

Mental Health and Quality-of-Life Concerns Related to the Burden of Food Allergy

N.L. Ravid, BA^a, R.A. Annunziato, PhD^{b,c}, M.A. Ambrose, BA^b,
K. Chuang, MA^b, C. Mullarkey, BS^b, S.H. Sicherer, MD^d,
E. Shemesh, MD^b, A.L. Cox, MD^{d,*}

KEYWORDS

• Food allergy • Distress • Bullying • Quality of life

Food allergy seems to be increasing. Based on data from the Centers for Disease Control in the United States, there was an 18% increase in prevalence of food allergy among children from 1997 to 2007, with prevalence estimates currently in the range of 4% to 8%.^{1–3} Food allergy differs from other chronic diseases in that affected individuals are in generally good health, but their health may be episodically compromised by acute food-allergic reactions that may be severe or life-threatening. Management of this unpredictable condition may lead to significant distress for food-allergic children and their parents or caregivers. Several studies have examined the effect of food allergy on quality of life (QoL) and emotional impact in children and families, with a particular focus on measures of distress.^{4,5} Food allergy has been shown to negatively impact parental, as well as patient, QoL.^{5–8} Psychological distress, which includes anxiety, depression, social isolation, and stress, has been demonstrated in children and adolescents with food allergy, although there are variable findings with regard to whether distress is more prevalent among children with food allergy when compared with normative samples.⁹

Several studies have demonstrated a negative impact on health-related QoL, as well as increased distress among food-allergic children and families. However, making

^a Mount Sinai School of Medicine, New York, NY, USA

^b Division of Behavioral and Developmental Health, Department of Pediatrics, Mount Sinai Medical Center, 1468 Madison Avenue, New York, NY 10029, USA

^c Department of Psychology, Fordham University, 441 East Fordham Road, Bronx, NY 10458, USA

^d Division of Pediatric Allergy and Immunology, Mount Sinai Medical Center, One Gustave L Levy Place, New York, NY 10029, USA

* Corresponding author.

E-mail address: Amanda.cox@mssm.edu

comparisons between studies is difficult because of the discrete populations studied, the differing study sizes and geographic locations, and the various methods or tools used to assess psychosocial effects of food allergy on children and their parents.⁵ Applying the available findings to a therapeutic end poses an additional challenge in that there is a paucity of literature describing effective interventions. In addition, methods of assessing distress or changes in QoL that result from food allergy vary in the literature. Some studies focus only on parental evaluations,^{10,11} while others survey both parents and children.¹² Several studies compared food-allergic children to nonallergic cohorts or to children with other chronic disease, such as diabetes.^{13,14} Another study relates subjects' scores to normative scores for the applied tests in the larger population.¹⁵ Moreover, individuals with food allergy often have other atopic conditions that may influence QoL and distress that may be underappreciated in these studies.

The broad range of ages studied should also be taken into consideration. Different developmental stages may influence the divergent manifestations of and means for assessing anxiety in children as opposed to adolescents. Types of questionnaires used and modes of administration also vary, with some studies relying on validated measures and others using modified and nonvalidated tests or qualitative measures such as interviews. Several tools to measure QoL, specifically in food-allergic patients or their families have been introduced and validated only recently.^{5,7,8,16}

This article discusses recent information concerning the effects of food allergy on parent and child QoL, as well as distress. It notes the limitations of the available evidence and points out where further study is needed. There is a general movement in medicine toward focusing on QoL as an important outcome measure in health and disease.^{17,18} The increasing number of articles about these effects in food allergy is an attestation to the growing importance that the field has started to ascribe to the QoL of affected patients and families.⁵ However, our methods of assessment need refinement, especially with regard to the development of evidence-based interventions to improve QoL and reduce distress. Where there is an absence of solid data to back any specific recommendations, the authors provide impressions based on clinical experience with the understanding that, as more data are gathered, our understanding and recommendations will likely need modification.

THE CHILD'S PERSPECTIVE

Studies Examining the Emotional and QoL Consequences of Food Allergy Compared with Other Chronic Illnesses

Assessing the impact of food allergy on QoL requires a point of comparison. Groups evaluated have included children with no food allergy, children with different types or severities of food allergy, children with other allergic disorders, and children with other chronic health conditions. The effects of food allergy on QoL were recently reviewed and summarized.⁵ This article offers a critical appraisal of some of the findings to date.

In a study conducted in England, both a self-reporting questionnaire designed by the researchers and an adapted allergy-specific questionnaire were used to survey 20 children with peanut allergy, ages 7 to 12 years, for their fear of adverse outcomes induced by potential or accidental consumption of peanuts.¹³ The responses of these children were compared with those of 20 children with insulin-dependent diabetes mellitus. The percentage of children reporting anxiety and the level of anxiety (ranked from high to low) was significantly greater in children with food allergy when compared with children with insulin-dependent diabetes mellitus. In a comparison of food allergy

and chronic disease performed in the Netherlands, 98 individuals with various food allergies were surveyed within a larger group of 758, ages 12 to 25 years, with chronic acquired digestive diseases, including inflammatory bowel diseases, chronic liver diseases, congenital disorders, and celiac disease.¹⁴ The survey included a self-reporting questionnaire and the Hospital and Anxiety Depression Scale to probe for burden of disease as measured by leisure activity, sexuality, education, work, and finances. The study found that individuals with food allergy experienced daily disease burden with an impact on school and leisure activities, comparable in several categories to other chronic digestive disorders.

In another study performed in the Netherlands, QoL of food-allergic individuals was compared with that of the general population, as well as to patients with other chronic diseases.¹⁵ Generic QoL questionnaires were completed by food-allergic children (8–12 years), adolescents (13–17 years), and adults (≥ 18 years). QoL scores were compared with published scores for individuals with irritable bowel syndrome, diabetes mellitus, and rheumatoid arthritis. Food-allergic children and adolescents reported poorer QoL than patients with diabetes mellitus, but had better QoL scores than patients with rheumatoid arthritis, asthma, or irritable bowel syndrome. In addition, food-allergic adolescents and adults showed impairments in QoL compared with the general population. Children, however, demonstrated the least QoL impairment due to food allergy.

Comparisons of these studies are interesting but have limitations due to their differing methodologies and study subjects. Although the findings of Avery and colleagues¹³ relate to anxiety while those of Flokstra-de Blok and colleagues¹⁵ relate to QoL, both groups found that food-allergic individuals scored worse than diabetic patients did in these respective psychosocial domains. On the other hand, Calsbeek and colleagues¹⁴ found that comparison of food allergy to a chronic, high somatic-impact disease such as inflammatory bowel disease revealed a lesser social impairment in food allergy. This is consistent with Flokstra-de Blok and colleagues¹⁵ report of better QoL in food-allergic patients compared with patients with irritable bowel syndrome, asthma, and rheumatoid arthritis. The findings of these studies collectively suggest that the emotional effects seen in patients with food allergy are not easily comparable to those encountered in other disease processes. The clinical manifestations of food allergy are largely episodic in that the disorder is generally not apparent unless or until an allergic reaction occurs. This distinctive characteristic of food allergy may contribute to features of increased anxiety (about the development of acute reactions) but may also result in a lesser impact on socialization when compared with a less episodic, chronic illness such as diabetes. More comparative data are needed before further conclusions can be made.

Studies that Primarily Investigate Children with Food Allergy

Studies comparing food-allergic children to each other, rather than to non-food-allergic cohorts, have suggested additional factors affecting food allergy-related distress and QoL, including epinephrine prescription, history of anaphylaxis, and perception of competence in managing personal health.

In a British study, 41 children (ages 6–16 years) with peanut and tree nut allergies and their mothers completed questionnaires to assess perceived stress and QoL.¹² Children who were not prescribed epinephrine showed greater distress. Distress was not, however, associated with whether or not the child actually carried the prescribed autoinjector. Of note, prior severity of allergic reaction, including anaphylaxis, did not significantly influence child and maternal levels of distress.

Another study, also conducted in England, focused on the impact of awareness and negative-versus-positive perceptions of food allergy on anxiety.¹⁹ Of 162 young adults (ages 15–20 years) who were surveyed at a university, 24 self-reported allergy to certain foods. All completed a Perceived Health Competence Scale and a State-Trait Anxiety Inventory (STAI). As expected, allergic patients were more anxious than those who did not report having allergy. Interestingly, within the small group of 24 food-allergic individuals, those who reported feeling more competent in handling their illness had higher anxiety levels compared with those who reported less competence. Objective assessment of patient levels of “perceived health competence” revealed that most patients who self-reported themselves as “highly competent” did not know the meaning of the term “anaphylaxis.” This suggests that self-reported levels of “perceived health competence” in this study were unreliable and unlikely to signify true proficiency in disease management. Nonetheless, the investigators speculated that the association between participants’ reported feelings of better competency in managing their illness, as well as increased anxiety, could be attributed to the fact that an increased understanding of food allergy could contribute to a heightened awareness of its risks.¹⁵

An alternate explanation for the association between anxiety and perceived health competence may be that anxiety prompts patients to inquire more about their illness and thus leads to self-reported higher competence. Based on this conjecture, anxiety among the adolescents surveyed may have contributed to a report of higher competence, rather than competence leading to a report of anxiety, even in cases where patients misjudged or overestimated their knowledge about food allergy. Thus, anxious patients may be more motivated to learn about their disorder, and educating them to become truly competent in managing their food allergy could perhaps decrease their anxiety. On the other hand, as inferred from these findings, patients with food allergy may develop increased anxiety as they learn more about their illness. These seemingly contradictory interpretations would lead to entirely different approaches to patients with food allergy. Accordingly, conclusions derived from cross-sectional studies involving self-reported symptoms or attitudes must be considered cautiously because self-reports do not always faithfully or completely represent the real attitudes, knowledge, or symptoms of the reporting individuals.

Although distress or anxiety are usually perceived as negative emotions that lead to suffering, in fact, some level of anxiety may be adaptive and can lead to better disease management and reduce risk-taking behaviors. Indeed, risk-taking behaviors, such as knowingly ingesting unsafe foods or not carrying prescribed epinephrine, have been noted in adolescents and young adults. In a survey of 13- to 21-year-old food-allergic patients in the United States, alarmingly high rates of risk-taking were reported (ie, 54% reported purposely ingesting unsafe foods and only 61% reported always carrying epinephrine).²⁰ Those who reported more unsafe behaviors also reported being less concerned about their allergy, and reported feeling “different” more often than those who took fewer risks.

The QoL of children with food allergy and the QoL of their parents has been the focus of several recent studies, as reviewed by Lieberman and Sicherer.⁵ QoL of teenagers living with food allergy has been evaluated in the context of developing a specific questionnaire to assess QoL in this group of patients.⁷ Teenagers identified limitations on social activities, not being able to eat what others were eating, and limited choice of restaurants as the areas with most adverse impact on their QoL.

Overall, these studies suggest that food-allergic individuals and their families may be more anxious and distressed, and have a lower QoL, when compared with the general population. Increased self-reported “competence” in managing the illness is

not necessarily associated with reduced anxiety, although these outcomes may be different if patients cultivate true disease-related competence. Being more anxious, however, is not always problematic, as anxiety can be adaptive and protective against risky behaviors. These findings should be considered when developing therapeutic interventions to improve distress or QoL in patients with food allergy and their families.

THE FAMILY PERSPECTIVE

Awareness of the emotional impact of food allergy has been extended to include the families living with this condition and has led to research on the distress that family members experience and potentially project on one another. The constant fear of anaphylaxis, as well as the consistent vigilance necessary to prevent accidental allergen exposures, can place significant strain on those caring for children with food allergy. Furthermore, parents have the added burden of communicating the risks to others involved in the child's care.

A study of more than 1000 parents of food-allergic children in the United States found overall QoL for caregivers to be variable, although caregivers consistently reported being troubled by social limitations resulting from their child's food allergy.¹⁰ Poor QoL was significantly more likely among caregivers with more knowledge about food allergy and among caregivers whose children had been to the emergency department for food allergy within the preceding year, had multiple food allergies, or were allergic to specific foods (milk, egg, or wheat). In another United States survey of 253 families of food-allergic children, which used a validated, self-administered, children's health questionnaire (CHQ-PF50), parents scored significantly lower (worse) on general health perception, parental emotional impact, and limitation on family activities compared with established norms.⁶

In a study aimed at exploring the challenges faced by parents of young children with food allergy, Rouf and colleagues²¹ interviewed a small group of British mothers of food-allergic children and identified themes of parental acclimation to the diagnosis, efforts toward normalizing living with the risks posed by food allergy, and parental concern about their child's identity and inclusion in social life. The study identified that there was a readjustment period to the diagnosis for these mothers that, in different subjects, elicited grief, anxiety, and hope. The study also identified maternal concern over parental responsibility in transferring care of the child to others, teaching others, and cultivating a "normalized" sense of identity in food-allergic children. Another United States study surveyed 2495 parents and found that their children's food allergies adversely affected the parent's personal relationships with the community as well as within the family.²² Moreover, as reviewed by Klinnert and Robinson,²³ there is concern that parents with extreme levels of anxiety, especially those for whom social interactions with others are also affected, may adopt maladaptive coping strategies. For instance, parents may impose unreasonable social restrictions on the food-allergic child that can interfere with the child's age-appropriate development.

Parental gender may influence the responses and behavioral changes related to food allergy. In one British study of 46 families in which there was a peanut-allergic child, responses of mothers were compared with fathers. Mothers reported greater anxiety and stress than fathers.²⁴ Importantly, mothers rated the anxiety of their children higher (worse) than the children rated their own anxiety levels. The discrepancy between child and parent reporting of anxiety underscores the importance of directly assessing the child himself or herself for impact of food allergy. This is consistent with the findings of parental reporting of the psychosocial impact of other illnesses on children.²⁵

The burden of managing the risks posed to children with food allergy lies with parents or primary caregivers. QoL assessments within families where there is a food-allergic child may show a greater impact on parents than on the children. The influence of a child's food allergy on child and parent QoL were examined in a study comparing QoL for 30 food-allergic children to 15 comparative normal children, as well as QoL between their respective caregivers.¹¹ The findings indicated that, although food allergy influenced QoL for some children, their parent's QoL was hindered to a greater extent. Furthermore, parents report a better QoL for their food-allergic children than children do when asked directly about themselves, suggesting that direct evaluation of child QoL is necessary.²⁶

Comparison of adult and child perspectives on food allergy may reveal specific factors that contribute to child distress from food allergy. LeBovidge and colleagues⁹ surveyed 69 children ages 8 to 17 years with food allergy and 141 mothers of food-allergic children ages 2 to 17 years to investigate the influence of maternal anxiety and negative attitudes toward food allergy on the development of child distress using several validated non-disease-specific questionnaires. Scores for anxiety, depression and social stress symptoms in children with food allergy were comparable to average normative child distress scores. The results of this study highlight resilience among children with food allergy. Greater distress was found only in children with a negative approach to food allergy and in younger children of mothers with greater anxiety.

Herbert and Dahlquist²⁷ examined food allergy as it relates to anxiety, depression, and the impact on autonomy and the influence of parental behavior for 86 food-allergic young adults ages 18 to 22 years. Responses were compared with 344 healthy individuals of the same age. Three nonstandardized questionnaires and several standardized ones were administered. The investigators found that food-allergic participants and healthy participants scored similarly with regard to social self-confidence, autonomy, depression, and anxiety. The subgroup of food-allergic individuals who had a perceived experience of anaphylaxis described greater anxiety about their condition and rated their parents as more overprotective in comparison with food-allergic individuals without a perceived experience of anaphylaxis. The investigators proposed that anaphylaxis in food-allergic patients is a predictor of psychological distress. Conversely, an experience of anaphylaxis may result in reduced distress if individuals are able to manage and master the allergic reaction; thus, the relationship between anaphylaxis and long-term distress requires further investigation.¹²

It is evident from the publications cited above that QoL is negatively affected in families of children who suffer from food allergy. Furthermore, several studies suggest that there is a greater impact on QoL of parents than on the QoL of food-allergic children themselves, at least in the younger age groups. It has not yet been well established whether anxiety is more prevalent among families of children with food allergy than in the general population or compared with families coping with other illnesses. When anxiety is substantially increased, it is likely to be high in both the caretaker and the child. Parental anxiety levels, patient perceptions of food allergy, and coping mechanisms all likely have marked effects on the anxiety and adaptive behaviors of children with food allergy.

The Impact of Oral Food Challenges

Management of pediatric food allergy often involves supervising oral food challenges to either confirm the diagnosis of a food allergy (by positive oral food challenge), or to determine tolerance or resolution of a particular food allergy (by negative oral food challenge). An intervention such as an oral food challenge may result in health-related QoL changes over time for patients and families affected by food allergy.

A few studies have attempted to determine parental anxiety levels related to the performance of oral food challenges.^{28–31} Anxiety levels were evaluated in parents of 57 Dutch children with suspected peanut or hazelnut allergy who underwent double-blind placebo-controlled food challenges (DBPCFC) using the Spielberger STAI.²⁸ Results were compared with Dutch normative values, as well as with parents who refused DBPCFC. The investigators found that parents of children with suspected peanut or hazelnut allergy had high levels of STAI anxiety compared with normal. However, after DBPCFC, state anxiety was significantly lower, regardless of whether their children passed or failed the oral food challenge. Lower state anxiety was maintained even 1 year after food challenge.

In another study, a questionnaire was completed by parents of children with egg allergy. Parents of children who did not undergo food challenge were compared with parents of children who did undergo an open oral food challenge to egg, including 27 who had positive challenges and 57 who had negative challenges to egg. Similar to the above findings among parents of peanut or hazelnut-allergic children, Kemp and colleagues²⁹ found that performance of an egg oral challenge was associated with reduced adverse parental concerns for most parameters related to expectations about their children's egg allergy, regardless of challenge outcome. These investigators concluded that the experience of an oral food challenge provided parents with greater certainty about their child's food allergy. DunnGalvin and colleagues³⁰ found comparable results for parental food-allergy QoL using the Food Allergy Quality of Life–Parent Form in a sample of children 0 to 12 years of age undergoing oral food challenges. Scores did improve after oral food challenges for parents of children who had negative challenges, as well as for those whose children had positive challenges.

The studies so far do suggest that oral food challenges may be one area where an intervention may influence or reduce parental anxiety, alleviate distress, and have a positive effect on QoL. However, none of these studies included a random allocation of patients, which precludes any assumption of cause-and-effect relationship between the performance of the food challenge and the apparent association with improved outcomes. It is possible that patients who choose to undergo a food challenge procedure are less anxious than those who do not choose to do it. If so, the difference between anxiety scores in the studied groups could simply reflect a characteristic of those families who tend to proceed with a challenge versus those who do not. The food challenge itself may not be an important factor in relieving anxiety. Although additional research in this area should be conducted before any conclusions or firm recommendations are made, it is possible that, for those who choose to do the challenge, the ensuing information about the child's allergy leads to lesser anxiety. Future studies in this field should be conducted with validated instruments and should assess similar QoL and distress measures among food-allergic children themselves.

FOOD ALLERGY AND BULLYING: AN EMERGING ISSUE

Bullying has devastating effects on children. A study conducted in the United States showed that youth subjected to multiple victimizations experienced more psychological distress and performed worse in school compared with their peers.³² Another study has shown a clear association between bullying and psychological distress among middle-school boys.³³ In Finland, being bullied in childhood is a predictor of becoming a teenage mother and teen pregnancy has been proposed as one of many long-term outcomes of bullying.³⁴ School bullying is typically targeted at children that are more vulnerable. A child with food allergy may experience separation

from his or her peers during certain social situations, and may have an underlying increased level of anxiety and social stress. These factors may make food-allergic children more susceptible to bullying and its psychological effects.

In a recent study by Lieberman and colleagues,³⁵ the bullying experience was examined in food-allergic children. A questionnaire designed to assess the nature of teasing, harassment, or bullying of food-allergic patients was distributed to attendees at several regional Food Allergy & Anaphylaxis Network conferences. Most of the surveys were completed by parents of food-allergic children. Of the 353 responses, 24% reported being bullied directly because of food allergy and, of these, most (86%) had experienced multiple episodes of bullying. Most bullying experiences (82%) occurred at school where bullies were mainly classmates. Bullying included teasing or verbal or physical harassment. Of those who experienced bullying, 57% described physical harassment, including being purposely touched with a food allergen. It was also found that 79% of those bullied perceived that they were bullied exclusively because of their food allergy. Furthermore, the respondents cited feelings of sadness, depression, embarrassment, and humiliation because of being bullied; 42.3% felt that the food-allergic child would be harassed or teased again in the future.

Other studies of parent-reported assessment of childhood QoL and anxiety have shown that parents may overestimate child anxiety with respect to food allergy and may not be reliable sources of information regarding their child's experience of food allergy.²⁴ The findings in the above study on bullying were largely based on parent-completed questionnaires; thus, on parent perception of the food-allergic child's experience. Future studies should directly question the food-allergic child about bullying. Nonetheless, this preliminary study clearly suggests that bullying of food-allergic children does occur and is likely prevalent in the school setting. The extent and correlates of bullying related to food allergy should be further investigated with the aims of raising awareness about this phenomenon and developing interventions to reduce or prevent bullying.

INTERVENTIONS THAT ATTEMPT TO IMPROVE EMOTIONAL OUTCOMES AND QOL

No published studies have evaluated the impact of any intervention on food-allergic children themselves. Studies evaluating the efficacy of educational interventions in other pediatric chronic diseases, including diabetes and asthma, have shown limited improvement in measurable clinical outcomes. For example, in one study of a brief, intensive diabetes educational intervention, patient satisfaction and empowerment improved whereas measures of diabetes such as hemoglobin A1c remained unchanged.³⁶ Similarly, in a meta-analysis of 37 studies investigating whether asthma self-management education affects children's use of acute care services, emergency department visits and number of hospitalizations decreased, whereas the likelihood of hospitalization and urgent physician visits for asthma remained the same.³⁷

To date, only one study has evaluated the impact of an intervention on constructs related to QoL and distress on families who have children with food allergy; however, this study did not use validated measures of those constructs. Lebovidge³⁸ and colleagues report that a group intervention, consisting of an educational workshop presented to 61 families with food-allergic children, was well accepted. Parents' pre-intervention and postintervention self-reports indicated increased perception of competence in coping with food allergy and reduced perceived burden of coping with the illness. This study provides preliminary justification for further investigation of group interventions in this population. However, because the study design lacked

controls, outcomes were self-reported and not based upon validated instruments, and child-specific assessments were not performed, the authors cannot conclude that the intervention was effective until further studies are performed.

CONCLUSIONS AND FUTURE DIRECTIONS

Box 1 presents a summary of the reviewed articles concerning findings related to QoL, anxiety, and distress in food-allergic patients and their families. Although QoL is invariably reported to be adversely affected, there are discrepancies among reports with regard to the impact of food allergy on distress and anxiety in children. Some articles demonstrate a clear correlation between the two, although others find no significant association. The use of qualitative as opposed to quantitative methods of study, as well as general as opposed to food allergy-specific instruments, may partially account for the variance in findings. Of note, the sample sizes are generally too small to merit definitive conclusions about the rate or level of distress in food-allergic children compared with children who do not have food allergy. The authors also observe that many of the patient populations recruited for these studies come from backgrounds of high education or income, are already attending an advocacy conference, or are in the care of highly focused allergists. Increasing the diversity of participating subjects with respect to income, health care access, ethnicity, and advocacy awareness will yield more information.

In addition, even when anxiety scales are used, investigators do not use “event-specific” anxiety but rather anxiety traits or states. Those may be less relevant constructs in this population because anxiety in food allergy is frequently related to a specific event, or to a fear about an event, and should be evaluated as such. In addition, the mere demonstration of increased distress in food-allergic children does not

Box 1 Reviewed articles categorized by construct and outcome		
Construct	Parents and Family	Patients
QoL	<i>Decreased</i> • Lieberman and Sicherer,⁵ 2011 • Gupta et al,²² 2010	<i>Decreased</i> • Resnick et al,⁷ 2010 • Flokstra-de Blok et al,¹⁵ 2010
	<i>Variable</i> • Springston et al,¹⁰ 2010	
Anxiety	<i>Increased</i> • Rouf et al,²¹ 2011 • Klinnert et al,²³ 2008 • King et al,²⁴ 2009	<i>Increased</i> • Avery et al,¹³ 2003 • Calsbeek et al,¹⁴ 2006 <i>No change</i> • Lebovidge et al,⁹ 2009 • Herbert and Dahlquist,²⁷ 2008
Distress	—	<i>Increased</i> • Cummings et al,¹² 2010

imply a pathologic reaction to the illness. Evaluation of correlates of event-specific distress in larger samples, with QoL and other constructs as the outcome variable, would enable an understanding of a threshold of distress in this group of patients. Only beyond that threshold could distress be considered maladaptive. Conversely, levels of distress below that threshold could be desirable. Finally, a total lack of distress may be maladaptive and a cause for concern in the food-allergic population because it could lead to excessive risk-taking.

The experience of being bullied has only recently been studied in the context of food allergy. Additional studies of patients, and potentially of those involved in bullying, are needed to explore the association between bullying and food allergy, as well as whether fear of being bullied contributes to anxiety in children with food allergy. Other considerations might include whether the type and severity of food allergy has an impact on the frequency and form of bullying. Additional research is needed to distinguish between outcomes found via parental reporting versus child reporting of the influence of food allergy on the experiences of being bullied. Of particular interest would be whether parents are aware of most cases of bullying and how bullying is managed when parents are aware.

Parents undoubtedly have a major influence on children's psychological response to their food allergy, and this deserves further exploration. Another unresolved inquiry is whether food allergy and anxiety are organically associated via a genetic link (eg, manifestations of an altered sympathetic nervous system), or whether anxiety develops because of learning patterns, as reviewed recently.⁴ Concerning learning patterns, in some patients it may be that increased perceived competency in managing food allergy will lead to increased anxiety.¹⁹ However, it may be that patients who are anxious at baseline are more likely to seek further knowledge about their illness. A cause-and-effect relationship between disease knowledge and distress in food allergy has not yet been substantiated. One pilot study indicated that educational workshops might increase perceived competence in parents.³⁸ Additional well-designed studies are needed to further examine the outcomes of educational interventions on QoL and distress, as well as to clarify the relationship between knowledge about food allergy and patient or parent anxiety.

SUMMARY

The study of food allergy-related mental health and QoL is truly in its infancy, thus further research is desired in each area reviewed. Based on findings from the available studies in the field, the authors propose the following recommendations with the caveat that, as understanding of the psychosocial impact of food allergy evolves, these recommendations may need to be modified or completely changed.

1. It is important to evaluate event-related anxiety in children with food allergy and their parents as a part of routine clinical visits, because anxiety can affect QoL and illness perception. Both very little and very marked anxiety in either the patient or parent should be of concern.
2. Age-appropriate, validated, food allergy-specific assessments of QoL are available and should be used to evaluate the QoL concerns of food-allergic children and their parents. Food allergy decreases QoL owing to its restrictive effects on diet patterns, social activities, and the need to avoid certain circumstances in which there may be a risk of an accidental exposure to a food.
3. It is not yet clear how to improve QoL in affected patients and families, but several opportunities do exist. To name just a few, a diagnostic test such as a food

challenge may improve QoL by confirming persistence versus tolerance of a food allergen, demonstrating appropriate management of an allergic reaction, or reaffirming the extent of avoidance that is needed to protect the patient.^{29,30} The provision of more focused information may achieve a similar goal as suggested recently.³⁹

4. Some understanding of food allergy is important for patients so that they can manage their illness; however, more knowledge may be associated with increased anxiety and decreased QoL. Thus, it is important to impart knowledge about the illness in a supportive and reassuring way, and to emphasize that successful management of food allergy is possible and, under most circumstances, should not lead to significant disability.
5. Bullying is an emerging concern. Clinicians should inquire about bullying at routine visits.
6. Potentially promising targets for intervention include specific QoL concerns, distress (if excessive), increased knowledge about the illness, and education about coping.
7. Schools are where children socialize most, so a child's safety and comfort in school lunch settings are crucial. In addition, schools are the sites of most bullying in this population.³⁵ Therefore, the arrangements made by schools to accommodate the child's needs should be of interest to practitioners who may be called on to advocate for a food-allergic child's specific needs.^{39,40}
8. When there is a concern about excessive distress or anxiety, allergists and primary care providers should consider referral to a mental health provider or suggest the use of integrated centers that have a psychiatrist or psychologist on staff.

REFERENCES

1. Branum AM, Lukacs SL. Food allergy among children in the United States. *Pediatrics* 2009;124(6):1549–55.
2. Gupta RS, Springston EE, Warrier MR, et al. The prevalence, severity, and distribution of childhood food allergy in the United States. *Pediatrics* 2011;128(1):e9–17.
3. Sicherer SH. Epidemiology of food allergy. *J Allergy Clin Immunol* 2011;127(3):594–602.
4. Cummings AJ, Knibb RC, King RM, et al. The psychosocial impact of food allergy and food hypersensitivity in children, adolescents and their families: a review. *Allergy* 2010;65(8):933–45.
5. Lieberman JA, Sicherer SH. Quality of life in food allergy. *Curr Opin Allergy Clin Immunol* 2011;11(3):236–42.
6. Sicherer SH, Noone SA, Munoz-Furlong A. The impact of childhood food allergy on quality of life. *Ann Allergy Asthma Immunol* 2001;87(6):461–4.
7. Resnick ES, Pieretti MM, Maloney J, et al. Development of a questionnaire to measure quality of life in adolescents with food allergy: the FAQL-teen. *Ann Allergy Asthma Immunol* 2010;105(5):364–8.
8. Cohen BL, Noone S, Munoz-Furlong A, et al. Development of a questionnaire to measure quality of life in families with a child with food allergy. *J Allergy Clin Immunol* 2004;114(5):1159–63.
9. Lebovidge JS, Strauch H, Kalish LA, et al. Assessment of psychological distress among children and adolescents with food allergy. *J Allergy Clin Immunol* 2009;124(6):1282–8.
10. Springston EE, Smith B, Shulruff J, et al. Variations in quality of life among caregivers of food allergic children. *Ann Allergy Asthma Immunol* 2010;105(4):287–94.

11. Valentine AZ, Knibb RC. Exploring quality of life in families of children living with and without a severe food allergy. *Appetite* 2011;57(2):467–74.
12. Cummings AJ, Knibb RC, Erlewyn-Lajeunesse M, et al. Management of nut allergy influences quality of life and anxiety in children and their mothers. *Pediatr Allergy Immunol* 2010;21(4 Pt 1):586–94.
13. Avery NJ, King RM, Knight S, et al. Assessment of quality of life in children with peanut allergy. *Pediatr Allergy Immunol* 2003;14(5):378–82.
14. Calsbeek H, Rijken M, Bekkers MJ, et al. School and leisure activities in adolescents and young adults with chronic digestive disorders: impact of burden of disease. *Int J Behav Med* 2006;13(2):121–30.
15. Flokstra-de Blok BM, Dubois AE, Vlieg-Boerstra BJ, et al. Health-related quality of life of food allergic patients: comparison with the general population and other diseases. *Allergy* 2010;65(2):238–44.
16. Flokstra-de Blok BM, DunnGalvin A, Vlieg-Boerstra BJ, et al. Development and validation of a self-administered Food Allergy Quality of Life Questionnaire for children. *Clin Exp Allergy* 2009;39(1):127–37.
17. Tyedin K, Cumming TB, Bernhardt J. Quality of life: an important outcome measure in a trial of very early mobilisation after stroke. *Disabil Rehabil* 2010;32(11):875–84.
18. Ganz PA, Land SR, Geyer CE Jr, et al. Menstrual history and quality-of-life outcomes in women with node-positive breast cancer treated with adjuvant therapy on the NSABP B-30 trial. *J Clin Oncol* 2011;29(9):1110–6.
19. Lyons AC, Forde EM. Food allergy in young adults: perceptions and psychological effects. *J Health Psychol* 2004;9(4):497–504.
20. Sampson MA, Munoz-Furlong A, Sicherer SH. Risk-taking and coping strategies of adolescents and young adults with food allergy. *J Allergy Clin Immunol* 2006;117(6):1440–5.
21. Rouf K, White L, Evans K. A qualitative investigation into the maternal experience of having a young child with severe food allergy. *Clin Child Psychol Psychiatry* 2011. [Epub ahead of print].
22. Gupta RS, Springston EE, Smith B, et al. Food allergy knowledge, attitudes, and beliefs of parents with food-allergic children in the United States. *Pediatr Allergy Immunol* 2010;21(6):927–34.
23. Klinnert MD, Robinson JL. Addressing the psychological needs of families of food-allergic children. *Curr Allergy Asthma Rep* 2008;8(3):195–200.
24. King RM, Knibb RC, Hourihane JO. Impact of peanut allergy on quality of life, stress and anxiety in the family. *Allergy* 2009;64(3):461–8.
25. Shemesh E, Newcorn JH, Rockmore L, et al. Comparison of parent and child reports of emotional trauma symptoms in pediatric outpatient settings. *Pediatrics* 2005;115(5):e582–9.
26. van der Velde JL, Flokstra-de Blok BM, Dunngalvin A, et al. Parents report better health-related quality of life for their food-allergic children than children themselves. *Clin Exp Allergy* 2011;41(10):1431–9.
27. Herbert LJ, Dahlquist LM. Perceived history of anaphylaxis and parental overprotection, autonomy, anxiety, and depression in food allergic young adults. *J Clin Psychol Med Settings* 2008;15(4):261–9.
28. Zijlstra WT, Flinterman AE, Soeters L, et al. Parental anxiety before and after food challenges in children with suspected peanut and hazelnut allergy. *Pediatr Allergy Immunol* 2010;21(2 Pt 2):e439–45.
29. Kemp AS, Allen CW, Campbell DE. Parental perceptions in egg allergy: does egg challenge make a difference? *Pediatr Allergy Immunol* 2009;20(7):648–53.

30. DunnGalvin A, Cullinane C, Daly DA, et al. Longitudinal validity and responsiveness of the Food Allergy Quality of Life Questionnaire–Parent Form in children 0–12 years following positive and negative food challenges. *Clin Exp Allergy* 2010; 40(3):476–85.
31. Strinnholm A, Brulin C, Lindh V. Experiences of double-blind, placebo-controlled food challenges (DBPCFC): a qualitative analysis of mothers' experiences. *J Child Health Care* 2010;14(2):179–88, 32.
32. Holt MK, Finkelhor D, Kantor GK. Multiple victimization experiences of urban elementary school students: associations with psychosocial functioning and academic performance. *Child Abuse Negl* 2007;31(5):503–15.
33. Dao TK, Kerbs JJ, Rollin SA, et al. The association between bullying dynamics and psychological distress. *J Adolesc Health* 2006;39(2):277–82.
34. Lehti V, Sourander A, Klomek A, et al. Childhood bullying as a predictor for becoming a teenage mother in Finland. *Eur Child Adolesc Psychiatry* 2011; 20(1):49–55.
35. Lieberman JA, Weiss C, Furlong TJ, et al. Bullying among pediatric patients with food allergy. *Ann Allergy Asthma Immunol* 2010;105(4):282–6.
36. George JT, Valdovinos AP, Russell I, et al. Clinical effectiveness of a brief educational intervention in Type 1 diabetes: results from the BITES (Brief Intervention in Type 1 diabetes, Education for Self-efficacy) trial. *Diabet Med* 2008;25(12): 1447–53.
37. Coffman JM, Cabana MD, Halpin HA, et al. Effects of asthma education on children's use of acute care services: a meta-analysis. *Pediatrics* 2008;121(3): 575–86.
38. LeBovidge JS, Timmons K, Rich C, et al. Evaluation of a group intervention for children with food allergy and their parents. *Ann Allergy Asthma Immunol* 2008; 101(2):160–5.
39. Sicherer SH, Mahr T. American Academy of Pediatrics Section on Allergy and Immunology. Management of food allergy in the school setting. *Pediatrics* 2010; 126(6):1232–9.
40. Young MC, Munoz-Furlong A, Sicherer SH. Management of food allergies in schools: a perspective for allergists. *J Allergy Clin Immunol* 2009;124(2):175–82, 182.e1–4 [quiz: 183–4].