

Pediatric Allergy and Immunology / Early View

ORIGINAL ARTICLE |  Full Access

Food-allergy-specific anxiety and distress in parents of children with food allergy: A systematic review

Clara Westwell-Roper , Sharon To, Gordan Andjelic, Cynthia Lu, Boyee Lin, Lianne Soller, Edmond S. Chan, S. Evelyn Stewart

First published: 14 November 2021

<https://doi-org.bibliosan.clas.cineca.it/10.1111/pai.13695>

ESC and SES should be considered joint senior authors.

Funding information:

No specific funding was received for this study. CWR is the recipient of a 2019 International OCD Foundation Young Investigator Award. ST is supported by the BC Children's Hospital Foundation. SES is supported by the Canadian Institutes of Health Research and Michael Smith Foundation for Health Research.

Abstract

Background

Parenting a child with food allergy (FA) can lead to impaired quality of life and family functioning. Anxiety is a critical component of FA-associated distress and a potential target for therapeutic intervention. This systematic review aimed to clarify the concept of FA-specific anxiety (FAA) and its antecedents, consequences, and correlates and to determine the extent to which existing FA-specific outcome measures capture symptoms of parental distress and FAA.

Methods

MEDLINE, EMBASE, PsycINFO, and CENTRAL were searched for qualitative and quantitative studies examining distress or anxiety in parents of children with FA through August 2020. This review was registered with PROSPERO (CRD42020208316) and conducted in accordance with PRISMA guidelines.

Results

Ninety-eight studies were included in the final narrative synthesis. Most participants were mothers, and reporting of demographic data was limited. Parents identified anxiety as the most burdensome form of FA-specific emotional distress. Several allergy-related factors as well as medical and psychosocial interventions were associated with reduced parental anxiety and distress. However, affective, cognitive, and behavioral dimensions of FAA were only partially addressed by existing measures for general anxiety symptoms and FA-specific parental factors.

Conclusions

FAA contributes to distress and functional impairment among parents of children with FA. Current FA-specific parent measures fail to adequately capture dimensions of FAA, suggesting that further work is needed to improve the assessment and monitoring of FAA and its impacts. Characterization of this construct represents an initial step in developing standardized methods for assessing and monitoring FAA in clinical populations.

Key message

Parental emotional distress and anxiety contribute to reduced health-related quality of life for children with food allergy and their families and may impact allergy management. However, it is unclear how allergists in busy specialist clinics should identify parents with food allergy-related distress who could benefit from psychosocial interventions. This systematic review characterizes the constructs of food allergy-specific distress and anxiety and points to gaps in current assessment scales. This work represents a critical first step in developing clinical tools to improve the assessment, monitoring, and management of anxiety in families living with food allergies.

1 INTRODUCTION

Food allergy (FA) affects 4–10% of children worldwide.^{1, 2} Anaphylaxis associated with immunoglobulin E- (IgE-)–mediated allergies may result in a life-threatening reaction requiring rapid epinephrine treatment.³ Many reports have emphasized the need for constant vigilance to avoid allergen exposure and treatment delays,^{4, 5} but families and healthcare providers often overestimate the risk of severe symptoms and mortality.^{6, 7} Worries that are difficult to control and cause significant distress in this context can interfere with family functioning⁸ and profoundly impact emotional and social aspects of a child's experience with FA.⁹

Children and adolescents with atopic diseases may be at increased risk of depression and anxiety symptoms compared with the general population.³ Children with FA score higher on subscales for separation anxiety/panic and heightened vigilance compared with non-allergic peers.¹⁰ Similarly increased rates of internalizing disorders in both monozygotic and dizygotic twins with FA point to likely environmental and epigenetic bases for familial aggregation.¹¹ While FA could theoretically impact release of immune mediators affecting neuronal function, indirect mechanisms linking anxiety with FA include fear of allergen ingestion¹² and distress communicated by caregivers.¹³

Assessment of parental distress in the context of FA has primarily focused on general anxiety and depression symptoms.¹⁴ Subdomains of emotional distress—unpleasant feelings or emotions associated with pain or suffering—include anxiety, depression, and anger.¹⁵ More broadly, parenting distress can involve subjective worry, guilt, sadness, fatigue, embarrassment, resentment, and anger as well as an objective dimension encompassing demands on time, family friction, disruption in social life and employment, and financial concerns.¹⁶ Anxiety is an emotion characterized by apprehension in anticipation of future or potential threat, best differentiated by symptoms of autonomic arousal and the experience of threat, including fearfulness, worry, and hyperarousal/nervousness.¹⁷ While anxiety can be adaptive in the context of FA management, symptoms have the potential to interfere with functioning and reduce health-related quality of life (HRQOL), a multidimensional construct that evaluates physical, psychological, and social components from the patient (or parent) perspective.¹⁸ Recent studies suggest a negative impact of FA on HRQOL for both individuals experiencing FA and their families.^{19, 20} Moreover, maternal anxiety has been linked to reduced psychological functioning and quality of life (QOL) in children with FA²¹ and may impact allergy symptoms.²² As described in other conditions, anxiety in the context of FA may represent a discrete construct not fully captured by measures of generalized anxiety disorder or other mental health conditions, yet potentially amenable to intervention.²³

Several reviews have drawn attention to parental FA-related HRQOL,¹⁸ emotional burden,²⁴⁻²⁶ and anxiety.^{3, 27} In particular, a recent narrative review of anxiety in the context of FA included a subsection on parents and caregivers. The authors noted that although many caregivers appear to function well, some experience high levels of stress and anxiety that may benefit from referral for psychological support and treatment.²⁶ Others have similarly recommended that physicians screen patients for mental health problems amenable to intervention and refer to mental health supports as needed.²⁶ However, efficient identification of significant parental distress is challenging in busy allergy clinics²⁸; allergists have difficulty identifying families reporting high anxiety and describe the process as time-consuming.²⁹ Moreover, limited healthcare resources often prohibit referral of all families who may benefit.³⁰

While symptoms of emotional distress are included in some HRQOL questionnaires,³¹⁻³³ assessment tools with utility in screening for parental FA-related distress have not been

systematically reviewed. To inform the future development of tools for identifying families likely to benefit from specific mental health interventions, we reviewed studies characterizing distress and anxiety in parents of children with FA. We sought to clarify the concept of FA-specific anxiety (FAA) by describing (1) anxiety- and distress-related symptoms reported by parents, together with their antecedents, consequences, and correlates; and (2) the extent to which existing FA-specific outcome measures capture symptoms of parental distress and FAA.

2 METHODS

2.1 Search strategy

This systematic review was conducted in accordance with PRISMA guidelines³⁴ and the protocol registered with PROSPERO (CRD42020208316). We searched MEDLINE, EMBASE, PsycINFO, and Cochrane Central Register of Controlled Trials (CENTRAL) for relevant studies from database inclusion dates through to August 25, 2020. Electronic searches were supplemented by manual consulting of reference lists from prior reviews and included studies and by consultation with experts in the field. An updated search was performed prior to publication. Search terms covered three primary concepts: (1) pediatric FA; (2) parents and caregivers; and (3) anxiety, worries, fear, or distress. A sample search strategy (MEDLINE) is shown in Table [S1](#). Titles and abstracts resulting from database searches were independently reviewed by two authors; the full text of selected articles was further reviewed by two different authors for eligibility. Reasons for exclusion were recorded with any disagreements resolved by consensus discussion with a third reviewer. At least two reviewers achieved consensus on the data to extract from included studies.

2.2 Study selection

Articles were included if they were empirical studies in English, either qualitative or quantitative. Conference abstracts, editorials, dissertations, and reviews were excluded. Included studies assessed distress or anxiety in parents of children with physician-diagnosed IgE-mediated FA, either verified by investigators or based on parent report. Studies of self-reported FA without physician diagnosis and non-IgE-mediated conditions were excluded, as were studies in which parent report measures referred to the child's emotional state but not that of the parent. Assessment of parental distress or anxiety prior to onset of diagnosed FA symptoms or in the context of suspected but not physician-diagnosed FA was excluded. For studies reporting HRQOL measures, only those that specifically reported on items related to distress or anxiety were included.

2.3 Data extraction and quality appraisal

Data extracted from full-text articles were as follows: country and dates of study, funding sources, study design, qualitative methodology, intervention type, inclusion/exclusion criteria, number of participants, demographic information (including age, gender,

race/ethnicity, and socioeconomic data), FA information (child's age, time since diagnosis, number of FA, history of anaphylaxis), outcome measures (general and FA-specific tools or themes related to distress), aspects of distress quantified or described, dimensions of FAA reported, impact on child, comparison with control group, and associations with parent/child factors. Included studies were assessed using the Mixed Methods Appraisal Tool (MMAT), a checklist developed for quality appraisal of quantitative, qualitative, and mixed-methods studies.³⁵ Overall risk of bias taking into account the MMAT checklist for each study was rated independently by two reviewers and conflicts resolved based on review by a third team member. Studies deemed low risk of bias were felt to be well-designed with adequate sample size (including surveys with response rates >70%), and limitations (eg, differences in demographics between groups) addressed in the analyses. Relevant outcome measures had undergone some validation. Studies at medium risk were not flagged for significant concerns but representativeness of the sample or relevant demographic data was felt to be limited. Studies at high risk of bias were flagged for significant concerns about quality, including very small sample sizes at high risk of selection bias (eg, response rates <50% for surveys), distinct methods of data collection between groups undergoing comparison, or an accumulation of medium risk factors.

2.4 Concept analysis

Distress-related items derived from general and FA-specific assessment measures were extracted from all studies and incorporated into the final narrative synthesis, as were the various types of FA-specific distress endorsed by parents. Major themes related to FAA—the predominant form of distress described by parents—were summarized using a concept analysis framework described previously for characterization of dimensions of anxiety in other contexts.³⁶ Concept analysis is a systematic process of developing, clarifying, and refining the phenomenon under examination that involves identifying defining attributes and known dimensions, defining antecedents and consequences, and identifying empirical referents (ways in which the concept is defined and measured).³⁷ To identify the extent to which the concept of FAA is covered by existing FA-specific scales measuring aspects of parental QOL or distress, all items from FA-specific scales employed in the retrieved studies were reviewed. Gaps in coverage of FAA dimensions were systematically identified.

2.5 Correlates of FAA

Study heterogeneity including use of multiple assessment tools and a combination of interventional/descriptive methodologies precluded reporting of a single effect measure or meta-analysis.³⁸ For quantitative studies, the direction of any comparisons in distress or anxiety measurement outcomes in parents of children with FA to other populations was noted. Associations between scores on standardized assessment tools for distress or anxiety and parent or child factors were recorded as positive or negative. Where applicable, for interventional studies, the direction of effect on the distress or anxiety measure was extracted. Qualitative studies were assessed for major themes.

3 RESULTS

3.1 Included studies

Of 1886 abstracts screened, 131 full texts were assessed for eligibility. Of 98 studies that met inclusion criteria and examined parental distress or anxiety associated with parenting a child with FA, 23 used qualitative or mixed methods (Table [S2](#)) and 75 were quantitative (Table [S3](#), Table [S4](#)), among which 12 were interventional (Table [S3](#)). A flow diagram of study selection is shown in Figure [1](#). Table [1](#) provides an overview of the characteristics of the 98 retrieved studies. Reporting of demographic variables and details of the child's FA was limited. The assessed risk of bias was rated as high in 60% of studies and medium in the remainder.

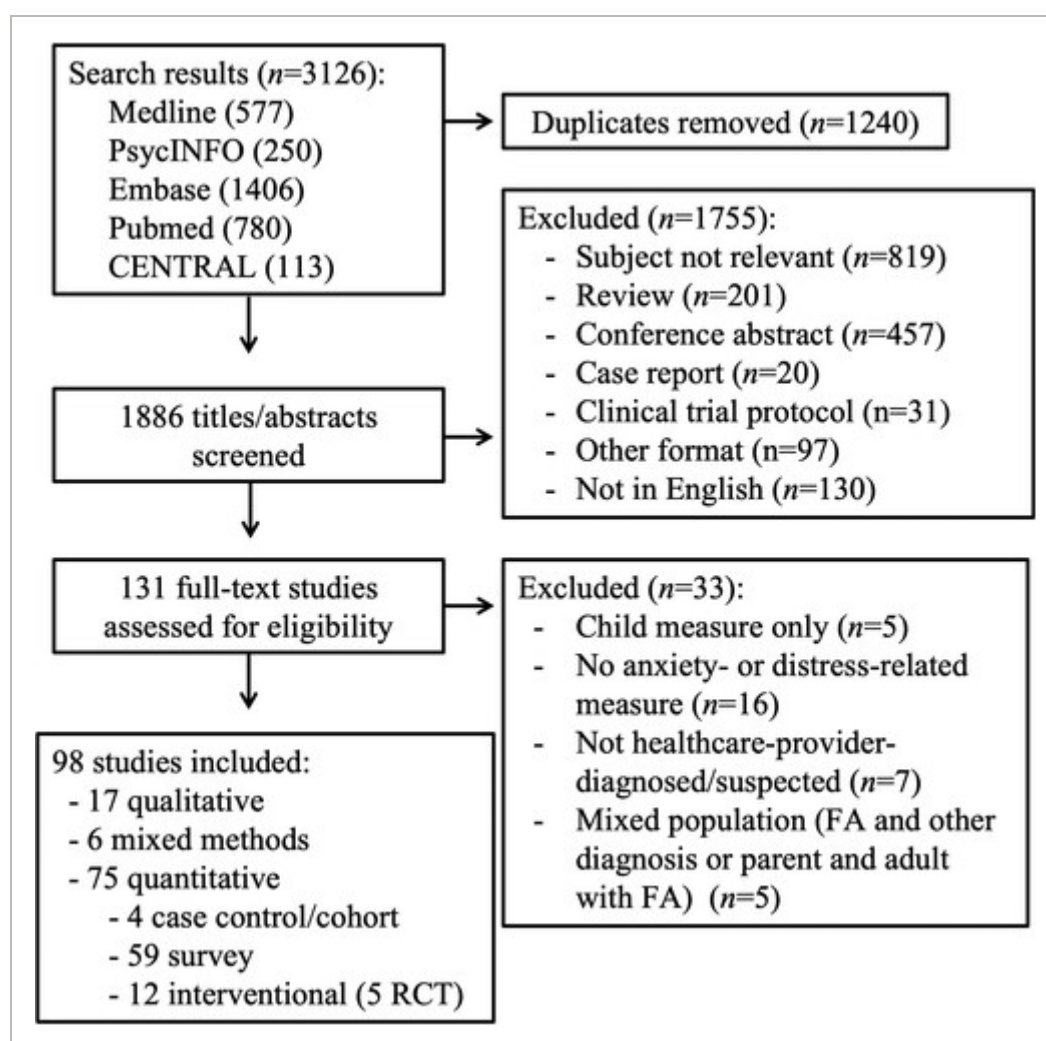


FIGURE 1

[Open in figure viewer](#) | [PowerPoint](#)

Flow diagram for study selection and exclusion

TABLE 1. Characteristics of included studies ($n = 98$)

Category	Variable/value	Number of studies, <i>n</i> (%)
Main country of study	Canada	13 (13)
	USA	38 (39)
	Australia	8 (8)
	UK	22 (23)
	Italy	4 (4)
	Sweden	3 (3)
	Japan	2 (2)
	The Netherlands	2 (2)
	Other	10 (10)
Demographics reported	Age	18 (19)
	Gender	74 (76)
	Race or ethnicity	33 (34)
Socioeconomic data reported	Any variable	45 (46)
	Household income	27 (28)
	Education level	21 (22)

^a Overall risk of bias was rated as high (significant concerns about quality, including small sample sizes or response rates <50% for surveys, discrepancies in data collection method between groups, or non-validated measures); medium (overall adequate with no concerns regarding sample size or non-validated outcome measures, but potential limitations including representativeness of the sample) or low (generally well-designed with possible limitations adequately controlled for in the analysis, psychometric testing of all measures, response rate >70% for surveys).

3.2 General measures of emotional distress in parents of children with FA versus other populations

Table 2 summarizes studies comparing general anxiety- and distress-related measures in parents of children with FA to those with other medical conditions, healthy children, or population norms. Eleven studies identified elevated scores on anxiety- or distress-related outcome measures in parents of children with FA compared to other populations, while seven did not. There was significant heterogeneity in outcome measures and demographic differences between sample and comparator populations. However, there has been some

consistency in reports of increased stress as measured by the Parenting Stress Scale (PSS) and Swedish Parenthood Stress Questionnaire (SPSQ), as well as anxiety as measured by the State-Trait Anxiety Inventory (STAI), Hamilton Anxiety and Depression Score (HADS), and anxiety subscale of the Delusions Symptoms States Inventory (DSSI) among parents of children with FA compared to parents of healthy children (Table 2). Results were less consistent with respect to comparison of measures completed by parents of children with FA versus other chronic conditions.

TABLE 2. Comparisons of anxiety- and distress-related measures in parents of children with FA and other populations

Comparator population	Reported difference	Outcome measure	Results
Parents of children with another medical condition	Increased	HADS	Higher anxiety but not depression scores in parents of children with FA compared to those diagnosed with other chronic illness ¹⁴
	None	HADS	No difference in depression, anxiety, or OCD scores among parents of children with FA versus orthopedic injury ⁵²
		IFQ	No significant difference on personal strain subscale between parents of children with FA versus rheumatological disease ⁸²
Parents of healthy children	Increased	DSSI	Parenting a child with FA was associated with increased maternal DSSI scores for anxiety and depression compared to controls ⁸³
		STAI	State and trait anxiety scores were significantly higher among parents of children with FA compared to those without ⁵⁰
		PSS, HADS	Stress, anxiety, and depression scores were higher in parents of children with FA compared to those without ⁸⁴
		SPSQ, FLIP	Parents of children with FA reported higher daily stress

Abbreviations: BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; CHQ-PF50, Child Health Questionnaire – Parent Form 50; DSSI, Delusions-Symptoms-States Inventory/states of Anxiety and Depression; FAQL-PB, Food Allergy Quality of Life-Parental Burden; FLIP, Food Hypersensitivity Family Impact; HADS, Hospital Anxiety and Depression Scale; HSCL-21, Hopkins Symptom Checklist-21; IFQ, Impact on Family Questionnaire; PSI, Parenting Stress Index; PSS, Parental Stress Scale; PTGI, Post-traumatic growth inventory; SPSQ, Swedish Parental Stress Questionnaire; STAI,

3.3 Attributes of FA-specific distress

A large subset of parents in most studies endorsed distress related to their child's FA. The majority of studies (78%) described emotional aspects of distress. The most commonly reported form of emotional distress was anxiety specific to the FA (63%). Other studies reported on stress (42%), distress (16%), general anxiety (37%), FA-related worry (35%) or fear (25%), sadness or sorrow (12%), and depression (10%). Fewer than 10% each referenced "mental health," a specific psychiatric diagnosis, anger, guilt, frustration, or fatigue.

3.4 Rationale for further characterization of FAA

Because anxiety was the most frequently reported form of FA-specific distress, we focused further analyses on this concept. Highlighting its significance for parents, a survey of FA burden in parents of young children identified anxiety levels as the factor most affecting parents' lives,³⁹ and other studies reported that the majority of parents endorsed being troubled by anxiety relating to a child's FA and its impact.⁴⁰

3.5 Attributes of FAA

Attributes of FAA described across studies fit within a cognitive behavioral framework, including affective responses, cognitions, behaviors, and somatic symptoms. While most studies described anxiety as a component of emotional distress, fewer reported on associated cognitions/worries (35%) or behaviors (33%), and only two queried physical symptoms or sleep. Nine studies specifically reported on functional impairment due to anxiety. Dimensions of these attributes are further highlighted below based on a synthesis of findings from qualitative and quantitative studies.

- A. *Cognitive dimensions*: Cognitions included fears about the consequences of allergen exposure (57%), challenges maintaining social identity or being understood (20%), child life transitions (20%), uncertainty about the child's future (16%) or outcomes of diagnostic/treatment procedures (8%), and trauma or recurrent/intrusive thoughts about previous FA symptoms such as anaphylaxis (5%). The most frequently reported cognitive dimensions are summarized in Table S5.
- B. *Behavioral dimensions*: Worry was described in adaptive terms as motivation for seeking more information (7%); however, parents also endorsed associated avoidance of social situations (11%), avoidance of other activities (7%), and delaying or limiting other foods (4%). For example, even following a negative oral food challenge (OFC), parental anxiety was associated with avoidance behaviors, with up to 11% of families not reintroducing the food.⁴¹ Child and parent report also referenced over-protectiveness (3%). Increased participation in social activities was a major hope of parents of children considering or participating in oral immunotherapy (OIT)

treatments.^{42, 43}

- C. *Physical symptoms and sleep disturbance*: While multiple screening tools for general anxiety symptoms and parenting stress query symptoms of physiological hyperarousal (Table S6A), only the Food Allergy Quality of Life Questionnaire—Parental Form (FAQLQ-PF, adapted for parent report) queried physical distress attributable to FA symptoms.³¹ Sleep disturbance was incorporated into multiple FA-specific scales (Table 4), but neither physical symptoms nor impact on sleep was predominant features of FA-related anxiety reported in qualitative studies.

3.6 Antecedents and consequences of FAA

Antecedents are necessary for the occurrence of a concept; consequences arise as a result. Reported themes of qualitative studies are shown in Table S7 within this framework. Antecedents included low perceived control; perceived lack of FA self-management knowledge and resources; and social factors including stigma and the associated impact on identity. Consequences of FAA included impacts on the family: shared experiences of distress, limitations on activities, and challenges in navigating joint responsibility. Multiple potential consequences for the child were identified across survey studies, including emotional and behavioral concerns and the potential emotional burden of parental over-protection or over-control.^{9, 21, 44, 45} Higher parental worry was associated with more limitations on children's activities⁴⁶ including social event attendance.⁴⁷ Parental FAA also has the potential to affect the health of the child through barriers to effective management of anaphylaxis,⁴⁸ avoidance of diagnostic procedures such as OFC,⁴⁹ associations with allergy symptoms,²² and unnecessary food elimination⁵⁰ or delayed food introduction⁵¹ even following negative OFC.⁴¹

3.7 Correlates of FAA in quantitative studies

Table 3 describes correlates of parental stress, anxiety, and related outcome measures. Heterogeneity of outcome measures and variable findings across study populations limits the strength of overall conclusions drawn. However, positive associations between measures of parental burden, distress, and anxiety have been consistently identified in multiple studies for (a) younger child age; (b) history of anaphylaxis or perceived FA severity; (c) FA multiplicity; (d) history of OFC; (e) milk or egg allergy; and (f) comorbid atopic disease. Among parent factors, measures of parental burden and anxiety/depression symptoms were positively associated with (a) peer support group membership and (b) self-efficacy, and negatively associated with higher income. Eight studies included a measure of distress or parental burden that was compared between mothers and fathers, reporting either no difference^{45, 52} or higher scores in mothers compared with fathers.⁵³⁻⁵⁷

TABLE 3. Child, allergy, and parental correlates of parental distress and burden in quantitative studies

Correlate	Direction of association	Outcome (measure)
<i>Child factors</i>		
Younger age	Positive	Younger age associated with greater parent distress (PECI), ⁹² greater fear re: autoinjector use (study-specific questionnaire), ⁹³ and higher scores on the anxiety/distress subscale of the FAPQ ³²
	Negative	Families with older children experienced greater FA-related impact (FLIP) and stress (SPSQ) ⁸⁵
Male gender	Positive	Parents of male children with FA reported poorer HRQOL compared to females with FA (FAQL-PB) ⁸⁴
<i>Allergy factors</i>		
History of anaphylaxis or serious reaction	Positive	Increased maternal state anxiety (STAI-S), ⁸⁶ parental burden (FAQL-PB), ^{50, 94} anxiety/distress (FAPQ, ³² CHQ-PF50 ⁸⁹), and distress due to a serious allergic reaction (IES). ⁷⁵ Increased parental over-protectiveness as reported by adolescents (PBI). ⁹⁵
	None	No significant difference in maternal worry or anxiety (BAI, PSWQ) ⁹¹ or “emotional issues” on FAQL-PB ⁶⁶
Autoinjector use or prescription	Positive	Increased fear with new requirement for use (study-specific questionnaire) ⁹³ ; increased parental burden (FAQL-PB) but interaction effect

Abbreviations: CHQ-PF50, Child Health Questionnaire - Parent Form; FAIM, Food Allergy Independent Measure; FAPQ, Food Allergy Parent Questionnaire; FAQL-PB, Food Allergy Quality of Life-Parental Burden; FASE-P, Food Allergy Self-Efficacy Scale for Parents; HADS, Hospital Anxiety and Depression Scale; PECI, Parent Experience of Child Illness scale; STAI, State-Trait Anxiety Inventory.

3.8 Tools measuring aspects of parental distress and FAA

We assessed items querying aspects of FA-related distress to determine the dimensions and attributes covered by existing outcome measures included in the retrieved studies. Previously validated as well as novel assessment tools measured aspects of general (Table S6A) and FA-specific (Table S6B) distress or anxiety in parents and caregivers. Table 4 summarizes the domains covered by each tool based on a cognitive behavioral framework. Only two scales included items that addressed forms of distress other than anxiety, specifically mood⁵⁸ or sadness³³ and irritability.⁵⁸

TABLE 4. FA-specific scales measuring a component of parental distress or anxiety^a

Scale	Anxiety						Other emotional distress ^c	Number of items
	Emotions	Cognitions	Behaviours	Sleep	Physical symptoms	Coping ^b		
FAIM ¹⁰⁸		×						4
FAIS ¹⁰⁹	×		×	×			Stress	32
FAMAS (interview) ⁶³	×	×						42
FAPQ ³²	×	×	×	×		×	Tearfulness	18
FAQLQ-PF (adapted) ³¹	×	×	×		×		Emotional distress	30
FAQL-PB ³³	×	×	×				Sadness	17
FARC-M ¹¹⁰	×			×		×	Stress	17
FASE-P ¹⁰⁶		×	×					21
FASEQ-P ¹¹¹		×						8
SPS-FA ⁵⁸	×			×			Mood, irritability	9
FLIP ⁸⁵		×	×				Sadness	19

^a Assessment tools that include the indicated category are marked by cross-hairs. Overall, utility of existing FA-specific tools in the clinical setting is limited. Tool abbreviations are as follows: FAMAS, Food Allergy Management and Adaptation Scale; FAIM, Food Allergy Independent Measure; FAIS, Food Allergy Impact Scale; FAPQ, Food Allergy Parent Questionnaire; FAQL-PB, Food Allergy Quality of Life-Parental Burden; FAQLQ-PF, Food Allergy Quality of Life Questionnaire - Parental Form; FARC-M, Food Allergy Response Capability Scale for Mothers; FASE-P, Food Allergy Self-Efficacy Scale for Parents; FASEQ-P, Food Allergy Self-Efficacy Questionnaire for Parents; FLIP, Food Hypersensitivity Family Impact; FPAC, Food-Pet-Allergy in Children Questionnaire; SPS-FA, Scale of Psychosocial Factors in Food Allergy.

^b Coping specifies ability to manage worries or anxious thoughts (i.e. effect of anxiety on function), rather than management of FA.

^c Other terms related to emotional distress specifically queried by assessment tool. Dashes denote no additional items beyond anxiety.

^d Scales are identified as “validated” for the purposes of this comparison if there has been – at a minimum – assessment of content validity (the extent to which it adequately measures the domain of interest, prior to survey administration), criterion validity (concurrent validity or the prediction of outcome for a “gold standard” measurement of a related construct, if possible), and construct validity (at least convergent and ideally discriminant). Scale reliability must include at least adequate internal consistency and ideally known test-retest reliability; semi-structured interviews must include assessment of inter-rater reliability. Some scales included additional psychometric analyses including predictive and known-group validity. Test-retest reliability was not assessed for the FAMAS, FASEQ-P, and SPS-FA.

Constructs measured by existing general anxiety- and FA-specific tools, while including some attributes of FAA were distinct. FA self-efficacy (FASE-P), general mental health (GHQ-12, CHQ-PF-50), and Food Allergy Independent Measure (FAIM) scores were associated with parental burden as measured by the FAQL-PB,^{59, 60} which in turn was associated with but distinct from parent-reported FAA as measured by a single-item visual analogue scale. FAA was also a separate construct from state anxiety as measured by the STAI.⁶¹ Moreover, diagnosed anxiety disorders were not necessarily present at elevated rates in parents of children with FA compared to other populations⁶² (Table 2), nor did FA-specific worries scores on the Food Allergy Management and Adaptation Scale (FAMAS)⁶³ correlate with generalized anxiety measures.⁶³

3.9 Interventions targeting FAA

Several allergy assessments or treatments may mitigate parental FA-related stress and anxiety, including OFC, regardless of outcome, and OIT. Additional psychological interventions including cognitive behavioral therapy, a self-regulation intervention, and psychologist-led educational workshops have shown some promise in early studies. These are outlined in Table S8.

4 DISCUSSION

Anxiety in parents of children and youth with FA contributes to impaired HRQOL, with potential long-term impacts on both parent and child health. Factor analysis of parental stress scales⁶⁴ and surveys of FA-related burden has consistently identified parental anxiety and worry as critical contributing factors,⁶⁵ particularly in mothers.^{56, 66, 67} Not only is FAA described by parents as the most burdensome component of their emotional distress, but it also lends itself to therapeutic intervention.

This systematic review integrates existing qualitative analyses of semi-structured interviews and parent focus groups with questionnaires addressing FA burden to define the concept of FAA according to a cognitive behavioral framework (Figure 2). Affective components of FAA include fear, hypervigilance or hyperarousal, and associated distress. Cognitive dimensions

include worry related to (a) uncertainty regarding potential allergen exposure and its consequences; (b) management of symptoms particularly in emergencies and in situations a parent is unable to control, particularly during times of transition; (c) general health and development of the child; (d) medical assessment and treatment, including OFC and OIT; and (e) social issues including isolation. Low perceived control and self-efficacy, limited access to FA-related resources and care, and social factors including stigma are likely perpetuating factors. FAA-related behaviors include avoidance and social isolation, and limitations imposed on a child's participation in diagnostic procedures such as OFC and management of the FA itself. FAA is associated with perception of increased risk,^{52, 61} expectation of negative outcomes,⁶³ and intolerance of uncertainty.⁶¹ Characterization of this construct represents an initial step in developing standardized methods for assessing and monitoring FAA in clinical populations.

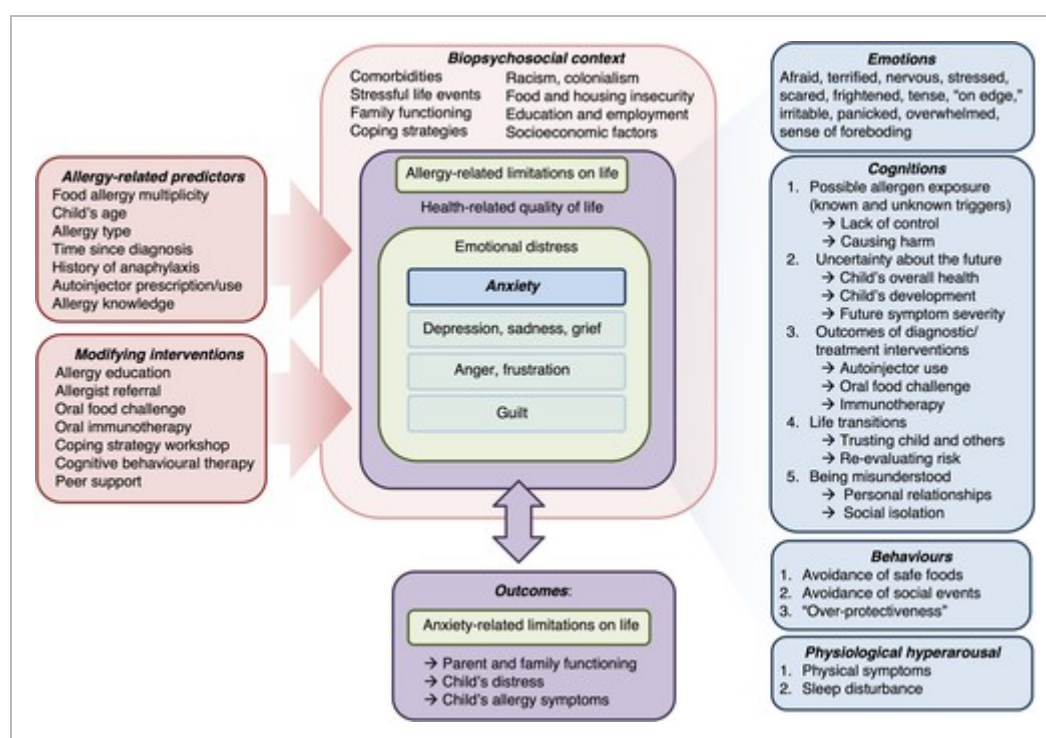


FIGURE 2

[Open in figure viewer](#) | [PowerPoint](#)

Simplified schematic summary of features of parental FA-specific anxiety. Among parents of children with food allergy (FA) in the retrieved studies, anxiety was the most frequently assessed and documented component of emotional distress, a key dimension of health-related quality of life (HRQOL) with significant functional impacts on both the parent and child. Allergy-related correlates (Table 4) and modifying interventions (Table S7) associated with HRQOL or distress measures are shown. Contextual biopsychosocial factors and in particular social determinants of health have received minimal attention to date. While measures exist to assess HRQOL and related constructs in parents of children with FA, neither these tools nor generic measures of anxiety symptoms appear to adequately assess the cognitive, behavioural, and functional aspects of FA-specific anxiety

Previously described cognitive behavioral models of health anxiety have addressed

interactions among cognitive interpretations of threat, physical reactions and arousal, safety-seeking behavior, and anxiety.⁶⁸ Consistent with these models and particularly in the context of understanding families' risk perception in the context of OIT, others have emphasized cognitive correlates of FAA, including threat interpretations (that is, perception of the risk and severity of a severe reaction in relation to coping and rescue factors), which may be amenable to CBT.⁶⁹ However, other factors incorporated into our framework in Figure 2 (including multiple contextual factors, other emotional experiences, the family's biopsychosocial context, and the balance of stressors and supports) are likely to affect the overall distress and impairment associated with FAA and may require distinct forms of intervention and support.

The affective and somatic attributes of FAA are similar to those for defined anxiety disorders and general anxiety symptoms, but specific cognitive and behavioral dimensions are not captured by instruments that have been used to date in studies of families of children with FA. Our group has recently demonstrated that currently available general measures of anxiety (such as the STAI), and FA-specific HRQOL (such as the FAQL-PB), while frequently used in FA research, do not adequately identify parents who are highly anxious specifically about their child's FA.⁶¹ Capturing of specific FAA dimensions is more likely to aid in the development and monitoring of targeted treatment approaches compared with the global self-report of FAA used in that study.⁶¹ Patient-reported outcome measures for anxiety symptoms designed to be used across multiple chronic diseases have yet to be validated in parents of children with FA.¹⁵ Validation studies of anxiety measures in other specific chronic conditions have emphasized the potential utility of both disease-attributed and universally relevant anxiety scales.⁷⁰ Along these lines, recent work has led to the development of FAA measures for children, with an accompanying parent proxy measure,⁷¹ as well as for adults with FA,⁷² but our summary of current FA-specific parent measures identifies gaps in evaluation of FA-specific distress. The most commonly used measure of FA-related HRQOL, the FAQL-PB, addresses some but not all dimensions of FAA. The FAPQ captures a more comprehensive set of FA-related anxiety attributes but has not been fully validated. The extent to which emotional distress—and in particular anxiety—contributes to limitations beyond those that are appropriate for FA management does not appear to be adequately captured by existing scales. Further work is also required to evaluate emotional states other than anxiety in parents of children with FA.

This review has a number of limitations. While designed to be maximally inclusive of relevant terms, our findings are limited by the search strategy employed. Some excluded studies were relevant to understanding FAA but due to lack of a physician diagnosis or absence of distress-related outcome measures were not included. All included studies had a medium-to-high risk of bias, with quality assessment highlighting the potential for significant selection bias across studies. This limits the strength and generalizability of conclusions drawn regarding correlates of FAA and effects of interventions, although despite these limitations we have been able to identify consistent associations across multiple studies

(Table 3). Moreover, our synthesis points to a need for more attention to the collection of demographic data. Income, for example—a variable not collected by most investigators—appeared to affect the experience of FA in included studies. Perspectives of fathers compared with mothers—who tend to report increased burden—are underrepresented. The present review is unique in its systematic approach, focus on parental distress, integration of FAA dimensions with existing measurement tools for other constructs, and overview of the current state of the field with respect to collection of data on demographic and other factors that impact the mental health and functioning of families with chronic medical conditions.

The studies included in this review emphasize the need to consider a diagnosis of FA in the family context,⁷³ in particular caregivers' perceptions of their own identity and social connectedness.⁷⁴ While survey studies have suggested that the majority of parents feel mental health support would be helpful in FA management, few seek this care spontaneously.^{12, 75} Importantly, clinical practice guidelines for allergists recommend facilitating access to psychological interventions,⁷⁶ but little guidance is provided on how to identify those families who may benefit. In fact, allergists had difficulty recognizing children's anxiety even after an interventional workshop aimed at improving anxiety detection in their patients.²⁹

For parents, appropriate interventions likely include education regarding risk perception, psychological distress, transitions, patterns of family adaptation, involving other family members, use of consumer organizations, and use of epinephrine autoinjectors.⁷⁷ Our findings are consistent with a previous systematic review pointing to the potential utility of CBT (particularly in mothers, based on one RCT with low-to-moderate risk of bias⁷⁸), but overall lack of robust research evaluating psychosocial interventions.²³ Most interventions for parents have focused on allergy education, with few outcome measures related to anxiety or emotional distress,²³ although two RCTs (one with moderate risk of bias⁷⁹) have shown impacts of oral food challenge on parent anxiety, particularly with appropriate psychoeducation.⁸⁰ More work is needed to understand the role of different types of exposure given this has not been of consistent benefit across RCTs of similar quality.⁸¹ While FA education is appropriate for all families, additional screening for FAA in settings with limited resources may identify those who would most benefit from further interventions including peer support, psychoeducation, and CBT. Development and validation of a screening tool for FAA encompassing the dimensions defined by existing studies may aid clinicians in providing more comprehensive assessment and management options for children with FA and their families.

CONFLICT OF INTEREST

EC has received research support from DBV Technologies and has been a member of advisory boards for Pfizer, Pediapharm, Leo Pharma, Kaleo, DBV, AllerGenis, Sanofi Genzyme, Bausch Health, Avir Pharma. The other authors declare no potential conflicts of

interest related to the manuscript content.

AUTHOR CONTRIBUTION

Clara Westwell-Roper: Conceptualization (equal); Data curation (lead); Formal analysis (lead); Methodology (lead); Project administration (lead); Supervision (lead); Writing-original draft (lead); Writing-review & editing (lead). **Sharon To:** Conceptualization (equal); Data curation (equal); Methodology (equal); Writing-original draft (supporting); Writing-review & editing (supporting). **Gordan Andjelic:** Data curation (supporting); Investigation (supporting); Writing-original draft (supporting); Writing-review & editing (supporting). **Cynthia Lu:** Data curation (supporting); Investigation (supporting); Writing-original draft (supporting); Writing-review & editing (supporting). **Boyee Lin:** Data curation (supporting); Investigation (supporting); Writing-original draft (supporting); Writing-review & editing (supporting). **Lianne Soller:** Conceptualization (equal); Writing-review & editing (equal). **Edmond S Chan:** Conceptualization (equal); Supervision (equal); Writing-review & editing (equal). **S. Evelyn Stewart:** Conceptualization (equal); Resources (equal); Supervision (equal); Writing-review & editing (equal).

PEER REVIEW

The peer review history for this article is available at <https://publons.com/publon/10.1111/pai.13695>.

Open Research



PEER REVIEW

The peer review history for this article is available at <https://publons.com/publon/10.1111/pai.13695>.

Supporting Information



Filename	Description
pai13695-sup-0001-TableS1-S8.docx Word 2007 document , 429.8 KB	Tables S1-S8

Please note: The publisher is not responsible for the content or functionality of any supporting information supplied by the authors. Any queries (other than missing content) should be directed to the corresponding author for the article.

REFERENCES



- 1 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.
[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)
- 2 Osborne NJ, Koplin JJ, Martin PE, et al. Prevalence of challenge-proven IgE-mediated food allergy using population-based sampling and predetermined challenge criteria in infants. *J Allergy Clin Immunol*. 2011; **127**(3): pp. 668–676 e661–662.
[Crossref](#) | [Web of Science®](#) | [Google Scholar](#)
- 3 Shaker MS, Schwartz J, Ferguson M. An update on the impact of food allergy on anxiety and quality of life. *Curr Opin Pediatr*. 2017; **29**(4): 497- 502.
[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)
- 4 Sampson HA, Mendelson L, Rosen JP. Fatal and near-fatal anaphylactic reactions to food in children and adolescents. *N Engl J Med*. 1992; **327**(6): 380- 384.
[Crossref](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)
- 5 Fleischer DM, Perry TT, Atkins D, et al. Allergic reactions to foods in preschool-aged children in a prospective observational food allergy study. *Pediatrics*. 2012; **130**(1): e25- e32.
[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)
- 6 Hanna HJ, Emmanuel J, Naim S, Umasunthar T, Boyle RJ. Community healthcare professionals overestimate the risk of fatal anaphylaxis for food allergic children. *Clin Exp Allergy*. 2016; **46**(12): 1588- 1595.
[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)
- 7 Umasunthar T, Leonardi-Bee J, Hodes M, et al. Incidence of fatal food anaphylaxis in people with food allergy: a systematic review and meta-analysis. *Clin Exp Allergy*. 2013; **43**(12): 1333- 1341.
[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)
- 8 Klinnert MD, Robinson JL. Addressing the psychological needs of families of food-allergic

children. *Curr Allergy Asthma Rep.* 2008; **8**(3): 195- 200.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

9 DunnGalvin A, Polloni L, Le Bovidge J, et al. Preliminary development of the food allergy coping and emotions questionnaires for children, adolescents, and young people: qualitative analysis of data on IgE-Mediated food allergy from five countries. *J Allergy Clin Immunol Pract.* 2018; **6**(2): 506- 513 e511.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

10 Lebovidge JS, Strauch H, Kalish LA, Schneider LC. Assessment of psychological distress among children and adolescents with food allergy. *J Allergy Clin Immunol.* 2009; **124**(6): 1282- 1288.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

11 Brew BK, Lundholm C, Gong T, Larsson H, Almqvist C. The familial aggregation of atopic diseases and depression or anxiety in children. *Clin Exp Allergy.* 2018; **48**(6): 703- 711.

[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

12 Polloni L, Lazzarotto F, Bonaguro R, Toniolo A, Celegato N, Muraro A. Psychological care of food-allergic children and their families: An exploratory analysis. *Pediatr Allergy Immunol.* 2015; **26**(1): 87- 90.

[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

13 Morou Z, Tatsioni A, Dimoliatis ID, Papadopoulos NG. Health-related quality of life in children with food allergy and their parents: a systematic review of the literature. *J Investig Allergol Clin Immunol.* 2014; **24**(6): 382- 395.

[CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

14 Knibb RC, Semper H. Impact of suspected food allergy on emotional distress and family life of parents prior to allergy diagnosis. *Pediatr Allergy Immunol.* 2013; **24**(8): 798- 803.

[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

15 Pilkonis PA, Choi SW, Reise SP, et al. Item banks for measuring emotional distress from the Patient-Reported Outcomes Measurement Information System (PROMIS(R)): depression, anxiety, and anger. *Assessment.* 2011; **18**(3): 263- 283.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

16 Brannan AM, Hefflinger CA. Distinguishing caregiver strain from psychological distress: Modeling the relationships among child, family, & caregiver variables. *J Child Family Stud.* 2001; **10**(4): 405- 418.

[Crossref](#) | [Google Scholar](#)

17 Irwin DE, Stucky B, Langer MM, et al. An item response analysis of the pediatric PROMIS anxiety and depressive symptoms scales. *Qual Life Res.* 2010; **19**(4): 595- 607.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

18 Dunn Galvin A, Hourihane JO. Health-related quality of life in food allergy : Impact, correlates, and predictors. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz*. 2016; **59**(7): 841-848.

[Crossref](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

19 Thornqvist V, Middelveld R, Wai HM, et al. Health-related quality of life worsens by school age amongst children with food allergy. *Clin Transl Allergy*. 2019; **9**: 10.

[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

20 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- 468.

[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

21 Chow C, Pincus DB, Comer JS. Pediatric food allergies and psychosocial functioning: Examining the potential moderating roles of maternal distress and overprotection. *J Pediatr Psychol*. 2015; **40**(10): 1065- 1074.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

22 Cortes A, Castillo A, Sciaraffia A. Food allergy: Children's symptom levels are associated with mothers' psycho-socio-economic variables. *J Psychosom Res*. 2018; **104**: 48- 54.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

23 Sugunasingha N, Jones FW, Jones CJ. Interventions for caregivers of children with food allergy: A systematic review. *Pediatr Allergy Immunol*. 2020; **31**(7): 805- 812.

[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

24 Feng C, Kim JH. Beyond avoidance: The psychosocial impact of food allergies. *Clin Rev Allergy Immunol*. 2019; **57**(1): 74- 82.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

25 Patel N, Herbert L, Green TD. The emotional, social, and financial burden of food allergies on children and their families. *Allergy Asthma Proc*. 2017; **38**(2): 88- 91.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

26 Herbert LJ, Lin A, Matsui E, Wood RA, Sharma H. Development of a tool to measure youths' food allergy management facilitators and barriers. *J Pediatr Psychol*. 2016; **41**(3): 363- 372.

[Crossref](#) | [PubMed](#) | [Google Scholar](#)

27 Polloni L, Muraro A. Anxiety and food allergy: A review of the last two decades. *Clin Exp Allergy*. 2020; **50**(4): 420- 441.

[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

28 Monga S, Manassis K. Treating anxiety in children with life-threatening anaphylactic conditions. *J Am Acad Child Adolesc Psychiatry*. 2006; **45**(8): 1007- 1010.

[Crossref](#) | [PubMed](#) | [Google Scholar](#)

29 Rubes M, Podolsky AH, Caso N, et al. Utilizing physician screening questions for detecting anxiety among food-allergic pediatric patients. *Clin Pediatr (Phila)*. 2014; **53**(8): 764- 770.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

30 Knibb R, Halsey M, James P, du Toit G, Young J. Psychological services for food allergy: The unmet need for patients and families in the United Kingdom. *Clin Exp Allergy*. 2019; **49**(11): 1390-1394.

[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

31 DunnGalvin A, de BlokFlokstra BM, Burks AW, Dubois AE, Hourihane JO. Food allergy QoL questionnaire for children aged 0–12 years: content, construct, and cross-cultural validity. *Clin Exp Allergy*. 2008; **38**(6): 977- 986.

[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

32 Lebovidge JS, Stone KD, Twarog FJ, et al. Development of a preliminary questionnaire to assess parental response to children's food allergies. *Ann Allergy Asthma Immunol*. 2006; **96**(3): 472- 477.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

33 Cohen BL, Noone S, Muñoz-Furlong A, Sicherer SH. 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- 1163.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

34 Moher D, Liberati A, Tetzlaff J, Altman DG, Group P. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *BMJ*. 2009; **339**: b2535.

[Crossref](#) | [Web of Science®](#) | [Google Scholar](#)

35 Hong QN, Pluye P, Fabregues S, et al. Improving the content validity of the mixed methods appraisal tool: a modified e-Delphi study. *J Clin Epidemiol*. 2019; **111**: 49- 59.e41.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

36 Bayrampour H, Ali E, McNeil DA, Benzies K, MacQueen G, Tough S. Pregnancy-related anxiety: A concept analysis. *Int J Nurs Stud*. 2016; **55**: 115- 130.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

37 Hupcey JE, Penrod J. Concept analysis: examining the state of the science. *Res Theory Nurs Pract*. 2005; **19**(2): 197- 208.

[Crossref](#) | [PubMed](#) | [Google Scholar](#)

38 Akeson N, Worth A, Sheikh A. The psychosocial impact of anaphylaxis on young people and their parents. *Clin Exp Allergy*. 2007; **37**(8): 1213- 1220.

[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

39 Komulainen K. Parental burden in families with a young food-allergic child. *Child Care in Practice*. 2010; **16**(3): 287- 302.

[Crossref](#) | [Google Scholar](#)

40 Springston EE, Smith B, Shulruff J, Pongracic J, Holl J, Gupta RS. Variations in quality of life among caregivers of food allergic children. *Ann Allergy Asthma Immunol*. 2010; **105**(4): 287- 294.
[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

41 Polloni L, Ferruzza E, Ronconi L, et al. Assessment of children's nutritional attitudes before oral food challenges to identify patients at risk of food reintroduction failure: a prospective study. *Allergy*. 2017; **72**(5): 731- 736.
[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

42 Greenhawt M, Marsh R, Gilbert H, Sicherer S, DunnGalvin A, Matlock D. Understanding caregiver goals, benefits, and acceptable risks of peanut allergy therapies. *Ann Allergy Asthma Immunol*. 2018; **121**(5): 575- 579.
[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

43 LeBovidge JS, Haskell S, Olney EK, et al. The psychological impact of oral immunotherapy for children with food allergy: Perceived benefits and treatment burden. *Clin Practice Pediatric Psychol*. 2014; **2**(1): 13- 26.
[Crossref](#) | [Google Scholar](#)

44 DunnGalvin A, Gallop K, Acaster S, et al. APPEAL-2: a pan-European qualitative study to explore the burden of peanut-allergic children, teenagers, and their caregivers. *Clin Exp Allergy*. 2020; **50**(11): 1238- 1248.
[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

45 Stensgaard A, Bindslev-Jensen C, Nielsen D. Peanut allergy as a family project: social relations and transitions in adolescence. *J Clin Nurs*. 2017; **26**(21–22): 3371- 3381.
[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

46 Peterson CC, Harrison LE. Development of a brief assessment of activity limitations in children with food allergy. *Ann Allergy Asthma Immunol*. 2018; **120**(3): 327- 328.
[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

47 Polloni L, Toniolo A, Lazzarotto F, et al. Nutritional behavior and attitudes in food allergic children and their mothers. *Clin Translational All*. 2013; **3**(1): 41.
[Wiley Online Library](#) | [PubMed](#) | [Google Scholar](#)

48 Begin P, Graham F, Killer K, Paradis J, Paradis L, Des RA. Introduction of peanuts in younger siblings of children with peanut allergy: a prospective, double-blinded assessment of risk, of diagnostic tests, and an analysis of patient preferences. *Allergy*. 2016; **71**(12): 1762- 1771.
[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

49 Hsu E, Soller L, Abrams EM, Protudjer JLP, Mill C, Chan ES. Oral food challenge implementation: The first mixed-methods study exploring barriers and solutions. *J Allergy Clin*

Immunol Pract. 2020; **8**(1): 149- 156.e141.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

50 Beken B, Celik V, Gokmirza Ozdemir P, Sut N, Gorker I, Yazicioglu M. Maternal anxiety and internet-based food elimination in suspected food allergy. *Pediatr Allergy Immunol.* 2019; **30**(7): 752- 759.

[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

51 McHenry M, Watson W. Impact of primary food allergies on the introduction of other foods amongst Canadian children and their siblings. *Allergy, Asthma Clin Immunol.* 2014; **10**(1): 26.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

52 Ogg J, Wong J, Wan MW, Davis N, Arkwright PD. Factors that determine parents' perception of their child's risk of life-threatening food-induced anaphylaxis. *Allergy Asthma Proc.* 2017; **38**(1): 44- 53.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

53 Lagercrantz B, Persson Å, Kull I. "Healthcare seems to vary a lot": A focus group study among parents of children with severe allergy. *J Asthma.* 2017; **54**(7): 672- 678.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

54 Hoehn JL, Dahlquist LM, Hahn AL, Bollinger ME. Parents of children With food allergy: Gender differences in perceived impact and perceived food allergy severity. *J Pediatr Psychol.* 2017; **42**(2): 186- 197.

[PubMed](#) | [Google Scholar](#)

55 Laura P, Sabrina B, Lucia R, et al. Post-anaphylaxis acute stress symptoms: a preliminary study on children with food-induced anaphylaxis and their parents. *J Allergy Clin Immunol Pract.* 2020; **8**(10): 3613- 3615.e1.

[Crossref](#) | [PubMed](#) | [Google Scholar](#)

56 Warren CM, Gupta RS, Sohn MW, et al. Differences in empowerment and quality of life among parents of children with food allergy. *Ann Allergy Asthma Immunol.* 2015; **114**(2): 117- 125.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

57 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- 445.

[Wiley Online Library](#) | [PubMed](#) | [Google Scholar](#)

58 Cortes A, Castillo A, Sciaraffia A. Development of the scale of psychosocial factors in food allergy (SPS-FA). *Pediatr Allergy Immunol.* 2013; **24**(7): 671- 677.

[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

59 Knibb RC, Barnes C, Stalker C. Parental self-efficacy in managing food allergy and mental

health predicts food allergy-related quality of life. *Pediatr Allergy Immunol.* 2016; **27**(5): 459- 464.
[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

60 Knibb RC, Stalker C. Validation of the food allergy quality of life-parental burden questionnaire in the UK. *Qual Life Res.* 2013; **22**(7): 1841- 1849.
[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

61 Soller L, To S, Hsu E, Chan ES. Current tools measuring anxiety in parents of food-allergic children are inadequate. *Pediatr Allergy Immunol.* 2020; **31**(6): 678- 685.
[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

62 Petrovic-Dovat L, Fausnight T, White AM, et al. Degree of anxiety in food allergic children in a tertiary care center. *Ann Allergy Asthma Immunol.* 2016; **116**(6): 528- 532.
[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

63 Klinnert MD, McQuaid EL, Fedele DA, et al. Children's food allergies: Development of the food allergy management and adaptation scale. *J Pediatr Psychol.* 2015; **40**(6): 572- 580.
[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

64 Zelman JJ, Ferro MA. The Parental Stress Scale: Psychometric properties in families of children with chronic health conditions. *Fam Relat.* 2018; **67**(2): 240- 252.
[Wiley Online Library](#) | [Web of Science®](#) | [Google Scholar](#)

65 Komulainen K, Child YF-A, Komulainen K. Parental burden in families with a young food-allergic child. *Child Care in Practice.* 2010; **16**(3): 287- 302.
[Crossref](#) | [Google Scholar](#)

66 Fathi SM, Tavakol M, Rezaei N, et al. Impact of IgE-mediated Food allergy on parental quality of life in iranian patients. *Iran.* 2016; **15**(5): 372- 380.
[Google Scholar](#)

67 Fedele DA, McQuaid EL, Faino A, et al. Patterns of adaptation to children's food allergies. *Allergy.* 2016; **71**(4): 505- 513.
[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

68 Salkovskis PM, Warwick HMC, Deale AC. Cognitive-behavioral treatment for severe and persistent health anxiety (hypochondriasis). *Brief Treat Crisis Intervention.* 2003; **3**: 353- 367.
[Crossref](#) | [Google Scholar](#)

69 Chong KW, Turner PJ. Food allergy desensitisation: a hard nut to crack? *Arch Dis Child.* 2019; **104**(11): 1021- 1022.
[Crossref](#) | [PubMed](#) | [Google Scholar](#)

70 Rose M, Devine J. Assessment of patient-reported symptoms of anxiety. *Dialogues Clin Neurosci.* 2014; **16**(2): 197- 211.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

71 Dahlsgaard KK, Wilkey LK, Stites SD, Lewis MO, Spergel JM. Development of the child- and parent-rated scales of food allergy anxiety (SOFAA). *J Allergy Clin Immunol Pract*. 2021.

[Crossref](#) | [PubMed](#) | [Google Scholar](#)

72 Coelho GLH, Byrne A, Hourihane J, DunnGalvin A. Development of the food allergy anxiety scale in an adult population: Psychometric parameters and convergent validity. *J Allergy Clin Immunol Pract*. 2021; **9**(9): 3452- 3458 e3451.

[Crossref](#) | [PubMed](#) | [Google Scholar](#)

73 Rouf K, White L, Evans K. A qualitative investigation into the maternal experience of having a young child with severe food allergy. *Clin*. 2012; **17**(1): 49- 64.

[Google Scholar](#)

74 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- 188.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

75 Annunziato RA, Shemesh E, Weiss CC, Izzo GN, D'Urso C, Sicherer SH. An assessment of the mental health care needs and utilization by families of children with a food allergy. *J Health Psychol*. 2013; **18**(11): 1456- 1464.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

76 Muraro A, Werfel T, Hoffmann-Sommergruber K, et al. EAACI food allergy and anaphylaxis guidelines: diagnosis and management of food allergy. *Allergy*. 2014; **69**(8): 1008- 1025.

[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

77 Manassis K. Managing anxiety related to anaphylaxis in childhood: a systematic review. *J Allergy (Cairo)*. 2012; **2012**: 316296.

[Crossref](#) | [PubMed](#) | [Google Scholar](#)

78 Boyle RJ, Umasunthar T, Smith JG, et al. A brief psychological intervention for mothers of children with food allergy can change risk perception and reduce anxiety: Outcomes of a randomized controlled trial. *Clin Exp Allergy*. 2017; **47**(10): 1309- 1317.

[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

79 Kitamura K, Sakai K, Sasaki K, et al. Efficacy, safety, and parental anxiety in a randomized trial of two dietary instruction methods for children with suspected hen's egg allergy. *All Int*. 2021; **70**(1): 114- 120. [10.1016/j.alit.2020.07.007](https://doi.org/10.1016/j.alit.2020.07.007)

[Crossref](#) | [CAS](#) | [PubMed](#) | [Google Scholar](#)

80 Howe LC, Leibowitz KA, Perry MA, et al. Changing patient mindsets about non-life-threatening symptoms during oral immunotherapy: A randomized clinical trial. *J All Clin Immunol*. 2019; **7**(5):

1550- 1559. [10.1016/j.jaip.2019.01.022](https://doi.org/10.1016/j.jaip.2019.01.022)

[Google Scholar](#)

81 Weinberger T, Annunziato R, Riklin E, Shemesh E, Sicherer SH. A randomized controlled trial to reduce food allergy anxiety about casual exposure by holding the allergen: TOUCH study. *J Allergy Clin Immunol Pract*. 2019; **7**(6): 2039- 2042 e2014.

[Crossref](#) | [PubMed](#) | [Google Scholar](#)

82 Primeau MN, Kagan R, Joseph L, et al. The psychological burden of peanut allergy as perceived by adults with peanut allergy and the parents of peanut-allergic children. *Clin Exp Allergy*. 2000; **30**(8): 1135– 1143.

[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

83 Ferro MA, Van Lieshout RJ, Ohayon J, Scott JG. Emotional and behavioral problems in adolescents and young adults with food allergy. *Allergy*. 2016; **71**(4): 532– 540.

[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

84 Birdi G, Cooke R, Knibb R. Quality of Life, Stress, and Mental Health in Parents of Children with Parentally Diagnosed Food Allergy Compared to Medically Diagnosed and Healthy Controls. *J Allergy (Cairo)*. 2016; **2016**: 1497375.

[PubMed](#) | [Google Scholar](#)

85 Mikkelsen A, Mehlig K, Borres MP, Oxelmark L, Björkelund C, Lissner L. Monitoring the impact of cow's milk allergy on children and their families with the FLIP questionnaire—a six-month follow-up study. *Pediatr Allergy Immunol*. 2015; **26**(5): 409– 415.

[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

86 Lau GY, Patel N, Umasunthar T, et al. Anxiety and stress in mothers of food-allergic children. *Pediatr Allergy Immunol*. 2014.

[Wiley Online Library](#) | [Google Scholar](#)

87 Goodwin RD, Rodgin S, Goldman R, et al. Food Allergy and Anxiety and Depression among Ethnic Minority Children and Their Caregivers. *J Pediatr*. 2017; **187**: 258– 264.e251.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

88 Burke KJ, Hooper J. Multiple child food hypersensitivity impacts positive adjustment in parents. *J Child Fam Stud*. 2017; **26**(7): 1844– 1853.

[Crossref](#) | [Google Scholar](#)

89 Sicherer SH, Noone SA, Muñoz-Furlong A. The impact of childhood food allergy on quality of life. *Ann Allergy Asthma Immunol*. 2001; **87**(6): 461– 464.

[Crossref](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

90 Roy KM, Roberts MC. Peanut allergy in children: relationships to health-related quality of life, anxiety, and parental stress. *Clin Pediatr*. 2011; **50**(11): 1045– 1051.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

91 Herbert LJ, Dahlquist LM, Bollinger ME. Maternal intolerance of uncertainty, anxiety, and adherence with food challenge referrals. *Journal of health psychology*. 2013; **18**(9): 1209– 1219.
[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

92 Williams NA, Parra GR, Elkin TD. Subjective distress and emotional resources in parents of children with food allergy. *Children's Health Care*. 2009; **38**(3): 213– 227.
[Crossref](#) | [Web of Science®](#) | [Google Scholar](#)

93 Chad L, Ben-Shoshan M, Asai Y, et al. A majority of parents of children with peanut allergy fear using the epinephrine auto-injector. *Allergy*. 2013; **68**(12): 1605– 1609.
[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

94 Kajornrattana T, Sangsupawanich P, Yuenyongviwat A. Quality of life among caregivers and growth in children with parent-reported food allergy. *Asian Pac J Allergy Immunol*. 2018; **36**(1): 22– 26.
[PubMed](#) | [Google Scholar](#)

95 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– 269.
[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

96 Cummings AJ, Knibb RC, Erlewyn-Lajeunesse M, King RM, Roberts G, Lucas JS. Management of nut allergy influences quality of life and anxiety in children and their mothers. *Pediatr Allergy Immunol*. 2010; **21**(4 Pt 1): 586– 594.
[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

97 Allen CW, Bidarkar MS, vanNunen SA, Campbell DE. Factors impacting parental burden in food-allergic children. *J Paediatr Child Health*. 2015; **51**(7): 696– 698.
[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

98 Allen CW, Bidarkar MS, vanNunen SA, Campbell DE. Factors impacting parental burden in food-allergic children. *J Paediatr Child Health*. 2015; **51**(7): 696– 698.
[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

99 Ward C, Greenhawt M. Differences in Caregiver Food Allergy Quality of Life Between Tertiary Care, Specialty Clinic, and Caregiver-Reported Food Allergic Populations. *Journal of Allergy and Clinical Immunology. In Practice*. 2016; **4**(2): 257– 264.e253.
[Google Scholar](#)

100 Ditzler N, Greenhawt M. Influence of health literacy and trust in online information on food allergy quality of life and self-efficacy. *Ann Allergy Asthma Immunol*. 2016; **117**(3): 258– 263.e251.
[Crossref](#) | [PubMed](#) | [Google Scholar](#)

-
- 101 Knibb RC, Ibrahim NF, Stiefel G, et al. The psychological impact of diagnostic food challenges to confirm the resolution of peanut or tree nut allergy. *Clin Exp Allergy*. 2012; **42**(3): 451– 459.
[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)
-
- 102 Franxman TJ, Howe L, Teich E, Greenhawt MJ. Oral food challenge and food allergy quality of life in caregivers of children with food allergy. *J Allergy Clin Immunol Pract*. 2015; **3**(1): 50– 56.
[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)
-
- 103 Walker SO, Mao G, Caruso D, Hong X, Pongracic JA, Wang X. Cardiovascular Risk Factors in Parents of Food-Allergic Children. *Medicine*. 2016; **95**(15):e3156.
[Crossref](#) | [PubMed](#) | [Google Scholar](#)
-
- 104 Abrams EM, Kim H, Gerdtz J, Protudjer JLP. Milk allergy most burdensome in multi-food allergic children. *Pediatr Allergy Immunol*. 2020.
[Wiley Online Library](#) | [PubMed](#) | [Google Scholar](#)
-
- 105 Baricic TV, Catipovic M, Cetinic EL, Krmek V, Horvat I. Parental Perception, Prevalence and Primary Care Physicians' Knowledge on Childhood Food Allergy in Croatia. *Children (Basel)*. 2015; **2**(3): 305– 316.
[PubMed](#) | [Google Scholar](#)
-
- 106 Knibb RC, Barnes C, Stalker C. Parental confidence in managing food allergy: development and validation of the Food Allergy Self-Efficacy Scale for Parents (FASE-P). *Clin Exp Allergy*. 2015; **45**(11): 1681– 1689.
[Wiley Online Library](#) | [CAS](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)
-
- 107 Widge AT, Flory E, Sharma H, Herbert LJ. Food Allergy Perceptions and Health-Related Quality of Life in a Racially Diverse Sample. *Children (Basel)*. 2018; **5**(6).
[PubMed](#) | [Google Scholar](#)
-
- 108 van der Velde JL, Flokstra-de Blok BM, Vlieg-Boerstra BJ, et al. Development, validity and reliability of the food allergy independent measure (FAIM). *Allergy*. 2010; **65**(5): 630– 635.
[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)
-
- 109 Bollinger ME, Dahlquist LM, Mudd K, Sonntag C, Dillinger L, McKenna K. The impact of food allergy on the daily activities of children and their families. *Ann Allergy Asthma Immunol*. 2006; **96**(3): 415– 421.
[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)
-
- 110 Aika S, Ito M, Yamamoto Y. Food allergy response capabilities of mothers and related factors. *Nurs Health Sci*. 2017; **19**(3): 340– 350.
[Wiley Online Library](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)
-
- 111 Greenhawt M, DunnGalvin A. Preliminary psychometric analyses and clinical performance of a caregiver self-efficacy scale for food allergy self-management. *Ann Allergy Asthma Immunol*. 2018;

120(1): 73– 79.

[Crossref](#) | [PubMed](#) | [Web of Science®](#) | [Google Scholar](#)

[Download PDF](#)

About Wiley Online Library

Privacy Policy

Terms of Use

Cookies

Accessibility

Publishing Policies

Help & Support

Contact Us

Training and Support

DMCA & Reporting Piracy

Opportunities

Subscription Agents

Advertisers & Corporate Partners

Connect with Wiley

The Wiley Network

Wiley Press Room

Copyright © 1999-2021 John Wiley & Sons, Inc. All rights reserved

**Food-allergy-specific anxiety and distress in parents of children with food allergy:
A systematic review**

SUPPLEMENTAL TABLES S1-S8

Table S1. Sample Medline search strategy.

Search	Terms	Results
1	exp anxiety/ or exp anxiety disorders/ or exp psychological distress/	156523
2	exp food hypersensitivity/	20430
3	((allerg* or hypersens* or IgE or anaphyla*) and (food or nut* or wheat or fish* or corn* or egg* or meat or milk or soy)).mp.	38355
4	(anxiety or anxious or worr* or phobi* or fear* or stress* or distress* or psycho* or emotion* or trauma* or post?trauma* or "mental health").mp.	2973798
5	adolescent/ or child/	2813237
6	(child* or adolescen* or teen* or infan* or pedatric* or p?ediatric* or preschool*).mp.	3884974
7	Parents/	63948
8	(parent* or mother* or maternal or father* or paternal or dyad* or famil* or caregiver*).mp.	1844198
9	1 or 4	2983616
10	2 or 3	38849
11	5 or 6	3884974
12	7 or 8	1844198
13	9 and 10 and 11 and 12	577

caregiver distress associated with a child's food allergy[†]

	n	Parent age, years	Proportion female, %	Race/ ethnicity	Socioeconomic variables reported	Child age range, years (mean/median)	Time since diagnosis, years	FA multiplicity	Proportion of with history of anaphylaxis (%)	
	17	Range 30-47 Mean 38	16	ND	ND	Range 0-17 Mean 3	All <1	ND	ND	1. La 2. m 3. Pr 4. St
r	64	ND	19	ND	ND	Range 0-18	96.7% diagnosed in infancy	All had multiple FA (2, 3, 4, 5, >6 approx 20% each)	51% had required epinephrine	1. C 2. P 3. S 4. th 5. C
in E-	21	ND	100	ND	Employment status; marital status	Range 0.6-16 Mean 10.6	9	66.6% had multiple FA	43.8	1. A 2. M 3. F 4. A 5. B
	9	ND	53	ND	ND	Range 13-16 Mean 14.7	ND	ND	100	1. A 2. K 3. su 4. co 5. pe 6. Pa 7. an 8. M
	27	ND	81.5	70.3% White	Education level	ND	ND	ND	ND	1. F 2. E
	69	Mean 38	71-89	11-36% "Culturally and linguistically diverse"	Education level	Range 0.6-15.2 Mean 5	ND	48-83% had >1 FA	ND	1. H 2. ur 3. gr 4. N 5. an 6. pa 7. m
	1-13	ND	80	ND	ND	Study 1: Range 9-18 Mean 11.5 Study 2: Range 7-15 Mean 10.7	ND	ND	ND	1. P 2. ne 3. T 4. di 5. wi
FA.	1126	ND	95%	90.1% Caucasian, 2% African American, 6.1% Asian, 3.8% Hispanic, 0.6% Other	Annual family income; education level	Range 0-17	ND	77.6% had child with multiple FA	ND	1. E 2. S 3. H 4. D 5. S
	20	Range 27-55 Mean 36 (maternal) or 38 (paternal)	80	ND	Annual family income; marital status	Range 1-10 Mean 4 (males) or 7 (females)	Range 0-9 Mean 4.5	ND	ND	1. 3- 2. re 3. Pa

t, ed d	10	Range 32-46	50	ND	Annual family income	Range 3-10	2-9	4.6	100	1. Pe 2. Li 3. Is 4. Ar 5. He 6. G 7. In 4. Le
	40	Mean 39	83	ND	Annual family income; education level; occupation; marital status	Range 0-15 Mean 6.6	ND	ND	76.9	1. An 2. A re 2. Th su
	18	Range 26-55	ND	ND	ND	Range 0-15 (most 1-5)	ND	ND	ND	1. Be 2. Ac 3. Ch 4. St 8. Is
of on	119	ND	80	ND	ND	Range 6-23 Mean 10.2 for <12, 17.5 for >12	Range 1-17	72% to 89% with >1 FA	ND	1. Ex 2. Se 3. M 4. Ex 3. In
and on	44	Range 25-49 Mean 39.4	91	ND	ND	Range 4-17 Mean 9.2	ND	ND	ND	1. Co 2. D 3. Co 4. Pr 5. Im ac
gist e.	6	Range 34-47 Mean 38.8	100	ND	Annual family income; marital status; education level	Range 6-11 Mean 7.8	Range 3.3- 8.5 Mean 5.6	Range 1-4 Mean 2.3	ND	1. Li 2. W 3. Lo 4. Re 5. It
	22	ND	68	84.2% White, 5.3% Hispanic, 10.5% Other	Annual family income	ND	ND	ND	ND	1. Pe (d 2. He se 3. He
	18	ND	56	ND	ND	Range 6-16	ND	ND	ND	1. Li 2. Co 3. In 4. Fe
	4	NA	100	100% European descent	Occupation; marital status	ND	NA	NA	NA	1. Th 2. Th 3. Th
	8	Mean 35.8	100	100% White British	Marital status	Range 3.5-5.3 Mean 4.6	3	ND	ND	1. Pa It' 3. Id
a	10	Range 22-45	100	ND	Education	ND	ND	50% had	ND	1. En

ed					level; occupation; marital status			multiple FA		2. D 3. P 4. M
	10	ND	50	ND	Marital status	Range 15-16	ND	ND	ND	1. T pe 2. W 3. T in
ood ly	8	Range 31-46	100	ND	ND	Range 5-13 years Mean 9.4	ND	ND	ND	1. Li ev 2. R 're
	36	Range 30-55 Median 39.5	89	94.4% Caucasian	Education level	ND	ND	ND	ND	1. C al se 2. C 3. P fra

allergy; Ig, immunoglobulin; OIT, oral immunotherapy; OFC, oral food challenge

ss related to a child's food allergy[†]

	n	Proportion female, %	Parent age, years	Race/ ethnicity	Socioeconomic variables reported	Child age, years	Time since diagnosis, years	FA multiplicity	Proportion with prior anaphylaxis, %	Geomean
d	57	ND	ND	65% Caucasian; 32% Asian; 9% Indian; 5% Hispanic; 2% African-American	None	Range 4-18 Median 9	ND	ND	ND	None
the f	58	ND	ND	White, Black, Asian, Other	Annual household income	Mean 5.1	Mean 3.5	Mean 2.4	21 (intervention) or 33 (control)	Study-
ed rt	200	100	Mean 36	59% non-White	Level of education	Mean 4.2	ND	Mean 2.8	31	PSS, SCAR
a m	46	ND	ND	40% White, 34% Asian, 2% African American, 24% multiple	None	Mean 10.8	ND	32% single FA; 68% multiple	ND	None
e ry	55	ND	ND	100% Asian	None	Range 1.2-1.9 Mean 1.5	ND	ND	ND	STAI
nic	124	80	ND	77.6% white British	None	Range 0.42-16 Mean 5.5	ND	ND	ND	HADS
I had ss r	11	100	Mean 39	100% White British	None	Range 2-12 Mean 6.6	Mean 5.7 (intervention) or 3.9 (control)	mean 2	60 (intervention) or 33 (control)	HADS, PSWG, WHOQ, BREF, 12
th s	50	ND	ND	ND	ND	ND	Range 4-16 Mean 8	Mean of 3-4 desensitized foods	ND	None
ing al	81	100	Range 26-48 Mean 38	ND	Level of education	Range 2-10 Mean 6.5	All <1	ND	ND	STAI

st										
	3143	ND	ND	ND	None	Range 8-17 Mean 6.4	ND	ND	ND	IES
or on	60	82	ND	75% White/ Caucasian; 12% Asian; 2% American Indian/ Alaskan Native	Annual household income; level of education	Range 9-17.5 Mean 12.5	ND	Mean 3.1	38 (history of epinephrine use); 29 (difficulty breathing or reduced consciousness)	None
ut.	114	50	ND	ND	None	Range 3-16 Mean 7.2	ND	ND	ND	STAI,

allergy; Ig, immunoglobulin; OIT, oral immunotherapy; OFC, oral food challenge

caregiver distress related to a child's food allergy[†]

Participant age, years	Race/ethnicity	Socioeconomic variables collected	Child age, years	Time since diagnosis, years	FA multiplicity	Proportion with prior anaphylaxis, %	General measures	F
Mean 33.6	Japanese	ND	Mean 3 Range 0-6.9	ND	ND	43.2	WHOQOL26	FAR
ND	ND	ND	Range 1-17 Mean 6.0	ND	ND	60.3	ND	FAQ
ND	Child's race: 91.7% White, 5.8% Asian, 1.6% African-American, 0.9% prefer not to answer	Annual household income	0-5: 37.8%; 6-12: 46.7%; 13-18: 14.2%; 19: 1.3%	ND	ND	ND	IES	ND
ND	ND	ND	0.5-1: <i>n</i> =160; 1-2: <i>n</i> =205; 2-4: <i>n</i> =337	ND	ND	ND	ND	ND
ND	ND	ND	Mean 5	ND	ND	ND	ND	ND
Mean 29	ND	Annual household income; level of education	Range 0.13-2 Mean 0.6	ND	ND	6.5	STAI	ND
ND	69.3% White/Caucasian, 17.3% Indian or Asian ethnicity, 5.3% Black/African, 3.3% Hispanic/Latino	Level of education	Range 0-11	ND	ND	ND	HADS, PSS, WHOQOL-BREF	FAQ
ND	35% African American, 56% White, 10% Other	ND	Range 0.67-17 Mean 5.14	ND	Mean 4.48 Range 1-10	ND	ND	FAIS
Range 24-68 Mean 41	ND	ND	Range 0-18 Mean 7.63	ND	ND	3.5	HSCL-21, PTGI	ND
Mean 40	91% Caucasian	ND	Range 0-17 Mean 4.7	2.5	ND	ND	ND	ND
83.4% were 6-40	89.5% White	Median annual household income	Range 0-17 Mean 2.64	ND	Mean 3.17 Range 1-11	59	PedsQL, DASS-21, VCOPS	FAQ (adaptive parent)
ND	2.8% Hispanic, 96% Non-Hispanic, 4% Asian, 3.4% African American, 90.8% White	Annual family income	Range 0-17 Mean 6.2	ND	1 FA: 86.6%, 2 FA: 12.5%, 3 FA: 0.9%	46.9	ND	FAQ

ND	ND	Perceived adequacy of income	Range 0.1-12.1 Mean 0.92	ND	ND	ND	HADS	SPS
Mean 31	ND	Social support score; perceived adequacy of family income	Mean 2.23	ND	ND	21.8	HADS, PSSQ,	ND
ND	ND	ND	Range 6-16 Mean 10.95	ND	ND	ND	PSS, STAI	FAQ
ND	87.8% White	Level of education	0-5: 46.9%; 6-10:38%; 11-18: 15.2%	ND	1 FA: 78.6%, 2 FA: 17.7%, 3 FA: 3.16%	55.8		FAQ FAS
ND	ND	ND	Range 0-18 Mean 9.9	ND	4.1 (SD=3.3)	76	GAD-7	FAIM PF
Mothers: 6% were 35, 14% >35 Fathers: 8% were 35, 52% >35 Mean 41	ND	Annual household income; level of education	<2: 30%; 2-5: 37.8%; >5: 32.3%	<2: 42.2%; >2: 57.8%	1 FA: 50%, 2 FA: 21.1%, 3 FA: 15.6%, 4 FA: 10%, 5 FA: 1.1%, 6 FA: 2.2%	ND	ND	FAQ
	ND	ND	Range 6-12 Mean 8.67	Mean 6.92	One FA: 19.3%; Two or More FA: 80.7%	56.1	STAI	FAIM FAM PB
ND	ND	Annual household income	Mean 13.9	ND	ND	ND	DSSI	ND
ND	75.9% Hispanic, 7% Latino, 4.1% Asian American, 1.8% African American, 4.6% >1 race, 3.1% other	ND	Range 13-17 Mean 15.11	ND	ND	ND	ND	Stud ques inclu repo pare beha
ND	80% White	Annual household income; level of	ND	ND	>1 FA: 96%	ND	ND	FAQ

		education						
Median 36	FA group: 44.4% White, 37.1% Black, 3.7% African American, 11.1% mixed race, 3.7% other	Annual household income	Range 4-12 Mean 8.0	ND	ND	ND	BAI, BDI	ND
ND	87.9% White	Annual household income; level of education	Mean 7	Age of initial reaction: 2.4	ND	58.6	ND	FAIS, FAS
ND	55% Caucasian, 41% African-American, 2% Asian, 2% other	Occupation; level of education	Range 1.25–13.08 Mean 4.57	Range 0.1-5.6 Mean 2.1	ND	ND	BAI, PSWQ, IUS	ND
Range 24-51 Mean 32	44.3% White, 28.60% African American, 11.4% Asian American, 5.8% Hispanic, 15.7% other	Level of education	Range 0.82-7.93 Mean 7	ND	ND	ND	PIP	Food Quality Parent (FAIS)
Others: Range 24-49 Mean 37	6.8% Asian American, 10.7% Black/African American, 75.7% White, 2.9% Hispanic/Latino, 3.8% Other	Employment status	Range 1-13 Mean 5.73	ND	3.27 (3.27)	ND	ND	FAIS, specific questions
ND	78.7% White	Annual household income	Median 6.6	ND	ND	44.7% (chart review) versus 36.7% (caregivers' report)	ND	FAIS
ND	ND	ND	0-4: 28.3%; 5-8: 33.1%; 9-12: 23.6%; ≥13: 15.0%	ND	ND	ND	ND	ND
ND	ND	ND	Mean: 6.1-7.4 (group-dependent) Range: 2.3-15.0	ND	ND	ND	ND	ND
Others: Mean 43	ND	Level of education	Range 8-12 Mean 10	ND	ND	ND	STAI, WHOQOL-BREF, PSS-14, PedsQL	ND
Others: Mean 45								

D	2% Asian, 3% Black, 85% White, 10% more than one race	Level of education; marital status	Range 6-12 Mean 8.7	ND	Range 1-3+ Mean 2.33	55	STAI	FAIM FAM
D	ND	ND	Range 6-16 Mean 11.7	ND	ND	ND	PSS, STAI, WHOQOL BREF	FAQ
D	ND	Marital Status; employment status	Range 0.4-16 Mean 8.9	ND	>1 FA: 50.9%	History of anaphylaxis: 57.7%; carry epipen: 91.2%	CHQ-PF50	FAQ
lean 21	ND	Number of children in family	Range 1-18 Mean 9.47	ND	Range 1-3 Mean 1	52.1	GSES, GHQ-12	FAIM
lean 42	ND	Marital Status; employment status; number of children in family with FA	Range 1-18 Mean 9.47	ND	ND	49.2	GHQ-12	FAIM FAS
lean 42	ND	Number of children in family; number of children in family with FA	Range 1-18 Mean 9.47	ND	ND	52.1	GHA-12	FAIM FAS FA
37, <i>n</i> =44; =27-37, 55; 27, <i>n</i> =5	ND	Level of education; employment status	<1, <i>n</i> =35, 1-2, <i>n</i> =40, 2-3, <i>n</i> =29	ND	ND	ND	ND	FAQ
lean 44	FA: 57.5% Caucasian; Asthma: 41.2% Caucasian; Control: 39.5% Caucasian	Occupation; marital status	Range 9-13 Mean 11.0	ND	ND	ND	PSS, STAI	FAIS
range 32-58 lean 43	ND	Level of education	Range 3-13 Mean 8.77	ND	ND	100	ND	ND

D	ND	ND	Range 0-18 Mean 6.3	Mean 4.3	Mean 2.9	53	ND	FAP
D	Child race: 87% White, 4% African American, 8% Asian, 2% other/mixed	Median household income; level of education	Range 0-18 Mean 8.3	Mean 6.6	Mean 5.3	100	STAI	ND
Mean 35	74.8% White, 8.7% Black or African American, 12.5% Asian or Pacific Islander, 4.1% American Indian or Eskimo, 14.6% Hispanic or Latino	Level of education; annual household income; marital status	Range 3-17 Mean 7.32	Mean 3.99	≥2: 15.2%	ND	DASS-21	ND
D	ND	ND	Mean 9.1	Mean 7	ND	ND	ND	ND
Mean 34	ND	ND	Range 0.17-5.9 Median 1.42	Median 1.1	1 FA: 76.1%	14.9	Peds-QL	FAQ (ada pare FAQ
D	ND	Level of Education	Range 0.5–7	ND	ND	ND	SPSQ	FLIP
D	ND	ND	Range 5.2-10.3 Median 8.1	Mean 5.3	ND	ND	ND	ND
D	ND	ND	Mean 4.8	Mean 2.3 Median 1.6-3 (after OPFC, not diagnosis)	ND	ND	ND	Stud point asse "con anxi
D	67% White European	Level of Education	Range 1-17 Median 5	ND	Multiple FA: 55%	28	HADS, OCI-R	FAIM

D	86% Caucasian, 1% African American, 10% Mixed, 2% Asian, 0.2% Native American, 5% Hispanic	Annual household income; level of education	ND	ND	Mean 1	ND	ND	FAQ
D	ND	ND	ND	ND	ND	ND	PECI	FAQ
3-39: 61%; 40: 39%	ND	ND	0-5: 59.1%, 6-11: 27.4%, 12-16: 14.5%	ND	ND	25.8	STAI	ND
D	ND	Level of education	Range 0-18 Mean 6.4	Mean age 1.7	59% had FA in addition to peanut	ND	IFQ, CHQ-PF50	ND
D	94% Caucasian, 1.9% Asian American, 4% Biracial	Annual household income; level of education	Range 6-12 Mean 8.1	Range 2 - 11 Mean 6.4	1	ND	PSI	ND
mean 48	ND	ND	Range 13-17 Mean 15.9	ND	2 FA: 32.7%, 3 FA: 23.6%, >3 FA: 32.7%	ND	IPQ, STAI	Study ques- burden treat
D	97% Caucasian, 3% Hispanic	Level of education	Range 1-11	>1 in 97%	ND	ND	ND	ND
D	"Majority Caucasian"	Proportion high income	Range 8-17	ND	ND	ND	IES	FAQ
D	ND	ND	Range 5-18 Mean 10.8	ND	1 FA: 26%, 2 FA: 42%, >2 FA: 32%	ND	CHQ-PF50	ND
range 36-45 median 40	ND	Annual household income; level of education; occupation; marital status	Range 4-12 Median 8	ND	Multiple FA: 70.7%	ND	STAI, IUS-12	FAIM visua scale
D	SS: 89.3% Caucasian; RC: 79.5% Caucasian	Annual household income; level of education	SS: Mean 6.9 RC: Mean 7.5	SS: Mean 2.5 RC: Mean 1.9	ND	SS: 61.9 RC: 37.5	ND	FAQ FAS

D	76.9% Caucasian, 3.4% African American, 8.8% Hispanic, 2.5% Asian, 8.3% Other	Annual household income; marital status; level of education; insurance coverage	0-1: 11.3%; 2-5: 47.5%; 6-10: 29.6%; 11-13: 7.0%; 14-20: 4.7%	ND	ND	ND	FES	FAQ
D	26% African American, 9% Asian American, 43% Caucasian, 9% Hispanic, 10% other, 4% declined to provide information on race/ethnicity	ND	Range 0-18 Mean 5.28	ND	2.85	ND	ND	FAQ
Mean 39	95.4% Caucasian	Marital status; level of education	Mean 8.01	Mean 6.34	Range 1-5+ Mean 3.17	ND	PECI	ND

9-PF50, Children's Health Questionnaire – Parent Form; DASS-21, Depression Anxiety and Stress Scales, Short Version; DBPCFC, double-blind placebo-controlled trial; FAIM, Food Allergy Independent Measure; FAIS, Food Allergy Impact Scale; FAIMS, Food Allergy Impact Measure Scale; FAMAS, Food Allergy Management and Adaptation Scale; FASE-P, Food Allergy Self-Efficacy Scale for Parents; FASEQ-P, Food Allergy Self-Efficacy Questionnaire for Parents; FES, Family Empowerment Scale; FESQ, Family Empowerment Scale Questionnaire; HADS, Hospital Anxiety and Depression Scale; HSCL-21, Hopkins Symptom Checklist 21 item; IES, Impact of Events Scale; IFQ, Impact on Family Questionnaire; OIT, oral immunotherapy; OFC, oral food challenge; OPFC, oral peanut food challenge; PECI, Parent Experience of Child Illness; PSWQ, Penn State Worry Questionnaire; PTGI, Post-traumatic Growth Inventory; SPS-FA, Scale of Psychosocial Factors in Food Allergy; WHOQOL-BREF, World Health Organization Quality of Life - BREF

Table S5. Cognitive dimensions of FA-specific anxiety[†]

Cognitive dimension	Examples of survey data	Examples of qualitative themes
Possible allergen exposure	• In a survey assessing the impact of FA on 940 families, items most strongly impacting parental HRQOL involved fears of allergen exposure, particularly in situations outside the parent's control⁵⁵. • Parents reported fear of both known and undiscovered allergens⁵⁰. • Fear of possible accidental reactions improved following oral immunotherapy, which despite its potential association with home dosing reactions allows for preparation and anticipation⁸³.	• “Living with risk” was a meta-theme in analysis of semi-structured interviews of mothers of children at risk for FA-induced anaphylaxis⁸⁴ and among parents of young children with severe FA⁶⁸. • Parents endorsed an associated lack of control over allergen exposure and its outcomes⁸⁴.
Uncertainty about the future	• Long-term uncertainty was a major cause of distress in a survey assessing the emotional functioning of 282 caregivers⁸⁵. • On the FARC-M scale, mothers' anxiety about FA persistence was negatively associated with their reported ability to manage FA⁸⁶. • Other specific worries included the child's nutrition and health⁶⁵.	• Interviews with parents in urban Ghana emphasized anxiety related to recurrence risk. The possibility of allergen exposure as well as future symptom severity were major contributors to participants' fears⁸⁷.
Outcomes of allergy diagnosis and treatment	• Parents of young children with severe FA emphasized the responsibility involved in managing risks for their children⁶⁸. In a survey of attitudes regarding epinephrine autoinjectors, FAQL-PB scores were greater if an epinephrine autoinjector had been administered by a parent compared to another user⁸⁸. • Parental confidence in managing allergic reactions was associated with better self-efficacy and lower parental burden⁸⁹. • OIT impacted overall HRQOL⁸³ including anxiety items on the FAQL-PB⁹⁰.	• Parents who had used an autoinjector described feelings of guilt related to hesitation to treat their child⁹¹. • Caregivers hoped that OIT would provide a “buffer” against unintentional allergen exposure. They did not report OIT-related decreases in anxiety, vigilance, or avoidance⁴¹. • The burden of OIT included uncertainty about possible reactions and practical difficulty with injections⁴². • Fear and re-evaluation of risk were central to mothers' experience of OFC and food reintroduction; “living with fear of the unknown” included the fear of not being able to control outcomes and causing harm⁶⁹.
Transitions	• A survey of 533 children with FA and their mothers found that those between the ages of 5 and 7 requiring an epinephrine autoinjector were particularly susceptible to maternal stress; transitions such as school entry were thought to account for increased vulnerability²¹.	• Adjustment to the initial diagnosis was a major challenge for parents, associated with grief, anxiety, and hope⁶⁸. • A community-based study of adolescents and their parents emphasized parental anxiety about “handing over” the responsibility for FA management³⁷. Parents similarly described difficulty trusting their college-age children⁹².
Maintaining social identity/ being understood	• A large proportion of parents reported that their child's FA had adversely affected their personal relationships, including within their family and community⁹³.	• Social aspects of allergy were identified by Rouf <i>et al.</i> as a superordinate theme in analysis of semi-structured interviews exploring parent experiences of having a young child with severe FA. Parents worried about being perceived as over-protective or having their FA-related concerns misunderstood⁶⁸.

[†]Abbreviations: FA, food allergy; FAQL-PB, Food Allergy Quality of Life – Parental Burden Questionnaire; FARC-M, Food Allergy Response Capability Scale for Mothers; HRQOL, health-related quality of life; OFC, oral food challenge; OIT, oral immunotherapy

Table S6. Formal assessment tools that include an aspect of (A) general and (B) food-allergy-related distress or anxiety assessment in parents of children with food allergies employed by studies included in this review (Tables S2 and S3)[†]

Tool	Description	Anxiety-related items relevant to food allergy
A) General Measures		
Beck Anxiety Inventory (BAI) ⁹⁸	Self-report measure of anxiety; 21 items rated on 4-point scale.	• General emotional state: Terrified or afraid, nervous, scared • Physical symptoms: Numbness or tingling, feeling hot, wobbliness in legs, unable to relax, dizzy or lightheaded, heart pounding/racing, unsteady, feeling of choking, hands trembling, shaky/unsteady, difficulty breathing, indigestion, faint/lightheaded, face flushed, hot/cold sweats • Specific fears: Fear of worst happening, fear of losing control, fear of dying
Generalized Anxiety Disorder-7 Item Scale (GAD-7) ⁹⁹	Self-report measure of anxiety; 7 items rated on 4-point scale. Primarily used as a screening tool for GAD.	• General emotional state: Feeling nervous, anxious, or on edge; becoming easily annoyed or irritable • Physical symptoms: Being so restless that it's hard to sit still, trouble relaxing • Specific fears: Feeling afraid as if something awful might happen • Worrying: Not being able to stop or control worrying; worrying too much about different things
Hospital Anxiety and Depression Scale (HADS) ¹⁰⁰	Self-report measure of anxiety (some argue best used as uni-dimensional measure of distress) including 7 items each assessing depression and anxiety symptoms rated on a 4-point scale.	• General emotional state: I get sudden feelings of panic; I get a sort of frightened feeling as if something awful is about to happen • Physical symptoms: I feel tense or wound up; I can sit at ease and feel relaxed; I get a sort of frightened feeling like "butterflies" in the stomach; I feel restless as I have to be on the move • Worrying: Worrying thoughts go through my mind
Impact of Events Scale (IES) ¹⁰¹	22-item self-report measure that assesses subjective distress caused by traumatic events (original scale has 15 items and is missing hyperarousal). Corresponds to DSM-IV symptoms of PTSD. Items rated on 5-point scale.	• General emotional state: Felt irritable and angry; felt watchful and on-guard • Physical symptoms: Physical reactions such as sweating/trouble breathing/nausea/pounding heart; jumpy and easily startled • Sleep: Trouble falling or staying asleep • Worrying: Thought about it when I didn't mean to; dreams about it • Other cognitive symptoms: Trouble concentrating
Impact on Family Questionnaire (IFQ) ¹⁰² ; adapted for peanut allergy ⁸⁸	24 items with agreement graded on 4-point scale. Specific statements are related to four dimensions of family life: familial/social, personal strain, financial burden, and mastery.	• Physical symptoms: fatigue is a problem for me because of my child's illness • Avoidance: Our family gives up things because of my child's illness; we see family and friends less because of the illness; we have little desire to go out because of my child's illness; we are not able to travel out of the city; it is hard to find a reliable person to take care of my child • Perceived isolation or stigma: People treat us specially because of my child's illness; I wonder whether my child should be treated 'specially' or the same as a normal child; nobody understands the burden I carry
Illness Perception Questionnaire (IPQ) ¹⁰³	Assesses 5 cognitive components contributing to perception of illness: identity, cause, timeline, consequences, cure/control. List of 14 symptoms	• General emotional state: I get depressed when I think about my illness; When I think about my illness I get upset; my illness makes me feel angry; having this illness makes me feel anxious;

	rated yes/no for (a) I have experienced this symptom since my illness, and (b) this symptom is related to my illness. 38 items rated on 5-point scale assessing views about illness. 18 items rated on 5-point scale assessing causes of illness. Also available in parent report version.	• Specific fears: My illness makes me feel afraid • Worrying: My illness does not worry me • Anxiety as a cause of symptoms: possible causes include stress or worry, family problems or worries, or my emotional state
Parent Experience of Child Illness (PECI) ¹⁰⁴	25-item measure to examine parental adjustment related to caring for a chronically ill child; 4 subscales include guilt and worry, unresolved sorrow and anger, long-term uncertainty, and emotional resources. Each item is rated on a 5-point Likert scale. Results of factor analysis of the Peci revealed an underlying four-factor structure including guilt and worry, unresolved sorrow and anger, long-term uncertainty, and emotional resources.	• General emotional state: I experience angry feelings when I think about my child's illness; I am aware of the specific ways I react to sadness and loss • Sleep: I wake up during the night and check on my child • Specific fears: I think about whether or not my child will die; I am afraid of this diagnosis occurring in another member of my family; I worry that I may be responsible for my child's illness in some way • Worrying: I worry that any minute, things might take a turn for the worse; I worry that my child's illness will worsen/return; I worry about something bad happening to my child when s/he is out of my care; When I'm not with my child, I find myself thinking about whether or not s/he is ok; My hopes and dreams for my child's future are uncertain; I worry about my child's future
Parenting Stress Index (PSI) ¹⁰⁵	120-item measure to explore stress within the parent-child system. Focuses on three major domains of stress: child characteristics, parent characteristics, and situational/demographic life stress. Within the Parent Domain, seven subscales (Competence, Isolation, Attachment, Health, Role Restriction, Depression, and Spouse/Parenting Partner Relationship) measure sources of stress related to parent characteristics.	General measures of stress and depression and their impacts; not specific to emotional, cognitive, or physical aspects of anxiety
Penn State Worry Questionnaire (PSWQ) ¹⁰⁶	16-item measure of the occurrence, intrusiveness, pervasiveness, and other characterizing features of an individual's experience with worry (independent construct from other measures of anxiety or depression). Each item is scored on a 5-point Likert scale.	• Worrying (frequency, severity, duration, lack of control, insight): My worries overwhelm me; many situations make me worry; I am always worrying about something; As soon as I finish one task, I start to worry about everything else I have to do; I worry all the time; I worry about projects until they are all done; I know I should not worry about things, but I just cannot help it; I find it easy to dismiss worrisome thoughts; once I start worrying, I cannot stop; I have been a worrier all my life; I notice that I have been worrying about things
Perceived Stress Scale (PSS) ¹⁰⁷	Measure of the degree to which situations in one's life are appraised as stressful. 4-, 10-, and 14-item scales exist with responses rated on a 5-point Likert scale for frequency over the past month.	• General emotional state: How often have you been upset because of something that happened unexpectedly?; How often have you felt nervous and "stressed"? • Perceived lack of control: How often have you felt that you were unable to control the important things in your life; how often have you felt you have been able to control irritations in your life? How often have you felt you were on top of things?
Perceived Social Support Questionnaire (PSSQ) ¹⁰⁸	20-item scale assessing social support from family and friends. Item responses are yes/no.	Includes rating of perceived emotional support by friends and family; not specific to anxiety.

State Trait Anxiety Index (STAI) ¹⁰⁹	20-item scale each for assessing state and trait anxiety. All items are rated on a 4-point scale. Predictor of caregiver distress.	• General emotional state: I feel nervous and restless • Worrying: I worry too much over something that really doesn't matter; I take disappointments so keenly that I can't put them out of my mind; I get in a state of tension or turmoil as I think over my recent concerns and interests; some unimportant thoughts run through my mind and bother me; I have disturbing thoughts • Perceived lack of control: I feel that difficulties are piling up so that I cannot overcome them • Other cognitions: I feel like a failure; I lack self-confidence
World Health Organization Quality of Life – BREF (WHOQOLBREF) ¹¹⁰	26-item QOL measure assessing broad domains: physical health, psychological health, social relationships, and environment. Each item is rated on a 5-point scale considering the past 4 weeks.	• General emotional state: How often do you have negative feelings such as blue mood, despair, anxiety, depression? • Sleep: How satisfied are you with your sleep? • Specific fears: How safe do you feel in your daily life? • Other items assess general satisfaction with self, work, and personal relationships and are not specific to anxiety.
(B) Food Allergy-Specific Measures		
Food Allergy Independent Measure (FAIM) ¹¹¹	Four questions rated on 7-point Likert scales assessing the parent's expectation of outcome for the child with FA. Parents rate for their child the chance of: (1) accidental exposure, (2) severe reaction when accidentally exposed, (3) dying when accidentally exposed, and (4) responding effectively when accidentally exposed. Child, teenager, and parent forms validated in a Dutch sample.	• Specific fears/risk estimation: How great do you think the chance is that your child will accidentally eat something to which they are allergic; will have a severe reaction if they accidentally eat something to which they are allergic; will die if they accidentally eat something to which they are allergic • Perceived lack of control: Cannot effectively deal with an allergic reaction should they accidentally eat something to which they are allergic
Food Allergy Impact Scale (FAIS) ⁴⁷	32-item questionnaire with eight subscales that evaluate the caregiver's perception of the impact of the child's FA on aspects of daily family activities (e.g., meal preparation, family social activities, parental stress and free time). Items are rated on a 7-point scale. Further psychometric testing including cross-validation in additional samples and assessment of discriminate and predictive validity as well as test-retest validity needed.	• General emotional state: Impact on your stress • Sleep: Impact on your sleep • Multiple items related to social and financial impact
Food Allergy Management and Adaptation Scale (FAMAS) ⁶⁹	Semi-structured interview and rating scales designed to assess family adaptation to a child's FA. Assess eight dimensions of FA management, child anxiety, parent anxiety, and overall balanced integration. Assesses the adequacy of families' FA management skills in relation to the behavioral coping strategies required for positive adaptation. Anxiety levels are self-reported by parents and	• General emotional state: On a scale from 1 to 5 with 1 equalling "don't worry at all" and 5 equaling "get really scared", how worried or nervous do you get when your child is having food allergy symptoms? • Worrying: How worried or concerned are you on an everyday basis? Why? • Additional open-ended questions regarding experience of FA and impact on family.

	revealed by responses regarding specific management strategies and experiences with reactions and by FA outcome expectations. Further studies needed to test validity.	
Food Allergy Parent Questionnaire (FAPQ) ¹¹²	18-item scale assessing parental coping; 4 factors accounting for half of variance include parental anxiety/distress, psychosocial impact, parental coping, and family support. Each item rated on a 4-point frequency scale ranging from “never” to “most of the time.” Limited internal consistency on impact and coping subscales. Further psychometric testing including cross-validation in a more diverse sample, construct/criterion validity, and test-retest reliability required.	• Sleep: I can't sleep because I am worried • General emotional state: I become tearful when I think/talk about it • Specific fears: I am afraid for my child's safety because of the allergies; I am afraid for my child's safety when he/she rides in a car; My child's psychological development is negatively affected by the allergies; My child's social development is negatively affected by the allergies • Worrying: I think about my child's allergies daily • Avoidance: Our family can't do our usual activities because of the allergies • Perceived lack of control: I feel helpless in dealing with this problem • Other negative cognitions: This is the worst thing that has happened to me • Additional items regarding coping and family support
Food Allergy Quality of Life Questionnaire - Parental Form (FAQLQ-PF); proxy, but may be adapted as parent measure ¹¹³	Measure to assess parental perception of HRQOL in children aged 0–12 years with food allergy. 14 items for children < 4 years and 26 and 30 items for children 4-6 and 7-12 years, respectively. Three subscales: emotional impact, food anxiety, social and dietary limitations account for 68% of variance. Each item is rated on a scale from 0-6 for impact on QOL (“not at all” through “extremely”). The version adapted as a parent measure has not been validated.	<i>(Adapted from original scale to assess parent experience rather than proxy for child; not previously studied for this purpose)</i> • General emotional state: I experience emotional distress because of symptoms; am more anxious in general than other parents • Physical symptoms: I experience physical distress because of symptoms • Specific fears: I am worried that he/she will have a reaction; feel anxious about food; feel anxious about eating an ingredient to which he/she is allergic; am afraid for my child to try new foods; am concerned that he/she must always be cautious about food; feel anxious by poor labelling on food products • Worrying: I feel worried about the future; feel anxious when going to new places; am anxious when eating with unfamiliar children/adults; am more cautious in general than other parents • Additional items regarding social restrictions
Food Allergy Quality of Life Parental Burden Index (FAQL-PB) ⁵¹	FA-specific HRQOL instrument measuring parental burden associated with having a child with a FA. 17-items each queried with a 7-point Likert scale ranking the extent to which the respondent has been troubled or limited. Validated across multiple populations.	• General emotional state: In the past week, how troubled have you been by (a) anxiety relating to your child's food allergy; (b) sadness regarding the burden your child carries because of their food allergy? • Specific fears: In the past week, how troubled have you been by (a) by your concerns for your child's health because of their food allergy; (b) with the worry that your child will not have a normal upbringing because of their food allergy; (c) about concerns for your child's nutrition because of their food allergy; (d) with issues concerning your child being near others while eating because of their food allergy (e) with being frightened by the thought that your child will have a food allergic reaction? • Avoidance or precaution-taking: In the past week, how troubled have you been (a) about your need to take special precautions before going out of the home with your child because of their food allergy; (b) by the possibility of, or actually leaving your child in the care of others because of their food allergy; (c) about your child's attending

		school, camp, daycare or other group activity with children because of their food allergy? • Perceived lack of control: In the past week, how troubled have you been with the worry that you will not be able to help your child if they have an allergic reaction to food? • Additional 3 items regarding functional limitations (family, social)
Food Allergy Response Capability Scale for Mothers (FARC-M) ¹¹⁴	17-item instrument designed to assess a mother's ability to confidently manage FA. Response capability included five factors, each rated on a 5-point Likert scale: stress coping, elimination diet capacity, gathering information from medical professionals, knowledge about food allergies, and spousal collaboration. Not a validated measure.	• General emotional state: I can cope with my stress well • Sleep: I am able to take rest • Other cognitions: I think I am coping with my child's food allergies well
Food Allergy Self-Efficacy Scale for Parents (FASE-P) ⁷¹	21-item scale with five subscales: Managing social activities, precaution and prevention, allergic treatment, food allergen identification, seeking information about FA. Parents asked to rate how confident they were that they could do each item. Validated in a sample of 250 parents recruited from the general population.	• Queries confidence in management affecting multiple domains including precautionary behaviours: Have a plan to make sure my child is safe at school or nursery; have a plan to make sure my child is safe with a relative, friend, or a baby sitter; plan to participate in social activities with others involving food; prepare to go out of the home with my child; prepare to go to a restaurant • Perceived lack of control: Control my child's environment to prevent an accidental exposure
Food Allergy Self-Efficacy Questionnaire (FASEQ-P) ⁶¹	8-item FA self-efficacy index for caregivers; 2-domain structure captures confidence in daily medical care and social functioning related to FA. Correlates with FAQL-PB. Validated in a large sample of 2308 caregivers.	• Specific fears: How confident do you feel that your child is safe at school, daycare, babysitters, or with relatives? How confident do you feel about identifying possible food cross contamination?; How confident do you feel about reading food labels?; How confident do you feel treating your child's allergic reaction?; How comfortable do you feel about recognizing an allergic reaction in your child? • Perceived lack of control: How confident do you feel that you can control your child's environment to prevent an accidental exposure? • Support: How confident do you feel that you have the resources and support you need to deal with your child's allergy?
Scale of Psychosocial Factors in Food Allergy (SPS-FA) ⁵²	9-item measure addressing three areas: impact on QOL, social impact, and conflicts. Correlates significantly with anxiety and depression measurements; distinguishes members and non-members of support groups. Responses are rated on a 5- or 6-point Likert scale. Internal consistency and construct validity assessed in a group of 63 parents. Requires further validation.	• General emotional state: Do you think that your child's allergy symptoms affect your mood?; Due to your child's condition, you have developed greater irritability; Do you feel that the symptoms have affected you psychologically? • Sleep: Due to your child's condition, you have developed sleep disorders • Effects of distress on disease symptoms: Do you think that your mood affects your child's allergy symptoms; Do you believe this crisis has worsened your child's allergy symptoms? [any crisis that might have provoked high stress or anxiety levels]
Food-Pet-Allergy in Children (FPAC) Questionnaire ¹¹⁵	24-item questionnaire addressing both the child's and parents' HRQOL, including the following: aspects of daily life (child/parents), limitations in social activities (child/parents), limitations in school work or in school activities (child), the child's	• Specific fears: Acute symptoms, future worsening of acute symptoms, overprotection, leaving the child with a babysitter or school staff, negative impact on future health, how to teach child what to avoid, child's nutrition • Avoidance or precaution-taking: Family's abandoning activities/changing plans;

	feelings and worry experienced by the parents, conflicts within the family (child/parent) and overall measure of the child's HRQOL. Each item is rated on a 4-point Likert scale. Three scales have high internal reliability and convergent/discriminant validity for both food and pet allergy: Limitations of Family/Child Activities, Parents' Distress and Child's Emotions.	negative impact on social interactions; child unable to eat at a friend's house, stay overnight at a friend's house, or eat in restaurants • Additional questions regarding child's worries and emotions
Food Hypersensitivity Family Impact (FLIP) ⁸¹	19-item questionnaire designed to measure perceived impairment in families of children with cow's milk protein hypersensitivity. Responses are rated on a 7-point Likert scale based on the past month. Subscales are grouped based on a three-factor solution including Nutrition, Health and Emotions, and Everyday Life. Validated in sample of 94 families attending a Pediatrics clinic.	• General emotional state: How often have you felt sad because of your child's food hypersensitivity? • Specific fears: Worry about reaction, that child may not outgrow the food hypersensitivity, that child will not have a "normal upbringing," child's health, nutritional content in diet • Avoidance or precaution-taking: Limits on holiday/vacation, restaurant choice, social activity participation based on FA, frequency troubled by need to spend extra time preparing meals or planning what to cook or serve your child • Perceived lack of control: Trouble about leaving child in the care of others, how often have you felt unsafe when leaving your child at the kindergartenbabysitter • Social factors: difficulties making others appreciate the importance of avoiding food items your child does not tolerate, troubled by comments from others concerning your child's food hypersensitivity • Additional items related to variation in child's diet and experience of child's happiness/satisfaction

[†]Abbreviations (not defined in table): DSM-IV, Diagnostic and Statistical Manual of Mental Disorders-IV; FA, food allergy; HRQOL, health-related quality of life; QOL, quality of life

Table S7. Attributes, antecedents, and consequences of FA-specific anxiety contained within major themes of qualitative and mixed-methods studies included in this review.

FAA conceptual framework		Qualitative Themes
<i>Attributes</i>		
Emotional distress (fear, anxiety)		• Fear for today, fear for the future⁷ • Anxiety; hesitation; guilt¹¹⁶ • Anxiety (an “emotional roller coaster”)¹¹ • Experiences/emotions¹¹⁷ • Living with fear¹¹⁸ • Fear and anxiety (subtheme: psychological distress)¹⁷ • Living with fear of the unknown¹¹⁹ • It's a big responsibility - living with risk¹²⁰ • Emotional burden⁶
Specific cognitions		• Worrying about well-being¹¹⁸ • Concern about cross-contamination; concern about nutritional sources...² • Perception of anaphylaxis¹¹⁶ • Health/nutrition; daily burden⁶ • Fear and anxiety about OFC; experiencing reactions³ • Treatment burden of OIT (anxiety about possible reactions, allergic reactions, disappointment if not successful, child anxiety, difficulty with injections, difficulty with daily milk dose)⁵
Behaviours		• Daily monitoring/vigilance/avoidance; practicalities and planning¹⁴
<i>Antecedents</i>		
Loss of control		• Control (sub themes: always having to be one step ahead, never being able to relax)¹⁷ • Coping and control¹⁴ • Looking for control¹¹⁸ • To be in control²¹
Limited access to information/resources		• Burden of accessing resources¹⁸; relying on resources¹¹⁸ • Medical support for these families was very limited⁸ • Understanding early signs/symptoms, allergen “cross-contamination”, label-reading, use of self-injectable epinephrine²³ • Lack of provision of information on recognition and management; prolonged wait times for an allergist¹ • Influence of health care professionals¹¹⁶ • The need for resources (day to day management, ages and stages, mental health supports, and “the dream”)¹¹ • Access to appropriate health care; clinician seen in hospital; support with allergy management; issues with information¹² • Parents' support needs during the child's transition to school²⁰
Social factors		• Helpful and negative aspects of support groups⁴ • Social impact of the condition; bullying happens, but we are alone to cope with it⁷ • Stigma/normalcy; social interactions/ limitations⁶ • Identity and the social aspects of allergy¹²⁰ • Injustice (subthemes: equal rights)¹⁷ • The cost of living with medically-diagnosed severe FA¹⁸ • A transformational journey (the waiting game, loss of normalcy, strained relationships and mistrust, and financial challenges)¹¹ • Public confusion² • Being taken seriously¹² • Communicating¹⁴
<i>Consequences</i>		
Family impact		• Significant family anxiety¹ • The nuclear family - safety and understanding (a learning process; perspectives of the siblings)²¹

	• Limitations (subthemes: structure of family life, lack of understanding)¹⁷ • Adolescents typically perceived anaphylaxis as ‘no big deal’; parents reported anxiety about ‘handing over’ the main responsibility for avoidance and emergency management to their children⁸
Social impact	• Multiple FA lead to anxiety and imposed isolation⁷ • Isolation¹¹⁶; the experience of isolation¹⁸
Positive coping	• Accommodation and adaptation; as time passes, FA management becomes our new normal⁷ • Parents engage in a 3 phase process: questioning, expanding, and finally, regaining competency⁹ • Re-evaluating earlier experiences (sub-themes 'daring to take new challenges', 'refraining from new challenges')¹¹⁹ • Psychological/behavioural issues - becoming a teacher and advocate, coping, framing²³ • Parental adjustment - re-establishing an "even keel"¹²⁰ • Management/coping; search for normality; external and internal mediators¹¹⁷ • Impact of coping strategies¹⁴ • Positive impact of OIT (decreased anxiety, ability to eat in restaurants, decreased need for planning, inclusion in social situations)⁵ • OIT only needs to provide minimal protection with minimal risks; how the buffer translates to meaningful effect on QOL; helping others by advancing science¹²¹ • The importance of having a social life (school, friends, and new relationships)²¹

Table S8. Effects of FA-specific and psychosocial interventions on measures of parental anxiety, depression, and quality of life.

Intervention	Outcome (measure)
<i>Allergy-specific interventions</i>	
First allergy clinic visit	No difference pre/post clinic visit in anxiety or depression (HADS) ¹²²
Diagnostic oral food challenge	Reduced state but not trait anxiety following challenge regardless of outcome (STAI) ²⁹ , associated with in nutritional habits if negative ²⁷
Education regarding non-life-threatening symptoms [‡]	Reduced parental anxiety (study-specific questionnaire) and improved allergen desensitization in families informed that non-life-threatening symptoms can signal desensitization (rather than represent unfortunate side-effects) ³²
Instruction on re-introducing egg following negative oral food challenge [‡]	Improved parental anxiety (STAI-S, but not STAI-T) compared to baseline in both step-up oral food challenge and home incrementing groups ³³
Oral immunotherapy	Reduced parental burden (FAQL-PB) ^{123,124}
<i>Psychosocial interventions</i>	
Education regarding casual exposure, with or without behavioural intervention (touch)	No change in parent-reported worry with exposure and education compared to education alone ³⁴
Single-session CBT [‡]	Improved anxiety at 6 weeks (STAI); reduced risk perception and salivary cortisol response at 12 months ¹²⁵
12 weekly CBT sessions	Reduced worry, anxiety, and depression (FAQL-PB, GHQ-12) ²⁶
Self-regulation intervention (3 phone sessions) [‡]	Significantly improved FA-related quality of life and reduced anxiety to control (FAQL-PB) ³⁰
Psychosocial screening program (parents screened for distress and burden based on abbreviated FAQL-PB)	No effect on subsequent follow-up with mental health consultation ²⁸

[†]Abbreviations: FAQL-PB, Food Allergy Quality of Life-Parental Burden; HADS, Hospital Anxiety and Depression Scale; QOL, quality of life; SPS-FA, Factors in Food Allergy; STAI, State-Trait Anxiety Inventory; World Health Organization Quality of Life-BREF, WHOQOL-BREF

[‡]Denotes randomized controlled trial

References (Supplemental tables)

1. Abdurrahman ZB, Kastner M, Wurman C, et al. Experiencing a first food allergic reaction: a survey of parent and caregiver perspectives. *Allergy, asthma, and clinical immunology : official journal of the Canadian Society of Allergy and Clinical Immunology*. 2013;9(1):18.
2. Abrams EM, Kim H, Gerdtz J, Protudjer JLP. Milk allergy most burdensome in multi-food allergic children. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2020.
3. Hsu E, Soller L, Abrams EM, Protudjer JLP, Mill C, Chan ES. Oral Food Challenge Implementation: The First Mixed-Methods Study Exploring Barriers and Solutions. *J Allergy Clin Immunol Pract*. 2020;8(1):149-156.e141.
4. Hu W, Loblay R, Ziegler J, Kemp A. Attributes and views of families with food allergic children recruited from allergy clinics and from a consumer organization. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2008;19(3):264-269.
5. LeBovidge JS, Haskell S, Olney EK, et al. The psychological impact of oral immunotherapy for children with food allergy: Perceived benefits and treatment burden. *Clinical Practice in Pediatric Psychology*. 2014;2(1):13-26.
6. Springston EE, Smith B, Shulruff J, Pongracic J, Holl J, Gupta RS. Variations in quality of life among caregivers of food allergic children. *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*. 2010;105(4):287-294.
7. Abrams EM, Simons E, Roos L, Hurst K, Protudjer JLP. Qualitative analysis of perceived impacts on childhood food allergy on caregiver mental health and lifestyle. *Ann Allergy Asthma Immunol*. 2020;124(6):594-599.
8. Akeson N, Worth A, Sheikh A. The psychosocial impact of anaphylaxis on young people and their parents. *Clinical and experimental allergy : journal of the British Society for Allergy and Clinical Immunology*. 2007;37(8):1213-1220.
9. Broome SB, Lutz BJ, Cook C. Becoming the Parent of a Child With Life-Threatening Food Allergies. *Journal of pediatric nursing*. 2015;30(4):532-542.
10. Chooniedass R, Temple B, Martin D, Becker A. A qualitative study exploring parents' experiences with epinephrine use for their child's anaphylactic reaction. *Clinical and translational allergy*. 2018;8:43.
11. Chooniedass R, Soller L, Hsu E, To S, Cameron SB, Chan ES. Parents of children with food allergy: A qualitative study describing needs and identifying solutions. *Ann Allergy Asthma Immunol*. 2020.
12. Diwakar L, Cummins C, Hackett S, et al. Parent experiences with paediatric allergy pathways in the West Midlands: A qualitative study. *Clinical and Experimental Allergy*. 2019;49(3):357-365.
13. DunnGalvin A, Polloni L, Le Bovidge J, et al. Preliminary Development of the Food Allergy Coping and Emotions Questionnaires for Children, Adolescents, and Young People: Qualitative Analysis of Data on IgE-Mediated Food Allergy from Five Countries. *The journal of allergy and clinical immunology In practice*. 2018;6(2):506-513.e511.
14. DunnGalvin A, Gallop K, Acaster S, et al. APPEAL-2: a pan-European qualitative study to explore the burden of peanut-allergic children, teenagers, and their caregivers. *Clin Exp Allergy*. 2020.
15. Gillespie CA, Woodgate RL, Chalmers KI, Watson WT. "Living with risk": mothering a child with food-induced anaphylaxis. *Journal of pediatric nursing*. 2007;22(1):30-42.
16. Greenhawt M, Marsh R, Gilbert H, Sicherer S, DunnGalvin A, Matlock D. Understanding caregiver goals, benefits, and acceptable risks of peanut allergy therapies. *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*. 2018;121(5):575-579.
17. Lagercrantz B, Persson Å, Kull I. "Healthcare seems to vary a lot": A focus group study among parents of children with severe allergy. *The Journal of asthma : official journal of the Association for the Care of Asthma*. 2017;54(7):672-678.
18. McBride C, McBride-Henry K, van Wissen K. Parenting a child with medically diagnosed severe food allergies in New Zealand: the experience of being unsupported in keeping their children healthy and safe. *Contemporary nurse*. 2010;35(1):77-87.

19. Rouf K, White L, Evans K. A qualitative investigation into the maternal experience of having a young child with severe food allergy. *Clinical child psychology and psychiatry*. 2012;17(1):49-64.
20. Sanagavarapu P. Experiences and support needs of mothers of children with food allergy during the transition to school. *Early Childhood Education Journal*. 2018;46(5):523-534.
21. Stensgaard A, Bindslev-Jensen C, Nielsen D. Peanut allergy as a family project: social relations and transitions in adolescence. *Journal of clinical nursing*. 2017;26(21-22):3371-3381.
22. Strinnholm A, Brulin C, Lindh V. Experiences of double-blind, placebo-controlled food challenges (DBPCFC): a qualitative analysis of mothers' experiences. *Journal of child health care : for professionals working with children in the hospital and community*. 2010;14(2):179-188.
23. Vargas PA, Sicherer SH, Christie L, et al. Developing a food allergy curriculum for parents. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2011;22(6):575-582.
24. Arasi S, Otani IM, Klingbeil E, et al. Two year effects of food allergen immunotherapy on quality of life in caregivers of children with food allergies. *Allergy, asthma, and clinical immunology : official journal of the Canadian Society of Allergy and Clinical Immunology*. 2014;10(1):57.
25. Knibb RC, Semper H. Impact of suspected food allergy on emotional distress and family life of parents prior to allergy diagnosis. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2013;24(8):798-803.
26. Knibb RC. Effectiveness of Cognitive Behaviour Therapy for Mothers of Children with Food Allergy: A Case Series. *Healthcare (Basel, Switzerland)*. 2015;3(4):1194-1211.
27. Polloni L, Ferruzza E, Ronconi L, et al. Assessment of children's nutritional attitudes before oral food challenges to identify patients at risk of food reintroduction failure: a prospective study. *Allergy*. 2017;72(5):731-736.
28. Shemesh E, Annunziato RA, Ambrose MA, et al. Child and parental reports of bullying in a consecutive sample of children with food allergy. *Pediatrics*. 2013;131(1):e10-17.
29. 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):e439-445.
30. Baptist AP, Dever SI, Greenhawt MJ, Polmear-Swendris N, McMorris MS, Clark NM. A self-regulation intervention can improve quality of life for families with food allergy. *The Journal of allergy and clinical immunology*. 2012;130(1):263-265.e266.
31. Boyle RJ, Umasunthar T, Smith JG, et al. A brief psychological intervention for mothers of children with food allergy can change risk perception and reduce anxiety: outcomes of a randomized controlled trial. *Clinical and experimental allergy*. 2017;47(10):1309-1317.
32. Howe LC, Leibowitz KA, Perry MA, et al. Changing Patient Mindsets about Non-Life-Threatening Symptoms during Oral Immunotherapy: a Randomized Clinical Trial. *Journal of allergy and clinical immunology: in practice*. 2019.
33. Kitamura K, Sakai K, Sasaki K, et al. Efficacy, safety, and parental anxiety in a randomized trial of two dietary instruction methods for children with suspected hen's egg allergy. *Allergology international : official journal of the Japanese Society of Allergology*. 2020.
34. Weinberger T, Annunziato R, Riklin E, Shemesh E, Sicherer SH. A randomized controlled trial to reduce food allergy anxiety about casual exposure by holding the allergen: TOUCH study. *J Allergy Clin Immunol Pract*. 2019;7(6):2039-2042 e2014.
35. Otani IM, Bégin P, Kearney C, et al. Multiple-allergen oral immunotherapy improves quality of life in caregivers of food-allergic pediatric subjects. *Allergy, asthma, and clinical immunology : official journal of the Canadian Society of Allergy and Clinical Immunology*. 2014;10(1):25.
36. Ferro MA, Van Lieshout RJ, Ohayon J, Scott JG. Emotional and behavioral problems in adolescents and young adults with food allergy. *Allergy*. 2016;71(4):532-540.
37. Goodwin RD, Rodgin S, Goldman R, et al. Food Allergy and Anxiety and Depression among Ethnic Minority Children and Their Caregivers. *The Journal of pediatrics*. 2017;187:258-264.e251.
38. Knibb RC, Ibrahim NF, Stiefel G, et al. The psychological impact of diagnostic food challenges to confirm the resolution of peanut or tree nut allergy. *Clinical and experimental allergy : journal of the British Society for Allergy and Clinical Immunology*. 2012;42(3):451-459.

39. Komulainen K. Parental burden in families with a young food-allergic child. *Child Care in Practice*. 2010;16(3):287-302.
40. Aika S, Ito M, Yamamoto Y. Food allergy response capabilities of mothers and related factors. *Nursing & health sciences*. 2017;19(3):340-350.
41. Allen CW, Bidarkar MS, vanNunen SA, Campbell DE. Factors impacting parental burden in food-allergic children. *Journal of paediatrics and child health*. 2015;51(7):696-698.
42. Annunziato RA, Shemesh E, Weiss CC, Izzo GN, D'Urso C, Sicherer SH. An assessment of the mental health care needs and utilization by families of children with a food allergy. *Journal of health psychology*. 2013;18(11):1456-1464.
43. Baricic TV, Catipovic M, Cetinic EL, Krmek V, Horvat I. Parental Perception, Prevalence and Primary Care Physicians' Knowledge on Childhood Food Allergy in Croatia. *Children (Basel, Switzerland)*. 2015;2(3):305-316.
44. Begin P, Graham F, Killer K, Paradis J, Paradis L, Des Roches A. Introduction of peanuts in younger siblings of children with peanut allergy: a prospective, double-blinded assessment of risk, of diagnostic tests, and an analysis of patient preferences. *Allergy*. 2016;71(12):1762-1771.
45. Beken B, Celik V, Gokmirza Ozdemir P, Sut N, Gorker I, Yazicioglu M. Maternal anxiety and internet-based food elimination in suspected food allergy. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2019;30(7):752-759.
46. Birdi G, Cooke R, Knibb R. Quality of Life, Stress, and Mental Health in Parents of Children with Parentally Diagnosed Food Allergy Compared to Medically Diagnosed and Healthy Controls. *Journal of allergy*. 2016;2016:1497375.
47. Bollinger ME, Dahlquist LM, Mudd K, Sonntag C, Dillinger L, McKenna K. The impact of food allergy on the daily activities of children and their families. *Ann Allergy Asthma Immunol*. 2006;96(3):415-421.
48. Burke KJ, Hooper J. Multiple child food hypersensitivity impacts positive adjustment in parents. *Journal of Child and Family Studies*. 2017;26(7):1844-1853.
49. Chad L, Ben-Shoshan M, Asai Y, et al. A majority of parents of children with peanut allergy fear using the epinephrine auto-injector. *Allergy*. 2013;68(12):1605-1609.
50. Chow C, Pincus DB, Comer JS. Pediatric Food Allergies and Psychosocial Functioning: Examining the Potential Moderating Roles of Maternal Distress and Overprotection. *Journal of pediatric psychology*. 2015;40(10):1065-1074.
51. Cohen BL, Noone S, Muñoz-Furlong A, Sicherer SH. Development of a questionnaire to measure quality of life in families with a child with food allergy. *The Journal of allergy and clinical immunology*. 2004;114(5):1159-1163.
52. Cortes A, Castillo A, Sciaraffia A. Development of the scale of psychosocial factors in food allergy (SPS-FA). *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2013;24(7):671-677.
53. Cortes A, Castillo A, Sciaraffia A. Food allergy: Children's symptom levels are associated with mothers' psycho-socio-economic variables. *Journal of psychosomatic research*. 2018;104:48-54.
54. Cummings AJ, Knibb RC, Erlewyn-Lajeunesse M, King RM, Roberts G, Lucas JS. Management of nut allergy influences quality of life and anxiety in children and their mothers. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2010;21(4 Pt 1):586-594.
55. Ditzler N, Greenhawt M. Influence of health literacy and trust in online information on food allergy quality of life and self-efficacy. *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*. 2016;117(3):258-263.e251.
56. DunnGalvin A, Treneva M, Pampura A, Grebenko A, Makatsori M, Munblit D. Quality of life associated with maternal anxiety disorder in Russian children and adolescents with food allergy. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2020;31(1):78-84.
57. Fathi SM, Tavakol M, Rezaei N, et al. Impact of IgE-mediated Food Allergy on Parental Quality of Life in Iranian Patients. *Iranian journal of allergy, asthma, and immunology*. 2016;15(5):372-380.
58. Fedele DA, McQuaid EL, Faino A, et al. Patterns of adaptation to children's food allergies. *Allergy*. 2016;71(4):505-513.

59. Fox JK, Masia Warner C. Food allergy and social anxiety in a community sample of adolescents. *Children's Health Care*. 2017;46(1):93-107.
60. Franxman TJ, Howe L, Teich E, Greenhawt MJ. Oral food challenge and food allergy quality of life in caregivers of children with food allergy. *The journal of allergy and clinical immunology In practice*. 2015;3(1):50-56.
61. Greenhawt M, DunnGalvin A. Preliminary psychometric analyses and clinical performance of a caregiver self-efficacy scale for food allergy self-management. *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*. 2018;120(1):73-79.
62. Herbert LJ, Dahlquist LM, Bollinger ME. Maternal intolerance of uncertainty, anxiety, and adherence with food challenge referrals. *Journal of health psychology*. 2013;18(9):1209-1219.
63. Herbert LJ, Mehta P, Sharma H. Mealtime behavior among parents and their young children with food allergy. *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*. 2017;118(3):345-350.
64. Hoehn JL, Dahlquist LM, Hahn AL, Bollinger ME. Parents of Children With Food Allergy: Gender Differences in Perceived Impact and Perceived Food Allergy Severity. *Journal of pediatric psychology*. 2017;42(2):186-197.
65. Howe L, Franxman T, Teich E, Greenhawt M. What affects quality of life among caregivers of food-allergic children? *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*. 2014;113(1):69-74.e62.
66. Kao LM, Greenhawt MJ, Warren CM, Siracusa M, Smith BM, Gupta RS. Parental and parent-perceived child interest in clinical trials for food allergen immunotherapy. *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*. 2018;120(3):331-333.e331.
67. Kemp AS, Allen CW, Campbell DE. Parental perceptions in egg allergy: does egg challenge make a difference? *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2009;20(7):648-653.
68. King RM, Knibb RC, Hourihane JO. Impact of peanut allergy on quality of life, stress and anxiety in the family. *Allergy*. 2009;64(3):461-468.
69. Klinnert MD, McQuaid EL, Fedeles DA, et al. Children's Food Allergies: Development of the Food Allergy Management and Adaptation Scale. *Journal of pediatric psychology*. 2015;40(6):572-580.
70. Knibb RC, Stalker C. Validation of the Food Allergy Quality of Life-Parental Burden Questionnaire in the UK. *Quality of life research : an international journal of quality of life aspects of treatment, care and rehabilitation*. 2013;22(7):1841-1849.
71. Knibb RC, Barnes C, Stalker C. Parental confidence in managing food allergy: development and validation of the Food Allergy Self-Efficacy Scale for Parents (FASE-P). *Clin Exp Allergy*. 2015;45(11):1681-1689.
72. Knibb RC, Barnes C, Stalker C. Parental self-efficacy in managing food allergy and mental health predicts food allergy-related quality of life. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2016;27(5):459-464.
73. Knibb RC, Cortes A, Barnes C, Stalker C. Validation of the English Version of the Scale for Psychosocial Factors in Food Allergy and the Relationship with Mental Health, Quality of Life, and Self-Efficacy. *Journal of allergy*. 2016;2016:4850940.
74. Lau GY, Patel N, Umasunthar T, et al. Anxiety and stress in mothers of food-allergic children. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2014.
75. Laura P, Sabrina B, Lucia R, et al. Post-anaphylaxis acute stress symptoms: a preliminary study on children with food-induced anaphylaxis and their parents. *The journal of allergy and clinical immunology In practice*. 2020.
76. Lebovidge JS, Stone KD, Twarog FJ, et al. Development of a preliminary questionnaire to assess parental response to children's food allergies. *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*. 2006;96(3):472-477.

77. Lebovidge JS, Strauch H, Kalish LA, Schneider LC. Assessment of psychological distress among children and adolescents with food allergy. *The Journal of allergy and clinical immunology*. 2009;124(6):1282-1288.
78. Luke AK, Flessner CA. Examining Differences in Parent Knowledge About Pediatric Food Allergies. *Journal of pediatric psychology*. 2020;45(1):101-109.
79. McHenry M, Watson W. Impact of primary food allergies on the introduction of other foods amongst Canadian children and their siblings. *Allergy, asthma, and clinical immunology : official journal of the Canadian Society of Allergy and Clinical Immunology*. 2014;10(1):26.
80. Mendonça RB, Solé D, DunnGalvin A, Len CA, Sarni ROS. Evaluation of the measurement properties of the Brazilian version of two quality-of-life questionnaires in food allergy - for children and their parents. *Jornal de pediatria*. 2019.
81. Mikkelsen A, Mehlig K, Borres MP, Oxelmark L, Björkelund C, Lissner L. Monitoring the impact of cow's milk allergy on children and their families with the FLIP questionnaire--a six-month follow-up study. *Pediatr Allergy Immunol*. 2015;26(5):409-415.
82. Ng IE, Turner PJ, Kemp AS, Campbell DE. Parental perceptions and dietary adherence in children with seafood allergy. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2011;22(7):720-728.
83. Nguyen M, Wainstein BK, Hu W, Ziegler JB. Parental satisfaction with oral peanut food challenges; perception of outcomes and impact on management of peanut allergy. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2010;21(8):1119-1126.
84. Ogg J, Wong J, Wan MW, Davis N, Arkwright PD. Factors that determine parents' perception of their child's risk of life-threatening food-induced anaphylaxis. *Allergy and asthma proceedings*. 2017;38(1):44-53.
85. Patel DR, Upton JEM, Wang J, et al. Quality of life for parents of children with food allergy in peanut-restricted versus peanut-free schools in the United States and Canada. *The journal of allergy and clinical immunology In practice*. 2018;6(2):671-673.e677.
86. Peterson CC, Harrison LE. Development of a brief assessment of activity limitations in children with food allergy. *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*. 2018;120(3):327-328.
87. Polloni L, Toniolo A, Lazzarotto F, et al. Nutritional behavior and attitudes in food allergic children and their mothers. *Clinical and translational allergy*. 2013;3(1):41.
88. Primeau MN, Kagan R, Joseph L, et al. The psychological burden of peanut allergy as perceived by adults with peanut allergy and the parents of peanut-allergic children. *Clinical and experimental allergy : journal of the British Society for Allergy and Clinical Immunology*. 2000;30(8):1135-1143.
89. Roy KM, Roberts MC. Peanut allergy in children: relationships to health-related quality of life, anxiety, and parental stress. *Clin Pediatr (Phila)*. 2011;50(11):1045-1051.
90. Saleh-Langenberg J, Flokstra-de Blok BM, Goossens NJ, Kemna JC, van der Velde JL, Dubois AE. The compliance and burden of treatment with the epinephrine auto-injector in food-allergic adolescents. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2016;27(1):28-34.
91. Sharma A, Prematta T, Fausnight T. A pediatric food allergy support group can improve parent and physician communication: results of a parent survey. *Journal of allergy*. 2012;2012:168053.
92. Sicherer SH, Noone SA, Muñoz-Furlong A. The impact of childhood food allergy on quality of life. *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*. 2001;87(6):461-464.
93. Soller L, To S, Hsu E, Chan ES. Current tools measuring anxiety in parents of food-allergic children are inadequate. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2020;31(6):678-685.
94. Ward C, Greenhawt M. Differences in Caregiver Food Allergy Quality of Life Between Tertiary Care, Specialty Clinic, and Caregiver-Reported Food Allergic Populations. *Journal of Allergy and Clinical Immunology: In Practice*. 2016;4(2):257-264.e253.

95. Warren CM, Gupta RS, Sohn MW, et al. Differences in empowerment and quality of life among parents of children with food allergy. *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*. 2015;114(2):117-125.
96. Widge AT, Flory E, Sharma H, Herbert LJ. Food Allergy Perceptions and Health-Related Quality of Life in a Racially Diverse Sample. *Children (Basel, Switzerland)*. 2018;5(6).
97. Williams NA, Parra GR, Elkin TD. Subjective distress and emotional resources in parents of children with food allergy. *Children's Health Care*. 2009;38(3):213-227.
98. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. *J Consult Clin Psychol*. 1988;56(6):893-897.
99. Spitzer RL, Kroenke K, Williams JB, Lowe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med*. 2006;166(10):1092-1097.
100. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand*. 1983;67(6):361-370.
101. Zilberg NJ, Weiss DS, Horowitz MJ. Impact of Event Scale: a cross-validation study and some empirical evidence supporting a conceptual model of stress response syndromes. *J Consult Clin Psychol*. 1982;50(3):407-414.
102. Stein RE, Riessman CK. The development of an impact-on-family scale: preliminary findings. *Med Care*. 1980;18(4):465-472.
103. Weinman J, Petrie K, R M-M, Horne R. The Illness Perception Questionnaire: A new method for assessing illness perceptions. *Psychology and Health*. 1996;11:431-446.
104. Bonner MJ, Hardy KK, Guill AB, McLaughlin C, Schweitzer H, Carter K. Development and validation of the parent experience of child illness. *J Pediatr Psychol*. 2006;31(3):310-321.
105. Loyd BH, Abidin RR. Revision of the Parenting Stress Index. *J Pediatr Psychol*. 1985;10(2):169-177.
106. Meyer TJ, Miller ML, Metzger RL, Borkovec TD. Development and validation of the Penn State Worry Questionnaire. *Behav Res Ther*. 1990;28(6):487-495.
107. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983;24(4):385-396.
108. Procidano ME, Heller K. Measures of perceived social support from friends and from family: three validation studies. *Am J Community Psychol*. 1983;11(1):1-24.
109. Gaudry E, Vagg P, Spielberger CD. Validation of the State-Trait Distinction in Anxiety Research. *Multivariate Behav Res*. 1975;10(3):331-341.
110. Development of the World Health Organization WHOQOL-BREF quality of life assessment. The WHOQOL Group. *Psychol Med*. 1998;28(3):551-558.
111. van der Velde JL, Flokstra-de Blok BM, Vlieg-Boerstra BJ, et al. Development, validity and reliability of the food allergy independent measure (FAIM). *Allergy*. 2010;65(5):630-635.
112. Lebovidge JS, Stone KD, Twarog FJ, et al. Development of a preliminary questionnaire to assess parental response to children's food allergies. *Ann Allergy Asthma Immunol*. 2006;96(3):472-477.
113. DunnGalvin A, de BlokFlokstra BM, Burks AW, Dubois AE, Hourihane JO. Food allergy QoL questionnaire for children aged 0-12 years: content, construct, and cross-cultural validity. *Clin Exp Allergy*. 2008;38(6):977-986.
114. Aika S, Ito M, Yamamoto Y. Food allergy response capabilities of mothers and related factors. *Nurs Health Sci*. 2017;19(3):340-350.
115. Uwe N, Eva O, Ann-Charlotte E, Gun N, Ann G. Validation of a disease-specific questionnaire for measuring parent-reported health-related quality of life in children with allergies. *Scand J Caring Sci*. 2012;26(4):679-687.
116. Chooniedass R, Temple B, Martin D, Becker A. A qualitative study exploring parents' experiences with epinephrine use for their child's anaphylactic reaction. *Clinical and Translational Allergy*. 2018;8:43.
117. DunnGalvin A, Polloni L, Le Bovidge J, et al. Preliminary Development of the Food Allergy Coping and Emotions Questionnaires for Children, Adolescents, and Young People: Qualitative Analysis of Data on IgE-Mediated Food Allergy from Five Countries. *J Allergy Clin Immunol Pract*. 2018;6(2):506-513 e511.
118. Gillespie CA, Woodgate RL, Chalmers KI, Watson WT. "Living with risk": mothering a child with food-induced anaphylaxis. *J Pediatr Nurs*. 2007;22(1):30-42.

119. 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):179-188.
120. Rouf K, White L, Evans K. A qualitative investigation into the maternal experience of having a young child with severe food allergy. *Clin*. 2012;17(1):49-64.
121. Greenhawt M, Marsh R, Gilbert H, Sicherer S, DunnGalvin A, Matlock D. Understanding caregiver goals, benefits, and acceptable risks of peanut allergy therapies. *Ann Allergy Asthma Immunol*. 2018;121(5):575-579.
122. Knibb RC, Semper H. Impact of suspected food allergy on emotional distress and family life of parents prior to allergy diagnosis. *Pediatr Allergy Immunol*. 2013;24(8):798-803.
123. Arasi S, Otani IM, Klingbeil E, et al. Two year effects of food allergen immunotherapy on quality of life in caregivers of children with food allergies. *Allergy, Asthma, & Clinical Immunology : Official Journal of the Canadian Society of Allergy & Clinical Immunology*. 2014;10(1):57.
124. Otani IM, Begin P, Kearney C, et al. Multiple-allergen oral immunotherapy improves quality of life in caregivers of food-allergic pediatric subjects. *Allergy, Asthma, & Clinical Immunology : Official Journal of the Canadian Society of Allergy & Clinical Immunology*. 2014;10(1):25.
125. Boyle RJ, Umasunthar T, Smith JG, et al. A brief psychological intervention for mothers of children with food allergy can change risk perception and reduce anxiety: Outcomes of a randomized controlled trial. *Clinical & Experimental Allergy*. 2017;47(10):1309-1317.