



Short communication

Parents of 5-to-12-year-old children with food allergies report more frequent use of structure-based food parenting practices

Lori A. Hatzinger^a, Peter Victoria^b, Jeffrey C. Miecznikowski^c, Mackenzie J. Ferrante^d, Katherine N. Balantekin^{a,e,*}

^a Department of Exercise and Nutrition Sciences, University at Buffalo, 3435 Main Street, Buffalo, NY 14214, United States

^b University of Virginia School of Medicine, 1340 Jefferson Park Ave, Charlottesville, VA 22903, United States

^c Department of Biostatistics, University at Buffalo, 723 Kimball Tower, Buffalo NY 14214, United States

^d Department of Nutritional Sciences, Rutgers University, 61 Dudley Road, New Brunswick, NJ, 08901, United States

^e Center for Ingestive Behavior Research, University at Buffalo, 355 Hochstetter Hall, Buffalo, NY 14260, United States

ARTICLE INFO

Keywords:

Food allergy
Children
Food parenting
Parent feeding practices

ABSTRACT

Objectives: Food parenting practices (FPP) can have effects on children's eating behaviors. Over 8 million children in the US have food allergies, however, little is known about FPP for those who have children with food allergies. The objective of this study was to describe FPP among children with food allergies.

Methods: Recruited across the United States using ResearchMatch in February and March 2021, parents of children ages 5–12 years (n = 346; n = 77 with food allergies) completed a single, online survey which measured health history, demographics, and FPP. Linear regressions were used to examine associations between FPP of children with and without food allergies, and associations between food allergy factors and FPP.

Results: Parents of children with food allergies reported greater use of limit exposure than parents of children without food allergies (B = 0.131; [CI], 0.021–0.293; P = 0.024), with no differences in other types of FPP.

Conclusions: Parents of children with food allergies reported more frequent structure-based FPP than parents of children without food allergies. More work is needed to explore mechanisms that promote positive food parenting among this population.

1. Introduction

It is estimated that about 5.6 million children in the US have at least one food allergy (Gupta et al., 2018). Management of food allergies requires eliminating certain foods or food groups, thus children with food allergies are at risk for growth problems and inadequate nutrient intake (Christie et al., 2002; Meyer, 2018) and are overrepresented at feeding clinics (Yeung et al., 2015). Food parenting practices (FPP) (e.g., restriction) are the goal-oriented behaviors that parents exhibit when feeding their child (Balantekin et al., 2020). The extant literature has noted several negative consequences associated with the use of controlling FPP (e.g., excess weight gain) (Vaughn et al., 2016). There is also some evidence of association between food allergies and elevated weight status (Visness et al., 2009), though it is unclear whether this is related to differences in FPP.

Pediatric food allergies also have a significant impact on parents. For example, parents of children with food allergies report greater anxiety

and depression (Springston et al., 2010; Qu et al., 2020; Feng and Kim, 2019). Given that parental anxiety impacts FPP (Qu et al., 2020) and food allergies impact how people eat, it might follow that parents of children with food allergies use different FPP (i.e., parents may use restriction to help their child avoid the allergen(s)). One known previous study examined the impact of food allergies/sensitivities on FPP and found no association between food allergy/sensitivity status and FPP, but did not explore any factors related to diagnosis or reaction history nor did they focus on only food allergies (Musaad et al., 2013).

As such, the first aim of this exploratory study was to determine whether FPP differ between parents of 5-to-12-year-old children with and without food allergies. The second aim of this paper was to examine differences in FPP of parents of 5-to-12-year-old children with food allergies by child age, age of diagnosis, health care professional who diagnosed, food allergy reaction history (e.g., mild reactions, severe reactions, hospitalizations), and other chronic conditions.

* Corresponding author at: Department of Exercise and Nutrition Sciences, University at Buffalo, 3435 Main Street, Buffalo, NY 14214, United States.

E-mail address: knbalant@buffalo.edu (K.N. Balantekin).

<https://doi.org/10.1016/j.pmedr.2024.102758>

Received 12 February 2024; Received in revised form 7 May 2024; Accepted 8 May 2024

Available online 9 May 2024

2211-3355/© 2024 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).

2. Methods

2.1. Participants and Procedures

Participants were recruited from Research Match ([researchmatch.org](https://www.researchmatch.org)), an US database of volunteers who are interested in participating in research projects, in February and March 2021. Volunteers who indicated they were the parent or guardian of a child under 18 were sent more information about the study. All volunteers who indicated interest were invited to participate via REDCap electronic data capture tools hosted at the University at Buffalo (Harris et al., 2019; Harris et al., 2009). Participants consented by reading a paragraph about the study, including researcher contact information, and selected yes to, "Do you agree to continue with the survey?" If parents had a child with a food allergy, they were told to answer all questions about that child. If parents had more than one child between the ages of 1 and 12, they were asked to select one and answer all questions about that child. This study was deemed exempt by the University at Buffalo Institutional Review Board.

2.2. Measures

2.2.1. Health history

All participants completed the health history form. Participants reported their child's birth month and year, sex at birth, height, weight, race, ethnicity, and whether their child had eczema, asthma, and anxiety/depression (all yes/no). Participants were asked, "Do you have a child with a current food allergy?" If they answered yes, participants were asked questions about their child's food allergy: which food(s); age at first reaction; if the child's allergy had been diagnosed by a health care professional and if so, type(s) of health care professional (e.g., allergist, pediatrician, other); age of diagnosis (0–1 years, 2–4 years, 5–12 years); and reaction history (i.e., symptoms experienced, hospitalization). Each allergic reaction symptom was classified as mild (e.g., a few hives, mild nausea) or severe (e.g., wheezing, repetitive vomiting, widespread hives) following classifications given by Food Allergy Research & Education (Food Allergy Research Education, 2022). If more than one health care professional diagnosed a child with a food allergy, they were categorized as being diagnosed by multiple health care providers.

2.2.2. Food parenting practices

All parents completed the Structure and Control in Parent Feeding Questionnaire (SCPF), which assesses FPP (Savage et al., 2017). The SCPF looks at two super factors, structure and control. Structure is the mean of the subscales limit exposure (e.g., "I avoid buying sweets or desserts that I don't want my child to eat.") and consistent feeding routines (e.g., "My child eats dinner at about the same time each night (within 15 min).") and is considered a more positive aspect of child feeding. Control assesses the more controlling aspects of food parenting and is the mean of the subscales restriction (e.g., "In my home, I hide snack foods from my child that I don't want my child to eat.") and pressure to eat (e.g., "I try to get my child to finish their food."). Participants reported on a scale from 0 (Never) to 4 (Always).

2.3. Analytic plan

The present analysis focused on responses of parents with 5-to-12-year-old children. Chi-squared (categorical variables; race, sex at birth, ethnicity) and t-tests (continuous variables; age, child BMI percentile) examined associations between a child's allergy group status (allergy/non-allergy) and child's race, sex at birth, age, and BMI percentile. Significantly associated variables with allergy group status were deemed potential confounders (i.e., age). Cronbach's alpha coefficient assessed the agreement between super factors (structure and control) and their respective subscales in the SCPF.

Linear regressions examined differences in FPP between children with and without a current food allergy. Potential confounders were confirmed by assessing the association with FPP variables by linear regression and a corresponding Wald test. Confounding variables were included as covariates. For the analysis within the food allergy group, linear regression examined the association between FPP scores with 1) the age at diagnosis (in years), 2) the professional (or type of professional) who diagnosed the allergy, 3) allergy history variables, and 4) chronic condition variables. In all analyses, significance was assessed at $p < 0.05$ and significant associations were reported with the corresponding effect size with 95 % confidence intervals. Statistical analysis was performed in SPSS, version 28.0.

3. Results

3.1. Participant Characteristics

Demographic and clinical characteristics of participants are shown in Table 1. The sample included 346 parents (84.0 % female) of children 5-to-12 years of age (50.9 % female). Children were primarily white or Caucasian (79.8 %) and had a mean BMI percentile of 61.3 ± 33.5 . Over three-quarters of the participants (77.7 %) did not have a food allergy. Child age was significantly different between children with and without

Table 1
Demographic characteristics of children with and without a food allergy and clinical characteristics of children with a food allergy (count, percentage or mean \pm standard deviation) reported by parents who completed an online REDCap survey in February and March 2021.

	Food Allergy n = 77	No Food Allergy n = 269	Total n = 346
Child sex at birth (n, %)			
Male	40, 51.9	129, 48.0	169, 48.8
Female	37, 48.1	139, 51.7	176, 50.9
Other	0, 0.0	1, 0.4	1, 0.3
Child age (years; means \pm SD)	8.2 \pm 3.5	6.5 \pm 3.2	6.9 \pm 3.4
BMI percentile (means \pm SD)	63.2 \pm 31.8	60.8 \pm 33.9	61.3 \pm 33.5
Child race (n, %)			
White or Caucasian	58, 75.3	218, 81.0	276, 79.8
Black or African American	5, 6.5	10, 3.7	15, 4.3
Mixed Race/Other	14, 18.2	39, 14.6	53, 15.8
Child ethnicity (n, %)			
Hispanic	12, 15.6	24, 8.9	36, 10.4
Non-Hispanic	65, 84.4	245, 91.1	310, 89.6
Children whose parents reported at least 1 food allergy			
Allergen(s) (n, %)	Top 9	Other	
	52, 67.5	25, 32.5	
Number of Food Allergies (n, %)	1	2	3+
	47, 61.0	14, 18.2	18, 20.8
Child Age at Diagnosis (n, %)	0–1 years	2–4 years	5–12 years
	30, 46.2	25, 32.5	10, 12.9
Diagnosed by (n, %)	Allergist	Pediatrician/ Family Physician	Multiple
	22, 28.6	18, 23.4	23, 29.9
History of Allergic Reactions (n, %)			
Mild	66, 85.7		
Severe	50, 64.9		
Hospitalization	7, 9.1		
Presence of eczema	36, 46.8		
Presence of asthma	21, 27.3		
Presence of anxiety and/ or depression	22, 28.6 %		

Notes: Top 9 Food Allergen(s) include cow's milk, peanut, eggs, tree nuts, shellfish, wheat, fish, soy, sesame. N of 12 (15.6%) are missing when reporting child age at diagnosis. N of 2 (2.6) reported having their child diagnosed by an 'Other' Health Professional and N of 12 (15.6%) did not reported having their child diagnosed by a health professional.

food allergies ($p < 0.001$) and thus was included as a covariate in models examining differences in FPP between parents of children with and without food allergies. No other potential confounders were significant. Of the 77 children with at least one food allergy, 39.0 % had multiple food allergies (18.2 % reported allergies to two foods, 14.3 % reported allergies to three foods, 6.5 % reported allergies to four or more food). The majority (85.7 %) of children had a history of least one mild allergic reaction, with 64.9 % reporting at least one severe allergic reaction.

3.2. Food parenting practices and child allergy status

Between parents of child with food allergies and without food allergies, there was a significant difference in use of limit exposure ($R^2 = 0.03$, $F(2,298) = 5.65$, $p = 0.004$), with more frequent use of limit exposure reported among parents of children with food allergies (food allergy: $\beta = 0.13$, $p = 0.02$). There were no significant differences in the other three subscales, pressure to eat ($p = 0.12$), restriction ($p = 0.16$), and consistent feeding routines ($p = 0.24$) or the super factors control ($p = 0.06$) and structure ($p = 0.05$). Cronbach's alpha for all super factors/subscales were greater than 0.76. Means and standard deviations for FPP are shown in Table 2.

3.3. Associations with food parenting practices in children with food allergies

General factors associated with food allergy diagnosis. There were no associations between FPP and age of diagnosis ($ps > 0.199$), diagnosed by a health care professional (i.e., were vs. were not diagnosed) ($ps > 0.132$), and type of health care professional(s) who diagnosed the food allergy (i.e., allergist, pediatrician, multiple health care providers) ($ps > 0.34$).

Allergic reaction history. There were no differences in FPP by history of mild ($ps > 0.098$) or severe allergic reactions ($ps > 0.118$). No differences were found in FPP by previous hospitalization ($ps > 0.237$).

Additional chronic conditions. There were no differences in FPP by co-occurrence of eczema ($ps > 0.216$), asthma ($ps > 0.139$), or anxiety/depression ($ps > 0.237$).

4. Discussion

Parents of children with food allergies reported more frequent use of positive, structure-based food parenting, driven by their more frequent use of limit exposure. This is potentially a positive, unintended consequence of parents purchasing fewer packaged, energy-dense foods to avoid allergen exposure and may impact weight status and eating behavior (Balantekin et al., 2020).

Parents are responsible for helping their child develop age-

Table 2

Means and standard deviations of food parenting practices for parents of children with and without food allergies who completed an online REDCap survey in February and March 2021.

	Food allergy Mean \pm SD	No food allergy Mean \pm SD
Control	1.3 \pm 0.6	1.3 \pm 0.6
Restriction	1.6 \pm 0.8	1.5 \pm 0.8
Pressure to eat	1.1 \pm 0.7	1.1 \pm 0.7
Structure	2.5 \pm 0.4	2.4 \pm 0.5
Limit exposure	2.5 \pm 0.4	2.2 \pm 0.5
Consistent feeding routines	2.6 \pm 0.5	2.6 \pm 0.5

Notes: Control and structure are super-factors. Control is the average of the subscales restriction and pressure to eat. Structure is the average of the subscales consistent feeding routines and limit exposure. The range for all is: 0 (never) to 4 (always). Higher values indicate more frequent use of that food parenting practice. Bold indicates a significant difference between parents of children with and without a food allergy at $p < .05$.

appropriate eating behaviors and skills (e.g., mealtime social skills) (Balantekin et al., 2020). Parents of children with food allergies also have to teach their child how to safely navigate their food allergy. It has been previously demonstrated that parents of 3-to-4 year old children with food allergies have more controlling parenting practices in non-feeding domains (Dahlquist et al., 2015), and children with food allergies were more likely to engage in mealtime behavioral concerns (e.g., food refusal) than children without food allergies (Herbert et al., 2017). These concerns were associated with parent perceptions of food allergy risk and food allergy-related parenting stress (Herbert et al., 2017), which may affect FPP. Moreover, mothers report extra burden in food parenting when they have a child with a food allergy (Crowley et al., 2012), often as a result of balancing their child's dietary needs with the rest of the family's preferences.

The null findings in use of controlling FPP in the current study is in agreement with previous work which examined food parenting among children with food allergies/sensitivities (Musaad et al., 2013). Null findings could reflect the inability of existing measures to capture nuances associated with feeding children with food allergies. Parents of children with food allergies might use more controlling FPP out of necessity (e.g., to avoid allergen consumption, reduce cross-contamination risk), not for weight or other health reasons, but this was not assessed by current measures. Moreover, there is some evidence of associated risk for food allergies and elevated weight status, though the mechanism for this relationship is less clear (Visness et al., 2009). However, even if parents use more controlling FPP globally, it may not have the same unintended consequences if children are aware this is partially due to necessity to avoid allergens.

In parents of children with food allergies, there were no differences in FPP based on factors surrounding the food allergy diagnosis or the presence of other chronic conditions. We hypothesized that parents of children with a more serious allergy history (e.g., hospitalization, severe reactions) would report greater use of controlling food parenting given their experienced heightened anxiety and the known relationship between parental anxiety and FPP (Qu et al., 2020). While this hypothesis was not supported by the current data, this again may be due to the inability of existing food parenting measures to capture nuances associated with feeding a child with food allergies.

This study had several strengths. The present study was the first known study to examine food parenting among those with just food allergies (versus food allergies and sensitivities). Moreover, several variables of interest (e.g., age of diagnosis, reaction type) were collected that had the potential to impact findings. Limitations of the current study include the sample size difference between the food allergy and non-food allergy group, which could dampen the ability to detect between group differences. In addition, there is a possibility of selection bias since parents were asked to report on the child in the household with a food allergy. Moreover, all study measures were parent-reported. In the current study, parents reported their child's food allergy history and health history; future work should consider using health care records for this information.

5. Conclusions

Findings from this exploratory study demonstrate that parents of children with food allergies report using more frequent limit exposure than parents of children without food allergies. It may be that what is required to keep a child with a food allergy safe makes it easier for parents to engage in more positive and structure-based food parenting, but more work is needed to explore these mechanisms. Nutrition professionals are necessary to help children identify a large variety of safe foods, which is critical given that diet quality is often compromised in children with food allergies (Christie et al., 2002). Further, given the nuances associated with feeding children with food allergies, future work is needed develop food allergy-specific measures of food parenting.

CRedit authorship contribution statement

Lori A. Hatzinger: Writing – review & editing, Writing – original draft, Formal analysis, Conceptualization. **Peter Victoria:** Writing – review & editing, Investigation, Conceptualization. **Jeffrey C. Miecznikowski:** Writing – review & editing, Supervision, Formal analysis. **Mackenzie J. Ferrante:** Writing – review & editing, Writing – original draft, Formal analysis. **Katherine N. Balantekin:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Investigation, Funding acquisition, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgements

This work was funded by the University at Buffalo Experiential Learning Network (awarded to PV) and NIH grants K01DK120778 and 3K01DK120778-02S1 (awarded to KNB).

References

- Balantekin, K.N., Anzman-Frasca, S., Francis, L.A., Ventura, A.K., Fisher, J.O., Johnson, S.L., 2020. Positive parenting approaches and their association with child eating and weight: A narrative review from infancy to adolescence. *Pediatr. Obes.* 15 (10), e12722.
- Christie, L., Hine, R.J., Parker, J.G., Burks, W., 2002. Food allergies in children affect nutrient intake and growth. *J Am Diet Assoc.* 102 (11), 1648–1651.
- Crowley, E.T., Williams, L.T., Brown, L.J., 2012. How do mothers juggle the special dietary needs of one child while feeding the family? A Qualitative Exploration. *Nutrition & Dietetics.* 69 (4), 272–277.
- Dahlquist, L.M., Power, T.G., Hahn, A.L., Hoehn, J.L., Thompson, C.C., Herbert, L.J., et al., 2015. Parenting and independent problem-solving in preschool children with food allergy. *J. Pediatr. Psychol.* 40 (1), 96–108.
- Feng, C., Kim, J.H., 2019. Beyond Avoidance: the Psychosocial Impact of Food Allergies. *Clin Rev Allergy Immunol.* 57 (1), 74–82.
- Food Allergy Research & Education 2022 [Available from: <https://www.foodallergy.org/>].
- Gupta, R.S., Warren, C.M., Smith, B.M., Blumenstock, J.A., Jiang, J., Davis, M.M., et al., 2018. The Public Health Impact of Parent-Reported Childhood Food Allergies in the United States. *Pediatrics* 142 (6).
- Harris, P.A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., Conde, J.G., 2009. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform.* 42 (2), 377–381.
- Harris, P.A., Taylor, R., Minor, B.L., Elliott, V., Fernandez, M., O'Neal, L., et al., 2019. The REDCap consortium: Building an international community of software platform partners. *J Biomed Inform.* 95, 103208.
- Herbert, L.J., Mehta, P., Sharma, H., 2017. Mealtime behavior among parents and their young children with food allergy. *Ann. Allergy Asthma Immunol.* 118 (3), 345–350.
- Meyer, R., 2018. Nutritional disorders resulting from food allergy in children. *Pediatr. Allergy Immunol.* 29 (7), 689–704.
- Musaad, S.M., Paige, K.N., Teran-Garcia, M., Donovan, S.M., Fiese, B.H., 2013. The Strong Kids Research T. Childhood overweight/obesity and pediatric asthma: the role of parental perception of child weight status. *Nutrients* 5 (9), 3713–3729.
- Qu, G., Wang, L., Tang, X., Wu, W., Zhang, J., Sun, Y., 2020. Association between caregivers' anxiety and depression symptoms and feeding difficulties of preschool children: A cross-sectional study in rural China. *Arch Pediatr.* 27 (1), 12–17.
- Savage, J.S., Rollins, B.Y., Kugler, K.C., Birch, L.L., Marini, M.E., 2017. Development of a theory-based questionnaire to assess structure and control in parent feeding (SCPF). *Int J Behav Nutr Phys Act.* 14 (1), 9.
- Springston, E.E., Smith, B., Shulruff, J., Pongracic, J., Holl, J., Gupta, R.S., 2010. Variations in quality of life among caregivers of food allergic children. *Ann. Allergy Asthma Immunol.* 105 (4), 287–94.e3.
- Vaughn, A.E., Ward, D.S., Fisher, J.O., Faith, M.S., Hughes, S.O., Kremers, S.P., et al., 2016. Fundamental constructs in food parenting practices: a content map to guide future research. *Nutr Rev.* 74 (2), 98–117.
- Visness, C.M., London, S.J., Daniels, J.L., Kaufman, J.S., Yeatts, K.B., Siega-Riz, A.-M., et al., 2009. Association of obesity with IgE levels and allergy symptoms in children and adolescents: results from the National Health and Nutrition Examination Survey 2005–2006. *J. Allergy Clin. Immunol.* 123 (5), pp. 1163–9. e4.
- Yeung, K.A., Taylor, T., Scheimann, A., Carvalho, R., Reinhardt, E., Girolami, P., et al., 2015. The prevalence of food allergies in children referred to a multidisciplinary feeding program. *Clin. Pediatr.* 54 (11), 1081–1086.