Caregiver Stress and Outcomes of Children with Pediatric Feeding Disorders Treated in an Intensive Interdisciplinary Program

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Objective This study investigated the impact of an intensive interdisciplinary feeding program on caregiver stress and child outcomes of children with feeding disorders across three categories. **Methods** Children were categorized into either tube dependent, liquid dependent, or food selective groups. Outcomes for caregiver stress levels, child mealtime behaviors, weight, and calories were examined at admission and discharge for 121 children. Repeated measures ANOVAs were used to examine differences pre- and post-treatment and across feeding categories. **Results** Caregiver stress, child mealtime behaviors, weight, and caloric intake improved significantly following treatment in the intensive feeding program, regardless of category placement. **Conclusions** Few studies have examined the impact of an intensive interdisciplinary approach on caregiver stress, as well as on child outcome variables with such a diverse population. This study provides support that regardless of a child's medical and feeding history, an intensive interdisciplinary approach significantly improves caregiver stress and child outcomes.

Key words caregiver stress; feeding disorders; feeding outcomes; parenting stress index.

Feeding problems have long been recognized as a significant issue in the pediatric population (Bentovim, 1970; Forsyth, Leventhal, & McCarthy, 1985; Manikam & Perman, 2000), affecting between 3 and 10% of all children (Chatoor, 2002; Lindberg, Bohlin, & Hagekull, 1991; Linscheid, 2006). Children with feeding disorders fail to eat a sufficient amount and/or variety of food to maintain a healthy nutritional status, which over time can lead to life-threatening medical conditions.

Feeding disorders can be difficult to diagnose and treat due to the unique combination of medical and behavioral influences that result in a child's food refusal (Babbitt et al., 1994; Burlow, Phelps, Schultz, McConnell, & Rudolph, 1998; Kerwin, 1999; O'Brien, Repp, Williams, & Christopherson, 1991; Shore & Piazza, 1997). Although most feeding problems resolve within the first couple of years of life, about 3% of cases become a chronic issue that requires intensive treatment (Babbitt et al., 1994; Kerwin, 1999; Shore & Piazza, 1997).

The successful treatment of a feeding disorder often relies upon establishing a new and positive learning history with eating between the child and caregiver. This is not easily done if caregivers are already under a tremendous amount of stress to get nutrition into their child (Singer, Song, Hill, & Jaffe, 1990). Currently, the classification system for identifying a feeding disorder often presents a mixed picture of both biological and environmental variables, which provides little information about a child's history with eating. Despite attempts to identify mutually exclusive categories of feeding disorders, there still remains considerable overlap amongst the groups (Budd et al., 1992; Chatoor & Ganiban, 2003). By categorizing children with feeding disorders into groups based on how they receive their nutrition, we gain insight into their eating history, which may help to identify ways to support caregivers and differentiate treatment approaches for the child.

With this in mind, children with a feeding disorder can be classified into one of three categories: tube dependent (require tube feedings for all or some of their daily caloric needs), liquid dependent (consume primarily liquids orally), or foods selective (consume all or some of

their caloric needs orally, but are selective about which solids and/or liquids they consume).

Although there have been a number of studies that have reported successful treatment of a feeding disorder using various contingency management strategies in single subject designs (Kerwin, 1999), few studies have attempted to systematically assess the effectiveness of an intensive interdisciplinary approach to treating feeding disorders. Of the studies that have assessed the efficacy of interdisciplinary feeding programs (Benoit, Wang, & Zlotkin, 2000; Byers et al., 2003; Irwin, Clawson, Monasterio, Williams, & Meade, 2003; Williams, Riegel, Gibbons, & Field, 2007) all have reported positive improvements in children with severe feeding disorders following behaviorally based intensive day or inpatient programs. However, all the children were primarily tube dependent and none of the studies reported outcome variables for the caregivers.

A severe feeding disorder not only affects the child's overall health and development, but also greatly impacts the parent–child relationship, which can lead to significant emotional distress in the caregivers (Budd et al., 1992). It has been proposed that stress in the parenting role affects the well being of both caregivers and their children (Abidin, 1992; Crnic & Greenberg, 1990). Multiple studies have demonstrated a negative correlation between high levels of parental stress and positive parent–child interactions (Crist et al., 1994; Darke & Goldberg, 1994; Downey & Coyne, 1990; McKay, Pickins, & Stewart, 1996; Powers et al., 2002).

Due to additional challenges placed on children with chronic illnesses, caregivers of these children often experience increased stress associated with their child's illness (Mulhern, Fairclough, Douglas, & Smith, 1994; Thompson, Gil, Burbach, Keith, & Kinney, 1993). A number of investigations have examined stress in caregivers of children with other chronic medical issues. These researchers have found that caregivers of children with numerous medical issues exhibit more stress than their counterparts (Powers et al., 2002). Similarly, Budd et al. (1992) found that children classified as having a feeding disorder that is primarily organic (e.g., gastroesophageal reflux, cerebral palsy) were more likely to have caregivers who had higher emotional distress.

In addition to the medical issues associated with feeding disorders, there are some unique aspects of caring for a child with a feeding disorder that may be particularly stressful. Craig, Scambler, and Spitz (2003) reported that caregivers of children with feeding disorders feel personally responsible for their child's disorder. Because providing physical nourishment to a child is one of

a caregiver's most fundamental responsibilities, the inability to do so can have profound effects on one's feelings of self-esteem, self-efficacy, and confidence in parenting (Craig et al., 2003; Crist et al., 1994; Powers et al., 2002). The caregivers increased stress and anxiety over not being able to feed their child can also lead to increased stress in the child from the repeated failed meals. Moreover, the caregiver's visible signs of anger and frustration can lead to even more avoidance of the meal by the child. This negative meal cycle can repeat itself without some direct intervention to help the caregiver overcome the child's desire to avoid food.

A recent study by Garro, Thurman, Kerwin, and Ducette (2005) examined caregiver stress levels of children hospitalized for the treatment of oral feeding difficulties. They evaluated the stress levels of maternal caregivers using the Parenting Stress Index Short Form (PSI-SF) and reported clinically significant levels of stress (mean PSI-SF Total Stress score of 89.8) at admission and a significant decrease in stress between admission and discharge. Moreover, the results revealed caregiver stress was positively related to a child's diagnosis of mental retardation (MR), autism, and oral-motor delays. Although the study of Garro et al. reveal a reduction in caregiver stress after treatment of the child's feeding disorder, the authors did not examine their participants in light of the heterogeneous nature of feeding disorders. Therefore, it is difficult to draw any conclusions about how a child's eating history affects the stress of his/her caregivers. Moreover, no information was provided on how the child fared in the overall program and whether any child variables affected caregiver stress levels pre- or post-treatment.

This study investigated the level of parental stress, as defined by the PSI-SF, in caregivers of children diagnosed with a feeding disorder at admission to and discharge from a pediatric feeding program. Caregivers' stress levels in relation to the subtype of the child's feeding disorder were examined. In addition, child outcome variables were also collected to determine the overall success of the interdisciplinary program. First, we hypothesized that the majority of caregivers would exhibit clinically significant levels of stress at admission. Second, there would be a significant difference in caregivers' Total Stress score at admission based on the subtype of their child's feeding disorder. Specifically, caregivers of tube-dependent children would be most stressed and caregivers of food selective children would be least stressed. Third, there would be a significant reduction in the Total Stress score between admission and discharge. Finally, there would be

an overall improvement in child feeding behaviors from admission to discharge.

Methods
Participants

A total of 141 cases were treated and discharged from a pediatric feeding program over a span of 5.5 years. Twenty were excluded from this study for at least one of the following reasons: (a) the child's feeding diagnosis did not fit into one of three established feeding categories ($n = 3$); (b) the child was being treated for obesity and/or rumination ($n = 3$); (c) the child was discharged early due to medical complications ($n = 3$); and/or (d) the PSI-SF was not completed at discharge ($n = 11$). Overall, the sample included 121 primary caregivers.

The sample consisted primarily of married Caucasian female caregivers whose ages ranged from 19.9 to 53.8 years ($M = 34.9$ years, $SD = 6.7$ years). Specifically, there were 114 female and seven male caregivers. Nearly 80% of the caregivers were married ($n = 95$) with considerably fewer (20%) respondents reporting themselves as single ($n = 18$), divorced ($n = 4$), widowed ($n = 1$), separated ($n = 1$), or undisclosed ($n = 2$). Overall, 77% of the sample was Caucasian, 14% African-American, and 9% of some other racial/ethnic background.

Children were grouped in one of the following feeding categories based on the way in which they received their daily caloric needs upon admission: (a) tube dependent, (b) liquid dependent, or (c) food selective. Tube-dependent children required tube feedings for all or some of their daily caloric needs. Liquid-dependent children were not receiving any tube feeds, and received at least 75% of their daily caloric intake from liquids orally. Food selective children were not receiving any tube feeds and did not meet criteria for the liquid dependent group. Instead, they received all or some of their caloric needs by solids alone or a combination of solids and liquids; however, they were selective about which solids and/or liquids they consume. These categories were mutually exclusively in that no child was in more than one group. Overall, 60% of children ($n = 72$) were categorized as tube dependent, 14% ($n = 17$) were liquid dependent, and 27% ($n = 32$) were food selective.

With respect to the children in the sample, 58.7% were males and 41.3% were females. Their ages ranged widely, from 10 months to 13.5 years ($M = 45.62$ months, $SD = 29.70$ months). Inpatients received behavior therapy 3 hr a day and oral motor therapy 1 hr a day, 7 days a week. Intensive day treatment individuals received behavior therapy 3 hr a day and oral motor

therapy 1 hr a day, 5 days a week. Behavior therapy consisted of systematic meal sessions with individualized behavior protocols involving antecedent and consequence manipulations in the meals. The goal of behavior therapy was to (a) identify the appropriate behavioral treatment procedures, (b) assess the efficacy of ongoing treatment and to maintain treatment gains, and (c) train the caregivers to implement treatment with a high degree of accuracy. Oral motor therapy was used to determine whether a child was safe to eat by performing nutritive and nonnutritive oral motor exercises.

Dependent Variables
Parenting Stress Index Short Form

The PSI-SF is a screening instrument designed to provide an indication of the overall level of parenting stress an individual is experiencing through self-report (Abidin, 1995). It is comprised of three subscales of 12 items each: Parental Distress (PD), Parent–Child Dysfunctional Interaction (P-CDI), and Difficult Child (DC). A Total Stress score is also obtained by adding the sums of the three subscales. Total Stress scores that equal 86 or higher are considered to be clinically significant. It has been used in pediatric samples and has exhibited high internal reliability as assessed via Cronbach's α: PCD-I, $r = .80$; DC, $r = .80$; PD, $r = .73$, and Total Stress $r = .83$ (Abidin, 1995).

Children's Eating Behavior Inventory (CEBI)

The CEBI is a caregiver report measure intended to assess eating and mealtime problems across a wide variety of medical and developmental disorders (Archer, Rosenbaum, & Streiner, 1991). The CEBI is comprised of 40 items. Two scores are derived from this measure: (a) a Total Eating Problem Score and (b) the total number of perceived problems. The Coefficient αs range between .58 and .76, depending on family structure (e.g., two parents with two or more children $r = .76$, two parents with one child $r = .71$, single parent with two or more children $r = .58$, single parent with one child $r = .76$). Test–retest reliability has been reported at .87 for the Total Eating Problem score and .84 for the percentage of items perceived to be a problem (Archer et al., 1991).

Observable/Measureable Child Feeding Behaviors

Data were taken for five child feeding behaviors, which include acceptance, mouth cleans, negative vocalizations, oral intake, and child weight. Acceptance was defined by a child accepting the bite of food within 5 s of its presentation. A mouth clean was defined as a child

swallowing a bite of food within 30 s of it being deposited into their mouth. Negative vocalizations included crying and making negative statements. Oral intake was defined as the number of calories consumed (calculated by a nutritionist at each meal). Weight was recorded by a registered nurse and documented in the medical chart. For each case, percent occurrence of feeding behavior was averaged across the first baseline phase (admission) and the final treatment phase (discharge). The length of these phases varied depending on clinical necessity, lasting long enough to identify stable patterns of behavior. Percent change of these variables was calculated by taking the mean value of the target variable at admission minus the mean value of the target variable at discharge.

Inter-observer agreement (IOA) on child feeding behaviors was calculated for at least 30% of the total assessment and treatment sessions for each child (randomly selected). Data were collected by independent observers either in vivo or with both observers viewing video taped sessions simultaneously. All observers received training on the scoring procedures prior to collecting data. Total agreement was computed by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. Total agreement was averaged for each child across each feeding behavior (i.e., acceptance, mouth cleans and negative vocalizations) and agreement always remained above 80%. No IOA was calculated for oral intake or weight.

Procedure

Human subject approval was obtained via an Institutional Review Board (IRB) prior to data collection. Data for this project were collected via anonymous review of medical records of inpatient and day treatment clients discharged from a pediatric feeding program. Informed consent was obtained from the caregivers as part of a routine procedure upon admission into the program. All families were part of an interdisciplinary team that included a gastroenterologist, a nutritionist, a behavioral psychologist, a speech and language therapist, an occupational therapist, and a social worker. Scores were collected from the PSI-SF and the CEBI, both of which were given to the same primary caregiver upon their child's admission and discharge. Directly observable outcome measures (i.e., acceptance, mouth cleans) were also obtained.

Results
Pretreatment Child and Caregiver Analyses
Pretreatment Child Comorbidity Issues and Demographic Variables
In order to assess the variability of child comorbidity issues and demographic variables across the feeding categories, multiple univariate ANOVAs and chi-squared analyses were used. To control for inflation of α-error with multiple comparisons, a Bonferonni correctional procedure reduced the significance level to .005 (Table I).

Table I. Univariate ANOVA and Chi-Squared Analyses for Child Comorbidity Issues and Demographic Variables Across Feeding Category ($N = 121$)

	Feeding Category			
	Tube dependent ($n = 72$)	Liquid dependent ($n = 17$)	Food selective ($n = 32$)	p-value
Demographic variables				
Female children (%)	48.60	23.50	34.40	.109
Mean [95% CI] child age (months)	41.2 [34.7, 47.7]	37.8 [23.9, 51.6]	59.8[a] [48.4, 71.1]	.006
Cognitive/developmental issues				
History of prematurity (%)	26.39	17.65	6.25	.058
Mental retardation/PDD/autism (%)	9.7	29.41	28.1	.027
Medical diagnoses/issues/variables				
Oropharyngeal and gastrointestinal abnormality (%)	83.3	47.1	50.0	<.001*
Cardiac, pulmonary, neurological, genetic medical conditions (%)	63.9	29.4	25.0	<.001*
Other medical variables				
Medications at start of treatment (%)	90.28	58.82	75.00	.017
Mean [95% CI] number of medical diagnoses	4.93[a] [4.58, 5.29]	3.77 [3.02, 4.51]	3.84 [3.30, 4.39]	.001*
Inpatient admission (%)	81.9	47.1	59.4	.004*
Mean [95% CI] length of time in program (days)	48.5 [45.8, 51.3]	42.4 [36.6, 48.3]	45.4 [40.4, 50.4]	.587

*Bonferroni $p \leq .005$.
[a]Bonferroni (post hoc) $p \leq .05$.

Significant differences among the feeding categories were found on oropharyngeal and gastrointestinal abnormality, χ^2(df = 6, N = 121) = 22.70, $p < .001$; cardiac, pulmonary, neurological, and genetic medical conditions, χ^2 (df = 6, N = 121) = 18.10, $p < .001$; mean number of medical diagnoses, F (2, 120) = 13.34, $p < .001$; and, treatment program status, χ^2(df = 2, N = 121) = 11.04, $p < .004$. In summary, the tube dependent group appeared to be the most medically complicated with significantly more medical issues than the other two groups.

Pretreatment Caregiver Demographic Variables
Multiple univariate ANOVAs and chi-squared analyses were used to examine caregiver demographic variables such as caregiver marital status, gender, age, and race. A Bonferroni correction reduced the significance level to .01. No significant differences were found across feeding category.

Pretreatment Caregiver Stress
The first hypothesis addressed in this study was that the majority of caregivers of children with a feeding disorder would exhibit clinically significant levels of stress on the Total Stress score of the PSI-SF upon admission of their child to a feeding program. According to the PSI-SF (Abidin, 1995), a Total Stress score of 86 or higher must be obtained for the Total Stress level to be clinically significant. Although the majority of this sample was not in the clinically significant range, 42.15% of the sample exhibited clinically significant levels of stress (n = 51, M = 99, SD = 14), 3.31% fell within the borderline range of 83 to 85 (n = 4, M = 85, SD = 0), 47.11% fell within the normal range of 56 to 82 (n = 57, M = 70, SD = 8), and 7.44% scored below normal (n = 9, M = 49, SD = 4). In order to examine pretreatment caregiver stress across the feeding categories as suggested in the second hypothesis, multiple ANOVAs were used applying a Bonferroni correction. Caregiver stress was not found to differ based on the way in which a child consumed their caloric intake. To further examine whether a caregiver's perception of his or her child's feeding disorder at admission differed across the feeding categories, the CEBI self-report measure was used. Multiple ANOVAs using a Bonferroni correction across feeding categories yielded no significant results.

Predictors of Pretreatment Caregiver Stress
Simple and multivariable linear regression models were created to assess the predictive impact that individual variables had on stress at admission. Interaction terms were also examined. When caregiver and child variables on total stress at admission were considered (all variables from Table I, total stress at admission, both CEBI subscale scores at admission, and weight for height status were used), it was found that marital status, presence of MR and/or autism/PDD, both CEBI subscale scores, child age, and caregiver age showed at least a trend toward significance ($p < .1$).

A multivariable linear regression was then run with adjustments made for marital status, presence of MR and or Autism/PDD, both CEBI subscale scores, child age, caregiver age, as well as child race (for scientific interest), with results revealing that only the CEBI Total Eating Problem score was significant ($R^2 = 0.27$). Specifically, a higher CEBI Total Eating Problem score at admission served as a predictor of higher total caregiver stress at admission, regardless of feeding category (slope [95% CI] = 0.64 [0.26, 1.02], $p = .001$).

Child and Caregiver Analyses for Changes from Admission to Discharge
Changes in Caregiver Stress and Perceptions from Admission to Discharge
The third hypothesis was that there would be a significant reduction in the caregiver's Total Stress score on the PSI-SF between admission and discharge. About 42% of this sample was in the clinically significant range of total stress at admission. As expected, there was a decrease of clinically significant levels at discharge. At discharge, 30.58% of the sample exhibited clinically significant levels of stress (n = 37, M = 98.68, SD = 10.97), 7.44% fell within the borderline range (n = 9, M = 83.89, SD = 93), 46.28% fell within the normal range (n = 56, M = 70.23, SD = 7.36), and 15.70% scored below normal (n = 19, M = 47.21, SD = 6.11).

Multiple repeated measures ANOVAs were used to delineate any differences within pre- and post-PSI and CEBI scores; and, between PSI and CEBI scores across feeding categories. A Bonferroni correction was applied a priori, decreasing significance level to .008. The PSI results indicated there was a statistically significant decrease in the PD subscale F(1, 118) = 8.35, $p < .003$, DC subscale F(1, 118) = 6.17, $p < .006$, and Total Stress scores F(1, 118) = 10.46, $p < .001$ from admission to discharge, but no statistically significant reduction was found in the P-CDI subscale. In addition, no statistical differences were found for changes in PSI subscale and Total Stress scores from admission to discharge across feeding categories. The CEBI results indicated that there

Table II. Analysis of Variance for Caregiver Stress Scores Across Time (N = 121)

	Admission	Change	δ^a	p-value
PSI-SF subscales				
Mean [95% CI] parental distress	27.6 [26.1, 29.2]	2.13 [0.74, 3.52]	.28	.003*
Mean [95% CI] parent–child dysfunctional interaction	21.9 [20.9, 23.0]	0.60 [−0.27, 1.48]	.12	.175
Mean [95% CI] difficult child	31.4 [29.8, 33.1]	1.88 [0.54, 3.22]	.25	.006*
Mean [95% CI] total stress	81.1 [77.6, 84.7]	4.80 [2.17, 7.43]	.33	<.001*
CEBI subscales				
Mean [95% CI] total eating problem	106.68 [104.61, 108.76]	4.87 [2.72, 7.02]	.44	<.001*
Mean [95% CI] perceived problem	12.61 [11.56, 13.67]	4.93 [3.72, 6.14]	.81	<.001*

*Bonferroni p < .008.
^{a}Mean change/standard deviation of change.

Table III. Analyses of Variance for Child Feeding Behaviors and Weight Across Time (N = 121)

	Admission	Change	δ^a	p-value
Mean [95% CI] Acceptance	27.49 [21.16, 33.83]	−60.91 [−67.90, −53.92]	1.59	<.001*
Mean [95% CI] Mouth Cleans	31.55 [24.14, 38.95]	−52.91 [−61.40, −44.41]	1.15	<.001*
Mean [95% CI] Neg. Vocalizations	24.57 [18.38, 30.76]	18.40 [12.43, 24.37]	.61	<.001*
Mean [95% CI] Oral Intake	353.79 [238.58, 468.99]	−544.33 [−647.09, −441.56]	1.26	<.001*
Mean [95% CI] Weight	14.52 [13.48, 15.55]	−.72 [−.88, −.56]	.82	<.0001*

*Bonferroni p < .01.
^{a}Mean change/standard deviation of change.

was a significant decrease in the Total Eating Problem score $F(1, 99) = 21.86$, $p < .001$, and in the Perceived Problem score $F(1, 96) = 52.31$, $p < .001$ from admission to discharge, but no significant differences were found across feeding categories (Table II).

Changes in Child Feeding Behaviors and Weight from Admission to Discharge

The final hypothesis was that there would be an overall improvement in child feeding behaviors from admission to discharge. In order to identify differences in the occurrence of feeding behaviors from admission to discharge, as well as between the occurrence of feeding behaviors across feeding categories, multiple repeated measures ANOVAs were used. A Bonferroni correction was applied lowering the α-level to .01. Significant differences were found in percentage acceptance $F(1, 117) = 297.66$, $p < .000$, mouth cleans $F(1, 114) = 152.23$, $p < .000$, negative vocalizations $F(1, 99) = 37.42$, $p < .000$, oral intake $F(1, 69) = 111.66$, $p < .000$, and weight $F(1, 115) = 53.21$, $p < .000$ from admission to discharge. Specifically, acceptance, mouth cleans, oral intake, and weight increased significantly, while negative vocalizations significantly decreased. However, no one category had better program outcomes than the others (Table III).

Discussion

Pretreatment Child and Caregiver Comorbidity Issues and Demographic Variables

When comparing child comorbidity issues and demographic variables across feeding categories, it was found that the tube-dependent group had a higher incidence of medical conditions, abnormalities and diagnoses, as well as a higher likelihood to be admitted as inpatients than either of the other groups. This suggests that there may be more than one distinct group within children diagnosed with feeding disorders. Additionally, no differences were found across feeding category when comparing caregiver demographic variables at admission, suggesting that the sample of caregivers across the three feeding categories was fairly homogenous in nature.

Pretreatment Caregiver Stress

The first hypothesis addressed the level of caregiver stress upon the admission of their child for treatment. Analysis of the data indicated that the caregivers' mean Total Stress score at admission ($M = 81.13$) did not meet clinical significance (≥ 86). This finding was contrary to expectations. One explanation for this is that caregivers were given pretreatment questionnaires upon their admission into a comprehensive interdisciplinary treatment program specifically targeted at their children's disorder. Once their children had entered the program,

the expectations of what this new support system had to offer (i.e., comprehensive medical care, professional, and social support) may have decreased their initial stress levels.

The second hypothesis was that there would be a significant difference in caregivers' stress at admission based on the subtype of their child's feeding disorder, such that caregivers of (a) tube-dependent children would be most stressed, and (b) food selective children would be least stressed. Based on previous literature, which suggests that caregivers of medically fragile children exhibit more stress than their counterparts (Budd et al., 1992; Powers et al., 2002), it would be expected that differences in caregiver stress across feeding categories would be found. However, no relationship was found between caregiver stress and the manner in which his or her child's daily caloric intake was met at admission. It remains possible that this difference was not found because parents across all three groups may have experienced a decrease in stress given the amount of support they expected to receive over the course of their admission. Perhaps a better measure of pretreatment caregiver stress would be before a child is admitted, removing the potential confound of expectations and hope of goal fulfillment experienced upon admission.

Predictors of Pretreatment Caregiver Stress

Given that a large minority of caregivers displayed significant levels of stress upon admission into the program (42.15%), it remained imperative that predictors of higher stress levels be examined. The results provided some unanticipated findings that raise issues for further study. While previous authors (i.e., Budd et al., 1992; Garro et al., 2005; Singer et al., 1990; Spender et al., 1996) have found support for a significant association between other variables (i.e., older child age, child fussiness and irritability, higher socioeconomic status, and the presence of organic/medical factors) and caregiver stress, this was not found in the present study. When assessing the predictive impact of individual variables on pretreatment caregiver total stress in the present study, only the CEBI Total Eating Problems score at admission was found to be a predictor. This score encompasses the frequency in which problematic behaviors occur during mealtimes. Not surprisingly, these results suggest that the total stress of a caregiver whose child is admitted to a feeding program is partially linked to the frequency in which their child's problematic mealtime behaviors occur.

Changes in Caregiver Stress and Perceptions from Admission to Discharge

The third hypothesis was that there would be a significant reduction in the caregiver's stress between admission and discharge. Analysis of the PSI-SF data indicated the Total Stress scores, as well as the PD and DC subscale scores, significantly decreased. Factors that may have influenced this decrease include the overall progress of their child's feeding issues, access to new support resources, and increased knowledge about ways to manage problematic mealtime behaviors.

Despite significant reductions in total stress from admission to discharge, 37 caregivers (30.58%) still reported clinical levels of stress at discharge. Thirty-two of those caregivers were also clinically stressed at admission. Of the remaining five caregivers, four had children with successful outcomes in the program. There are several reasons as to why this increase may have occurred such as family stressors (i.e., financial restraint, new job, etc.), higher parental expectations than what was achieved, and/ or the added stress of having to implement a specific behavioral protocol. Since a large majority of those stressed at discharge were also stressed at admission, identifying this sub sample of caregivers early on may indicate who is in need of more support as they progress through the program.

In addition to the significant decreases in overall stress found by the PSI-SF, the change in CEBI scores suggested that caregiver report of his/her child's frequency and severity of mealtime behaviors also decreased significantly from admission to discharge. This significant decrease further bolsters the argument that treatment of a child's feeding disorder using an interdisciplinary approach may not only decrease a caregiver's overall stress, but also decrease the caregiver's perceptions of problematic issues directly related to feeding.

Changes in Child Feeding Behaviors and Weight from Admission to Discharge

The final hypothesis was that there would be an overall improvement in child feeding behaviors from admission to discharge. This was substantiated, and given these results, a reduction in stress would be expected given the overall success of the children in the feeding program. Although Garro et al. (2005) also found reduced levels of stress in the caregivers at discharge, no data were given in regards to the overall success of the intervention for the child's feeding problem. This study provides support (based on objective and subjective measures) that regardless of the heterogeneity of a child's medical and eating history, an intensive interdisciplinary approach can

improve caregiver stress and child mealtime behavior. These results also support previous studies that found positive child outcomes for an interdisciplinary feeding program.

Limitations and Future Research

The findings in the present study should be viewed in the context of a few methodological limitations. This study did not utilize a randomized control design, therefore the magnitude of the impact the program had on measurable outcomes must be considered cautiously. Another limitation was the discrepant sample size across the groups. Since this investigation occurred as part of a large ongoing clinical operation, it was not easy to control the number of children that were recruited into the various feeding categories. Consequently, the category sample size varied from one group to the next. These unbalanced sample sizes may have reduced the power required to identify differences between the categories.

While no association was found between caregiver stress levels and child program outcome variables, it is possible that other factors may contribute to stress. For example, stress may be more closely associated with their own performance related to feeding his or her child, than the child's outcome in the program. Additionally, for caregivers managing other stressors and responsibilities, following a complex protocol may contribute to their overall stress. Consequently, future studies may want to examine protocol complexity, parent treatment integrity measures, and their relation to overall stress. Including measures that examine support systems, coping strategies, and caregiver personality traits, may also help to gain a better understanding of how caregivers are affected by a child with a feeding disorder.

Finally, this study only assessed caregiver stress pretreatment and immediately posttreatment. Future studies should include a larger sample of caregivers at various time intervals following discharge. Implications of these results would then give insight to the amount of support needed in long-term care following discharge from an intensive program.

Despite these limitations, this study marked an important contribution to the literature in that the effectiveness of an interdisciplinary feeding program including both caregiver and child variables across several feeding categories was examined. It was demonstrated that caregiver stress did indeed decrease from admission to discharge, though we were not able to identify the exact mechanism in which this was accomplished. This study also provides much needed evidence on the outcomes of children with feeding disorders after going through an intensive feeding program. From a clinical standpoint, the results of this study suggest that those caregivers who are clinically stressed at admission may need closer attention and more social support, particularly as their child progresses through the program. Clinicians should also be aware that the overall stress of caregiver's of children with feeding disorders can be reduced by providing them with a specific plan to manage their child's inappropriate feeding behaviors, as well as support from multiple disciplines on how to implement that plan.

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