Published in final edited form as:

Pediatr Pulmonol. 2015 June ; 50(6): 560–567. doi:10.1002/ppul.23149.

QUALITY OF LIFE IN CHILDREN WITH CF: PSYCHOMETRICS AND RELATIONS WITH STRESS AND MEALTIME BEHAVIORS

Kimberly A. Driscoll, Ph.D.,

Dept. of Medical Humanities & Social Sciences, Florida State University College of Medicine,
1115 W. Call Street, Tallahassee, FL 32306-4300, 850-645-1742 (p); 850-645-1773 (f)

Avani C. Modi, Ph.D.,

Division of Behavioral Medicine & Clinical Psychology, Cincinnati Children's Hospital Medical
Center, 3333 Burnet Ave. Cincinnati, OH 45229

Stephanie S. Filigno, Ph.D.,

Division of Behavioral Medicine & Clinical Psychology, Cincinnati Children's Hospital Medical
Center, 3333 Burnet Ave. Cincinnati, OH 45229

Erin E. Brannon, M.S.,

Department of Psychology, Oklahoma State University, 116 North Murray Hall, Stillwater, OK
74078

Leigh Ann Chamberlin, M.Ed., R.D.,

Division of Behavioral Medicine & Clinical Psychology, Cincinnati Children's Hospital Medical
Center, 3333 Burnet Ave. Cincinnati, OH 45229

Lori J. Stark, PhD, ABPP, and

Division of Behavioral Medicine & Clinical Psychology, Cincinnati Children's Hospital Medical
Center, 3333 Burnet Ave. Cincinnati, OH 45229

Scott W. Powers, Ph.D, ABPP

Division of Behavioral Medicine & Clinical Psychology, Cincinnati Children's Hospital Medical
Center, 3333 Burnet Ave. Cincinnati, OH 45229

Kimberly A. Driscoll: kimberly.driscoll@med.fsu.edu

Abstract

Background—The purpose of this study was to evaluate the utility of the Cystic Fibrosis Questionnaire-Revised (CFQ-R) with toddlers and preschool-aged children is unknown. Clinically relevant relations between health-related quality of life (HRQOL), stress, and mealtime behaviors have not been examined. It was hypothesized that problematic mealtime behaviors and increased stress would be negatively associated with HRQOL.

Methods—Parents of 73 children (2–6 years) with CF completed questionnaires assessing their children's generic (PedsQL) and CF-specific HRQOL, parenting and CF-specific stress, and mealtime behaviors.

Results—CFQ-R Physical, Eating, and Respiratory HRQOL subscales had acceptable to strong reliability (alphas=0.73–0.86); other scales approached acceptable reliability. Lower CF-specific stress was associated with higher CFQ-R Eating HRQOL ($B=-0.84$; $p<0.05$) scores. Fewer eating problems were associated with higher CFQ-R Eating ($B=-1.17$; $p<.0001$) and Weight HRQOL ($B=-0.78$; $p<.01$) scores.

Conclusions—As hypothesized, problematic eating and higher CF-specific stress was associated with lower CF-specific HRQOL. The CFQ-R has promise for use in young children with CF, but will need to be modified to exchange items not relevant to preschoolers with items that are more relevant to this age group.

Keywords

cystic fibrosis; children; mealtime behavior; parent stress; health-related quality of life

Introduction

Health-related quality of life (HRQOL) has emerged as an essential patient-reported health outcome in clinical care and research and it measures 1) disease state and symptoms; 2) functional status; 3) psychological and emotional functioning; and 4) social functioning. (1) HRQOL is an indicator of how an individual perceives his/her functioning, regardless of illness status. The PedsQL is the most widely-used pediatric questionnaire to assess generic HRQOL (2) across four domains of functioning: physical, emotional, social, and school. Generic HRQOL questionnaires allow for comparisons across different chronic and non-chronic illnesses, (3) but they lack the sensitivity and specificity needed to assess functioning related to a specific disease and may not detect small, but clinically meaningful changes resulting from intervention. (1) In contrast, disease-specific HRQOL questionnaires provide assessment of health domains germane to a specific chronic disease and are sensitive to the impact of targeted interventions used to improve individual functioning. (4,5)

The Cystic Fibrosis Questionnaire-Revised (CFQ-R) was specifically developed to assess HRQOL in individuals with CF. It has been used in several randomized clinical trials, (6–8) and epidemiological studies (9) and its psychometric properties are well-established (5). The self-report version is for individuals ages 6 years and older (10), whereas, the parent-proxy version provides parents' perceptions of their children's (ages 6–13 years) HRQOL.(5) Sub-scales include Physical, Emotional, Vitality, School, Eating, Body Image, Treatment Burden, Health, Respiratory, Digestion, and Weight. The CFQ-R queries aspects of CF functioning such as “You had to cough up mucous” and “You coughed during the day,” whereas items on the PedsQL are more general (e.g., problems with running, bathing). At the time this study was conducted there was no established questionnaire readily available that assessed CF-specific HRQOL in toddlers and preschool-aged children; however, the CFQ-R Preschool Version for children ages 3–6 is currently in development (11) and several recent studies have used the Respiratory, Treatment Burden, and Physical CFQ-R subscales to assess HRQOL in young children ages 4 months to 5 years. (8)

Understanding how the complexity of CF disease management impacts the entire family is vital to improving HRQOL and treatment adherence. One particularly challenging aspect of the CF treatment regimen is adherence to the Cystic Fibrosis Foundation's (CFF) recommendation of 110–200% Daily Reference Intake of calories and 40% of those calories from fat. (12) Better nutritional status is associated with better pulmonary functioning in young children with CF (13) and is a critical component to the treatment regimen beginning early in life. Despite parents' best efforts to increase children's caloric intake, (14), (15) adherence to the CFF recommendations is poor (12–16%) based on parents' ratings of adherence and 7-day diet diaries of their 3–12 year old children. (16) For parents of children with CF, increasing caloric intake can be difficult, especially in toddlers and preschool-aged children when typical eating challenges, such as refusal and distraction occur. (16,17)

Challenging mealtime behaviors and difficulties attaining the CFF dietary intake recommendations are sources of parenting stress. For example, 43% of parents of children with CF endorse concerns that their child's eating patterns "hurt" the child's health, and parents often feel "intense desperation" to get their child to eat. (18,19) Moreover, preschoolers with CF are twice as likely to have mealtime problems as non-CF peers and their parents are three times more likely to report clinical levels of general stress. (20) Importantly, lower parenting stress is associated with better dietary intake in children with CF ages 3–11 years. (21) Although some studies have examined the impact of parenting stress on CF treatment adherence, few studies have examined stress specifically in relation to HRQOL or child mealtime behaviors. (22) Thus, there is a significant need to understand the role of child mealtime behaviors, stress, and HRQOL in toddlers and preschool-aged children as this is time of great potential for effective and early intervention.

The first aim of the current study was to determine the reliability of the parent-proxy CFQ-R, originally developed for use with school-aged children, in a sample of toddlers and preschoolers with CF. It was hypothesized that a majority of CFQ-R subscales would demonstrate reliability >0.70 (23) with the exception of the School and Body Image scales, which are not developmentally salient in young children. The second aim was to cross-sectionally examine the relations between mealtime behaviors, stress, and generic and CF-specific HRQOL. Based on the extant literature, it was hypothesized that problematic mealtime behaviors and increased stress would be negatively associated with generic HRQOL (i.e., PedsQL Social and Total scales) and CF-specific HRQOL (i.e., CFQ-R Eating, Weight, and Respiratory subscales). These specific subscales were selected because they are most likely to be impacted by parent and family stress and problematic mealtime behaviors.

Method

Participants

Participants were part of a larger prospective, randomized controlled, multi-site clinical trial aimed at testing a behavioral and nutrition treatment versus an attention control/education intervention to determine the effects on daily energy intake, weight for age z-score, and height for age z-score (Funded by National Institute of Diabetes and Digestive and Kidney Diseases, R01DK054915, PI: Scott W. Powers, PhD; ClinicalTrials.Gov #NCT00241969).

Participants were recruited from seven accredited CF Centers across Ohio, Michigan, and Arizona. Inclusion criteria for the larger trial included: confirmed diagnosis of CF, confirmed pancreatic insufficiency, 2–6 years of age, diagnosis of at least 6 months, and lack of dietary restrictions around fat intake. Children were excluded if they had a developmental delay (e.g., autism), comorbid condition or medications known to affect growth (e.g., diabetes, short bowel syndrome), use of supplemental nutrition (e.g., nasogastric tube, total parenteral nutrition), weight z-scores >1.0, or were at their genetic potential for height and consuming 140% Daily Reference Intake of calories and 40% of those calories from fat. (24)

For the larger longitudinal clinical trial, 102 patients were consented. Ten children were determined ineligible [WAZ > 1.0 (5), current use of G-tube (1), pancreatic sufficient (2), dietary intake exceeding 140% Daily Recommended Intake (2)], and one additional family declined participation. Ninety one (89%) of the children met the inclusion criteria and were randomized. Of those, 78 (86%) met intent to treat criteria (attended first treatment session). Of the 91 subjects randomized, 14 participants did not complete baseline questionnaires, yielding a subsample of 73 participants for the current study. There were no differences in child or parent age, child sex, or income between those that completed the questionnaires and those that did not. Characteristics of the children with CF were: $M_{\text{age}} = 3.82 \pm 1.27$ years with 55% female and 98% Caucasian. Mean time since diagnosis was 3.21 ± 1.45 years. Mothers were 33.21 ± 6.22 years old and 95% were Caucasian. Fathers were 35.89 ± 6.70 years old and 98% were Caucasian. Eighty-three percent of parents were married, with an average of 4.27 ± 1.14 family members in the household. Insurance status was categorized as Private (54%), Medicaid (26%), both Private and Medicaid (20%). Approximately 44% of families had a family income under \$50,000. Forty-six percent of children attended preschool or daycare.

Procedure

This IRB approved trial was conducted between January 2006 and June 2012. All parents/legal guardians provided written informed consent. Participants were randomized to one of two treatment conditions within the larger clinical trial. At the baseline, post treatment (6 months), and follow up (18 months), all participants completed a battery of questionnaires including information on demographics, mealtime behaviors, stress, and HRQOL. This analysis examines the questionnaires collected at baseline across both treatment groups.

Measures

Demographic Information—A demographic questionnaire regarding general information about the child's age, sex, and medical history, as well as demographics (e.g., parent age, sex) was completed by parents.

Cystic Fibrosis Questionnaire-Revised (CFQ-R; (4,10))—The CFQ-R is a self-report CF-specific HRQOL measure designed for school age children, adolescents, and adults with CF, as well as parent-proxy HRQOL of school-aged children with CF (6–13 years) with the following subscales: Physical (8 items); Emotional (5 items); Vitality (4 items); Eating (3 items); Treatment Burden (3 items); Health (3 items); Respiratory (6 items); Digestion (3

items); and Weight (1 item). Body Image (3 items) and School (3 items) were not used in this study. The parent-proxy CFQ-R uses a 4-point Likert scale (e.g., Always, Often, Sometimes, Never) and produces scaled scores ranging from 0 to 100, with higher scores reflecting better HRQOL.

Pediatric Quality of Life Inventory (PedsQL™)(2)—The PedsQL™ is a 23-item generic HRQOL measure designed for children and adolescents ages 2–18 years. In the current study, the PedsQL™ Toddler Report (ages 2–4) and Young Child Report (ages 5–7) were used. The PedsQL™ assesses Physical, Emotional, Social, and School functioning using a 5-point Likert scale. Scores range from 0 to 100, with higher scores reflecting better HRQOL. The PedsQL™ is psychometrically sound. (2)

Family Stress Scale (FSS) (25,26)—The 15-item Family Stress Scale is a CF-specific measure of stress designed for parents of children with CF. Parents rate each item on a 5-point Likert scale (1 = not at all stressful to 5 = extremely stressful) based on having a child with CF. Items assess both general family stress (e.g., financial responsibility, discipline) and CF-specific stress (e.g., eating more calories, doing treatments). Total scores range from 0 to 60, with higher scores reflecting higher levels of stress. The FSS has an established reliability of 0.80. (27)

Parenting Stress Index (PSI) (28)—The PSI is a 120-item parent self-report measure designed to assess the degree to which stress is related to parent functioning, the child's behavior and temperament, and the parent-child relationship. The PSI was developed for parents of children ages 1 month to 12 years. The PSI is comprised of child domains and parent domains; however, only the parent domains (Competence, Isolation, Attachment, Health, Role Restriction, Depression, Spouse) were used for the current study. Reliability coefficients for the normative sample are excellent. (28)

Behavioral Pediatrics Feeding Assessment Scale (BPFAS) (29)—The BPFAS is a 35-item parent-report questionnaire assessing children's mealtime behaviors and parents' feelings and strategies during mealtimes. It includes 25 child-focused and 10 parent-focused items. Parents rate the frequency of behaviors, as well as how problematic the behaviors are with higher scores reflecting greater mealtime behavior problems.

Statistical Analyses

Means, standard deviations, and frequencies were calculated for demographic, mealtime behavior, stress, and HRQOL variables. Cronbach's alphas were computed for the parent-proxy CFQ-R scales to ascertain the reliability of this measure in a younger CF population with >0.70 and <0.9 indicating good and >0.6 and <0.70 indicating acceptable reliability. (23) Five multiple linear regressions were conducted using PedsQL (i.e., Social, Total) and CFQ-R (i.e., Weight, Eating, Respiratory) subscales as the dependent variables with $p<0.01$ to indicate statistical significance based on Bonferroni correction to control for type 1 error. Independent variables in the models included the FSS Total Score, PSI Parent Domain Total Score, and BPFAS Total Score. Given the particular interest in the mealtime behaviors, all subscales of the BPFAS were included in an exploratory regression model (i.e., we did not

have a priori hypotheses about these associations). Significance was defined as $p < 0.05$. IBM Statistical Package 20.0 was used for analyses.

Results

Means, standard deviations, and frequencies for demographic, mealtime behavior, stress, and HRQOL variables are found in see Table 1.

Reliability of the Parent-Proxy CFQ-R for School-aged Children in Toddlers and Preschoolers

Coefficient alphas for the 11 parent-proxy CFQ-R scales in this study were: Physical = 0.86; Emotional = 0.68; Vitality = 0.64; Eating = 0.73; Treatment Burden = 0.68; Health = 0.59; Respiratory = 0.75; Digestion = 0.44; and Weight = not calculated (one-item scale). Thus three scales met acceptable reliability and three scales approached acceptability. Only subscales related to CF-specific HRQOL outcomes with acceptable reliability and associated with eating were examined in subsequent analyses: Weight, Eating, and Respiratory.

Relationships between Mealtime Behaviors, Stress, and HRQOL

First, linear regression was conducted to identify significant cross-sectional associations with PedsQL Social Scores ($R^2 = 0.11$, $F(3, 56) = 3.2$, $p < 0.05$) and Total Scores ($R^2 = 0.11$, $F(3, 56) = 3.3$, $p < 0.05$). The PSI Parent Domain Total score was significantly associated with the PedsQL Social Scale (See Table 2), which indicated that as general parenting stress increases, PedsQL Social scores decrease. Linear regressions were also conducted for the parent-proxy CFQ-R Eating HRQOL ($R^2 = 0.58$, $F(3, 71) = 33.0$, $p < 0.001$), CFQ-R Respiratory HRQOL ($R^2 = 0.06$, $F(3, 71) = 2.51$, $p = 0.07$), and CFQ-R Weight HRQOL ($R^2 = 0.15$, $F(3, 71) = 5.2$, $p < 0.01$) scales (see Table 2). Parent-proxy CFQ-R Eating HRQOL scores decreased as CF-specific stress and problematic mealtime behaviors increased. Generic stress was significantly and positively associated with CFQ-R Eating HRQOL scores. As problematic mealtime behaviors increased, CFQ-R Weight HRQOL scores decreased.

Cross-sectional exploratory linear regression analyses were conducted to identify BPFAS subscales that may influence CF-specific HRQOL. Problematic mealtime behaviors (i.e., BPFAS Picky Eating, Food Refusal, Texture Refusal, and Stallers) were explored in relation to CFQ-R Eating and Weight HRQOL. The overall CFQ-R Eating HRQOL ($R^2 = 0.63$, $F(6, 71) = 20.98$, $p < 0.001$) and CFQ-R Weight HRQOL ($R^2 = 0.14$, $F(6, 71) = 2.94$, $p < 0.05$) models were significant. Significant variables associated with CFQ-R Eating HRQOL included CF-specific stress (i.e., FSS Total Score), and problematic mealtime behaviors of picky eating and general food refusal (i.e., BPFAS Picky Eaters, BPFAS Toddler Refusal-General), whereas the only variable that was significantly associated with CFQ-R Weight HRQOL was problematic mealtime behavior of textured food refusal (i.e., BPFAS Toddler Refusal-Textured Foods; see Table 3).

Discussion

The parent-proxy version of the CFQ-R was administered to parents at baseline who were participating in a larger randomized clinical trial in order to examine its reliability in young children, which is consistent with several recent studies that have used the CFQ-R to assess Respiratory, Treatment Burden, and Physical HRQOL in infants and toddlers (ages 4–60 months). (7,8) In the current study, the CFQ-R Physical, Eating, and Respiratory subscales had acceptable to strong reliability in 2–6 year old children. Brumback and colleagues found that worse Respiratory and Physical Functioning HRQOL at baseline was associated with significantly higher rates of pulmonary exacerbations across a 48 week period. Together, these findings demonstrate that the CFQ-R Physical, Eating, and Respiratory subscales can reliably assess CF-specific HRQOL in toddlers and preschool-aged children ages 2–5 years.

The reliabilities of remaining subscales were variable with Emotional, Treatment Burden, and Vitality approaching acceptable reliability, whereas School, Digestion, Body Image, and Health were poor. These results suggest that several subscales from the parent-proxy version of the CFQ-R need to be adapted and refined specifically for young children with CF. For example, items that assess body image (e.g., “My child feels that he/she is too thin,” “My child feels small compared to other kids the same age”) are not likely to be of concern during this developmental period. In addition, many parents did not complete the school items, which suggests that they were not applicable. Forty-six percent of the children with CF in the current study attended daycare or preschool, thus modifying or adding items about functioning specific to these settings is recommended for the parent-proxy version of the CFQ-R. Other items (e.g., “Seemed worried,” “Seemed short-tempered”) could be modified to use language that more appropriately reflects behaviors that are typically demonstrated in this developmental period such as “Talks about fears” or “Has temper tantrums.” Finally, although parent-proxy questionnaires are useful, it is also beneficial to ascertain the child’s perceptions of his/her HRQOL; therefore, efforts are underway to develop a pictorial version of the CFQ-R for administration directly to young children. (30)

Parents in our study rated their children’s generic physical, social, school, and total HRQOL (i.e., PedsQL) as comparable to children in other studies; (31) with the exception of emotional HRQOL which was significantly higher in our sample (80.2 v. 74.4; $p<.05$) With the exception of Eating and Weight, all parent-proxy CFQ-R subscale scores were better in our sample compared to other CF studies (see Table 1). (5,9) Parents perceived their young children to have good physical and respiratory HRQOL, which is expected given that overall physical health and lung functioning tends to be better in young children with CF.

Parents in our study reported significant concerns about their children’s eating, which is consistent with other studies.(14,22,32) For families in our study, lower CF-specific stress was associated with better CFQ-R Eating HRQOL. However, CFQ-R Eating HRQOL decreased as picky eating and food refusal increased. In addition, CFQ-R Weight HRQOL decreased as children’s refusal of textured foods increased. Parents experience the common difficulty of getting their children to eat a variety of foods and novel textures and as a result, they may perceive these difficulties as interfering with weight gain and negatively impacting CFQ-R Weight HRQOL. New foods with novel textures offered to young children with CF

often have important nutritional value, including protein from meat sources, sodium from crunchy snacks, and added fat. However, food refusal may lead to increased parenting stress and decreased HRQOL especially because added food variety can lead to better weight gain. If young children demonstrate texture and food refusal beyond what is typical for this developmental period and if parenting stress and HRQOL are negatively impacted, then a referral to an occupational or speech therapist or a feeding team might be warranted. Importantly, interventions targeted at decreasing parenting stress specifically associated with mealtimes and problematic eating may lead to improved HRQOL.

Parents would also likely benefit from receiving anticipatory guidance from CF teams regarding general eating problems from a health-care provider with expertise in behavioral strategies to aid parents in gradual, repeated, and consistent exposure to foods. Parents of infants and toddlers with CF perceive more problems with their own strategies for managing mealtimes than parents of healthy children; (13) therefore, teaching effective behavioral strategies to parents will promote their children's acceptance of new textures and foods and increase food consumption. Mastery of effective eating strategies will lead to children with CF reaching CF nutrition goals while decreasing parent stress, and improving HRQOL. Assisting parents in the identification of a hierarchy of behaviors that interfere with eating and focusing on mastery of skills to improve eating is recommended. (22,33)

Results of the current study should be interpreted in light of its limitations. First, we downwardly extended the CFQ-R to an age group in which it was not normed. Although many items were appropriate for this age group, some were not (e.g., school); therefore, consideration to modifying items and establishing norms is needed. Second, although a relatively large sample for a CF study, the sample size is small and thus may limit the generalizability of findings to all parents of children with CF or those not seeking nutritional treatment. Third, data presented in this study are from baseline measurements of a clinical trial. Longitudinal assessment of parenting stress and eating-related HRQOL in the context of child mealtime behaviors is needed. Indeed, Sawicki and colleagues (9) found that parents of older children perceived their child's CF-specific HRQOL as declining slowly over one year. In addition, they found that declining weight was significantly associated with worsening scores on the CFQ-R nutritional health domains. Therefore, future studies should consider determining associations between children's daily energy intake with eating problems, adherence to nutritional recommendations, and parenting stress especially because the CF Foundation recommends that children eat 3 meals and 3 snacks per day to achieve the recommended daily intake. More frequent eating may lead to more opportunities for parents to experience behavioral problems and mealtime stress if these behaviors are not addressed. The relation between adherence to nutritional recommendations and eating problems and stress has not been investigated.

Finally, the findings of this study highlight two important themes. First, CF-specific assessment of eating problems and parenting stress is much more informative and accounts for more of the variance in HRQOL than when generic measures are used. Generic measures of HRQOL in CF samples perform poorly in regard to sensitivity and specificity. (1) Therefore, it is generally accepted and expected that CF-specific measures of HRQOL are used in studies especially as primary and secondary outcome measures in clinical trials.

Second, there are multiple areas of intervention that can be targeted in future studies and clinical efforts. The strength of the relationships found in the current study between eating problems, parenting stress and CF-specific HRQOL highlight the need for intervention in these areas. Indeed, interventions exist at improving mealtime behaviors and nutritional status in toddlers, preschoolers, and school-aged children with CF. (32,34,35) As a result, the larger clinical trial from which the current data are derived focuses on providing intervention to improve general eating behaviors and improving caloric and fat intake. Future interventions may need to be adapted and refined to address broader influences on problematic child eating such as parenting stress.

Acknowledgments

This work was supported by the National Institute of Diabetes, Digestive, and Kidney Diseases. Funding was provided to Drs. Driscoll, Modi, and Filigno (T32DK063929; PI: Powers); Dr. Powers (R01DK054915; K2459973); and Dr. Stark (K24 DK059492).

We would like to thank the families who participated in this study and the research staff at all 7 study sites (Akron, Ann Arbor, Cincinnati, Cleveland, Columbus, Dayton, Tucson) for their support

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Table 1

Means and Standard Deviations of Baseline Questionnaires

Questionnaires and Subscales	Mean (SD)	Range	Alpha
PedsQL			
<i>Physical</i>	87.71 (13.72)	34–100	0.85
<i>Emotion</i> *	80.17 (14.93)	50–100	0.75
<i>Social</i>	91.38 (10.55)	60–100	0.63
<i>School</i>	80.38 (18.92)	41–100	0.87
<i>Total</i>	86.22 (11.27)	54–100	0.93
Cystic Fibrosis Questionnaire –Revised (parent-proxy)			
<i>Physical</i>	87.87 (15.43)	25–100	0.86
<i>Emotional</i> *	90.11 (10.83)	47–100	0.68
<i>Vitality</i>	72.51 (12.72)	33–100	0.64
<i>Eating</i> **	62.10 (28.63)	0–100	0.73
<i>Treatment Burden</i>	62.56 (21.56)	22–100	0.68
<i>Health</i> *	83.41 (16.88)	44–100	0.59
<i>Respiratory</i> *	84.41 (14.23)	38–100	0.75
<i>Digestion</i> **	71.46 (16.01)	33–100	0.44
<i>Weight</i>	49.77 (38.14)	0–100	
Parenting Stress Index			
<i>Competence</i>	27.14 (6.34)	15–42	0.77
<i>Isolation</i>	13.17 (4.75)	6–27	0.83
<i>Attachment</i>	10.78 (3.11)	7–19	0.59
<i>Health</i>	12.35 (3.35)	6–22	0.68
<i>Role Restriction</i>	18.30 (5.36)	7–35	0.81
<i>Depression</i>	18.68 (5.83)	9–39	0.83
<i>Spouse</i>	18.08 (5.08)	7–32	0.69
<i>Parent Domain Total</i>	118.49 (26.43)	62–194	0.94
Family Stress Scale	31.70 (9.24)	15–50	0.86
Behavioral Pediatrics Feeding Assessment Scale			
<i>Picky Eaters</i>	24.71 (6.73)	13–41	0.84
<i>Toddler Refusal-General</i>	28.58 (5.94)	17–45	0.70
<i>Toddler Refusal-Textured Foods</i>	15.45 (3.72)	9–28	0.62
<i>Older Children Refusal-General</i>	28.04 (6.62)	13–49	0.77
<i>Stallers</i>	33.76 (7.47)	18–55	0.78
<i>Total Frequency Score</i>	76.90 (16.29)	43–119	0.90

Note. Z-scores were calculated for the PedsQL and CFQ-R subscales based on means and standard deviations from the current study and Thomas et al. (PedsQL) and Quittner (2012) and Sawicki (2011) for CFQ-R.

* HRQOL in the current study was significantly higher;

** HRQOL was significantly lower in the current study.

Table 2

Linear Regression Analysis Predicting HRQOL Scales

	B	SE B	β	R²
<i>PedsQL Social Scale</i>				.15*
FSS Total Score	0.03	0.21	0.02	
PSI Parent Domain Total Score	-0.17	0.07	-0.42**	
BPFAS Total Frequency Score	0.07	0.09	0.11	
<i>PedsQL Total Scale</i>				
...Child Age	-3.48	1.05	-0.41	0.33
FSS Total Score	-0.06	0.21	-0.05	
PSI Parent Domain Total Score	-0.16	0.07	-0.36	
BPFAS Total Frequency Score	-0.06	0.09	-0.08	
<i>CFQ-R Eating Subscale</i>				0.59***
FSS Total Score	-0.84	0.35	-0.27**	
PSI Parent Domain Total Score	0.26	0.11	0.25	
BPFAS Total Frequency Score	-1.17	0.15	-0.68***	
<i>CFQ-R Weight Subscale</i>				0.19**
FSS Total Score	-0.68	0.66	-0.17	
PSI Parent Domain Total Score	0.05	0.22	0.03	
BPFAS Total Frequency Score	-0.78	0.29	-0.34**	
<i>CFQ-R Respiratory Subscale</i>				0.17
Income ⁺	2.00	0.82	0.29	
FSS Total Score	-0.47	0.25	-0.31	
PSI Parent Domain Total Score	0.15	0.08	0.28	
BPFAS Total Frequency Score	-0.13	0.11	-0.14	

*
 $p < 0.05$;**
 $p < 0.01$;***
 $p < 0.001$ ⁺ demographic variable added as covariate because of positive significant correlation with dependent variable

Table 3

Exploratory Regression Analysis Predicting the CF-specific HRQOL Scales with Specified BPFAS and PSI Parent Domain Subscales

Variables	B	SE B	β	R ²
<i>CFQ-R Eating Subscale</i>				0.63
FSS Total Score	-0.88	0.33	-0.29**	
PSI Parent Domain Total Score	0.18	0.11	0.16	
BPFAS Picky Eaters	-2.68	0.67	-0.62***	
BPFAS Toddler Refusal-General	-4.02	1.07	-0.86***	
BPFAS Toddler Refusal-Textured Foods	1.80	1.00	0.24	
BPFAS Stallers	1.97	1.07	0.53	
<i>CFQ-R Weight Subscale</i>				0.14
FSS Total Score	-1.07	0.68	-0.26	
PSI Parent Domain Total Score	0.20	0.23	0.14	
BPFAS Picky Eaters	-1.09	1.37	-0.19	
BPFAS Toddler Refusal-General	-0.67	2.19	-0.11	
BPFAS Toddler Refusal-Textured Foods	-4.40	2.03	-0.43*	
BPFAS Stallers	2.01	2.17	0.40	
<i>CFQ-R Respiratory Subscale</i>				0.21
Income ⁺	1.81	0.85	0.27	
FSS Total Score	-0.42	0.26	-0.28	
PSI Parent Domain Total Score	0.12	0.09	0.23	
BPFAS Picky Eaters	0.56	0.53	0.26	
BPFAS Toddler Refusal-General	-0.45	0.86	-0.19	
BPFAS Toddler Refusal-Textured Foods	0.04	0.77	0.01	
BPFAS Stallers	-0.42	0.86	-0.22	

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$

⁺ demographic variable added as covariate because of positive significant correlation with dependent variable