BRIEF REPORT

Mothers' and Fathers' Interactions With Children With Motor Delays

Eftichia Ganadaki,
Joyce Magill-Evans

KEY WORDS
- Nursing Child Assessment Teaching Scale
- observational pilot study
- toddlers

OBJECTIVE. In early intervention programs, parents are often asked to teach their child new skills. As fathers are increasingly involved in intervention, clinicians need more information on fathers' unique interactive style. This pilot study compared mothers' and fathers' parent–child interactions during a teaching episode to identify similarities and differences in order to better understand parents' strengths.

METHODS. The Nursing Child Assessment Teaching Scale was used to observe 10 mothers and 10 fathers interacting with their 10- to 28-month-old children in their homes. The children were receiving early intervention for a motor delay. The Caregiver Scores (parent's contribution to the interaction) of mothers and others were compared using paired *t* tests.

RESULTS. Mothers had more optimal interactions as indicated by significantly higher Caregiver scores than fathers, $t(9) = 3.83$, $p = .004$. The subscales with statistically significant differences were Caregiver Contingency and Cognitive Growth Fostering. Children's scores when they interacted with their mothers or fathers did not differ.

CONCLUSION. When observing fathers teaching their child new skills, therapists should remember that fathers of children with motor delays (and typically developing children) may use a more task-oriented communication style with less consideration of the child's actions than do mothers.

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Eftichia Ganadaki, MSc, OT, is Occupational Therapist, Chania, Crete, Greece.

Joyce Magill-Evans, PhD, OT(C), is Professor, University of Alberta, Room 2-64, Corbett Hall, Edmonton, Alberta, Canada T6G 2G4; joyce.magill-evans@ualberta.ca

Parent–child interaction represents a transactional system of mutually adaptive responses between members of the dyad (Barnard et al., 1989). The quality of the parent–child relationship has been linked with the child's overall development (McGrath & Sullivan, 1999; Moore, Saylor, & Boyce, 1998; Sumner & Spietz, 1994). Maternal style of interaction has been explored more than paternal style as the mother has long been considered a central influence on the child's development. However, new social trends have led to diverse family environments, changing family structures and functions, and a shift in caregiving patterns to a coparent role for both parents (Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000).

Some researchers have explored the unique ways in which both parents interact with their children. Lamb (1997) reported that both mothers and fathers are capable of being responsive to their children although fathers often appear less able. While both parents are equally involved in play, fathers spend less time in childcare than mothers (Bailey, 1994). Fathers engage in more physical, tactile, and arousing play than mothers (Clarke-Stewart, 1978). They are more task-oriented and focused on the goal of the activity when interacting with children both with typical (Conner, Knight, & Cross, 1997) and atypical development (Girolametto & Tannock, 1994). In several studies using the Nursing Child Assessment Teaching Scale (NCATS) (Sumner & Spietz, 1994), fathers of typically developing children have scored lower than mothers for items related to fostering the infant's cognitive growth (Brophy-Herb, Gibbons, Omar, & Schiffman, 1999; Harrison, Magill-Evans,

& Sadoway, 2001; Nakamura, Stewart, & Tatarka, 2000).

Evidence (Harrison et al., 2001; Nakamura et al., 2000) suggests that typically developing children behave differently with their mothers than with their fathers and are more responsive (modify their behavior based on the other's behavior) to their fathers. Based on a study of 20-month-old typically developing children, Clarke-Stewart (1978) concluded that children's greater responsiveness to fathers may be because they were expecting a more playful interaction.

Although these studies revealed important information on the unique ways in which fathers interact with their children, research on parent–child interaction when the child has special needs is less frequent. Among the existing studies there is agreement that interaction patterns exhibited with typically developing children and children with motor difficulties are similar. Any differences appear to be a matter of degree rather than of type of behavior (Barrera & Vella, 1987). These results, however, come from studies that focus only on mothers. Information on father–child interaction and differences between mothers' and fathers' interactions when a child has atypical development is limited.

Occupational therapists address environmental influences on the child's development. Understanding mothers' and fathers' interactions with their children with motor delays provides information to assist therapists in assessments and providing appropriate intervention (Davis, 1994). While mothers are often the primary caregivers, fathers are increasingly involved in family-centered programs. Therapists may be unprepared to assess paternal behavior. There is a need for knowledge about fathers' interactive styles. Therefore, the first question addressed in this pilot study was whether there were differences between fathers' and mothers' interaction patterns as measured by the Caregiver scores on the Nursing Child Assessment Teaching Scale (NCATS). A second question addressed differences on the Child NCATS score in order to ascertain whether or not differences on Caregiver scores related to how the child interacted with his or her mother versus father. An observational analytical design was used to compare parent–child interactions within the context of an exploratory, descriptive pilot study.

Methods

Individual parent–child interactions of mothers and fathers were videotaped in their homes. The NCATS was used to score the interaction from the videotape.

Participants

A convenience sample of 10 families with children with motor delays (associated with a diagnosis such as cerebral palsy or indicated by a delay on a standardized motor measure) was recruited from early intervention programs and programs at a rehabilitation hospital. Each mother–father pair of parents resided together, were Canadians, and were not recent immigrants. The parents were white–Caucasian except two parents from one family who were Indian and one father who was Japanese. Mothers (M = 31.7) and fathers (M = 33.7) ages and education (mothers = 13.8; fathers = 13.6) were similar. All fathers were employed full-time whereas 3 mothers were at home, 2 worked part-time from home, and 5 worked full-time. The median income was $60,000–69,000 Canadian ($n$ = 9). The mother was identified as the major caregiver in all but one family where parents shared care.

The sample consisted of 6 boys and 4 girls who ranged from 10 to 28 months of age (M = 21.8). Eight children were first-born and one child was a twin. The severity of impairment was determined using the Gross Motor Function Classification System (GMFCS) (Palisano et al., 1997). Six children had mild motor difficulties (two with developmental delay, one with ataxia, one with hemiparesis, and two with cerebral palsy) and were walking independently. Of the remaining four children (one with hemiplegia, two with spina bifida, one with hydrocephalus), two scored at level II (would eventually walk without assistive devices) and two at level III (would walk with assistive devices) of the GMFCS. These four children had greater difficulties in gross motor development than fine motor skills. All four were learning to use an assistive device to walk. Cognitive and language skills were not measured; however, all of the children vocalized during the observations and understood verbal directions.

Measures

Nursing Child Assessment Teaching Scale (NCATS) (Sumner & Spietz, 1994). The NCATS, developed with mothers, guides the observation of caregiver–child interactions during a brief (less than 10 minutes) semi-structured teaching episode. It consists of 73 items that are scored only by a trained certified observer on a dichotomous "yes or no" scale. There are six conceptually derived subscales. Four subscales (Sensitivity to Cues, Response to Distress, Social–Emotional Growth Fostering, Cognitive Growth Fostering) represent the contributions of the caregiver during the interaction and result in a Total Caregiver score (maximum = 50). Two subscales (Clarity of Cues, Responsiveness to Caregiver) represent the child's contributions and provide a Total Child score (maximum = 23). Contingency (behavior that considers or reacts to the actions of the second person) scores for the caregiver and the child can also be obtained. Higher scores indicate more optimal parent–child interactions. The developers of the NCATS report acceptable Cronbach's coefficient alphas for the Caregiver (.87) and Child score (.76) based on studies with mothers (Sumner & Spietz). Cronbach's alphas for fathers' Caregiver scores were lower (.70) (Harrison et al., 2001). Scores on the NCATS discriminate between groups (e.g., pre-term and full-term infants) expected to differ in dyadic interactions (Sumner & Spietz).

Gross Motor Function Classification System for Cerebral Palsy (GMFCS) (Palisano et al., 1997). The GMFCS was used to describe each child's motor function. It is an ordinal, five-level classification system representing clinically meaningful distinctions in motor function. The levels for each child in this study were described earlier. Nominal group process and Delphi survey methods with consensus among 48 experts were employed to establish content validity. Interrater reliability (κ) was .55 for children under 2 years and .75 for children 2 to 12 years old (Palisano et al.).

Procedure

Approval from the health region ethics board was obtained. All observations took place in participants' homes except two that were completed at a hospital. Parents gave consent prior to data collection. One parent then taught the child to play with a toy while being videotaped. The second parent completed a demographic form in a separate room. The parents then switched tasks. The order of observation of the parents was counterbalanced across participants to control for any order effects of having the child interact first with mother or father. Each parent selected one task that was new for the child and a little above of the child's current developmental skills from a standardized list (e.g., stringing beads, turning pages in a book, zipping a zipper). Each parent did a different activity with the child. Immediately after the taping session, the first author scored the child's gross motor function using the GMFCS. The videotape was used to score the parent interacting with the child for the NCATS. A second certified rater, blind to the purpose of the study, scored 25% of the videotapes to ensure consistent rating. The mean percentage of point-by-point agreement was 87.2% (range = 81%–90%).

Results

Mothers scored statistically significantly higher than fathers on the Caregiver score, $t(9) = 3.83$, $p = .004$ (Table 1) with a medium effect size (0.73). A paired t test was used as both parents were interacting with the same child. A planned second t test to examine the difference between Child scores when interacting with mothers versus fathers was not needed as the means were identical. To identify differences between parents on the Caregiver subscales, paired t tests were done for 4 subscales (Social–Emotional Growth Fostering was excluded as means were identical) with Bonferroni correction, $\alpha = .01$. Fathers scored significantly lower than mothers on the Caregiver Contingency scale [$t(9) = 3.56$, $p = .006$], and on the Cognitive Growth Fostering subscale, $t(9) = 5.66$, $p < .001$. It was noted that 8 of the 10 mothers had Caregiver scores at ($n = 3$) or below the "worrisome" score (39) (Sumner & Spietz, 1994) for children this age. Normative cutoffs are not available for fathers.

Table 1. Participants' Total and Subscale Scores on the NCATS

NCATS subscales	Fathers		Mothers	
	Mean	(*SD*)	Mean	(*SD*)
Caregiver				
Sensitivity to Cues	8.4	(0.7)	8.8	(1.1)
Response to Distress	8.5	(1.8)	9.6	(1.3)
Social–Emotional Growth Foster*	7.2	(1.0)	7.2	(1.4)
Cognitive Growth Fostering*a	10.1	(2.0)	12.3	(2.2)
Total Caregiver*b	34.2	(3.0)	37.9	(2.6)
Caregiver Contingency *c	11.7	(1.6)	14.2	(2.0)
Child				
Clarity of Cues	9.2	(0.9)	8.9	(1.1)
Responsiveness to Caregiver	7.6	(0.8)	7.9	(1.4)
Total Child	16.8	(1.3)	16.8	(2.3)
Child Contingency	6.8	(0.8)	7.2	(1.2)

* means were identical, no statistical analysis was needed
*a indicates significant difference, $t(9) = 5.66$, $p < .001$
*b indicates significant difference, $t(9) = 3.83$, $p = .004$
*c indicates significant difference, $t(9) = 3.56$, $p = .006$

Discussion

The results of this pilot study with a small number of parents revealed statistically significant differences in scores on the NCATS between mothers and fathers while interacting with their children with motor delays. Similar to another study that used the NCATS to observe parents with typically developing children (Harrison et al., 2001), the mothers obtained more optimal scores on Caregiver, Cognitive Growth Fostering, and Contingency scales. Thus the differences between parents in this study may reflect stable characteristics of mothers and fathers.

Fathers' lower scores on the Cognitive Growth Fostering subscale may be due to different communication styles. This subscale includes items that describe communication style such as "caregiver uses explanatory verbal style more than imperative style in teaching the child" and "caregiver gives clear and unambiguous directions." Marcos (1995) reported that while mothers produced more descriptions of objects, actions, and person, fathers communicated more instructions and requests. Le Chanu and Marcos (1994) found that fathers are less likely to adjust their speech to their child's developmental level.

Fathers also scored significantly lower than mothers on the Caregiver Contingency scale that includes items such as "caregiver pauses when child initiates behaviors" and "caregiver allows non-task manipulation of task materials." Lower fathers' scores are consistent with other studies (Harrison et al., 2001; Kornhaber & Marcos, 2000; Nakamura et al., 2000). This difference between parents may be related to fathers' task orientation. A father who wants his child to learn the task may not pause when the child is off-task or wants to explore the materials.

The mean Total Caregiver scores in this study (M for mothers = 37.9; for fathers = 34.2) are lower than those reported in the literature for parents of typically developing children (M for mothers = 44.5; for fathers = 37. 6; Harrison et al., 2001). Mothers in this study scored similarly to Canadian mothers of 12-month-old preterm children (M = 38.4) (Harrison & Magill-Evans, 1996), mothers of 12-month-old children with motor impairments (M = 36.0), and mothers of 16-month-old children with developmental delays (M = 35.7) (Shonkoff, Hauser-Cram, Krauss, & Upshur, 1992).

Lower Caregiver scores on the NCATS may not indicate problematic dyadic interaction. Teaching a child something new places stress on the interactive system (Sumner & Spietz, 1994). It may be even more stressful for parents of children with motor delays due to the child's limited skills or because of the parent's concern that this will be yet another task that is too hard for the child. The result may be a parent who focuses on the task and persists so the child can learn the task, behaviors that would decrease NCATS scores.

The children in this study obtained similar Total Child scores whether interacting with their mothers or their fathers and their scores were similar to children in the normative database with no "worrisome" scores (Sumner & Spietz, 1994). Thus, the parents' lower scores cannot be explained by the children being less responsive or less clear in the messages they send to the parents.

The results of this study are limited by several factors, the most important being the small sample size with heterogeneous participants. The small sample did not allow an examination of the complex intercorrelations that can be assumed to exist in family data. A sample of convenience introduces selection biases as participants may have different interactions than those who did not participate. Development of the NCATS was based on mother–child dyads and may not capture fathers' unique interactions. There is no available standardized measure based on observations of fathers' interactive behavior.

To build on this pilot study, future research should employ a larger sample size, a range of severity levels, and a combination of methodologies including naturalistic observation such as that used by Larson (2000) with mothers. Observing early intervention providers interacting with the child would determine if their interactions reflect the same characteristics as the parents and allow exploration of behaviors attributable to modeling by service providers. The most optimal patterns for interactions with children with motor delays need to be identified.

Conclusion

This pilot study found statistically significant differences between mothers and fathers in how they interact with their child when teaching new tasks as measured by the Nursing Child Assessment Teaching Scale. Both parents obtained lower Caregiver scores than those reported for parents interacting with typically developing children; an awareness of these interaction differences may enhance early intervention programs. Information from observations of parent–child dyads during a teaching episode is critical because as part of our practice we often encourage parents to teach their child new things. The Caregiver cutoff score for "worrisome" levels of interaction (Sumner & Spietz, 1994) was established with mothers and typically developing children. Health care professionals using the NCATS to evaluate parents interacting with a child with motor delays should interpret the cutoffs with caution to ensure that they do not over-identify parents in need of assistance.▲

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