

Peanut Allergy Impact on Productivity and Quality of Life (PAPRIQUA): The Psychosocial Impact of Peanut Allergy in Children and Caregivers

Sarah Acaster,¹ Katy Gallop,¹ Jane de Vries,² Robert Ryan,³ Andrea Vereda,³ Rebecca Knibb⁴

¹Acaster Lloyd Consulting, Ltd, London, UK; ²Independent consultant, London, UK; ³Aimmune Therapeutics, London, UK; ⁴Department of Psychology, School of Life and Health Sciences, Aston University, Birmingham, UK

INTRODUCTION

- Food allergy (FA) has a significant impact on the health-related quality of life (HRQL) of children and caregivers¹
- Many factors affect HRQL, including perceived FA severity and objective indicators of FA severity (eg, history of anaphylaxis, number of symptoms experienced during a reaction)^{2,3}
- Peanut allergy (PA) is potentially life-threatening and affects up to 3% of children in the developed world, although prevalence estimates vary widely^{4,5}
- Few PA-specific studies have explored the factors associated with child and caregiver HRQL or considered utility, the HRQL metric required for economic analysis, as an outcome

OBJECTIVE

- The PAPRIQUA study used validated instruments to evaluate the psychosocial burden of PA, including the effect of caregiver's or child's sex and caregiver's anxiety, caregiver's perception of PA severity in their child, and factors that predict burden

METHODS

Study Design and Participants

- This study used an online survey to explore burden in children with PA and their caregivers in the United Kingdom (UK). Data on child burden was proxy-reported by the caregivers
- The study was reviewed and approved by the Freiburg Ethics Commission International (FECI code: 017/1938)
- Caregivers in the UK were recruited through a survey recruitment panel
- Eligible participants were parents or primary caregivers of a child aged 4–15 years with medically diagnosed PA who had experienced ≥ 1 reaction to peanut in daily life (excluding a food challenge)

Survey Measures and Analysis

- The cross-sectional, 30-minute online survey included:
 - Sociodemographic questions
 - Clinical questions about child's PA (including caregiver-reported severity level)
 - Proxy-reported child HRQL (EQ-5D-Y and FAQLQ-PF questionnaires)
 - Caregiver/child expectation of outcome, assessed using the FAIM questionnaire
 - Caregiver anxiety/depression, assessed using the HADS questionnaire
- EQ-5D-Y was scored by applying the UK EQ-5D-3L adult value set⁶; other instruments were scored in accordance with published guidelines^{7,8}
- Data were analysed using descriptive statistics, inferential statistics, correlation analyses and regression models

RESULTS

- 100 caregivers of a child with PA completed the survey (Table 1)

Table 1. Caregiver and Child Demographics and Clinical Characteristics

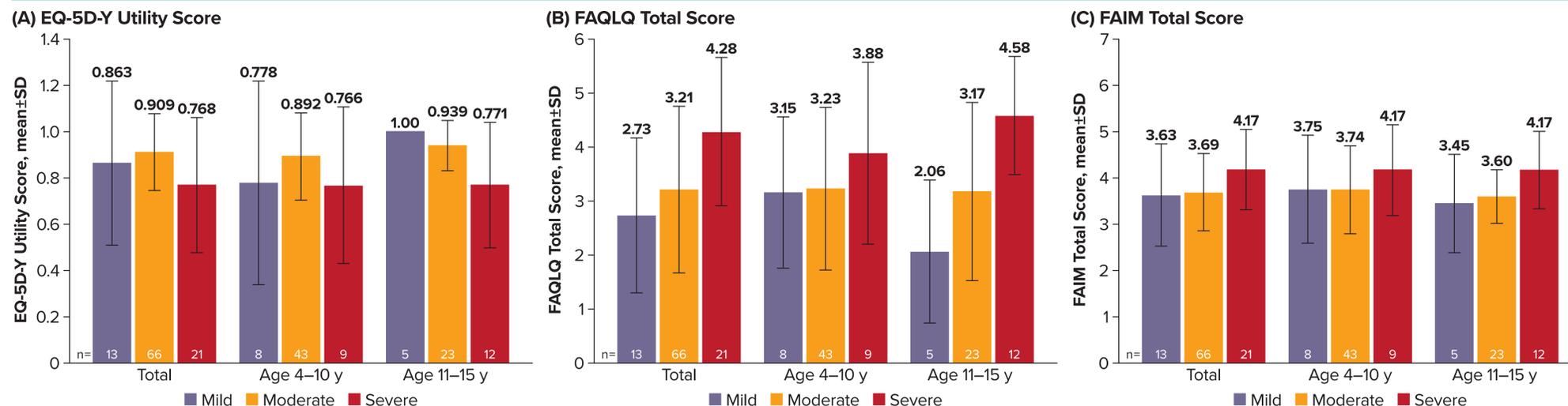
Characteristic	Caregivers N=100	Children N=100
Age, mean (SD), years	39.5 (7.6)	9.8 (3.4)
Female sex, n	55	42
Comorbidities, n		
Allergic rhinitis	22	36
Asthma	20	34
Diabetes type 1 / 2	2 / 4	3 / 2
Eating disorders	7	6
Skin disorders	17	26
Stress	13	5
Other	2	4
None of the above	37	28
Other food allergies, n	—	24 ^a
Prescribed an AAI, n	—	71
Experienced life-threatening event (lifetime), n	—	34
Number of reactions (lifetime), mean (SD)	—	12.0 (28.2) ^b
Proxy-reported severity of peanut allergy, n		
Mild	—	13
Moderate	—	66
Severe	—	21

^a38% among those with severe peanut allergy, as reported by caregiver proxy.
^bIf two outliers are excluded (192 and 206 reactions), the mean (SD) is 8.2 (8.6).
AAI, adrenaline auto-injector; SD, standard deviation.

Child Impacts

- Greater child burden was reported by caregivers who rated their child's PA as more severe; this was driven by the older age group (11–15 years) of children (Figure 1)
 - EQ-5D-Y utility scores showed a significant association between proxy-reported severity in the total sample and in the older population ($P < 0.05$)
 - FAQLQ total scores showed that caregivers of younger children consistently reported levels of moderate burden, whereas burden reported by caregivers of older children was dependent on PA severity
 - A significant effect of PA severity ($P < 0.05$) was observed for children aged 11–15 years across all FAQLQ domains
 - FAIM total scores did not significantly differ across levels of PA severity for either age group
- Caregiver anxiety, caregiver confidence, PA severity, life-threatening events, and number of reactions were significantly correlated with several measures of child burden (Table 2)

Figure 1. Proxy-Reported Utility Scores by Peanut Allergy Severity and Age Group for (A) EQ-5D-Y, (B) FAQLQ, and (C) FAIM



(A) Participants reported their child's current health on 5 dimensions (mobility, self-care, pain and discomfort, usual activities, anxiety and depression) from no problems to extreme problems. Responses were converted into a single index value where a score of 1 = full health and a score of 0 = dead.
(B) FAQLQ is a 30-item questionnaire assessing 3 domains (emotional impact, food anxiety, social and dietary limitations). Each item is scored on a 7-point scale ranging from 0 (no impact) to 6 (extreme impact); the total score represents the mean of the domain scores.
(C) FAIM consists of 8 items in total (4 items asked twice each, once for the caregiver's own perception and once for the caregiver's perception of their child's beliefs) regarding the likelihood of: accidentally ingesting the food to which they are allergic, having a severe reaction, dying from their food allergy, effectively treating themselves when needed. Each item is answered on a 7-point scale ranging from 1 (low perceived disease severity) to 7 (high perceived disease severity).
FAIM, Food Allergy Independent Measure; FAQLQ, Food Allergy Quality of Life Questionnaire; SD, standard deviation.

- For all measures of child burden except EQ-5D-Y, ≥ 2 reactions in the past 12 months and parental anxiety significantly predicted higher levels of burden
- Having experienced a life-threatening event (in their lifetime or in the past 12 months) significantly predicted EQ-5D-Y proxy utility ($P < 0.05$; $P < 0.01$)
 - Similarly, the number of reactions (lifetime; in the past 12 months) significantly predicted EQ-5D-Y proxy utility ($P < 0.01$)
- Sex of the child was not significantly associated with any child outcome measure or PA severity

Caregiver Impacts

- Caregivers' mean anxiety and depression scores were significantly higher than the population norms for male and female participants (range, $P < 0.001$ to $P < 0.05$); rates of probable clinical anxiety (moderate/severe HADS scores > 10) were approximately twice the UK population norms⁹ (Figure 2)
 - Caregiver anxiety was significantly associated with the number of life-threatening reactions the caregiver's child had experienced in the past 12 months/lifetime ($P < 0.05$)
- Increased expectation of negative outcomes (FAIM scores) and lower caregiver confidence were significant predictors of higher burden
- Sex of the caregiver and child were not significantly correlated with any measure of caregiver burden
- Disutility associated with having a child with increased peanut allergy severity ranged from 0.025 (mild utility=0.913 vs moderate utility=0.888) to 0.11 (mild utility=0.913 vs severe utility=0.803), with a mean disutility of 0.068

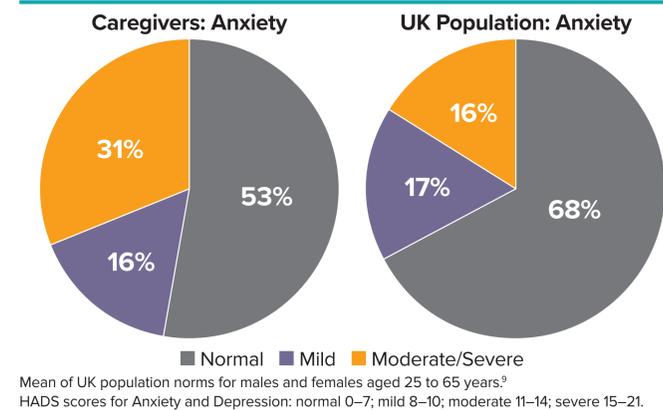
Table 2. Correlations of HRQL Measures

	EQ-5D-Y Utility	FAQLQ	FAIM
Caregiver anxiety	-0.30**	0.54***	0.42***
Caregiver sex	-0.11	-0.12	-0.02
Caregiver confidence	0.05	-0.21*	-0.13
Proxy-reported PA severity	-0.26*	0.31**	0.21*
Life-threatening: past 12 mo (Y/N)	-0.36***	0.29**	0.15
Life-threatening: lifetime (Y/N)	-0.32**	0.32**	0.20
No. reactions: past 12 mo	-0.37***	0.45***	0.28**
No. reactions: lifetime	-0.37***	0.35***	0.15

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

FAIM, Food Allergy Independent Measure; FAQLQ, Food Allergy Quality of Life Questionnaire; HRQL, health-related quality of life; m, months; N, no; PA, peanut allergy; Y, yes.

Figure 2. Caregiver-Reported Anxiety Levels (HADS) Compared With UK Population Norms



CONCLUSIONS

- This survey conducted in the UK highlights the psychosocial factors influenced by PA that should be considered in order to develop strategies to reduce child and caregiver burden
- Male and female caregivers experience high levels of anxiety significantly associated with their child's clinical history
- The data demonstrate that children and caregivers experience high levels of psychosocial burden that intensify with increased perceived severity of PA and experience with allergic reactions

References 1. Patel N, et al. *Allergy Asthma Proc.* 2017;38(2):88-91. 2. Saleh-Langenberg J, et al. *Allergy.* 2015;70(6):616-624. 3. Chow C, et al. *J Pediatr Psychol.* 2015;40(10):1065-1074. 4. Scott LA, et al. *Expert Rev Clin Immunol.* 2019; 15(12):1333-1339. 5. Nwaru BI, et al. *Allergy.* 2014;69(1):62-75. 6. Dolan P. Modeling valuations for EuroQol health states. *Med Care.* 1997;35(11):1095-1108. 7. DunnGalvin A, et al. *Clin Exp Allergy.* 2008;38(6):977-986. 8. Zigmond AS, Snaith RP. *Acta Psychiatr Scand.* 1983;67(6):361-370. 9. Breeman S, et al. *Qual Life Res.* 2015;24(2):391-398.

Acknowledgements This study was funded by Aimmune Therapeutics. The authors thank Anne Marciniak for her contributions to the study and this report. Editorial assistance and medical writing support were provided by The Curry Rockefeller Group, LLC and were funded by Aimmune Therapeutics.

Disclosures SA, KG, JdV and RK are consultants to Aimmune. RR and AV are employees of Aimmune.