

Scales of Food Allergy Anxiety (SOFAA): A Novel Tool to Assess Anxiety Among Children with Food Allergy and Their Caregivers



Jennifer L.P. Protudjer, PhD Winnipeg, MB, Canada; and Stockholm, Sweden

For those living with food allergy, avoidance of the allergen(s) is necessary to prevent an allergic reaction.¹ Although the physical consequences of food allergy are well described, the psychological burden of food allergy is an emerging and important topic.² Indeed, much literature exists surrounding the deleterious impact of food allergy on health-related quality of life.³⁻⁶ Food allergy-related anxiety is an increasing focus, measured typically with generic survey instruments,^{4,6} or through qualitative descriptions.^{7,8} Missing from these assessment tools, however, is a disease-specific instrument to measure the role of food allergy in anxiety across different age groups. To date, such an instrument exists only for the adult population.⁹ But, food allergy affects up to 10% of the population, including a disproportionate number of children,¹ with presentation common—albeit not exclusively—in infancy and early childhood, and with a low odds of resolution of allergies to certain foods.¹ As such, a single tool starting from school-age through to adolescence, and a parallel tool for their parents, would provide a means by which to assess food allergy anxiety from the time when children are able to respond for themselves, estimate patterns by children's ages, and between children and their parents, and plan for age-specific programs that address food allergy-related anxiety. In the current issue of the *Journal of Allergy and Clinical Immunology: In Practice*, Dahlsgaard et al¹⁰ introduce the Scales of Food Allergy Anxiety (SOFAA), a tool that addresses this gap.

Informed by multidisciplinary clinical experience and a scoping review, as well as through parent partner engagement, SOFAA was developed for 2 groups of respondents: children aged 8 to 18 years who are followed clinically for IgE-mediated

allergy and their parents, differentiated with the suffixes —C and —P, respectively. Although titled a parent form, it warrants mention that the SOFAA-P is likewise intended for legal guardians. The statements in both forms follow a parallel order with similar wording, making comparisons straightforward. Food allergy anxiety over the previous week is assessed, with higher scores denoting greater anxiety, in 21-item full versions for both children and parents, and a 14-item version and a 7-item brief version, for the child and parent, respectively.

Dahlsgaard et al assessed the SOFAA in a population of children comparably distributed by sex, and their parents (almost exclusively mothers). Children had, on average, 2.6 food allergies, and most (74%) had a history of anaphylaxis. Nearly all (99%) had been prescribed an epinephrine autoinjector. Both the child and parent versions of the SOFAA had excellent levels of internal consistency, with Cronbach alphas of 0.94 and 0.92, respectively, and which far exceeded the *a priori* score for acceptable internal consistency. Likewise, the SOFAA was shown to be reliable, via test-retest, across an average of 16 days, with few significant differences in both bivariate and adjusted analyses.

Before the development of SOFAA, food allergy-specific anxiety was difficult to estimate. Generic anxiety questionnaires are not designed to capture disease-specific anxiety, and thus have contributed to equivocal results and limited understanding of the subtype of anxiety. Food allergy-specific quality-of-life questionnaires provide information on multiple ways in which a child and their family are impacted by food allergy, rather than specifically focusing on anxiety. This new tool addresses the limitations inherent to previous tools used to estimate subtypes of food allergy-related anxiety, balanced against the understanding that some degree of anxiety, which, as Dahlsgaard et al describe, “is necessary and adaptive in this population.” In addition to its more focused utility compared with generic measures of anxiety, both the full and brief versions of SOFAA contain fewer questions than the Food Allergy Quality of Life Questionnaires for parents of children aged 8 to 12 years (30 items) or parents of adolescents, aged 13+ years (27 items),¹¹ and against which the SOFAA was found to have high convergent validity, with moderate to strong correlations. As such, the SOFAA can be used as a stand-alone tool that imposes less respondent burden than the concurrent administration of questionnaires on both generalized anxiety and disease-specific health-related quality of life, as well as a complement to both questionnaires on generic anxiety and food allergy-related quality of life. This latter approach may prove important when restrictions beyond those required by food allergy are suspected, or if a child or their parent exhibits frustration or loneliness attributable to food allergy. In brief, SOFAA is a

^aDepartment of Pediatrics and Child Health, University of Manitoba, Winnipeg, MB, Canada

^bChildren's Hospital Research Institute of Manitoba, Winnipeg, MB, Canada

^cGeorge and Fay Yee Centre for Healthcare Innovation, Winnipeg, MB, Canada

^dDepartment of Food and Human Nutritional Sciences, University of Manitoba, Winnipeg, MB, Canada

^eCentre for Allergy Research, Karolinska Institutet, Stockholm, Sweden

Conflicts of interest: J. L. P. Protudjer sits on the Steering Committee of Canada's National Food Allergy Action Plan, and is Section Head of Allied Health, Canadian Society of Allergy and Clinical Immunology.

Received for publication August 17, 2021; revised October 19, 2021; accepted for publication October 20, 2021.

Corresponding author: Jennifer L.P. Protudjer, PhD, University of Manitoba Faculty of Health Sciences, Department of Pediatrics and Child Health, 501G-715 McDermot Ave, Winnipeg, MB, Canada R3E 3P4. E-mail: Jennifer.Protudjer@umanitoba.ca.

J Allergy Clin Immunol Pract 2022;10:170-1. 2213-2198

© 2021 American Academy of Allergy, Asthma & Immunology
<https://doi.org/10.1016/j.jaip.2021.10.036>

more concise tool than those to which it was compared, yet provides a comprehensive and focused measure of food allergy anxiety.

Dahlsgaard et al offered guidance on the use of the different versions of SOFAA. The brief versions permit a means by which allergists and pediatricians can quickly screen for anxiety and efficiently identify targets for personalized, exposure-based cognitive-behavioral therapy. In contrast, the 21-item full versions may be more suited to researchers and clinicians who seek to measure treatment outcomes, including consideration to anxiety-driven, medically unnecessary food avoidance. Because the full version of the SOFAA-P is appropriate for simultaneous administration to multiple caregivers, this tool also provides a means by which to glean insight into family functioning and thus guide clinical decisions. When used longitudinally, the SOFAA may also differentiate between predictable variations in anxiety during child and adolescent development, anxiety subsequent to acute food allergy–related stressors such as an allergic reaction, and excessive anxiety.

The SOFAA also offers future opportunities, specifically related to consideration of nonfemale parents, and historically underrepresented populations. Likewise, because the current version of SOFAA was validated among English speakers, translation (including linguistic evaluation and context) and validation into other languages warrants consideration. Although the SOFAA was evaluated among patient populations with internet access, free downloads are available¹² if paper versions are preferred.

In conclusion, Dahlsgaard et al present a novel tool that assesses food allergy anxiety based on reports from affected children aged 8 to 18 years, and their parents/caregivers. The SOFAA can add to the assessment of the nonphysical burden of food allergy,

either independently or in combination with food allergy quality-of-life assessment tools.

REFERENCES

1. Sicherer SH, Sampson HA. Food allergy: a review and update on epidemiology, pathogenesis, diagnosis, prevention, and management. *J Allergy Clin Immunol* 2018;141:41-58.
2. Feng C, Kim JH. Beyond avoidance: the psychosocial impact of food allergies. *Clin Rev Allergy Immunol* 2019;57:74-82.
3. Flokstra-de Blok BM, Dubois AE, Vlieg-Boerstra BJ, Oude Elberink JN, Raat H, DunnGalvin A, et al. Health-related quality of life of food allergic patients: comparison with the general population and other diseases. *Allergy* 2010;65:238-44.
4. Protudjer JLP, Golding MA, Salisbury MR, Abrams EM, Roos LE. High anxiety and health-related quality-of-life in families with children with food allergy during COVID-19. *Ann Allergy Asthma Immunol* 2021;126:83-8.
5. Saleh-Langenberg J, Goossens NJ, Flokstra-de Blok BM, Kollen BJ, van der Meulen GN, Le TM, et al. Predictors of health-related quality of life of European food-allergic patients. *Allergy* 2015;70:616-24.
6. 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. *Pediatr Allergy Immunol* 2020;31:78-84.
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;124:594-9.
8. Johnson SF, Woodgate RL. Qualitative research in teen experiences living with food-induced anaphylaxis: a meta-aggregation. *J Adv Nurs* 2017;73:2534-46.
9. Coelho GLH, Byrne A, Hourihane J, DunnGalvin A. Development of the Food Anxiety Scale in an adult population: psychometric parameters and convergent validity. *J Allergy Clin Immunol Pract* 2021;9. 3452-8.e1.
10. Dahlsgaard K, Wilkey LK, Stites SD, Lewis MO, Spergel JM. Development of the Child- and Parent-Rates Scales for Food Allergy Anxiety. *J Allergy Clin Immunol Pract* 2022;1:161-9.
11. Flokstra-de Blok BMJ. Food Allergy Quality of Life Questionnaires (FAQLQ). In: Michalos AC, editor. *Encyclopedia of Quality of Life and Well-Being Research*. Springer; 2014. p. 100.
12. Children's Hospital of Philadelphia. Scale of Food Allergy Anxiety (SOFAA). Accessed October 19, 2021. <https://www.chop.edu/centers-programs/food-allergy-center/scales-food-allergy-anxiety-sofaa>