

Parent–Child Interactions and Everyday Routines in Young Children With Failure To Thrive

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OBJECTIVE. This pilot study explored the use of a parent–child interaction scale during a nonfeeding event and a systematic method for recording children’s sleep and feeding routines at home to determine if these two measures could be useful additions to the occupational therapy assessment of young children with failure to thrive.

METHOD. Five mother–child dyads were administered the Nursing Child Assessment Teaching Scale (NCATS) and the mothers completed a 24-hour, 7-day Sleep Activity Record (SAR).

RESULTS. Two of the five dyads scored below the 10th percentile cutoff on the NCATS indicating low levels of mutually adaptive interactions. The NCATS subscale scores revealed low performance in three of the mothers, but none of the children. The SAR documented concerns in the sleep and feeding patterns in 4 of the 5 children, including irregular bedtimes, frequent nighttime waking, and irregular feeding times.

DISCUSSION. The NCATS and SAR revealed a wide range of strengths and concerns in this sample. Findings suggest that occupational therapists evaluating the complex nature of failure to thrive in young children should consider including measures to assess parent–child interactions during nonfeeding situations, as well as obtain information on the children’s sleep and feeding routines.

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Children labeled with failure to thrive are frequently referred to occupational therapy due to delays in physical growth, feeding difficulties, or behavior problems (Denton, 1986; Wavrek, 1995). Traditionally, failure to thrive has been classified as organic (e.g., biological impairment in the child) or nonorganic (e.g., impairment in the environment or parent–child interactions); however, these categories may be too simplistic and overlook the complex interaction among biological and psychological factors (Denton, 1986; Homer & Ludwig, 1981; Humphry, 1995).

An in-depth understanding of the biological organization of the child and the caregiver interactions that help regulate the way the child fits into his or her social system is essential for accurate assessment and effective intervention for young children at risk (Sameroff & Fiese, 2000; Barnard, 1997). From birth, the infant is embedded in relationships with caregivers who provide

the nutrients for physical, social, and cognitive growth. Using a transactional developmental model, Barnard proposed that both the caregiver and the child contribute to the parent–child relationship. For healthy, nurturing interactions to occur, the caregiver is sensitive to the child’s cues, able to alleviate the child’s distress, and fosters social–emotional and cognitive growth in the child. The child is able to provide clear cues and responds contingently with the caregiver. When there is undue stress in the environment or when either the parent’s or child’s skills are deficient, an interruption in the adaptive process may cause the interactive system to break down.

Evidence from several studies on children with failure to thrive support the transactional nature of human development. Investigators found significantly lower scores on parent–child interaction measures in failure-to-thrive children compared to matched control groups (Berkowitz & Senter, 1987;

Lobo, Barnard, Coombs, 1992). Lobo, Barnard, and Coombs conducted a study using the Nursing Child Assessment Feeding Scale (NCAFS) (Sumner & Spietz, 1994a) and the Nursing Child Assessment Teaching Scale (NCATS) (Sumner & Spietz, 1994b) to examine the mutually adaptive dialogue of 12 mothers and their infants with failure to thrive. The parent–infant dyads in the nonorganic failure to thrive group ($n = 5$) scored significantly lower on the NCAFS than the normal control group ($n = 17$) ($Z = 1.9625$; $p = 0.0497$). The mothers' subscale scores of Social-Emotional Growth Fostering and Cognitive Growth Fostering revealed the most concerns. On the NCATS, there were no significant differences in performance between the groups. However, the NCATS scores showed a similar pattern to the NCAFS scores, including low Social-Emotional and Cognitive Growth Fostering scores in the mothers with infants in the nonorganic failure to thrive group. These findings are noteworthy, but must be interpreted with caution due to the small comparison group used in this study. Also, since this study included only infants less than 12 months, there were no data on interaction patterns in young children ages 12–36 months with failure to thrive.

Sullivan (1991) compared the effect of two different interventions (Calorie Management vs. Mother-Child Interaction) on the weight of children ages 12–36 months with failure to thrive and the interactive behaviors of 10 mother–child dyads. In the group that received the mother-child interaction intervention, the children demonstrated greater weight gain and the mothers scored better on the Social-Emotional Growth Fostering subscale of the NCATS than the group who received the intervention that focused on nutritional intake. Although the small sample size in Sullivan's study limits generalizability of the results, these findings support the notion that early intervention to promote healthy mother–child interactions may help improve parenting skills and child outcomes in young children with failure to thrive.

Kellegrew (2000) studied the daily routines in families of children with disabilities and concluded that occupational therapy services based on an ecocultural view of

the family may help mothers gain a better understanding of children's occupational potential and create home routines that promote development. Two everyday childhood routines that are influenced by parent–child interaction are mealtime and bedtime. These routines often interconnect (Yoos, Kitzman, & Cole, 1999). When an infant or young child has failure to thrive, the feeding routines as well as the sleep patterns may be disrupted. Barnard (1999) stated, "Self-regulatory behaviors of eating, sleeping, waking, moving, reacting and responding have biological origin and are influenced by many environmental factors" (p. 13). The daily activities of waking up, going to sleep, eating and interacting with parents can be important regulators of an infant's biological clock. Parents help children learn to regulate their own basic biological rhythms through predictable routines and sensitive caregiving.

A number of studies on children with failure to thrive have examined parent–child interactions during feeding situations, but less information is available on parent–child interactions during nonfeeding activities. Parents and children in this population may already be experiencing disrupted interactions during mealtimes. A nonfeeding situation, therefore, may provide a more neutral context in which to assess parent–child interactions. Therefore, the purpose of this pilot study was to describe parent–child interactions during a nonfeeding event and the sleep and feeding routines in children age birth to 3 years with failure to thrive. Two research questions were addressed: (1) Do young children with failure to thrive and their primary caregivers perform significantly lower compared to the norms on a parent–child interaction measure during a nonfeeding situation? and (2) Does a 24-hour/7-day chart of the sleep and feeding routines reveal different patterns in children with failure to thrive compared to their peers without failure to thrive?

Method

Research Design

A case study design was implemented to describe the parent–child interactions dur-

ing a nonfeeding situation and to document the sleep and feeding routines in a sample of young children with failure to thrive.

Participants

Participants were a convenience sample of mothers and children recruited by the investigators through a local network of occupational therapists, physical therapists, and nurses from early intervention programs, hospitals, and outpatient clinics in the greater Seattle-Tacoma area. After approval of this study from the university's institutional review board, the investigators asked the therapists and nurses to contact potential participants. Only those children ages birth to 3 years labeled with failure to thrive at the time of the study or who weighed below the 5th percentile within the last 6 months, per report of the referring therapist or nurse, were included in the study. Approximately 25 families were initially contacted through the local network of therapists and nurses. Five parents agreed to participate and signed informed consent forms before data collection began.

Instruments

Nursing Child Assessment Teaching Scale (NCATS). (Sumner & Spietz, 1994b). The NCATS includes 73 items organized around six constructs of parent–child interaction. Four subscales pertain to the caregiver: Sensitivity to Cues, Response to Child's Distress, Social–Emotional Growth Fostering, and Cognitive Growth Fostering. Two subscales pertain to the child: Clarity of Cues and Responsiveness to Caregiver. To administer the NCATS the examiner asks the caregiver to select one task from a standard list of developmental activities that her child has not yet learned, but is within the child's capability (e.g., hold onto rattle, pull a toy by a string, turn pages in a book, etc.). The caregiver is given the necessary task materials and asked to teach her child that task, taking as long as she wants. Higher total NCATS scores indicate a more mutually adaptive parent–child interaction system. Scores that fall below the 10th percentile of the normative database are considered "worrisome scores" and may indicate a significant disruption in parent–child interaction. In addition, subscale scores that

fall at least one standard deviation (*SD*) below the normative mean are considered low scores and warrant further assessment.

Psychometric studies on the NCATS are reported in the manual. Internal consistency was evaluated using Cronbach coefficients and ranged from .50 on Clarity of Cues Subscale score to .87 on Overall Total score. Test-retest reliability estimates were high for the Total Parent score (.85) and lower for the Total Infant score (.55), suggesting greater stability for the parent scores than the infant scores. Concurrent validity studies revealed significant moderate correlation between the NCATS and the Home Observation for Measurement of the Environment (.41–.48; $p < .01$). There was also a significant concurrent association between the NCATS and the Bayley Mental and Psychomotor scores (.28–.46; $p < .05$) (Bayley, 1969). Predictive validity studies suggest that there is a moderate correlation (.45–.55) between 24-month NCATS scores and cognitive scores at 60 months (Sumner & Spietz, 1994b).

Sleep Activity Record (SAR). The SAR was designed for caregivers to systematically record the frequency and duration of sleep and feeding behaviors in their children on a daytime–nighttime grid over a 7-day period. Clinicians use the normative data in the SAR manual (Barnard, 1999) to determine if there are concerns regarding the amount of sleep, frequency of feedings, and regularity of sleeping and feeding times. Regularity is defined in the SAR manual as events occurring within an hour of each other on consecutive days. Reliability and validity values are not reported in the SAR manual.

Procedures

Before data collection began, the investigators became certified on the administration and scoring of the NCATS and achieved the requirement of 90% interrater reliability on five videotaped parent–child interactions in order to use the NCATS for research. After parents gave permission to be contacted, the investigator (second author) called them to schedule time and location for the research visit. The same investigator conducted all the research visits and consistently followed the research protocol with each dyad. The protocol includ-

ed introductions, consent forms, an overview of research visit, a brief interview with parents to obtain demographic data, administration and videotaping of NCATS, an explanation of the SAR and a 24-hour recall practice with the parent, and a phone call 3 days after the research visit to remind the parent to send the 7-day SAR data to the investigators. To control for examiner drift, each NCATS administration for this study was videotaped. The videotaped interactions of the third dyad were scored independently by the two investigators and 86% interrater reliability was achieved.

Data Analysis

The NCATS scores included six subscale scores, the caregiver total score, the child total score, contingency (responsiveness of caregiver and child to each other) scores, and the total caregiver–child score. The scores for each dyad were used to calculate *z* scores to determine how each dyad compared to the normative data reported in the test manual. The child's age and mother's ethnicity were used to determine which scores fell below the 10th percentile cutoff, indicating a concern.

Data from the SAR yielded average number of hours of sleep and feeding and average number of sleep and feeding segments in each 24-hour period over 7 consecutive days. The SAR data for each child were compared to norms published in the SAR manual (Barnard, 1999) and published normative sleep patterns (Jacklin, Snow, Gahart, & Maccoby, 1980).

Results

Characteristics of the five mother–child dyads are described in Table 1. While the sample was fairly homogeneous with regard to maternal race (all Caucasian), age, education, and marital status, the sample varied substantially with regard to the children's ages, gender, parity, gestation, method of feeding, and medical conditions.

To address the first research question, the NCATS scores of the five dyads were compared to the norms published in the manual. See Table 2 for the NCATS norms and the dyad's scores. Dyads 4 and 5 obtained a total NCATS score greater than one *SD* below the mean, placing them at risk for interaction difficulties. These two dyads scored below the 10th percentile cutoff, indicating need for further follow-up regarding parent–child interaction issues. The mothers of the 3 G-tube (gastrostomy tube)-fed children (Dyads 1, 4, and 5) scored greater than one *SD* below the mean on one or more of the caregiver subscales. Interestingly, all 5 of the children performed within normal limits on the child subscales.

To address the second research question, the data from the SAR were analyzed for each child and compared to the published norms on sleep and feeding patterns in young children. The mothers in Dyads 1 and 3 expressed concern regarding their children's sleep patterns. However, data on the SAR revealed that four out of the five children (Dyads 1, 3, 4, 5) had irregular

Table 1. Characteristics of Participants.

Variable	Dyad				
	1	2	3	4	5
Mother					
Age (years)	38	25	32	41	38
Education (years)	18	14	16	14	18
Marital status	married	married	married	single	married
Child					
Age (months)	21	3	12	29	20
Gender	male	female	female	female	male
Parity	4 ^a	1	1	5 ^a	2 ^a
Gestation (weeks)	38	39	39	32	36
Method of feeding	G-tube	bottle-fed	breast-fed	G-tube	G-tube
Medical condition ^b	Licencephaly Polymicrogyri Cortical vision impairment Nystagmus Reflux ^c Twin–Twin ^d	Congenital Hypotonia Reflux	Group B Strep	Reflux ^c Premature	Twin–Twin ^d Cerebral Palsy

Note. ^a twin; ^b as reported by family; ^c gastroesophageal reflux; ^d twin to twin transfusion syndrome.

Table 2. Nursing Child Assessment Teaching Scale (NCATS) Scores.

	Mean	SD	Dyad				
			1	2	3	4	5
Caregiver							
Sensitivity to Cues	9.72	1.30	10	10	8†	9	7††
Response to Distress	10.31	1.53	11	10	10	8†	8†
Social-Emotional Growth	9.56	1.37	11	9	9	7†	9
Cognitive Growth	13.82	2.64	11†	13	13	11†	10†
Total Score	43.41	5.09	43	42	40	35†	34†
Contingency Total Score	17.35	2.90	18	15	16	12†	13†
Child							
Clarity of Cues	8.2	1.34	7	8	9	8	9
Responsiveness to Caregiver	7.95	2.88	11	8	11	6	9
Total Score	16.15	3.84	18	16	20	14	18
Contingency Total Score	7.21	2.68	10	7	10	6	8
Caregiver/Child							
Total	59.56	6.95	61	58	60	49†	52†

Note. Mean is based on NCATS data base for Caucasian mothers between 20–45 years old ($n = 963$).
 † = greater than one standard deviation (SD) below the mean. †† = greater than two SDs below the mean.

sleep schedules compared to their age peers. The same four out of the five children in this sample also had irregular feeding schedules compared to their age peers.

Discussion

An analysis of all data gathered on the five dyads yielded three major findings: (1) interaction scores were “worrisome” in two of the five dyads, suggesting that some, but not all, dyads in this sample were at risk in parent–child interactions during a nonfeeding activity; (2) interaction subscale scores revealed low performance in three of the mothers, but none of the children; and (3) irregular sleep and feeding patterns were found in 4 of the 5 children, suggesting a high rate of atypical mealtime and sleep routines in this sample.

Our results were similar to Lobo et al. (1992), who found that mothers of children with failure to thrive, compared to a control group, scored lower on the Cognitive Growth Fostering subscale. In our dyads, the mothers with children who were G-tube fed scored significantly lower on the Cognitive Growth fostering subscale than the mothers of children who were bottle fed or breast fed. One possible explanation for these results is that during tube feeding, reciprocal interactions are not required between the parent and child; therefore, natural opportunities may be missed for the caregiver to develop and provide enriched learning experiences for the child. For example, the mother in Dyad 4 in our study reported on the SAR that the

majority of her child’s tube feedings, during day and night, occurred when the child slept.

According to Case-Smith and Humphry (2001), “mealtimes create a temporal organization to the day and give the child opportunities to practice object manipulation, experience new sensations, and learn how to communicate needs and desires” (p. 453). When a child has a feeding problem, the primary caregiver may need support to learn how to adapt the feeding routines, adjust the sleep schedules, and alter the play activities so that the child’s biological and psychosocial needs are met. The findings in our pilot study suggest that systematic data on the children’s daily routines recorded over a 7-day period yielded useful information about how the children were regulating their sleep and feeding behaviors and how the caregivers were adapting to the special needs of their children.

Limitations and Future Research

The primary limitation of this study was that dyads were assessed at only one point in time using the NCATS and results should be interpreted with caution. Other limitations in this study include the following: participants were a small sample of convenience based on voluntary willingness to participate; reliability and validity data are not reported in the SAR manual, the adult sample was homogeneous; and videotaping the parent–child interactions may have influenced the mothers’ performance on the NCATS. Future research

should include longitudinal studies with larger, more diverse samples of children with failure to thrive, particularly those fed via G-tube, using a variety of measures (e.g., developmental assessment of oral–motor and feeding skills, parent–child interactions during feeding and nonfeeding situations, a home environment inventory, and a systematic record of sleep and feeding routines).

Implications for Occupational Therapy

Occupational therapists have the knowledge and skills to assess children’s occupations and everyday routines within the context of their families. This study demonstrates how a parent–child interaction scale during a nonfeeding situation and a parent report instrument on sleep and feeding routines can provide valuable assessment data on children with failure to thrive. The use of multiple measures across time is essential to obtain the most accurate assessment of the children’s daily routines and their social context.

The results from this study illustrate a wide range of strengths and limitations in parent–child interactions measured during a nonfeeding situation in a small sample of young children with failure to thrive. While some dyads exhibited a mutually adaptive parent–child interaction system, two of the mothers scored significantly lower than the norms on the parent–child interaction measure. The high rate of irregular feeding and sleep routines, compared to normative data, is of concern and needs further investigation. The complex nature of failure to thrive and its influence on young children’s performance on everyday activities warrants additional research and careful assessment by occupational therapists.▲

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