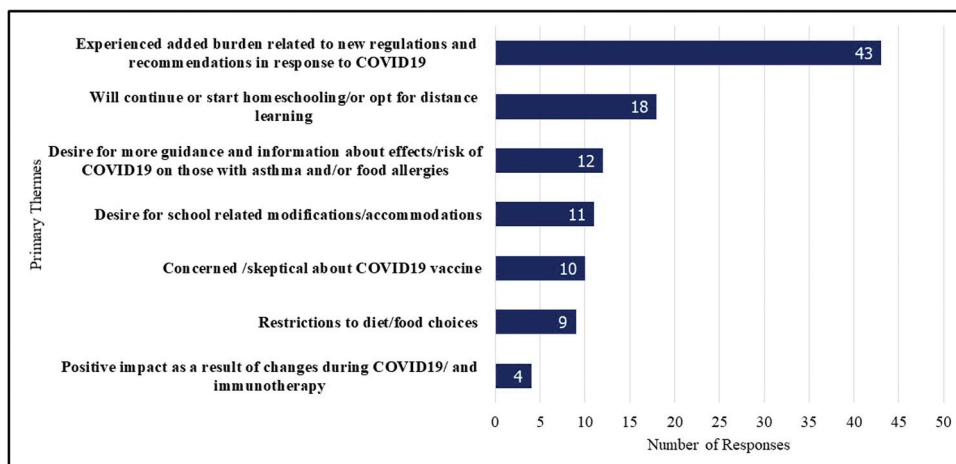


Figure 2. Primary themes from respondents’ end-of-survey comments. The respondents were given an option to comment at the end of the survey. Of 359 respondents, 92 chose to comment. All written text comments were analyzed and grouped into seven major themes. The top themes are noted in the bar graph.

Table 4 Asthma management during the pandemic and the presence of a school nurse

Asthma Management	n (%)
Does your child have healthcare provider–diagnosed asthma?	
Yes	183 (51)
No	176 (49)
Total	359 (100)
Does your child currently have a prescribed inhaler for management of his or her asthma?	
Yes	181 (99)
No	2 (1)
Total	183 (100)
Does your child currently have prescribed nebulizer treatments for management of his or her asthma?	
Yes	75 (41.5)
No	108 (58.5)
Total	183 (100)
The CDC recommended that nebulizers at school only be used for students who cannot use or do not have an inhaler. Inhalers are preferred over nebulizers to avoid the potential spread of COVID-19 particles into the air. Did you discuss this recommendation with your child’s health care provider?	
Yes	11 (6)
No	69 (37.7)
Not aware	38 (20.8)
Not applicable	65 (35.5)
Total	183 (100)
The presence of a school nurse: does your school employ a school nurse who provides students with allergy and/or asthma management care on site?	
Yes	278 (77.4)
≤ Part-time or shared	19 (6.8)
No	58 (16.2)
Not aware	15 (4.2)
N/A	8 (2.2)
Total	359 (100)
On a scale from 1 to 5, how concerned are you about having your child back at school before a COVID-19 vaccine becomes available? (1 [not at all concerned] to 5 [extremely concerned])	359 (100)*

CDC = U.S. Centers for Disease Control and Prevention; COVID-19 = coronavirus disease 2019; N/A = not applicable.
 *Additional data: mean ± standard deviation, 4.07 ± 1.23; potential range, 1–5; actual range, 1–5.

with providers. Asthma management action plans may require modifications to reflect this CDC recommendation. Proactive discussions by clinical teams may include risks and benefits of the new guideline. Patient education sessions may include refresher training on proper inhaler use with technique evaluation.

School

Before the pandemic, some students with food allergies may have had accommodations that involved food allergen–restricted or food-free classrooms and designated cafeteria policies.^{12–14} The CDC recommended classroom dining to avoid large gatherings in cafeterias.¹⁰ Most respondents indicated that this guideline influenced their dining modification requests. Collaborating with schools on such requests requires additional caregiver time and effort, and may influence parental perception of school safety and decisions with regard to in-person school reentry.

Most respondents reported having a school nurse, whereas others had none or were unaware. Optimally, all students have access to a full-time registered professional nurse, who provides services such as evidenced-based health care, anaphylaxis prevention and preparedness education and disease surveillance.¹⁸ Lacking a school nurse may influence parental perception of school safety and decisions with regard to in-person school reentry.

Parental comfort levels may increase when knowing a nurse is present to provide services, including oversight of infection control measures; COVID-19 education, screening, triage, and acute care; allergic reaction assessment and treatment; supervision of individualized health plan compliance; and vaccination programming leadership. In addition, school nurses can emphasize food sharing avoidance and create a bullying prevention policy.^{14,19,20} Awareness of school nurse coverage and school-specific resources (e.g., unassigned stock EAI) helps clinical teams identify potential school service gaps that influence individualized patient accommodation planning.

The majority of respondents reported being very concerned about school reentry. This is a significant discussion point for clinical teams to consider addressing, with shared decision-making assistance. If parents elect in-person school reentry, then individualized health plans may require updating in collaboration with caregivers, school nurses, and consideration of evolving guidelines.²⁰

Themes

In the open comments, many of the respondents described burdens related to new recommendations and regulations (Fig. 2). Others shared plans to continue homeschooling, start homeschooling, or opt for

Table 5 Suggested basic food allergy patient education discussion points during the COVID-19 pandemic to individualize for established pediatric patients*

Food Allergy#

- Review the need to maintain avoidance of diagnosed food allergens even during periods of quarantine and stay-at-home restrictions.
- Review the importance of knowing all the ingredients of any food/beverage before consumption (*e.g.*, read ingredient labels; ways diagnosed food allergen can be described on a label in food and nonfood products).
- Discuss the temporary FDA policy that allows food manufacturers to make certain minor ingredient formulation changes during food supply chain disruptions without conforming to ingredient label changes.
- Review the need to contact manufacturers with questions with regard to food label content, production processes and/or protein cross-contact risks, and to check their website for ingredient changes.
- Recommend cooking and baking ahead to safely store and/or freeze meals free of avoided food allergens.
- Suggest having home supply of nonperishable foods/beverages free of avoided food allergens.
- Propose contacting store managers with regard to supply shortages of preferred food allergen-free brands to request increased order quantities of specific products; consider purchasing preferred products directly from a manufacturer.
- Emphasize following food allergen-avoidance measures when purchasing unfamiliar product brands.
- Discuss any concerns about food insecurity and/or nutritional deficit risk and provide referrals (*e.g.*, social worker, dietician) as needed.
- Address pandemic impact on mental/emotional health and coping strategies with referral as needed.
- Provide interactive review of a patient-specific AEP with updates as needed to include any pandemic-related changes in management steps.
- Emphasize the need for available and accessible prescribed unexpired EAIs at home and school.
- Evaluate the ease of access to EAIs and assist the patient in problem-solving any barriers.
- Provide an interactive review of the use of an EAI trainer and evaluate caregiver technique and the understanding of the medication.
- Encourage having prescribed medication refills completed as needed to ensure availability for the near future.
- Address any pandemic-related patient-specific changes to school food allergy management (*e.g.*, dining options; 504 plan modifications [A Section 504 plan is a type of plan used in schools for students needing extensive accommodations.]) within the context of school-specific resources and shared decision-making with regard to risk mitigation needs.

COVID-19 = Coronavirus disease 2019; FDA = U.S. Food and Drug Administration; AEP = anaphylaxis emergency plan; EAI = epinephrine autoinjector.

*These discussion points are not intended as an exhaustive list.

#From Refs. 5, 16, and 25.

distance learning. Some expressed a desire for information on how COVID-19 affects individuals with food allergies and/or asthma, whereas others reported the need for school accommodation modifications. COVID-19

vaccine skepticism was noted, and other respondents had diet restrictions or food-choice concerns. Several noted a positive impact from food immunotherapy in coping with change. The comments represented 25% of the total

respondents but focused on additional pandemic-related burdens.

Implications

The pre-pandemic burden of meticulousness required for effective food allergy daily management with anaphylaxis threat has been well documented with regard to negative quality of life (QoL) effects.^{21–24} Among respondents, pandemic changes intensified food allergy management burdens. Heightened awareness about increased burdens and the potential for further adverse QoL effects can assist clinical teams in individualizing referral screening, patient education, and risk mitigation analysis. Suggested patient education that addresses study themes is provided in Table 5. Discussions could be provided *via* telehealth. Online Supplemental Table 2 lists selected resources. Personalized patient education and individualized resource provision, in combination with active listening, shared decision-making, and customized risk-mitigation analysis, may assist in addressing pandemic-related concerns.

Limitations and Future Studies

This study included limitations. The sample size was small. Respondents were recruited from food allergy support groups and a national advocacy nonprofit, which suggested that participants self-selected as engaged in seeking information and may have been aware of topics survey addressed. The survey did not ask whether respondents were previously notified by any organizations with regard to changes that the survey addressed. The participants were primarily highly educated white women. The survey involved self-reported data collection, which risked erroneous recall and social desirability bias. The data were not captured about the quantity of parents completing the survey for additional children, which may have skewed the percentages. The online survey prevented participation from those without Internet and/or computer access. The survey was in English, which created a language barrier. Demographic questions did not include the income range or community type.

The respondents were not queried on diagnosed food allergens, so no associations could be made with regard to whether specific food allergen avoidance influenced the survey answers. Such limitations hinder generalizability of the study findings to all U.S. families managing food allergies. To expand generalizability, future studies may include greater representation from men, diverse races, and education ranges. Improved assessment of social determinants of health may reveal how the pandemic is affecting children with food allergy who were facing health care access barriers, food insecurity, and schools with fewer resources. Future studies that investigate school accommodations may evaluate the long-term

impact of pandemic-related changes. Future studies may include parents of children < 5 years of age. Studies that investigate the QoL impact of food immunotherapy during the pandemic would be instructive.

CONCLUSION

This study provided a glimpse into cumulative pandemic-related changes that affected a sample of families who were managing food allergies. During the pandemic, clinical teams may see families who experienced increased burdens related to evolving regulations, medical recommendations, and food supply chain disruptions, which resulted in more time spent on daily food allergy management, the risk for adverse health outcomes, and school safety concerns. Awareness of such stressors can assist clinical teams in providing patient-specific education, shared risk-mitigation analysis, and referral screening to promote positive patient outcomes.

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