

Assessment of psychological distress among children and adolescents with food allergy

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Background: Youth with food allergy may experience psychosocial stressors including limitations in activities, differences from peers, and anxiety. Factors such as allergy-related medical history, children's attitudes toward their allergies, and parental anxiety may function as risk and resilience factors associated with psychological distress in this population.

Objective: To assess mean scores and rates of elevated scores on standardized measures of psychological distress among youth with food allergy and identify factors associated with distress.

Methods: A total of 141 mothers of children age 2 to 17 years with food allergy completed questionnaires about child medical history, child anxiety and depressive symptoms, and maternal anxiety symptoms. A total of 69 children age 8 to 17 years completed self-report measures of anxiety and depressive symptoms, social stress, and attitudes toward food allergy.

Results: Mean scores on self-report and parent-report measures of child anxiety symptoms, depressive symptoms, and social stress fell in the average range on standardized measures of child distress. Comparisons with normative scores generally indicated either no differences or lower rates of distress in our sample of youth with food allergy, with the exception of child-reported anxious coping and separation anxiety symptoms, which were significantly higher than normative scores.

Maternal reports of child symptoms were significantly higher than child self-reports. Multiple regression analyses yielded models in which child attitudes toward food allergy and maternal anxiety were associated with child distress for children 8 to 17 years old.

Conclusion: Results suggest targets for prevention of distress, including assessment of attitudes toward food allergy and support for parental anxiety management. (*J Allergy Clin Immunol* ■■■■;■■■:■■■-■■■.)

Key words: Food allergy, child, adolescent, parent, anxiety, psychological distress, risk factors

Management of food allergy, which affects approximately 6% of children, depends on strict avoidance of causal foods with ready availability of self-injectable epinephrine.^{1,2} Avoidance of food allergens may limit participation in social and school activities, and youth may feel different from peers because of dietary restrictions and safety precautions.³⁻⁵ Indeed, teens report social isolation to be the hardest part of living with a food allergy.⁶ Youth with food allergy may also experience anxiety about accidental exposure to a food allergen and a resulting allergic reaction.⁷ In some cases, anxiety may lead to unmanageable worried thoughts and avoidance behaviors above and beyond medically necessary precautions.^{8,9}

Although there are useful studies examining the quality of life and psychosocial needs of children with food allergy and their families,^{3,5,7,10-16} it is unclear whether average scores on measures of psychological distress (eg, anxiety, depression, social stress) among youth with food allergy exceed those of normative samples, or for what proportion of the population symptoms warrant clinical intervention. Moreover, provision of effective services to children with food allergies and their families will require identification of risk and resilience factors associated with distress in this population, including psychosocial factors that may be amenable to intervention.

For example, research conducted in children with other chronic medical conditions has found that children's attitudes toward their condition can influence psychological adjustment,¹⁷⁻¹⁹ a finding that has received support in qualitative research on adjustment to childhood food allergy.¹⁴ Indeed, clinical experience suggests that children who adopt a negative attitude toward their allergies (eg, focus on limitations and differences from peers) may be more likely to experience distress than children who adopt a more positive perspective (eg, emphasize strengths and coping strategies).

In addition, parental response to food allergy may affect child adjustment. Parents of children with food allergy commonly endorse anxiety about accidental exposure.^{10,11} While a moderate level of anxiety can be helpful in motivating adherence to allergy management plans, more intense, persistent anxiety may lead to a maladaptive pattern of overresponding to perceived risks.^{7,14,15} In the general population, parental anxiety is significantly correlated with child anxiety, and certain parenting behaviors, such as modeling fearful and avoidant behavior and reinforcing children's anxious behaviors, increase children's vulnerability to develop anxiety.²⁰

The primary goals of this study, therefore, were (1) to assess psychological distress among children with food allergy and (2) to identify factors associated with child distress. Specifically, it was hypothesized that (1) children with food allergy would report

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Abbreviations used

AAFA New England: Asthma and Allergy Foundation of America/
New England Chapter
BASC-2: Behavior Assessment System for Children,
Second Edition
CATIS: Child Attitude Toward Illness Scale
MASC: Multidimensional Anxiety Scale for Children
PRS: Parent Rating Scales
SRP: Self-Report of Personality

higher scores on standardized measures of psychological distress in comparison with normative samples, and (2) medical variables (higher number of food allergies, more recent food allergy diagnosis, history of anaphylaxis), more negative child attitudes toward food allergy, and maternal anxiety would be associated with higher scores on measures of child distress (ie, anxiety symptoms, depressive symptoms, and social stress).

METHODS

Procedure

The study was approved by the Children's Hospital Boston Committee on Clinical Investigation. Mothers of children age 2 to 17 years and children age 8 to 17 years with a diagnosis of food allergy were eligible for participation. Children under 8 years were not eligible because child self-report measures used in the study were not validated for this age group. Exclusion criteria included a diagnosis of severe developmental disability or another major nonallergic chronic illness in the child. Participants were recruited from (1) patients followed through the Atopic Dermatitis Center or Allergy Program at Children's Hospital Boston and (2) members of the Asthma and Allergy Foundation of America/New England Chapter (AAFA New England). Families recruited through the hospital clinics were contacted via a mailing to the home. Families recruited through AAFA New England were informed of the study through an advertisement in the organization newsletter and were required to provide a letter from the child's doctor confirming the food allergy diagnosis before participation.

Study visits were conducted in person. Written parental consent and child assent were obtained by the research coordinator. Mothers completed questionnaires about family demographics, child medical history, child distress, and maternal anxiety. Children completed self-report questionnaires about psychological distress and attitudes toward food allergies. For children age 8 to 14 years, study measures were generally administered by the study coordinator. Older children completed questionnaires independently with the study coordinator present to answer any questions.

Measures

Medical history. Child medical history related to food allergy (eg, number/type of allergies, date of diagnosis, history of anaphylaxis, presence of comorbid conditions) was assessed via a brief parent-report questionnaire. Parents were asked to indicate whether the child had experienced anaphylaxis on the basis of the following definition: (1) two or more body systems involved in an allergic reaction (eg, skin, plus respiratory, gastrointestinal, or cardiovascular), or (2) hypotension (ie, low blood pressure, with symptoms such as fainting or collapse). Parents were also asked to respond to a checklist of potential symptoms of anaphylaxis; if the parental rating of anaphylaxis did not match the symptom profile, study personnel clarified this information with the parent. All participants identified as having anaphylaxis on the basis of the criteria described met the current working diagnostic criteria for anaphylaxis.

²¹ Information related to allergy or asthma medications taken by the child was obtained via medical record review. Because the medical record review was

implemented after the study was already underway, this information was obtained for a subset of study participants.

Child psychological distress. Mothers completed the Behavior Assessment System for Children, Second Edition (BASC-2), Parent Rating Scales (PRS), a parent-report measure of child internalizing and externalizing behaviors with strong psychometric properties.²² The BASC-2 PRS has developmentally appropriate versions for preschool (2-5 years), child (6-11 years), and adolescent (12-21 years) age groups, with norms based on age and sex. The anxiety and depression scales were used as outcome measures in the current study (11-13 items for each scale, depending on the age version). The α coefficients for each of the versions of the anxiety scale in this sample were as follows: preschool, $\alpha = .85$; child, $\alpha = .88$; and adolescent, $\alpha = .85$. The α coefficients for the depression scale were as follows: preschool, $\alpha = .79$; child, $\alpha = .87$; and adolescent, $\alpha = .88$.

Children age 8 to 17 years completed the BASC-2, Self-Report of Personality (SRP), a well validated self-report measure of child psychological functioning, which complements parent report on the BASC-2.²² The BASC-2 SRP has developmentally appropriate versions for child (8-11 years) and adolescent (12-21 years) age groups, with norms based on age and sex. For purposes of this study, we report data on the anxiety scale (eg, generalized fear, nervousness, and worries; 13 items), the depression scale (eg, feelings of loneliness, sadness, and inability to enjoy life; 12-13 items depending on the age version), and the social stress scale (eg, bothered by teasing/criticism, loneliness, feeling left out; 8-10 items depending on the age version). The α coefficients in this sample for the anxiety scale were as follows: child, $\alpha = .82$; and adolescent, $\alpha = .91$. The α coefficients for the depression scale were as follows: child, $\alpha = .66$; and adolescent, $\alpha = .79$. The α coefficients for the social stress scale were as follows: child, $\alpha = .68$; and adolescent, $\alpha = .83$.

Children age 8 to 17 years also completed the Multidimensional Anxiety Scale for Children (MASC), a 39-item child-report measure with strong psychometric properties.²³⁻²⁶ We included a second measure of child anxiety in addition to the BASC-2 because the MASC assesses anxiety domains beyond generalized worry that may be relevant to the experience of children with food allergy. Norms are available for children age 8 to 19 years on the basis of age and sex. The total anxiety scale was used in this study ($\alpha = .90$), as well as the measure's subscales (tense/restless, somatic/autonomic symptoms, perfectionism, anxious coping, humiliation/rejection, performance fears, and separation/panic). The α coefficients for the MASC subscales ranged from .63 to .89, with the exception of the perfectionism subscale ($\alpha = .24$), which was dropped from analyses because of low reliability.

Child attitudes toward food allergy. Children age 8 to 17 years completed the Child Attitude Toward Illness Scale (CATIS).¹⁷ The CATIS is a 13-item self-report measure designed to assess children's attitudes toward having a chronic medical condition (eg, How often do you feel that your food allergies keep you from doing things you like to do? How good or bad do you feel it is that you have food allergies? How often do you feel different from others because of your food allergies?).¹⁷ Lower scores reflect more negative attitudes and higher scores more positive attitudes. The CATIS has displayed good reliability and validity in other pediatric populations.^{17,18} Internal consistency in the present sample was $\alpha = .80$.

Maternal anxiety. Parents completed the State-Trait Anxiety Inventory, a widely used 40-item self-report measure that assesses anxiety in adults.²⁷ Norms are available on the basis of age and sex, and reliability and validity are strong.^{27,28} The trait anxiety component of the measure (assessing stable individual differences in anxiety) was used in this study, with internal consistency of $\alpha = .91$.

Statistical analyses

Statistical analyses were performed separately for older and younger participants unless otherwise noted, because child-report measures were not administered to children under 8 years of age. Descriptive statistics were used to assess average scores and frequency of elevated scores on measures of child psychological distress, and 1-sample *t* tests were conducted to compare participants' scores with those of the normative samples on measures of child

distress. Because of skewed distributions on several distress measures, Spearman correlations and Mann-Whitney *U* tests were used to examine bivariate relationships among study variables. Multiple regression analyses were performed to investigate the impact of medical variables, child attitude toward food allergies, and maternal anxiety on child psychological distress.

RESULTS

Participants

A total of 131 families of children followed in Children's Hospital Boston allergy clinics and 10 families who were members of AAFA New England agreed to participate, yielding a total sample of 141 families. Approximately half of participating families had a child between 2 and 7 years ($N = 69$; 49%), with the remainder having a child between 8 and 17 years. For the families of older children, in 70 of the 72 cases, both the mother and child participated; in 2 cases, only the mother participated because scheduling conflicts prevented the child from attending the study visit. Demographic and medical characteristics of the participants are summarized in Table I.

Mann-Whitney *U* tests and χ^2 tests were used to compare families recruited through the hospital allergy clinics with families recruited through AAFA New England on study variables. No significant differences were found; therefore, all analyses were conducted on the full sample.

Average distress scores and frequency of elevated distress scores

For measures of child psychological distress used in the study (BASC-2 PRS, BASC-2 SRP, MASC), raw scores were converted to T scores (mean = 50; SD = 10) by using nonclinical normative samples to facilitate comparisons to children in the general population. Consistent with published guidelines, T scores of 60 to 69 on the BASC-2 fall in the at-risk range (significant problems that require treatment but may not be severe enough to warrant a formal diagnosis; potential problems that need to be monitored carefully), and scores ≥ 70 fall in the clinical range (high level of maladaptive behavior).²² Similarly, T scores of 60 to 69 on the MASC are considered above average, and scores ≥ 70 very much above average.²³

Table II lists means scores and percentages of elevated scores on the measures of child psychological distress in this sample. All mean scores on the BASC-2 and the MASC fell in the average range.

Wilcoxon signed-ranks tests indicated that maternal report of child anxiety and depressive symptoms on the BASC-2 was significantly higher than child report among children 8 to 17 years old ($P = .001$ for anxiety; $P = .001$ for depression). Greater maternal anxiety was associated with greater discrepancies between maternal and child reports (Spearman $\rho = -.29$; $P = .016$).

Comparison of distress scores to normative scores

We compared participants' scores on measures of distress to the normative T score of 50 on the BASC-2 and MASC. There were no significant differences between scores for parent report of child anxiety and depressive symptoms on the BASC-2 in this sample and scores in the normative sample for either children 2 to 7 years old or children 8 to 17 years old. However, scores based on child report of anxiety symptoms ($t = -2.34$;

TABLE I. Demographic and medical characteristics of participants

Characteristic	Mean $\pm$ SD or N (%)
Child age	
Full sample	8.3 $\pm$ 3.7
2-7 y	5.2 $\pm$ 1.6
8-17 y	11.2 $\pm$ 2.5
Child sex female	56 (40)
Child race	
White	122 (87)
African American	5 (4)
Asian	11 (8)
Other/mixed	3 (2)
Child ethnicity	
Hispanic	3 (2)
Not Hispanic	138 (98)
Mother highest level of education	
Less than college degree	20 (14)
College degree or graduate degree	121 (86)
Father highest level of education	
Less than college degree	30 (21)
College degree or graduate degree	111 (79)
Median income	\$100,000 to \$149,000
No. of food allergies	5.3 $\pm$ 3.8
Specific food allergies	
Peanut	105 (74)
Tree nut	102 (72)
Egg	80 (57)
Milk	60 (43)
Shellfish	38 (27)
Fish	26 (18)
Soy	22 (16)
Wheat	21 (15)
Time since diagnosis (y)	6.6 $\pm$ 3.5
History of anaphylaxis*	
Lifetime	100 (71)
Past year	22 (16)
Other allergic disease	
Asthma	77 (55)
Atopic dermatitis	24 (17)
Use of allergy/asthma medication†	
Inhaled steroid	50 (47)
Singulair	42 (40)
Antihistamine	34 (32)
Bronchodilator	28 (26)
Topical steroid nasal spray	22 (21)

*All participants with a history of anaphylaxis met the working diagnostic criteria for anaphylaxis.²¹

†Percentages of medication use based on subset of full sample for which consent to review the medical record was obtained ($n = 106$).

$P = .022$), depressive symptoms ($t = -7.84$; $P < .001$), and social stress ($t = -3.35$; $P = .001$) on the BASC-2 were significantly lower than in the normative sample, indicating better functioning. Child-report scores for anxiety on the MASC yielded a mixed picture. Scores for total anxiety and for most subscales (tense/restless, somatic/autonomic, performance fears) were not significantly different from normative scores. However, scores for anxious coping ($t = 5.33$; $P < .001$) and separation/panic ($t = 3.78$; $P < .001$) were significantly higher in the current sample compared with normative scores, and the score for humiliation/rejection ($t = -3.01$; $P = .004$) was significantly lower than normative scores.

TABLE II. Mean scores and percentage of elevated scores on measures of psychological distress

	2-7 y			8-17 y		
	Mean (SD)	At risk (%)	Clinical (%)	Mean (SD)	At risk (%)	Clinical (%)
Parent report BASC-2						
BASC-2 anxiety	50.3 (10.3)	10.3	4.4	50.0 (11.2)	19.4	5.6
BASC-2 depression	48.5 (10.1)	13.1	1.4	49.5 (10.6)	13.9	6.9
Child report BASC-2						
BASC-2 anxiety				47.4 (9.1)	4.4	2.9
BASC-2 depression				45.0 (5.3)	4.3	0.0
BASC-2 social stress				46.9 (7.7)	5.8	1.4
				Mean (SD)	Above average (%)	Very much above average (%)
Child report MASC						
Total anxiety				51.3 (10.3)	17.2	4.7
Tense/restless				49.8 (10.2)	14.1	3.1
Somatic/autonomic				49.2 (10.8)	14.1	3.1
Anxious coping				56.4 (9.6)	28.1	10.9
Humiliation/rejection				46.4 (9.6)	7.8	1.6
Performance fears				47.7 (9.4)	10.9	1.6
Separation/panic				55.3 (11.1)	15.6	14.1

Unadjusted associations between study variables and child distress

Child age, child sex, and presence of comorbid atopic conditions in the child (ie, asthma, atopic dermatitis) were not significantly associated with scores on measures of child distress when examining the 2 study age groups separately or examining the full sample. Mann-Whitney *U* tests were used to assess the relationship between use of asthma or allergy medications and child distress. This information was available for a subset of study participants ($n = 106$; 75%). Use of Singulair (Merck & Co, Inc, Whitehouse Station, NJ) was associated with greater parent-reported child anxiety on the BASC-2 PRS among children 8 to 17 years old ($P = .009$; n_1 [using Singulair] = 25, $n_2 = 28$; m_1 [using Singulair] = 54.3, $m_2 = 46.4$). Among children using Singulair, 40.0% scored in the at-risk or clinical range on the BASC-2 PRS, compared with 10.7% among children who were not using Singulair. Use of bronchodilators was associated with less parent-reported child anxiety on the BASC-2 PRS among children 2 to 7 years old ($P = .036$; n_1 [using bronchodilator] = 14, $n_2 = 38$; m_1 [using bronchodilator] = 46.4, $m_2 = 53.5$).

For younger children, the only significant relationship between medical or psychosocial variables and child distress was between maternal anxiety and maternal report of child depressive symptoms (Spearman $\rho = .26$; $P = .034$).

For older children, Mann-Whitney *U* tests did not reveal any significant relationships between dichotomous medical variables (history of anaphylaxis [any episode, within the past year]) and child distress. Table III presents bivariate correlations between continuous medical and psychosocial variables and child distress for older children. A lower number of food allergies was associated with greater child-reported anxiety and depressive symptoms. Higher maternal anxiety scores were associated with greater parent-reported child anxiety and depressive symptoms, as well as greater child-reported anxiety symptoms, depressive symptoms, and social stress. More negative attitudes toward food allergy were associated with greater parent-reported child depressive symptoms and child-reported anxiety, depressive symptoms, and social stress.

TABLE III. Spearman correlations between medical and psychosocial variables and distress variables for children 8 to 17 years old

	No. of allergies	Time since diagnosis	Attitudes	Maternal anxiety
Parent report of distress				
BASC-2 anxiety	-.23*	-.01	-.23	.33**
BASC-2 depression	-.21	.08	-.25*	.39**
Child report of distress				
BASC-2 anxiety	-.26	-.23	-.49***	.34**
BASC-2 depression	-.30*	-.16	-.44***	.37**
BASC-2 social stress	-.21	-.08	-.33**	.28*
MASC anxiety	-.16	-.09	-.34**	.20

* $P < .05$.** $P < .01$.*** $P < .001$.

Adjusted associations between study variables and child distress

Regression analyses were not conducted for younger children, because maternal anxiety was the only variable associated with child distress.

For each regression analysis with older children (8-17 years), 1 of the child distress measures was treated as an outcome variable. Medical and psychosocial variables were chosen for inclusion in the model on the basis of significant bivariate relationships with outcome measures and included number of food allergies, attitudes toward food allergies, and maternal anxiety. As indicated in Table IV, number of food allergies was not significantly associated with scores on any of the outcome measures. More negative attitudes toward food allergy were associated with child-reported anxiety symptoms, depressive symptoms, and social stress on the BASC-2, as well as anxiety symptoms on the MASC. Higher maternal anxiety scores were associated with greater child-reported anxiety symptoms, depressive symptoms, and social stress on the BASC-2, as well as parent-reported child anxiety and depressive symptoms on the BASC-2.

TABLE IV. Multiple regression analyses predicting child distress among children 8 to 17 years old

	β	R^2	F
Parent report			
BASC-2 anxiety		.16	4.18**
No. of allergies	-.66		
Attitudes	-3.31		
Maternal anxiety	.31*		
BASC-2 depression		.26	7.61***
No. of allergies	-.38		
Attitudes	-3.52		
Maternal anxiety	.46***		
Child report			
BASC-2 anxiety		.35	11.25***
No. of allergies	-.41		
Attitudes	-7.65***		
Maternal anxiety	.26**		
BASC-2 depression		.42	15.98***
No. of allergies	-.22		
Attitudes	-4.75***		
Maternal anxiety	.20***		
BASC-2 social stress		.20	5.38**
No. of allergies	-.37		
Attitudes	-3.82*		
Maternal anxiety	.21*		
MASC anxiety		.15	3.53*
No. of allergies	-.14		
Attitudes	-7.63**		
Maternal anxiety	.09		

* $P < .05$.** $P < .01$.*** $P < .001$.

A *post hoc* analysis was conducted to assess for differences in regression results for maternal report of anxiety on the BASC-2 after controlling for Singulair use. Child attitudes emerged as a significant predictor of anxiety on the BASC-2 PRS. Maternal anxiety was no longer a significant predictor.

DISCUSSION

Mean scores on self-report and parent-report measures of child anxiety symptoms, depressive symptoms, and social stress fell in the average range on standardized measures of child distress, and distress scores in this sample were generally similar to or lower than scores in normative samples. Mothers tended to report more child anxiety and depressive symptoms than their children, with greater discrepancies for mothers who endorsed more anxiety symptoms themselves, supporting the importance of obtaining the child's perspective on their own psychological functioning in addition to parent proxy report.

Study findings of distress scores similar to those in the general population are encouraging, because they highlight the resiliency of youth with food allergy. Such results are also surprising, however, given clinical observations and previous research suggesting significant anxiety and stress in this population. Several factors may help explain these discrepancies. In this study, scores on 2 subscales of the MASC (anxious coping, separation/panic) were significantly higher than normative scores, with nearly 40% of our sample in the elevated range for anxious coping, and nearly 30% for separation/panic. This pattern of scores suggests that although children with food allergy may

not experience higher than normal rates of generalized worry or depressed mood, they may exhibit increased vigilance and checking behaviors or fears about going places without parents present. These thoughts and behaviors may actually reflect adaptive strategies for youth with food allergy that can become excessive for a subset of children.

In addition, many previous studies examining stress and distress among youth with food allergy have used qualitative research methods or food allergy-specific measures of quality of life.^{3,5,7,13,14} It is possible that such assessment methods may be more sensitive to children's experience of anxiety and stress specifically associated with food allergy than the measures used in this study. However, such allergy-specific measures do not allow for comparison of distress scores with general population norms, which was a goal of this study. Choice of measures and study design involves trade-offs and may influence results. Finally, it is important to note that this was a self-selected study sample. We did not interview all children with food allergy followed in our clinics; it is possible that some of the most anxious children may have opted out of participation.

Despite mean distress scores in the average range in our sample, it is important to stress that we did identify a subset of youth with significantly elevated distress scores in this study. Identifying factors associated with distress may be critical in supporting resiliency among youth with food allergy. Contrary to predictions, medical variables such as a higher number of food allergies, more recent food allergy diagnosis, and history of anaphylaxis were not significantly associated with increased child distress in our sample. However, our sample did not include a high percentage of children with recent anaphylaxis. Results may also reflect the possibility that patients' and families' perception of risk for serious reactions are more predictive of anxiety than actual reaction history.^{5,15,29,30} Moreover, a surprising bivariate relationship emerged between more food allergies and less child distress. It is possible that for children with many food allergies, who must learn early how to manage allergies in varied situations, the food allergy diagnosis becomes an accepted part of one's identity, rather than a perceived limitation or source of anxiety. As children find ways to participate in activities despite their allergies, this may be perceived as a source of strength. Indeed, in our sample, a significant relationship was found between a higher number of food allergies and more positive attitudes toward allergies.

Psychosocial variables, on the other hand, did demonstrate significant associations with child distress in this study. This is important, because these factors may be amenable to intervention. As predicted, among older children, more negative child attitudes toward food allergy and higher maternal anxiety scores were associated with greater child anxiety, depressive symptoms, and social stress. The relationship between maternal anxiety and child distress was present when children reported on their own symptoms in addition to when mothers reported on child distress, suggesting that this relationship is not merely an artifact of maternal informant bias. Somewhat surprisingly, maternal anxiety was not related to child anxiety among the younger children in the sample. It is possible that older children become more attuned to parental anxiety cues as their understanding of risks associated with food allergy increases and they begin to participate more actively in allergy management.

Given our cross-sectional study design, it is not possible to determine the directionality of associations between study variables. Thus, interpretation of findings and recommendations for clinical implications should be made with caution. Associations between positive attitudes toward allergies and child distress do suggest, however, that it may be helpful to assess children's attitudes toward their allergies. Asking children simple questions about the extent to which they perceive that food allergy keeps them from participating in activities or makes them feel different from peers may yield important information related to potential experience of distress. Children who do endorse negative attitudes might benefit from interventions such as coaching in use of problem-solving skills³¹ for managing potentially challenging situations including parties or carrying medication during social events, or rehearsal of language for explaining food allergies and basic safety precautions to peers.

Similarly, results suggest the importance of screening parents' experience of anxiety related to food allergy and helping parents to manage such anxiety. Provision of resource materials (eg, trusted web sites, support/advocacy organizations) may increase parents' sense of control. Suggestions for developmentally appropriate language about food allergy to use with children may help to promote children's engagement in allergy management rather than fear. When parents project a calm, matter-of-fact approach to allergy management focusing on safety routines and model use of coping strategies themselves, children will benefit from the underlying message that food allergy is manageable. For some parents, participation in support groups with other parents of children with food allergy may reduce burden by normalizing experiences and providing emotional and practical support.³²

In addition, it will be important for health care providers working with youth with food allergy to be alert for signs of significant distress (eg, unmanageable worry about a reaction, avoidance or checking behaviors beyond adaptive levels of vigilance, restriction of daily activities) and make appropriate referrals to mental health professionals who can help children and families develop adaptive anxiety management and coping skills. Well validated food allergy-specific measures of quality of life may be helpful in this respect.^{10,29,30,33}

Several study limitations are important to note. This study used questionnaires to assess psychological distress. It is not known what percentage of study participants would meet diagnostic criteria for an anxiety or depressive disorders based on Diagnostic and Statistical Manual of Mental Disorders³⁴ criteria, although it is likely that use of such criteria would yield similar or lower rates of distress compared with those identified in this study. As noted, data are cross-sectional and do not address the directionality of associations between study variables. In addition, our research did not include fathers of children with food allergy. There is evidence of sex differences in parental coping with food allergy; thus, paternal influences on child adjustment to food allergy will be important to address in future research.¹⁶ Finally, the demographic profile of this sample was skewed toward white, highly educated, affluent families, limiting the generalizability of findings.

Regarding findings of increased child anxiety among older children taking Singulair, it is important to note that this study was not designed to assess anxiety associated with Singulair use. Because of the retrospective assessment of medication use by chart review, our sample of children 8 to 17 years old contained only 25 children taking Singulair at the time of the study, and we

did not assess rates of anxiety before and after initiation of Singulair. A Food and Drug Administration review of mood and behavioral changes possibly related to Singulair use (including anxiousness) determined that some post-marketing reports include clinical details that appear consistent with a drug-induced effect.³⁵

Despite the limitations noted, to our knowledge, this study represents the first attempt to examine psychological distress among youth with food allergy by using parent report and child self-report on standardized measures. Results support the resilience of youth with food allergy and suggest strategies for promoting such resilience.

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Clinical implications: Results suggest strategies for reducing risk for psychological distress in response to food allergy, including assessment of children's attitudes about food allergy and support for parental anxiety management.

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