

ORIGINAL ARTICLE

Parents report better health-related quality of life for their food-allergic children than children themselves

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Summary

Background Food allergy affects 5–6% of children and impairs health-related quality of life (HRQL). Children and parents may differ in their views concerning the child's HRQL. In food allergy, child- and parent-proxy-reported HRQL have never been compared using valid disease-specific instruments.

Objective The aim of this study was to compare child- and parent-proxy reports on HRQL in food-allergic children (8–12 years).

Methods The Food Allergy Quality of Life Questionnaire-Child Form (FAQLQ-CF), and -Parent Form (FAQLQ-PF) and the Food Allergy Independent Measure-Child Form and -Parent Form (FAIM-CF and -PF) were completed by Dutch food-allergic child-parent pairs. Child- and parent-proxy reports were correlated and tested for significant differences. Construct validity (Spearman's correlation coefficient between the FAQLQs and FAIMs) and internal consistency (Cronbach's α) were assessed and compared.

Results Seventy-four child-parent pairs were included. The FAQLQ-CF score was significantly higher than the FAQLQ-PF score (3.74 vs. 2.68, $P < 0.001$, where 1 indicates no impairment and 7 indicates extreme impairment). FAIM-CF and -PF scores were almost identical (3.29 vs. 3.33, $P = 0.594$). There was moderate agreement between the FAQLQ-CF and -PF scores (ICC = 0.57 [$P < 0.001$]) and good agreement between the FAIM-CF and -PF scores (ICC = 0.80 [$P < 0.001$]). Construct validity was confirmed for the FAQLQ-CF ($\rho = 0.60$, $P < 0.001$) and -PF ($\rho = 0.58$, $P < 0.001$). Internal consistency was excellent for the FAQLQ-CF ($\alpha = 0.95$) and -PF ($\alpha = 0.95$).

Conclusions and Clinical Relevance Parents reported significantly less impact of food allergy on the child's HRQL than children themselves, while reported perceptions of disease severity were nearly identical. This may reflect real differences in perspectives between children and parents and may indicate that parents tend to underestimate their child's HRQL impairment. It is important for clinicians to include both the child's and their parent's perceptions in order to perform a complete assessment of the impact of food allergy on the child's HRQL and to identify areas of disagreement that need special attention in clinical practice.

Keywords children, food allergy, health-related quality of life, parent-report, self-report

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Introduction

Food allergy affects up to 5–6% of children in western countries [1, 2] and may cause severe anaphylactic reactions. Living with the fear of allergic reactions and living with the need to avoid the culprit foods in numerous situations may interfere with the daily life of food-allergic

children and their families [3, 4]. Therefore, health-related quality of life (HRQL) measurements are important to investigate the impact of daily problems of food-allergic children and their families [5–7]. As no clinical objective measure is available that reflects the ongoing disease severity of food allergy, measuring HRQL is also important

to determine the effects of diagnostic or therapeutic interventions on HRQL.

HRQL of children can be measured using questionnaires that are self-reported or proxy-reported. Assessment of HRQL in children has traditionally relied on parent-reporting, as it was thought that children lack the necessary language skills and cognitive abilities for accurate self-reporting [8, 9]. However, it has been reported that children ≥ 8 years are able to assess their HRQL appropriately [10, 11]. Consequently, a number of HRQL questionnaires have been developed for and validated in children [12, 13]. As parents seem to be less able to make judgements regarding the experience of symptoms, relationships with peers or worries about the future of their child [14, 15], self-report is the primary method of assessing the subjective aspects of health. On the other hand, it is obvious that parent-reports are indispensable in children who are unable to assess their own HRQL [16]. Moreover, parental attitudes may influence their child's own attitudes and the utilization of health-care services for their child. Additionally, parents may provide information not provided by children themselves. It is thus important to study child- and parent-proxy reports on the child's HRQL and to assess the quality of parent-proxy reporting. However, in food-allergic children, a comparison of child-self and parent-reported HRQL has never been made using validated disease-specific instruments.

Two disease-specific HRQL instruments, the Food Allergy Quality of Life Questionnaire-Child Form (FAQLQ-CF) and -Parent Form (FAQLQ-PF), have been developed recently and validated as part of the EuroPrevall project [7, 13, 17, 18]. The FAQLQ-CF was originally developed in the Netherlands for children aged 8–12 years and provides a valid and reliable self-report on the child's HRQL. The FAQLQ-PF was originally developed in Ireland for parents of children aged 0–12 years and provides a valid and reliable parent-proxy report on the child's HRQL. Therefore, the aim of this study was to compare the outcome (i.e. total FAQLQ scores and domain scores) and the psychometric properties of the FAQLQ-CF and -PF and to investigate areas of (dis)agreement between child and parent reports.

Methods

Patients and procedures

Dutch food-allergic children (8–12 years) and their parents were recruited from our paediatric allergy clinic between May 2007 and March 2009. All children with at least one physician-diagnosed food allergy were included. All common food allergies and different types and severities of symptoms were represented.

The Dutch versions of the FAQLQs and the Food Allergy Independent Measure questionnaires (FAIMs) were sent by

mail to be completed at home [13, 19]. Participation was completely voluntary. Child–parent pairs were requested not to discuss questions and responses with each other. Child–parent pairs were excluded when $<85\%$ of the questions were completed.

This study was approved by the local medical ethics review commission (METc 2005/051), who deemed that permission from the commission was not required.

Questionnaires

The FAQLQ-CF provides a self-report on the child's HRQL and contains 24 items and four domains (Risk of Accidental Exposure, Emotional Impact, Allergen Avoidance and Dietary Restrictions) [13]. Items were scored on a seven-point scale ranging from not troubled to extremely troubled. In order to improve understanding, the scale was illustrated by drawings of faces ('smileys'), ranging from a smiling face to a sad face. The total FAQLQ score is the sum of all the items divided by the number of items and ranges from 1 (minimal impairment in HRQL) to 7 (maximal impairment in HRQL).

The FAQLQ-PF provides a parent report on the child's HRQL and contains 14 items, 26 items and 30 items for children aged 0–3 years, 4–6 years and 7–12 years, respectively [7]. Items are divided into three domains (Emotional Impact, Food Anxiety and Social & Dietary Limitations) and scored in the same way as the FAQLQ-CF. The FAQLQ-PF was translated from English into Dutch by a native Dutch speaker and back translated by a native English speaker, using established guidelines [20]. The original English version was compared with the back-translated English version by an expert panel. No important linguistic or semantic differences emerged.

The Food Allergy Independent Measure-Child Form and Parent-form (FAIM-CF and -PF) were originally developed as an independent measure for food allergy in order to evaluate the construct validity of the FAQLQs [19]. The FAIMs contain four expectation of outcome questions, concerning the child's perceived expectation of the chance of accidental exposure and of what will happen following accidental exposure and two questions reflecting perceived disease severity. Such expectations are likely to be the source of quality of life differences in anaphylactic disorders and are therefore an appropriate independent measure for anaphylactic disorders [21]. Furthermore, HRQL instruments built upon the method of expectation of outcome questions have proved to be useful and consistent in measuring HRQL [6, 7, 13, 22–24]. Questions were scored on a seven-point scale. The translation procedure, as described for the FAQLQ-PF, was followed for the FAIM-PF as well.

Additionally, child and parent characteristics were determined in terms of age, sex, type, number of food allergies, etc. Parental health and well-being was

measured using a question that was previously used during the development of the FAQLQ-PF [7]: 'How would you describe your general health and well-being?' (seven-point scale ranging from excellent to very poor).

Statistical analysis

Comparison of child-self and parent-proxy reports. Data were analysed using SPSS software for Windows (Version 16.0). The total FAQLQ-CF and -PF scores (and domain scores) were tested for significant differences using Wilcoxon's signed-rank tests. The total FAQLQ-CF and -PF scores were correlated using Spearman's correlation coefficient and the Intraclass correlation coefficient (ICC, two-way mixed effects model). Correlations were classified as follows: <0.4 = poor to fair, $0.4-0.6$ = moderate, $0.6-0.8$ = good and >0.8 = excellent. Bland-Altman plots illustrated the differences of each child-parent pair (FAQLQ-CF score minus FAQLQ-PF score), which were plotted against the mean FAQLQ score of each child-parent pair. Limits of agreement were calculated as mean difference ± 1.96 * standard deviation of the mean difference. The procedure, as described above, was followed for the comparison of the FAIMs as well.

Influence of child characteristics on child-parent agreement. Univariate linear regression analyses were performed to investigate which child characteristics influenced child-parent agreement. The mean difference between child- and parent-reported HRQL was used as the dependent variable and child characteristics (age, sex, anaphylaxis, last experience of anaphylaxis, number of food products that must be avoided) were used as independent variables. The same procedure was followed for the FAIMs.

Psychometric properties of the questionnaires. Construct validity of the FAQLQs was investigated using Spearman's correlation coefficient between the total FAQLQ-CF score and the total FAIM-CF score and between the total FAQLQ-PF score and the total FAIM-PF score, respectively. A moderate correlation ($0.4-0.6$) was to be expected [25]. Internal consistency was investigated using Cronbach's alpha ($\alpha \geq 0.70$ was considered to be good) [26]. Discriminative abilities were investigated by comparing the total questionnaire scores for boys vs. girls, for patients who have one vs. more than one food allergy, for patients who must avoid ≤ 10 vs. > 10 food products and for patients who experienced anaphylaxis vs. patients who did not. Experience of anaphylaxis was determined using the definition of the 'Symposium on the Definition and Management of Anaphylaxis' [27]. Floor and ceiling effects were calculated as the percentage of patients with questionnaire scores of 1 (no impact on HRQL) and 7 (maximal impact on HRQL), respectively.

Results

Patients

The questionnaire package was sent to 109 Dutch child-parent pairs and returned by 84 child-parent pairs (response rate 77%). Ten child-parent pairs were excluded because $<85\%$ of one of the questionnaires was completed. Thus, 74 child-parent pairs were eligible for analysis. Descriptive characteristics of the child-parent pairs are shown in Table 1.

Table 1. Child and parent characteristics

Participants, <i>n</i> (%)	74 (100)
Mean age, years (SD)	10.4 (1.6)
Child sex, male/female (%)	46/28 (62/38)
Type of food allergies, <i>n</i> (%)	
Peanut	54 (73)
Nut	54 (73)
Milk	9 (12)
Egg	12 (16)
Wheat	4 (5)
Soy	11 (15)
Sesame	3 (4)
Fish	1 (1)
Shell fish	4 (5)
Fruit	10 (14)
Vegetables	4 (5)
Number of food allergies, <i>n</i> (%)	
1 food	23 (31)
2 foods	28 (38)
3 foods	9 (12)
> 3 foods	14 (19)
Number of food products that must be avoided, <i>n</i> (%)	
0-2	30 (41)
3-6	16 (22)
7-10	6 (8)
> 10	19 (26)
Type of symptoms, <i>n</i> (%)	
Cardiovascular	21 (28)
Respiratory	60 (81)
Gastro-intestinal	45 (61)
Skin	49 (66)
Other*	65 (88)
Anaphylaxis, yes/no (%)	62/12 (84/16)
Last experience of anaphylaxis, years (SD)	4.8 (3.6)
Epinephrin autoinjector, yes/no (%)	56/18 (76/24)
Parent sex, male/female (%)	7/67 (9/91)
Reported parental health & wellbeing, <i>n</i> (%)	
Excellent	11 (15)
Very good	22 (30)
Good	37 (50)
Moderate	1 (1)
$< moderate$	1 (1)

*Oral Allergy Syndrome, swollen tongue or lips and symptoms of the nose or eyes.

Table 2. Outcome of the questionnaires

	Mean total scores (SD)
FAQLQ-CF	3.74 (1.34)
Allergen avoidance	3.35 (1.41)
Risk accidental Exposure	3.78 (1.57)
Emotional impact	4.13 (1.57)
Dietary restrictions	3.74 (1.44)
FAQLQ-PF	2.68 (1.02)
Emotional impact	2.61 (0.95)
Food anxiety	2.96 (1.15)
Social & dietary limitations	2.53 (1.29)
FAIM-CF	3.29 (1.09)
FAIM-PF	3.33 (0.94)

FAQLQ-CF, Food Allergy Quality of Life Questionnaire-Child Form;
 FAQLQ-PF, Food Allergy Quality of Life Questionnaire-Parent form;
 FAIM-CF, Food Allergy Independent Measure-Child Form; FAIM-PF,
 Food Allergy Independent Measure-Parent Form.

Comparison of the Food Allergy Quality of Life Questionnaire-Child Form and -Parent Form

The total FAQLQ-CF score was significantly higher (indicating a more severe impact on HRQL) than the total FAQLQ-PF score (3.74 vs. 2.68, $P < 0.001$) (Table 2). All domain scores of the FAQLQ-CF were significantly higher than the domain scores of the FAQLQ-PF. Spearman's correlation coefficient between the total FAQLQ-CF and -PF score was 0.56 ($P < 0.001$). The ICC of 0.57 (95% CI; 0.40–0.71, $P < 0.001$) was comparable. Figure 1a illustrates this moderate correlation. The Bland-Altman plot illustrates the mean difference (1.06, SD = 1.10) between the FAQLQ-CF and -PF score (Fig. 2a).

Comparison of the Food Allergy Independent Measure-Child Form and -Parent Form

There was no significant difference between the total FAIM-CF and -PF scores (3.29 vs. 3.33, $P = 0.594$) (Table 2). Spearman's correlation coefficient between the total FAIM-CF and -PF score was 0.82 ($P < 0.001$). The ICC of 0.80 was comparable (95% CI; 0.69–0.87, $P < 0.001$). Figure 1b illustrates this good correlation. The Bland-Altman plot illustrates that the mean difference between the FAIM-CF and -PF was close to zero (-0.04 , SD = 0.65) (Fig. 2b).

Influence of child characteristics on child–parent agreement

Univariate linear regression analyses are shown in Table 3. The mean difference between child- and parent-reported HRQL was significantly associated with child age; i.e. the difference was smaller for the oldest children (11–12 years) than for the youngest children (8–10 years). The mean difference between child- and parent-reported

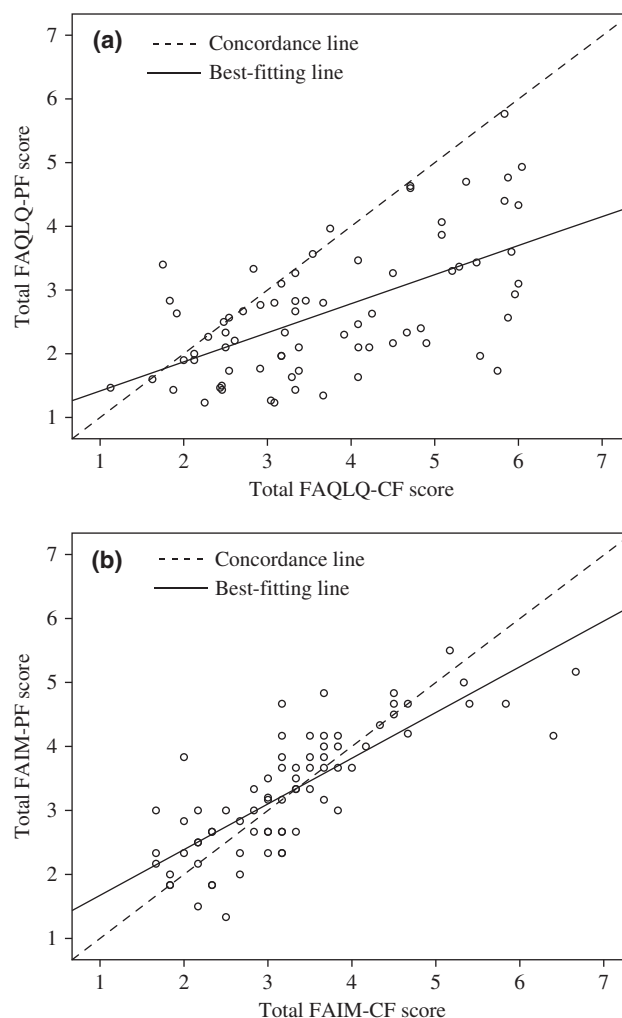


Fig. 1. Child vs. parent reports on the child's health-related quality of life (a) disease severity and expectations (b).

FAIM scores was not significantly associated with any of the child characteristics.

Psychometric properties of the questionnaires

Construct validity was confirmed for the FAQLQs (Table 4). Internal consistency was considered to be excellent for the FAQLQs and good for the FAIMs. There were no remarkable floor or ceiling effects for the FAQLQs and the FAIMs.

None of the questionnaires discriminated between boys and girls. The FAQLQ-PF discriminated between patients who had one vs. more than one food allergy; i.e. the scores were significantly higher (indicating more severe impact on HRQL) in patients who had more than one food allergy. A trend in the same direction was shown for the FAQLQ-CF, FAIM-CF and -PF. All questionnaires discriminated between patients who must avoid ≤ 10 vs. > 10 food products. The FAIM-CF and -PF discriminated between

patients who had experienced anaphylaxis vs. patients who did not. A trend in the same direction was shown for the FAQLQ-CF and -PF.

Discussion

This is the first study comparing child reports and parent-proxy reports on the child's HRQL in food-allergic

children (8–12 years) using equally valid disease-specific instruments. A moderate correlation was shown between the total FAQLQ-CF and -PF score, which means that children and parents had concordant judgements concerning the child's HRQL. However, children systematically reported a significantly greater impact of food allergy on their HRQL than their parents, while reported perception of disease severity and expectation of outcome of an allergic reaction were nearly identical in children and their parents. The difference between child- and parent-proxy-reported HRQL (1.06) is highly likely to be a clinically significant difference as it exceeds the minimal important difference (MID) that patients find meaningful using HRQL questionnaires with a seven-point scale (0.5) [28] and exceeds at least twice the established MID for the FAQLQ-PF (0.45) [17].

Generally, child- and parent-proxy reports on the child's HRQL are moderately correlated [29]. Disagreement between child- and parent-proxy reports may reflect real differences in perspectives of children and parents, but some other causes of disagreement should be considered [9], including child characteristics, parent characteristics, questionnaire characteristics and response styles of children and parents.

Firstly, child characteristics may influence disagreement between child and parent reports on the child's HRQL. In our study, the age of the child may have influenced this disagreement. We found that the difference between child- and parent-proxy-reported HRQL was smaller for the oldest children (11–12 years) than for the youngest children (8–10 years). This is in line with previous results, which showed that in asthmatic children under the age of 11, complementary information can be obtained by questioning both children and parents, but for children aged over 11, parents provide little information beyond that obtained from questioning the child [30]. A possible explanation may be that as children mature, they become more articulate in expressing their feelings or concerns and, consequently, parents may have a better insight into their child's HRQL [30]. Additionally, it has been shown previously that children's conceptions of health and disease are shown to be related to age and this may suggest a developmental trend in their understanding

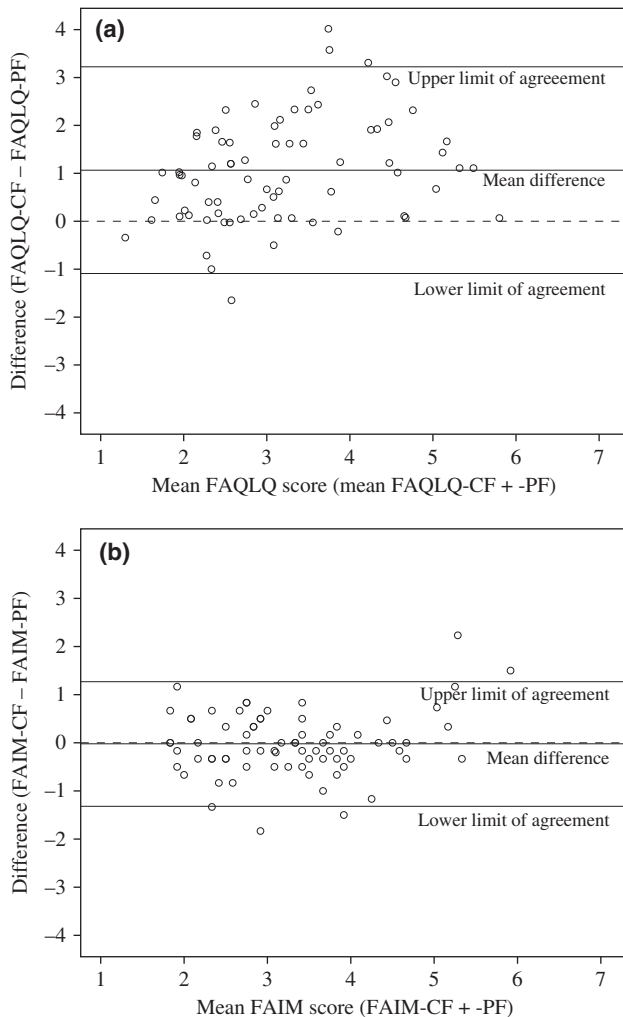


Fig. 2. Bland-Altman plots; child and parent reports on the child's health-related quality of life (a) disease severity and expectations (b).

Table 3. Univariately associated factors influencing the difference between child-self and parent-proxy-reported HRQL and disease severity

	HRQL (FAQLQs)			Disease severity (FAIMs)		
	B	R ² (%)	P	B	R ² (%)	P
Sex (girls vs. boys)	0.127	7.5	0.630	0.013	2.2	0.933
Age (8–10 vs. 11–12 years)	−0.547	6.2	0.034	−0.270	4.2	0.080
Number food products (0–10 vs. > 10)	0.124	0.3	0.677	0.101	0.4	0.463
Anaphylaxis (no vs. yes)	0.216	0.7	0.464	0.084	0.3	0.636
Last experience of anaphylaxis (how long ago in years)	−0.043	2.0	0.249	−0.008	0.2	0.702

Bold scores represent significant *P* values (*P* < 0.05).

HRQL, health-related quality of life; FAQLQs, Food Allergy Quality of Life Questionnaires; FAIM, Food Allergy Independent Measure.

Table 4. Psychometric properties of the questionnaires

	Rho*	$\alpha^{\dagger}$	Floor & ceiling effects (%/%) [‡]	Discriminative abilities			
				Sex (boys vs. girls)	Food products (0–10 vs. > 10) [§]	Number of food allergies (1 vs. > 1)	Experience of anaphylaxis (no vs. yes)
FAQLQ-CF	0.60	0.95	0/0	3.76 vs. 3.70 (<i>P</i> = 0.780)	3.45 vs. 4.63 (<i>P</i> = 0.007)	3.49 vs. 3.87 (<i>P</i> = 0.210)	3.13 vs. 3.85 (<i>P</i> = 0.078)
Allergen avoidance	0.52	0.88	2.70/0	n.p. [¶]	n.p.	n.p.	n.p.
Risk accidental Exposure	0.62	0.83	1.35/0	n.p.	n.p.	n.p.	n.p.
Emotional impact	0.60	0.87	1.35/1.35	n.p.	n.p.	n.p.	n.p.
Dietary restrictions	0.49	0.82	1.35/1.35	n.p.	n.p.	n.p.	n.p.
FAQLQ-PF	0.58	0.95	0/0	2.65 vs. 2.73 (<i>P</i> = 0.902)	2.45 vs. 3.21 (<i>P</i> = 0.023)	2.33 vs. 2.86 (<i>P</i> = 0.037)	2.23 vs. 2.77 (<i>P</i> = 0.102)
Emotional impact	0.47	0.87	0/0	n.p.	n.p.	n.p.	n.p.
Food anxiety	0.68	0.86	1.35/0	n.p.	n.p.	n.p.	n.p.
Social & dietary limitations	0.48	0.92	5.41/0	n.p.	n.p.	n.p.	n.p.
FAIM-CF	–	0.81	0/0	3.18 vs. 3.53 (<i>P</i> = 0.264)	2.89 vs. 3.98 (<i>P</i> = 0.001)	3.05 vs. 3.42 (<i>P</i> = 0.122)	2.74 vs. 3.42 (<i>P</i> = 0.022)
FAIM-PF	–	0.79	0/0	3.22 vs. 3.53 (<i>P</i> = 0.184)	2.98 vs. 3.90 (<i>P</i> = 0.006)	3.08 vs. 3.44 (<i>P</i> = 0.131)	2.96 vs. 3.41 (<i>P</i> = 0.017)

*Construct validity of the FAQLQs; i.e. Spearman's correlations between the FAQLQ score and the FAIM score, *P* < 0.001 for all values.

[†]Internal consistency, Cronbach's α .

[‡]Percentage of patients with the minimal (floor) or maximal (ceiling) FAQLQ-PF score.

[§]Number of food products that must be avoided.

[¶]N.p., not performed.

Bold scores represent significant *P* values (*P* < 0.05).

FAQLQ, Food Allergy Quality of Life Questionnaire; FAIM, Food Allergy Independent Measure.

of the concepts of health maintenance and illness; i.e. the older the child, the more the child's thinking about disease approaches the adult way of thinking. Furthermore, the impact of illness experience seemed to vary with age as well [31–33]. However, the fact that there was little difference between the FAIM reporting in children and parents suggests that there is no significant lack of understanding of the disease severity in these children. Moreover, it has been shown previously that children ≥ 8 years are able to assess their HRQL appropriately [10, 11]. Additionally, a consultant for sick children and a linguist previously reviewed the FAQLQ-CF and FAIM-CF in order to improve clarity and ease of use [13]. The difference between child- and parent-proxy-reported HRQL may thus suggest a real difference in perspectives and may well be age related.

Secondly, parent characteristics may influence disagreement between child and parent reports. In our study, almost all parents were mothers and they reported less impact on the child's HRQL than their children. It has been shown previously that mothers tend to report a greater impact on the child's HRQL than fathers [34–36] and it is thus unlikely that maternal (as opposed to paternal) reporting was the cause of the greater impact of food allergy on the child's HRQL reported by children than by parents. Impaired parental health and well-being may also influence agreement between child and parent reports as

this may be a psychosocial stressor for children and parents [36–38]. In our study, all parents classified their own health as moderate to excellent. Therefore, parent characteristics did not seem to be an important cause of the difference between child- and parent-proxy-reported HRQL.

Thirdly, questionnaire characteristics such as validity, sensitivity and content may influence agreement between child- and parent-proxy reports on the child's HRQL. Both the FAQLQ-CF and -PF were developed using the same methods and were previously shown to be valid and reliable [7, 13]. However, the FAQLQ-CF and -PF are developed in a different language and culture. It has previously been shown that the translation of an instrument may compromise the validity and sensitivity (the ability to detect differences between groups in a cross-sectional study design) of a translated instrument due to semantic differences or flaws in the cross cultural adaptation process [39, 40]. Additionally, this may be due to the fact that some HRQL items may be regarded as unimportant by patients or proxies from a particular cultural setting (and therefore not included in the original instrument), whereas the same items would have been regarded as important by patients or proxies from another cultural setting. Therefore, detailed guidelines have been proposed [20] in order to achieve a high quality of the translated instruments. The translated Dutch FAQLQ-PF was a valid,

reliable and discriminative instrument for measuring HRQL in food-allergic children (8–12 years) and the psychometric properties were comparable to the original Irish FAQLQ-PF [7]. Despite the use of established guidelines [20], loss of sensitivity of a translated instrument is not completely avoidable and may cause an underestimation of the real impact of a disease on HRQL compared with the impact as measured by the translated instrument. However, indicators of sensitivity (slight floor effects, no ceiling effects and good discriminative abilities) do not suggest a relevant loss of sensitivity of the Dutch FAQLQ-PF. Moreover, the FAIM-PF has been translated and adapted in the same way as the FAQLQ-PF, but no significant difference was shown between child- and parent-proxy-reported FAIM scores. Therefore, we think that loss of sensitivity of the translated FAQLQ-PF is not likely to contribute significantly to the differences between HRQL scores reported by children and their parents. We recommend comparing the FAQLQ-CF and -PF in the English language to fully exclude loss of sensitivity in the translated instruments.

Fourthly, differences in the response styles between children and parents may cause disagreement [41]. In general, young children tend to choose extreme scores (never and always instead of sometimes and often) than adults do. In our study, the risk of choosing extreme scores was minimized using visual aids ('smileys') for children. Moreover, an additional analysis showed that only 16.6% of all individual items of the FAQLQ-CF were given the lowest score and 13.0% the highest score. Therefore, it seems unlikely that differences in response styles influenced disagreement between child- and parent-proxy-reported HRQL. Future studies based on the item response theory may be useful for more in-depth investigations of child and parent responses to the items of the FAQLQ-CF and -PF and to determine how scores on one questionnaire calibrate against scores on the other.

In addition to the factors that may have influenced agreement between child and parent reports, real differences in perspectives between children and their parents may at least be partially responsible for the differences in the HRQL scores we found. Children and parents often agree on objective domains (symptoms or functioning), while there is less agreement for socio-emotional domains, because parents may have a lack of insight into their child's experiences and beliefs [15]. As the FAQLQ-CF and -PF mainly consist of socio-emotional domains, this may explain part of the difference between child and parent reports and may reflect a real difference in perspectives. A difference in perspectives is also suggested by the direction of the difference between FAQLQ and FAIM scores. In parents, the FAQLQ-PF score (2.68) was lower than the FAIM-PF score (3.33), possibly suggesting that parents may underestimate the impact of food allergy on their child's HRQL. In children, the opposite is seen, with

higher FAQLQ-CF (3.74) than FAIM-CF scores (3.29), possibly suggesting that children overestimate their HRQL. This seemingly real difference in perception between children and their parents may also be contributing to the difference between child- and parent-proxy-reported HRQL.

A difference in perspectives is also reflected by the differences in the content of the FAQLQ-CF and -PF for children aged 8–12 years. The two FAQLQs were developed using the same preferred methods in order to measure the same concept 'the child's quality of life'; Firstly, all potential items for the new questionnaires were assembled using a literature search, expert opinion and interviews with food-allergic children aged 8–12 years (FAQLQ-CF) or parents of food-allergic children aged 8–12 years (FAQLQ-PF). Secondly, the clinical impact method [42, 43] was used to select the most important items for children and their parents for the final versions of the FAQLQ-CF and -PF, respectively [i.e. For each item, respondents were asked to indicate whether an item was important to them ('yes' or 'no'), followed by a 5-point response option indicating the degree of importance related to that item. Items identified most frequently and rated the most important were selected for the final FAQLQ-CF and -PF]. As some HRQL items were regarded as important by parents, but regarded as unimportant by children, these items were included in the FAQLQ-PF, but not in the FAQLQ-CF and vice versa. These differences in the content of the FAQLQs thus highlight the areas of disagreement in perspectives between children and parents on HRQL (such as worries about the future, self-confidence compared with other children of his/her age, feeling left out). Therefore, the FAQLQs are not interchangeable, but complement each other in the assessment of the child's HRQL from two perspectives and highlight areas of disagreement that need special attention.

Despite an increase in the number of studies evaluating child- and parent-proxy reports on the child's HRQL [9], only some studies used reliable and well-validated HRQL instruments. Generally, child- and parent-proxy reports on the child's HRQL are moderately correlated [29]. In food allergy, only one study evaluated child- and parent-proxy reports on the child's HRQL [34]. King et al. showed that mothers estimated the impact of peanut allergy on their child (8–12 years) as more severe than the children themselves, their siblings and their fathers. Part of the difference between the previous and the current study results may be explained by the fact that different HRQL instruments were used in the two studies. King et al. used validated generic HRQL instruments and unvalidated disease-specific HRQL instruments, whereas our study used validated disease-specific HRQL instruments. Additionally, the previous study was performed in another cultural setting, which may yield different results compared with our study. Examples of such cultural differences may

include differences in the allergy services of the United Kingdom and the Netherlands, causing different levels of medical awareness in English and Dutch parents. Also, it has been shown that the psychosocial determinants of HRQL, such as coping strategies, attitudes, knowledge, social support, socio-economic status, education and beliefs, may differ between cultures [44–47]. Finally, studies on cultural differences in children's emotional reactions to difficult situations have shown that children from different cultures differ in the way they communicate negative emotions [48]. Dutch and English children may thus express their emotions differently to their parents, which might have influenced the difference between the previous and the current study results.

In summary, this study clearly demonstrated that children reported more impact of food allergy on their HRQL than their parents, while the psychometric properties of the FAQLQ-CF and -PF were nearly identical. This difference between child- and parent-proxy reports on the child's HRQL appears to reflect real differences in perspectives between children and parents and was related to the age of the child. As parental and child perspectives are thus likely to be different, it is important for clinicians to include both the child's and their parent's perceptions in

order to perform a complete assessment of the impact of food allergy and the effects of diagnostic or therapeutic interventions on the child's HRQL. Additionally, studying both perspectives allows the identification of areas that need special attention in clinical practice.

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