466

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Peanut Allergy Burden Survey: Impact of Peanut Allergy on Global Quality of Life in Adolescent Patients

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INTRODUCTION

- Peanut allergy (PA), a common food allergy, has become increasingly prevalent in recent years, particularly among children[1]
  - A recent large population-based survey estimated that 2.2% of all children and adolescents in the United States (US) have PA[2]
- Individuals with PA who are exposed to peanuts can develop various symptoms that range in severity and onset. The most severe allergic reaction is anaphylaxis, which may be life-threatening and requires immediate treatment with epinephrine[3]
- The standard of care for PA has been to avoid peanuts and appropriately treat the symptoms of a reaction.[3,4] With the first treatment for PA recently approved by the US Food and Drug Administration in January 2020[5] and other treatments under investigation, this may be changing
- Given the potential severity of symptoms and need for close management, living with food allergies such as PA presents day-to-day concerns and challenges for allergic individuals and their families that can negatively impact health-related quality of life (HRQL)[6-8]
- Although the burden of food allergy has been fairly well-documented, the literature on allergy-specific HRQL among adolescent patients with PA is limited

OBJECTIVE

- The Peanut Allergy Burden Study (PABS) assessed the real-world burden of PA on patients and caregivers in the US. The objective of this analysis was to understand the relationship between demographic characteristics, PA experience, and treatment on dimensions of adolescent HRQL

METHODS

Study Design and Population

- Data were collected via the PABS, a cross-sectional, online survey in the US[9]
- Adolescents aged 13 to 17 years with self-reported, physician-diagnosed PA were recruited for the survey using commercial research panels
- Prospective participants first completed a brief screening questionnaire; those who met inclusion and exclusion criteria were eligible to complete the 20-minute survey
  - Inclusion criteria:
    - Aged 13 to 17 years
    - (a) Had been diagnosed by a healthcare provider as having PA, and (b) had experienced a reaction to peanuts that required medication/medical care *or* have ready access to emergency medication in case of an allergic reaction to peanuts
    - Agree "completely" or "very much" with the following statement: "I avoid being around peanuts. I don't eat peanuts, things made with peanuts, or peanut oil or other things that might have touched peanuts or peanut oil."
    - Resident of the US
    - English speaker
  - Exclusion criteria:
    - Sex or age quotas had already been met
- The study protocol and survey were reviewed and approved by an independent institutional review board

Survey Measures

- Demographic characteristics, disease experience, PA-related medical and treatment history
- General HRQL was measured by the validated Pediatric Quality of Life Inventory version 4.0 Teen Report[10] (PedsQL)
  - The PedsQL consists of 23 items comprising 5 domains. The 5 domains and their minimal important difference (MID) are: Physical (6.66), Emotional (8.94), Social (8.36), School (9.12), and Psychosocial (5.30); a Total score was also calculated
  - Each item of the PedsQL is measured on a 5-point scale (0="Never" to 4="Almost always")
  - The domain scores and Total score are converted to a 0 (worst) to 100 (best) scale
  - Higher scores indicate better HRQL
- The perceived risk of health consequences of PA was measured by the validated Food Allergy Independent Measure-Teenager Form[11] (FAIM-TF)
  - The 6-item FAIM-TF contains 4 items that can be summarized into an Expectation of Outcomes subscale. Respondents assess the likelihood they will:
    - Eat something to which they are allergic
    - Have a reaction if they eat something to which they are allergic
    - Die if they eat something to which they are allergic
    - Not effectively deal with an allergic reaction
  - Each of the FAIM-TF Expectation of Outcomes items are measured on a 7-point scale (0="Never" to 6="Always")

Analysis

- Between-group PedsQL scores were compared using t-tests

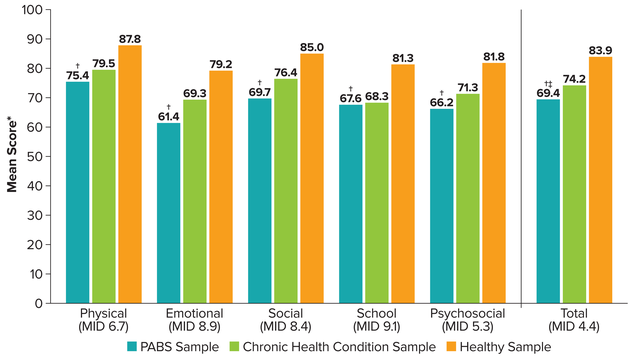
RESULTS

- 102 adolescents with PA completed the PABS; mean (SD) age was 14.7 (1.4) years, 55.9% were male, and 62.8% were white
- Mean PedsQL Total score was 69.4; mean subscale scores were: Physical (75.4), Emotional (61.4), Social (69.7), School (67.6), Psychosocial (66.2)
  - There were no differences in PedsQL scores by:
    - Sex
    - Presence of other food allergies (0 vs ≥1)
    - Presence of other health conditions (0 vs ≥1)
    - Satisfaction with epinephrine autoinjector ("Not at all"/"Not very"/"Somewhat" vs "Very"/"Extremely" satisfied)
    - Degree of agreement that respondents avoid indirect contact with peanut allergen ("Do not agree at all"/"Do not agree very much"/"Agree somewhat" vs "Agree very much"/"Agree completely")

Comparison of Adolescents With Peanut Allergy to Subsets of the General Pediatric Population

- Varni et al[10] reported mean domain and Total scores from 2 subsets of the general population of 8–16-year-olds
  - Healthy respondents: N=5079 to 5026, depending on scale
  - Respondents with a chronic health condition: N=574 to 568, depending on scale
    - Chronic health condition was defined as asthma, diabetes, attention-deficit/hyperactivity disorder (ADHD), depression, or other, as identified by parents
- All PedsQL domain scores of adolescents with PA were *lower* than those of the 2 Varni subgroups (**Figure 1**)
  - PA PedsQL scores from the PABS were worse compared to reported scores for healthy respondents and exceeded the MID of each domain and the Total score
  - The Peds QL Total score for adolescents with PA also exceeded the MID in comparison with the Total score for respondents with other chronic health conditions

Figure 1. Comparison of Mean PedsQL Domain and Total Scores to Subsets of the General Pediatric Population[10]



[a]Range 1–100; higher scores indicate better HRQL. [†]Difference versus the Healthy Sample exceeds the MID. [‡]Difference versus the Chronic Health Condition Sample exceeds the MID.
HRQL, health-related quality of life; MID, minimal important difference; PABS, Peanut Allergy Burden Survey; PedsQL, Pediatric Quality of Life Inventory version 4.0 Teen Report.

Comparison of Subgroups by Disease Experience and Behaviors

- Statistically significant differences in domain and Total scores were seen in comparisons of subgroups of adolescent PABS respondents across several variables. Those differences commonly exceeded the scale MID (**Table 1**)
- To better understand the variability in HRQL among adolescents with PA, additional analyses were conducted using the following variables:
  - Differences in satisfaction with current approaches to avoiding or preventing peanut allergies
  - The degree to which respondents feel they are in control of their PA
  - The degree to which PA limits their day-to-day life
  - The impact that fear of a reaction has on their emotional well-being
  - Recent reaction experience
    - PA reaction in the last year
    - PA reaction that required clinician intervention (ie, use of emergency department, hospitalization, intravenous epinephrine, or intubation) during the last year

Table 1. Comparison of PedsQL Domain and Total Scores on Disease Experience and Behavior Variables in Subgroups of Respondents

Variable	Comparison	Physical	Emotional	Social	School	Psycho-social	Total
Satisfaction with prevention approaches	Very/Extremely	77.4	66.5[a,b]	74.9[a,b]	70.7	70.7[a,b]	73.0[a,b]
	Not at all/ Not very/ Somewhat	71.6	51.2	59.1	61.6	57.3	62.2
Control over PA	Very much/ Completely	78.9[a]	66.9[a]	75.4[a]	73.7[a]	71.9[a]	74.4[a]
	Not at all/ Not very much/ Somewhat	71.0	54.4	62.4	60.0	59.0	63.1
Extent PA limits day-to-day life	Not at all/ Not very much/ Somewhat	78.4[b]	64.9[a,b]	73.7[a,b]	70.1[b]	69.5[a,b]	72.6[a,b]
	Very much/ Completely	67.2	51.5	58.5	60.7	57.0	60.5
Impact of fear on emotional well-being	Not at all/ Not very much/ Somewhat	76.9	68.0[a,b]	74.3[a,b]	69.6	70.5[a,b]	72.7[b]
	Very much/ Completely	73.2	51.6	62.8	64.8	59.7	64.4
PA reaction in last year	No	88.9[a,b]	74.8[a,b]	79.8[a,b]	73.5	75.9[a,b]	80.4[a,b]
	Yes	70.8	56.8	66.2	65.6	62.9	65.6
Clinician intervention in last year	No	89.9[a,b]	74.9[a,b]	79.6[a,b]	76.2[a,b]	76.8[a,b]	81.4[a,b]
	Yes	67.2	53.7	64.0	62.8	60.2	62.6

[a]*p*-value of group comparison ≤0.05. [b]Difference between groups exceeds the MID.
MID, minimal important difference; PA, peanut allergy; PedsQL, Pediatric Quality of Life Inventory version 4.0 Teen Report.

Comparisons of Subgroups Defined by Responses to the FAIM-TF

- Statistically significant differences in domain and Total scores were seen in comparisons of subgroups of adolescent PABS responses to the FAIM-TF (**Table 2**)
  - All comparisons were statistically significant for 2 items:
    - Chance of death if they eat something to which they are allergic
    - Chance they will not effectively deal with an allergic reaction
  - Only the difference on the Expectation of Outcomes subscale of the FAIM-TF was statistically significant for the item regarding the chance of a severe reaction
  - None of the comparisons for the chance of eating something to which they are allergic were significant
- A higher percentage of the comparisons exceeded the scale MID (83.3% of comparisons) than were statistically significant (54.2% of comparisons)

Table 2. Comparison of PedsQL Domain and Total Scores in Subgroups of Respondents on FAIM-TF Items

Variable	Comparison	Physical	Emotional	Social	School	Psycho-social	Total
Chance of eating something they are allergic to	Never/Very small/ Small	80.5[a]	68.1[a]	77.6[a]	70.0	71.9[a]	74.9[a]
	Fair/Great/ Very great/Always	73.4	58.7	66.5	66.7	63.9	67.2
Chance of a severe reaction if eat something they are allergic to	Never/Very small/ Small	79.4	67.5	79.1[a,b]	74.3	73.6[a]	75.6[a]
	Fair/Great/ Very great/Always	74.4	59.7	67.1[b]	65.8	64.2	67.7
Chance of death if eat something they are allergic to	Never/Very small/ Small	84.4[a,b]	68.6[a,b]	79.4[a,b]	75.4[a,b]	74.4[a,b]	77.9[a,b]
	Fair/Great/ Very great/Always	69.1	56.4	62.8	62.2	60.4	63.5
Chance they will not effectively deal with reaction	Never/Very small/ Small	88.5[a,b]	75.4[a,b]	87.3[a,b]	83.9[a,b]	82.2[a,b]	84.4[a,b]
	Fair/Great/ Very great/Always	68.6	54.0	60.4	59.2	57.8	61.6

[a]Difference between groups exceeds the MID. [b]*p*-value of group comparison ≤0.05.
FAIM-TF, Food Allergy Independent Measure-Teenager Form; MID, minimal important difference; PedsQL, Pediatric Quality of Life Inventory version 4.0 Teen Report.

CONCLUSIONS

- The PedsQL domain and Total scores ranged from 61.4 to 75.4 on a scale of 0–100, where higher scores indicate better HRQL
  - Adolescents with PA had much lower PedsQL domain scores and Total scores than those reported for a sample of healthy 8–16-year-olds
  - Furthermore, these differences and the difference in Total score versus the scores of chronically ill 8–16-year-olds exceeded the MID, with peanut-allergic children exhibiting lower HRQL scores
  - Surprisingly, the number of other food allergies and other health conditions did not affect the scores
- A number of subgroup comparisons within disease experience and behavior variables were statistically significant and/or exceeded the MID
  - The largest differences in PedsQL Total scores were seen for subgroup comparisons within the variables dealing with control over PA and need for clinician intervention in the last year, having a reaction in the last year, impact of PA on day-to-day life, satisfaction with current prevention approaches, and impact on emotional well-being
- Scores for FAIM-TF items on which patients evaluated their perceived risk of death due to PA and their ability to effectively deal with a reaction were more closely related to PedsQL scores than scores for the other 2 FAIM-TF Expectation of Outcomes subscale items

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