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The Impact of Feeding on the Parent and Family Scales (Feeding Impact Scales): Development and psychometric testing

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Abstract

Background and Purpose: Families of children with feeding disorder face significant challenges in supporting their child's feeding, growth, and development. The Feeding Impact Scales were developed to assess how child feeding impacts parent and family.

Methods: Items were adapted from an existing scale. Parents of children with feeding difficulty completed the online survey. Item response theory (IRT) analyses were used to evaluate and reduce items. Internal consistency reliability, convergent validity, and readability were tested.

Results: IRT analyses ($n = 317$) identified 12 items for the Parent Impact and 13 items for the Family Impact. Internal reliability for the scales were acceptable. Convergent validity was supported.

Conclusions: The Feeding Impact Scales have evidence of reliability and validity. They can be utilized in practice and research.

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Keywords

Item Response Theory; Pediatric Feeding Disorder; Feeding Problems; Measurement; Family

Introduction

Families of children with feeding disorder face significant challenges in their efforts to support their child's eating, growth, and development (Estrem, Thoyre, Knafl, Pados, & Van Riper, 2018). While feeding-related interventions almost exclusively target the child's behavior and/or skill, parents and family are integral to successful long-term implementation of feeding interventions (Begotka, Long, Goday, & Silverman, 2018; Dahlsgaard & Bodie, 2019). Understanding how a child's feeding disorder impacts the parent and family is essential for tailoring interventions for long-term success. The purpose of this study was to develop and test the Feeding Impact on Parent and Family Scales (Feeding Impact Scales).

Background and Conceptual Framework

The recently proposed criteria for Pediatric Feeding Disorder (PFD) is defined as oral intake that is not age-appropriate and that is associated with dysfunction in at least one of four domains: medical, skill, nutrition, or psychosocial (Goday et al., 2018). Included in the psychosocial domain are: caregiver distress at mealtime, and the mental health of caregivers and family. Caring for a child with PFD is often a chronic experience for the parent and family system, and is associated with significant challenges (Estrem et al., 2016; Estrem et al., 2018), yet there is little research on this aspect of PFD.

This newly adapted instrument is intended for use by clinicians and researchers who work with infants and children when feeding may be challenging. The scale scores can be used to track family and parent impact of their child's feeding over time. To our knowledge interventions directly for family and parent impact of pediatric feeding disorder (PFD) are not evidence based at present. There are evidence based interventions for improving an infant or child's feeding outcomes (Lukens & Silverman, 2014; Sharp, Jaquess, Morton, & Herzinger, 2010), and some programs are beginning to assess and report more comprehensively by seeking parent report of their own stress or satisfaction with treatment (Dahlsgaard & Bodie, 2019; Marshall, Hill, Wallace, and Dodrill, 2018). In the last several years, there has been increased attention to parent and family outcomes in PFD treatment, partly because clinicians question generalization of clinic outcomes into the home setting, or non-feeding specific parent stress assessments have resulted in high scores (Sharp, Jaquess, Morton, & Herzinger, 2010).

One of the main reasons for scarce data on the parent and family aspects of PFD has been a lack of available tools meeting criteria for patient reported outcome (PRO) research. PRO measures require input from the intended respondents early in the measure development process to establish content validity (Francis, McPheeters, Noud, Penson, & Feurer, 2016). There are two tools available to measure impact of feeding disorder on parent and/or family. One, the Feeding Swallowing Impact Survey (FS-IS; Lefton-Greif et al., 2014) lacks evidence that parents were directly involved in the survey development. The second was

in an unpublished dissertation: the Pediatric Feeding and Swallowing Disorders Family Impact Scale (Redle, 2007). The Pediatric Feeding Swallowing Disorders Family scale is a 44-item scale using a 5-point response option (Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree) that measured challenges and concerns in the family related to care for a child with feeding disorders, with higher scores indicating lower family impact. It does meet some criteria for PRO measure development, such as parent involvement in item development. Initial items were developed from interviews with 20 primary caregivers of children with feeding problems, pilot-tested with eight caregivers, and then revised (Redle). The final scale was then field-tested with 136 caregivers of children with ($n=90$) and without ($n=46$) feeding disorders; and Redle reported a single factor was identified using exploratory factor analysis.

Although the initial factor analysis identified a single factor (Redle, 2007), 18 of the 44 items did not directly measure the impact of a child's feeding on the parent and family (ex. "My child gags while eating" and "I think my child understands hunger"). Additionally, the sample size used in the factor analysis was not sufficient for generating meaningful factor structures (DeVellis, 2012). This indicated the need for further testing. Therefore, we present the development and testing of a newly adapted instrument, the Feeding Impact on Parent and Family Scales (Feeding Impact Scales).

Methods

Institutional Review Board approval was obtained from the University of North Carolina at Chapel Hill prior to commencement of this study.

Phase 1: Modification of Redle's Pediatric Feeding and Swallowing Disorders Family Impact Scale

Items for the Feeding Impact Scales were derived from items on the Pediatric Feeding and Swallowing Disorders Family Impact Scale (Redle, 2007). To modify the scale, the research team first evaluated original items systematically. Items that did not directly measure the impact of feeding on the parent or family were removed. For example, items that assessed the child's skill for eating (ex. "My child can bite and chew foods like other children his/her age") or observable symptoms of problematic feeding (ex. "My child gags while eating") were removed. The remaining items were then reviewed and revised for consistency of format and clarity. Next, items were divided into two separate pools: one set items that assessed impact on family and another that assessed impact on parent. The two Feeding Impact Scales were created from this process: the Parent Impact Scale and the Family Impact Scale. Response options for the Feeding Impact items remained as originally designed, on a 5-point Likert scale, but the direction of the response options was reversed for easier interpretation of the scores (from "strongly disagree" to "strongly agree"). With the new response options, higher scores indicate greater impact on the parent and family.

Phase II: Item Reduction Using Item Response Theory Analyses

In Phase II, we further evaluated the items in each scale using Item Response Theory (IRT). Parents of children with feeding problems were invited to complete the Feeding

Impact Scales using an online survey on the Qualtrics Research Suite platform (Qualtrics, Provo, UT). Parents were also asked to share demographic information, the child's feeding and medical history, as well as respond to three additional feeding measures to evaluate convergent validity of the Feeding Impact Scales. To participate in the study, parents had to be at least 18 years old, able to read English, have internet access, and have an infant or child less than 18 years old with feeding problems. Parents less than 18 years old were excluded to eliminate potential confounding of adolescent parenting. Those who were not fluent in English were excluded as we are first developing the tool in English. Translations to Spanish and other languages are underway and will have their own evaluations with native speakers. Those without internet access were excluded simply because the survey was distributed via the internet.

The primary intent of sample selection was to identify a wide range of possible respondents so that the resulting instrument would be widely applicable (DeVellis, 2012). To avoid dependency in the data, only one parent per family could report on one child in that family. Parents of children with feeding problems were recruited through online family support groups and research volunteer communities including: the Feeding Challenges Registry; a registry of parents of children with feeding difficulties maintained by the research team; FeedingMatters.org, an online resource for families of children with feeding difficulty; and ResearchMatch.org, a national health volunteer registry supported by the National Institutes of Health as part of the Clinical Translational Science Award (CTSA). Additionally, parents were recruited locally through a hospital feeding clinic and nationally through Qualtrics response panels. Qualtrics response panels are a registry of individuals interested in participating in market and other research. Qualtrics matches potential participants with a particular survey's inclusion criteria. This recruitment strategy allowed for geographic and racial-ethnic diversity of the sample as well as diversity in terms of the child's underlying cause of feeding problem. Diversity of the sample is important for developing a tool with participants who reflect the population. Parents were offered a small incentive at survey completion (value less than \$10).

Data Analysis.—IRT comprises a collection of modeling techniques for the analysis of item level data obtained to measure inter-individual variation (e.g., the degree of the impact of a child's feeding on the parent), which generates rich item level information and offers several advantages over classical test theory (Nguyen, Han, Kim, & Chan, 2014). IRT can be used to evaluate psychometric properties of an existing scale and its items, to optimally shorten the scale when necessary, and to evaluate the performance of the reduced scale. IRT assumes unidimensionality (van der Linden & Hambleton, 2013), thus with two different dimensions in the Feeding Impact Scales (Parent Impact Scale and Family Impact Scale), we ran IRT analysis separately for each scale. Given the 5-point Likert response scale, a graded response IRT model was determined to be most appropriate (Paek & Han, 2013). The IRT analysis was conducted using IRTPRO Version 4.2 software (Scientific Software International Inc., Skokie, IL, USA).

The following process was followed for each of the Feeding Impact Scales. Individual items were evaluated for the following IRT parameters: item fit statistics, local dependency (LD χ^2), discrimination parameter (a parameter), category response curves, and information

curves. Items were considered for removal if they had poor statistical fit, low discrimination parameter (a parameter < 1), or excess local dependency with another item (>10), which indicates possible redundancy of the concepts being measured by those items (Edelen & Reeve, 2007; Nguyen et al., 2014). Items were also evaluated for item location (b parameter) to maximize variation in item location along the trait continuum (Nguyen et al., 2014). Poor fit items were evaluated using adjusted p -value of .001 based on the Benjamini-Hochberg adjustment for multiple comparisons (Benjamini & Hochberg, 1995). During the evaluation of individual items, category response curves and information curves were also assessed to aid in decisions. Through an iterative process, items that did not meet any of the criteria described above were eliminated.

Phase III: Psychometric Properties and Readability

Once a final set of items was determined from the IRT analyses, we evaluated psychometric properties and readability. In this phase, participants were excluded from the analysis if they had missing data on any item in the Feeding Impact Scales or the measures used for convergent validity.

Internal Consistency Reliability.—Cronbach's alpha was calculated to estimate internal consistency reliability for each of the scales. Each item was also evaluated to determine if removal of the item would significantly increase the Cronbach's alpha for each scale.

Convergent Validity with Related Measures.—There is currently no standard for the assessment of the impact of a child's feeding on parents or families, therefore convergent validity for each of the Feeding Impact Scales was tested with three measures of related constructs that would be theoretically expected to be related to the Feeding Impact Scales' scores. Convergent validity is used to determine how much two different tools measure the same information, and this is an important contribution to the evidence for construct validity (Carlson & Herdman, 2012). Because these were measures of related constructs, weak to moderate correlations were anticipated (Abma, Rovers, & Wees, 2016). The validation measures included the Pediatric Eating Assessment Tool (PediEAT) (Pados, Thoyre, & Park, 2018; Thoyre et al., 2014; Thoyre et al., 2018), Family Management Measure of Feeding (FaMM Feed; Estrem et al., 2017; podium presentation; unpublished data), and the Family Assessment Device – General Functioning (FAD-GF) (Miller, Bishop, Epstein, & Keitner, 1985). For each of the three measures, bivariate correlations (r , Pearson's product-moment correlation) were calculated between the scores on the measure and the Feeding Impact Scales.

PediEAT: The PediEAT is a 78-item measure of symptoms of problematic eating in children between the ages of 6 months and 7 years old who are offered solid food (i.e., something other than liquids) to eat by mouth. The PediEAT has four subscales: Physiologic Symptoms, Problematic Mealtime Behaviors, Selective/Restrictive Eating, and Oral Processing. Response options are on a 6-point Likert scale, from Never to Always, indicating frequency or severity of symptoms. Higher scores on the PediEAT indicate more symptoms of problematic feeding. Theoretically, it would be expected that parents of children with more symptoms of problematic eating (i.e., higher PediEAT score) would

experience greater impact of feeding (i.e., higher scores on the Feeding Impact Scales). The PediEAT has evidence of reliability and validity (Thoyre et al., 2014; Thoyre et al., 2018).

FaMM Feed.: The FaMM Feed is a 48-item measure of how families manage when their child has problematic feeding. The FaMM Feed was adapted from the Family Management Measure (Knafl et al., 2011), which was originally developed to measure how families manage when their child has a chronic condition. The FaMM Feed was adapted to specifically ask about how families manage problematic feeding. It has six subscales, five of which are completed by all parents: Family Feeding Efforts and Challenges, Feeding Confidence and Ability, Feeding Uncertainty and Concerns, Future Feeding Outlook, and Feeding Related Family Life Difficulties. Only parents with partners complete the final subscale, Parent Mutuality on Feeding, which asks questions related to the way partnered parents manage their child's feeding. Parents are asked to rate their response to items on a 5-point Likert scale from Strongly Disagree to Strongly Agree. Higher scores on the FaMM Feed generally indicate better management. The FaMM Feed has evidence of reliability and validity (Estrem et al., 2017; podium presentation; unpublished data). Scale scores from the FaMM Feed were expected to be lower when Feeding Impact scores are higher.

FAD-GF.: The FAD-GF is a 12-item scale measuring family functioning (Miller, Bishop, Epstein, & Keitner, 1985). The score of the FAD-GF is calculated as the average score (i.e., the sum score is calculated and divided by 12). A higher score on the FAD-GF indicates more problematic general family functioning. Previous research and the PFD conceptual model's psychosocial component (Estrem et al., 2018; Goday et al., 2019) indicate that families experiencing greater impact from their child's problematic feeding (i.e., higher score on the Family Feeding Impact scale) might experience more problematic family functioning (i.e., higher score on the FAD-GF).

Readability.—A member of the research team tested the Readability of the Feeding Impact Scales once all revisions were made from the previous phases of development using a free online readability calculator (readabilityscore.com).

Results

Phase I: Modification of Redle's Pediatric Feeding and Swallowing Disorders Family Impact Scale

At the completion of Phase I, there were 36 total items on the Feeding Impact, sorted into two conceptually distinct scales: Feeding Impact on Parent (19 items) and Feeding Impact on Family (17 items). The research team modified the wording of 15-items to simplify or clarify the statement. Also, after modification, higher scores indicate greater impact on the parent and family.

Phase II: Item Reduction Using Item Response Theory Analyses

Sample.—The IRT analysis included responses from a sample of 317 parents. Their demographic characteristics are provided on Table 1. The top two child conditions in the sample were developmental delay (32.2%) and history of prematurity (29.2%), and the

sample of children represented were 57.4% male. More detail on the characteristics of the children are provided on Table 2. The majority of participants lived in the United States ($n = 306$), while 4 participants were from Canada, 1 from Germany, 2 from the United Kingdom, and 11 chose not to share their location. Within the United States, there were respondents from 38 states and the District of Columbia.

Data Analysis Using Item Response Theory.—Starting with the 19 items on the Feeding Impact on Parent scale from Phase I, four items were initially removed for poor fit on the graded response model. When the model was run again, three additional items were identified as having poor fit and removed, after which all items had good fit. The IRT parameter values associated with each item on the Parent Impact Scale are in Table 3. In evaluating local independence, two items were identified as having excess local dependence ($LD\chi^2 > 10$). The research team reviewed these items and found them to be conceptually distinct. Also, both items had a parameters > 1 , acceptable information curves, and distinct category response curves; therefore, the decision was made to keep both items (“I worry that my child’s feeding affects his/her health”, and “Feeding my child requires extra patience”). The research team then reviewed the categorical response curves and the range of b parameter values of all the remaining items, with the goal of ensuring sufficient item density across the latent trait. As expected, higher categorical responses had higher item locations: $b_1 = (-1.52 \text{ to } -0.91)$ versus $b_4 = (0.47 \text{ to } 1.45)$ (Table 3). At the completion of Phase II, the Feeding Impact on Parent scale had 12 items, all with good fit and sufficient a parameters.

For the Feeding Impact on Family Scale (17-items), all items fit within the model. There were 2 pairs of the items with excess local dependence ($LD\chi^2 > 10$). Based on the concepts assessed in the item, the a parameter, information curve, and category response curves, two items were removed. After these two items were removed, the model was run again and all items fit the model. Four items were further evaluated because they had a parameters < 1 . Two of those items were deleted because they also had low information curves and indiscernible category response curves. The other two items were retained for the following reasons: one item was the only item to assess extended family, and its a parameter was just under 1, and the other item had an acceptable information curve and discernable category response curves. At the completion of Phase II, the Feeding Impact on Family scale had 13-items. IRT parameter values are displayed in Table 4. As we anticipated, higher category responses had higher response locations. Location parameters spanned the trait continuum, with $b_1 = (-2.53 \text{ to } -1.21)$, and $b_4 = (0.53 \text{ to } 2.67)$.

Phase III: Testing of Psychometric Properties and Readability

Internal Consistency Reliability.—Internal consistency reliability was good for the 12-item Impact on Parent scale ($n = 307$; Cronbach’s alpha = .83) and was excellent for the 13-item Impact on Family scale ($n = 310$; Cronbach’s alpha = .93). No items would significantly increase the Cronbach’s alpha for either of the scales if deleted.

Convergent Validity with Related Measures.—There were 231 participants who completed the Feeding Impact Scales and all three measures testing convergent validity.

The results of correlations between the Feeding Impact Scales and the PediEAT, FaMM Feed, and FAD-GF are presented in Table 5. Overall, the correlations between the Feeding Impact Scales with the convergent validity measures were weak to moderate, which was expected. The Impact on Parent scale was weakly, but significantly correlated with the Problematic Mealtime Behaviors subscale of the PediEAT ($r = .15, p < .05$), indicating that parents were more highly impacted by their child's feeding when the child exhibited more problematic mealtime behaviors. The Impact on Parent scale had a weak (yet significant) negative correlation with the FAD-GF score ($r = -.16, p < .05$). This means that for this sample, parents who perceived more personal impact of their child's feeding problems also reported better general family functioning.

The Impact on Family scale was significantly correlated with the PediEAT total score ($r = .23, p < .01$) as well as the following subscales of the PediEAT: Physiologic Symptoms ($r = .15, p < .05$), Problematic Mealtime Behaviors ($r = .23, p < .01$), and Selective/Restrictive Eating ($p < .05$). In other words, the family was more highly impacted when the child had more symptoms of problematic eating across all domains with the exception for Oral Processing. The Impact on Family was also significantly correlated with the FaMM Feed total score ($r = -.31, p < .01$) and all of the subscales except for the Parent Mutuality subscale. This means parents who reported greater impact of their child's problematic feeding on the family also reported having their family feeding problem as foreground; additionally, they felt less able to manage feeding, perceived feeding to be more difficult, and had more of a negative outlook for the future. There was no significant correlation between the FAD-GF and the Impact on Family scale.

Readability.—The Feeding Impact on Family and Parent Scales together are written at a Flesch-Kincaid Grade Level of 6.42, which is consistent with recommendations that health-related materials be written at or below a 6th grade reading level (Roberts, Zhang, & Dyer, 2016).

Discussion

The Feeding Impact Scales meet the need for a measurement of parent and family impact of a child's feeding. Overall the sample for this study was representative of the larger population of infants and children with PFD. Typically, more male children have PFD than do females, and our sample represented 57.4% male children (Sharp, Jaquess, Morton, & Herzinger, 2010). Also the main other diagnoses reported were developmental delay and a history of premature birth, this is also a reflection of common co-occurring conditions noted in other studies (Field, Garland, & Williams, 2003; Sharp, Jaquess, Morton, & Herzinger, 2010). As a parent report measure, it is easy to administer and to track both when a child is in clinic and at home. IRT analysis facilitated selection of items that gave the most information, fit within the graded response model, and provided unique contributions to their respective scales. The Parent (12-items) and Family (13-items) Impact Scales have good internal consistency reliability, and are at a desirable reading level for health-related materials.

Parent and Family Impact scale scores had weak to moderate correlations with the other measures used in the study (symptoms of problematic eating, family management of feeding, and general family functioning). Most of these were significant. Weak correlations between measures of theoretically related, yet different constructs can be interpreted as meaningful because they were not hypothesized to be strongly correlated (Abma et al., 2016). Most relationships between scale scores were in a hypothesized direction, for example, it was hypothesized that there would be a positive relationship between a child's symptoms of problematic feeding and the impact on the family. However, the relationships between the Feeding Impact Scales and the FAD-GF were unexpected. Contrary to what was hypothesized, parents who perceived more personal impact (Parent Impact) of their child's feeding disorder reported significantly better FAD-GF scores. Also unexpected, was that the relationship between the FAD-GF and the Feeding Impact on Family was not significant. This could mean that the FAD-GF is measuring something conceptually unrelated to the Feeding Impact Parent and Family. Or, it may be that greater parent impact of feeding has a paradoxical outcome of improving family function in a compensatory manner. More work is needed to explore the relationships between family functioning and impact of feeding on the family system.

Limitations

Limitations of this study include a lack of standard measures for similar constructs for concurrent validation. As with past studies that have endeavored to develop measures where no valid and reliable tools existed, the closest approximations were used (Knafl et al., 2011; Thoyre et al., 2018). Also, parents self-identified as having a child with feeding problems. While this could not be confirmed clinically, in past studies with the PediEAT, total scores and subscale scores were significantly higher for the children whose parents identified their child as having feeding disorder versus those that did not (Thoyre et al., 2018). That adds evidence that parents can be reliable reporters of their child's feeding problem status.

Relevance to Nursing Practice and Research

With established validity and reliability, the Feeding Impact Scales are innovative tools to assess the impact of a child's feeding on the parent and family system. These scales specifically measure the parent-reported impact of feeding on parent, and on family. The Feeding Impact Scales can be used to assess outcomes for families of children in interdisciplinary care for PFD. It can be administered on paper, in electronic charting, or via a survey platform, and this can be adjusted as needed for data format and security, as well as ease of administration for the parent. For example, an intensive day treatment program for PFD can mail ahead the questionnaire for parents to bring to a first visit, or parents could complete it while in the treatment center. If a telehealth appointment, it can be sent ahead in a digital survey or chart form for providers to have the information on hand. This will allow the team of providers to adjust and tailor interventions for optimal success in the child's natural environment. The benefits to nursing and interdisciplinary processes will be ability to develop interventions that are more tailored to the challenges parents and families experience, thus improving effectiveness and outcomes. Work was recently completed to establish norm-reference values which guide interpretation of the Feeding Impact Scales and

item scores. A recent development of response to the COVID-19 pandemic has been that many PFD treatment programs have gone completely to telehealth format. Knowing parent and family impact of feeding will be more important than ever, as they are critical providers of feeding care in their own homes.

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Table 1.

Demographic Characteristics of Parents in Sample

Variable of Interest	<i>n</i> (%)
Respondent's Relationship to Child (<i>n</i> =317)	
Mother	307 (96.8%)
Father	8 (2.5%)
Other Primary Caregiver	2 (0.6%)
Family Type (<i>n</i> =314)	
Two Parent	268 (85.4%)
One Parent	41 (13.1%)
Other Family Type	5 (1.6%)
Family Income (<i>n</i> =313)	
< \$20,000	18 (5.8%)
\$20,000 – 39,999	57 (18.2%)
\$40,000 – 59,999	69 (22%)
\$60,000 – 79,999	55 (17.6%)
\$80,000 – 99,999	32 (10.2%)
> \$100,000	82 (26.2%)
Parent Education Completed (<i>n</i> =317)	
High School or Less	51 (16.1%)
Technical School / Community College	41 (12.9%)
College / University or Higher Education	225 (71%)
Parent's Race (<i>n</i> =315)	
American Indian or Alaskan Native	1 (0.3%)
Asian	9 (2.9%)
Black or African American	16 (5.1%)
Hispanic or Latino	9 (2.9%)
White	263 (83.4%)
More than one race	16 (5.1%)
Other	1 (0.3%)

Table 2.

Characteristics of Children in Sample

Age Group	Female (<i>n</i>)	Male (<i>n</i>)	Total (<i>n</i>)
0 – 6 months	8	4	12
6 – 12 months	12	12	24
12 – 24 months	25	24	49
2 – 3 years	17	30	47
3 – 4 years	15	29	44
4 – 5 years	10	25	35
5 – 6 years	11	17	28
6 – 7 years	15	9	24
7 – 18 years	22	32	54
Total: <i>n</i> (% of total)	135 (42.6%)	182 (57.4%)	317
Child Conditions^a		<i>n</i>	%
Developmental Delay		102	32.2%
History of prematurity		88	29.2%
Sensory processing disorder		68	21.5%
Genetic disorder		55	17.4%
Congenital heart disease		48	15.1%
Cerebral palsy		28	8.8%
Autism spectrum disorder		46	14.5%

Note. Prematurity was defined as less than 37 weeks gestation at birth.

^aMultiple conditions could be selected.

Table 3.

Parent Impact Scale Parameter Estimates

Item #	Item Description	a	b ₁	b ₂	b ₃	b ₄	S-X ²	p-value
1	My child requires more of my effort at mealtime because of the way he/she eats than other children his/her age.	2.13	-1.31	-0.67	-0.07	0.89	111.93	0.04
2	I feel other people do not understand my child's feeding needs.	2.76	-0.91	-0.52	-0.18	0.61	90.82	0.10
3	I worry about how long it will take for my child's feeding to get better.	1.93	-1.03	-0.35	0.03	0.71	100.95	0.20
4	Feeding my child requires extra patience.	1	-1.52	-0.47	0.24	1.45	120.79	0.27
5	I have to prepare a special meal for my child because of his/her feeding needs.	2.09	-1.08	-0.46	0.03	0.91	98.79	0.16
6	Meeting my child's nutritional requirements is a daily concern.	2.5	-1.24	-0.55	0.15	0.89	85.82	0.23
7	I worry daily about my child's feeding.	2.4	-1.21	-0.51	-0.12	0.74	109.76	0.02
8	I worry that my child's feeding affects his/her health.	2.03	-1.12	-0.7	-0.18	0.48	108.39	0.07
9	Feeding my child takes more than 20 minutes.	2.61	-1.05	-0.58	-0.12	0.47	105.68	0.05
10	I worry the way my child eats will affect his/her development.	2.69	-1.02	-0.5	-0.05	0.54	82.88	0.40
11	I feel frustrated that I do not know how much my child will eat.	2.8	-1.06	-0.66	-0.08	0.6	79.38	0.23
12	There is more stress in my life because of my child's feeding.	2.25	-1.16	-0.79	-0.12	0.69	102.22	0.10
	Value Ranges	1 to 2.8	-1.52 to -0.91	-0.79 to -0.91	-0.18 to -0.35	-0.18 to 0.24	0.47 to 1.45	

Note. a = θ parameter; b_1 , b_2 , b_3 , and b_4 are the location parameters; $S-X^2$ =graded response model item fit statistic; p -value= p -value of fit statistic, with items $>.001$ not significant and therefore having item-model fit.

Table 4.

Family Impact Scale Parameter Estimates

Item #	Item Description	<i>a</i>	<i>b</i> ₁	<i>b</i> ₂	<i>b</i> ₃	<i>b</i> ₄	<i>S</i> - <i>X</i> ²	<i>p</i> -value
1	We have to plan ahead when eating somewhere other than our home.	1.93	-1.33	-0.7	-0.06	1.12	99.57	0.08
2	Family mealtime is longer because of my child's feeding.	1	-1.59	-0.64	0.46	1.58	85.2	0.87
3	Other caregivers (grandparents, babysitters) have difficulty feeding my child.	0.96	-2.21	-0.54	0.36	1.68	127.22	0.05
4	The number of appointments my child has affects our family.	1.32	-1.59	-0.61	0.28	1.43	95.62	0.52
5	My child's feeding affects his/her siblings.	1.15	-1.71	-0.48	0.42	1.69	79.34	0.92
6	My child's feeding care affects my family financially.	0.99	-1.76	-0.88	0.53	1.47	118.19	0.16
7	There is more stress in my family because of my child's feeding.	1.2	-1.33	-0.59	0.13	0.92	95.9	0.48
8	Family members do not want to watch my child because of his/her feeding needs.	0.87	-2.53	-1.02	0.75	2.67	103.6	0.38
9	My family avoids social activities due to my child's feeding needs.	1.44	-1.21	-0.51	0.16	0.72	91.33	0.47
10	We can easily find a babysitter for our child.	0.98	-2.06	-0.37	0.74	1.97	101.57	0.66
11	My extended family understands my child's feeding needs.	1.31	-1.5	-0.78	-0.33	0.53	103.36	0.16
12	My family enjoys eating in a restaurant.	1.72	-1.46	-0.56	0.16	1	95.4	0.25
13	Mealtime is pleasant for my family.	1	-1.38	-0.38	0.54	1.6	118.5	0.10
	Value Ranges	0.87 to 1.93	-2.53 to -1.21	-1.02 to -0.38	-0.33 to 0.75	0.53 to 2.67		

Note. *a*=*a* parameter; *b*₁, *b*₂, *b*₃, and *b*₄ are the location parameters; *S*-*X*²=graded response model item fit statistic; *p*-value=*p*-value of fit statistic, with items >.001 not significant and therefore having item-model fit.

Table 5.

Results of convergent validity between the Feeding Impact Scales, PediEAT, FaMM Feed, and FAD-GF

	Impact on Parent	Impact on Family
PediEAT Total Score	.06	.23 **
Physiologic Symptoms	0	.15 *
Problematic Mealtime Behaviors	.15 *	.23 **
Selective/Restrictive Eating	-.02	.16 *
Oral Processing	0	.11
FaMM Feed Total Score	-.11	-.31 **
Family Feeding Efforts & Challenges	-.1	-.29 **
Feeding Confidence & Ability	-.1	-.13 *
Feeding Uncertainty & Concerns	-.1	-.29 **
Future Feeding Outlook	-.1	-.28 **
Feeding Related Family Life Difficulties	-.04	-.2 **
Parent Mutuality (Partnered Parents)	-.06	-.12
FAD-GF Score	-.16 *	.03

Note.

* Indicates $p < .05$ (2-tailed).

** Indicates $p < .01$ (2-tailed).

PediEAT: Pediatric Eating Assessment Tool – higher scores = more frequent symptoms; FaMM Feed: Family Management Measure for Feeding – higher scores = better management; FAD-GF: Family Assessment Device – General Functioning – higher scores = more problematic general family functioning