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Longitudinal Analysis of Parent Communication Behaviors and Child Distress during Cancer Port Start Procedures

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Abstract

Background: The roles parents play in supporting their child during painful cancer procedures have been studied as communication strategies versus a broader caring framework and from a cross-sectional versus longitudinal perspective.

Objectives: To examine the longitudinal change in parent communication behaviors over repeated cancer port start procedures experienced by their children.

Methods: This study used a longitudinal design. Two trained raters coded 104 recorded videos of port starts from 43 children being treated for cancer. This included 25 children with two video-recorded port starts and 18 children with three (T1, T2, T3). The Parent Caring Response Scoring System derived from Swanson's Caring Theory was used to code parent communication behaviors as caring responses during their children's port starts. Three 3- to 5-minute slices (pre-port start, during, and post—port start) were coded for each video. Mixed modeling with generalized estimating equations and Friedman test were used to analyze longitudinal change in parent behaviors.

Results: Significant differences were found between T1 versus T3 in eye contact ($\beta = -1.05$, $p = .02$), distance-close-enough-to-touch ($\beta = -0.81$, $p = .03$), nonverbal comforting ($\beta = -1.34$, $p = .04$), and availability ($\beta = -0.92$, $p = .036$), suggesting that more parents used communication behaviors at T3 compared with T1. Parent burdensome or intrusive questions (e.g., Why do you cry? $\beta = -1.11$, $p = .03$) and nonverbal comforting ($\beta = -1.52$, $p = .047$) increased from T2 to T3. The median values of parent communication behaviors overall had no significant changes from T1 to T3.

Conclusion: Parents adjusted to use more nonverbal caring behaviors as their child experienced additional port starts. Experimental studies should be designed to help parents use caring behaviors to better support their children during cancer procedures.

Appropriately 12,400 children are diagnosed with cancer each year (American Cancer Society, 2013). These children have to undergo intensive cancer treatments that are often accompanied by a variety of painful and distressing procedures such as lumbar punctures (LPs), bone marrow aspirations (BMAs), and port start procedures (Hockenberry et al., 2011; Pizzo & Poplack, 2010). Port start procedures involve the insertion of a flexible and sterile thin plastic tube or catheter into a blood vessel to establish intravenous (IV) access through which blood can be withdrawn and chemotherapies and supportive care agents can be delivered. In most instances, children experienced more pain and distress from these procedures than from cancer itself (Hedstrom, Haglund, Skolin, & von Essen, 2003). Traumatic experiences of these distressing and painful procedures not only lead to avoidance of essential monitoring for adverse effects of cancer therapies in children (Pate, Blount, Cohen, & Smith, 1996), lower quality of life (Bai, Harper, & Penner, 2017a), and increased pain sensitivity (Woolf & Salter, 2000), but they also are associated with the development of anxiety and posttraumatic stress symptoms for their parents (Harper et al., 2014a).

Parent behaviors play a critical role to support and protect their child during painful and distressing cancer procedures. Appropriate parent communication behaviors during these procedures may promote child coping behaviors (Blount et al., 1989; Cline et al., 2006). Blount et al. (2001) studied parent-child interaction behaviors during LPs and BMAs and found that parent behaviors such as humor, commands to use coping strategies, and nonprocedural talk can reduce child's pain and distress (Blount, Bunke, Cohen, & Forbes, 2001). In contrast, parent behaviors such as verbalization of empathy, criticism, apology, giving control to the child, and reassurance can increase child's pain and distress (Chorney, Tan, & Kain, 2013; Taylor, Sellick, & Greenwood, 2011).

For children with cancer, the treatment trajectory, including various painful procedures, may last more than 2–5 years. Parent emotions vary along with their child's treatment trajectory and during the painful and distressing procedures experienced by their child, which can directly or indirectly influence parent communication behaviors to support their child with cancer (Penner et al., 2008; Power, Liossi, & Franck, 2007). Penner et al. (2008) investigated parent empathy (empathy concern and empathy distress) and found that parent empathy concern (e.g., 'soft-hearted and warm') was negatively correlated with children's pain and distress, whereas parent empathy distress (e.g., 'upset and worried') was positively correlated with children's pain and distress during painful procedures. Meanwhile, parents keep adapting their emotions and behaviors and try to find a new normalization in the family after their child's cancer diagnosis so that they can take good care of their sick child. Studies have provided evidence to answer which parent behaviors can help the child cope with painful medical procedures (Blount et al., 1989; Cline et al., 2006). However, most of these studies investigated parent communication behaviors using a cross-sectional design (e.g., only one port start procedure for each child) rather than a longitudinal design (e.g., repeated port starts over cancer treatment trajectory for each child).

A longitudinal analysis of parent communication behaviors and child distress during port start procedures can fill the gap regarding how parent communication behaviors evolve as the port start procedures are repeated over the course of the child's therapies and the impact on children's treatment-related responses in both the short and longer terms. The purpose of this study was to understand the longitudinal changes in parent verbal and nonverbal behaviors and child distress over the three repeated port start procedures (T1, T2, and T3).

MATERIAL AND METHODS

Overview

This study used a longitudinal design to conduct a secondary analysis of an existing dataset. The sample of this study was selected from the primary study titled 'Resources, Parent-Child Communication and Adjustment to Pediatric Cancer' (R01CA138981; PI: L. Penner). Children with cancer and their parents were recruited from pediatric oncology programs at two major children's hospitals in the United States. All data were collected at entry to the study (T0), immediately before and after up to three treatment-related procedures (T1, T2, and T3), and at two follow-up assessments (i.e., 3 and 9 months after the last video-recorded treatment-related procedure, T4 and T5). Treatment-related procedures at T1, T2, and T3 were separated by at least 2 weeks but no more than 3 months. This secondary analysis of the data from the primary study employed data from T0 to T3. The present study was approved by the Institutional Review Board from the University of North Carolina, Chapel Hill, NC, with a reliance on the Institutional Review Board at Wayne State University in Detroit, Michigan, where the custodian of the data (L. Penner) is a faculty member.

Participants

Children and their primary caregivers (hereafter 'parents') were eligible for the primary study if the children met the following criteria: (1) ages 3–12 years at study entry; (2) undergoing cancer therapy; and (3) experiencing regular port starts, LPs, and/or BMAs with the purposes of evaluating their response to cancer therapy and, in the case of port starts, establishing venous access through which pharmacologic agents could be administered. Only children and their parents who provided data at baseline (T0) and at least two of three port starts (T1, T2, T3) were included in this secondary analysis. We excluded children and parents if (1) the child did not undergo port start procedures; (2) the port starts were conducted with LPs or BMAs on the same day; or (3) the port start was accomplished in <3 minutes because very short procedures produced few meaningful communication behaviors. Consequently, data from 43 children and their parents (one parent per child) were subjected to this secondary analysis, including data from 25 children with two video-recordings of port starts and 18 children with three video-recordings of port starts, resulting in a total of 104 video-recordings of port starts coded for this study (Fig. 1).

Measures

Parent Caring Response Scoring System.—The Parent Caring Response Scoring System (P-CaReSS) is an observational measure developed to code parent communication behaviors as caring responses toward their child during cancer painful procedures. The scoring system is composed of 18 observational codes that describe parent verbal, nonverbal,

and emotional behaviors (Bai, Swanson, Harper, Penner, & Santacroce, 2017b). Parent verbal behaviors are coded as “presence” or ‘absence’; onset and offset time points are coded for each nonverbal behavior once occurred; and emotional behavior assesses parent emotions globally as positive, neutral, or negative emotion. All parent behaviors represent five domains derived from Swanson’s Caring Theory (knowing, being with, doing for, enabling, and maintaining belief) and one empirically derived noncaring domain. The P-CaReSS has good inter-rater reliability with percent agreement >80% for each domain and the P-CaReSS overall (Bai et al., 2017b).

Karmanos Child Coping and Distress Scale (K-CCD).—Harper et al. developed the K-CCD to quantify a child’s coping and distress behaviors during cancer procedures (Harper, Peterson, Taub, Albrecht, & Penner, 2014b). The distress subscale was used to code children’s verbal and behavioral distress during cancer port start procedures. This distress subscale has acceptable inter-rater reliability with an average percent agreement of 78% between two trained coders (Bai et al., 2017b; Harper et al., 2014b).

Coder Training

The first author and one trained research assistant (RA) coded the video data under the supervision of two scientists from Wayne State University. Both coders received training to code the video data by the P-CaReSS and K-CCD using the StudioCode software (StudioCode Business Group, Sydney, Australia). Five videos were randomly selected from the primary study to train the coders. Both coders met daily to resolve coding disagreements during the training period. The RA was considered sufficiently trained after she met a percent agreement of .8 with the first author (Sharpe & Koperwas, 2003). Lastly, 11 videos were used to test the inter-rater reliability between both coders, resulting in an average percent agreement >80% between two coders for the observational measures. The video data used for coder training and instrument psychometric testing were excluded from this secondary analysis.

Data Coding Process

Each video-recording of the port start procedure was divided into three phases (pre, during, and post) according to the work of Cline et al. (2006). *Pre-port start phase* refers to the time between the start of video and the nurse’s immediate preparation for the port start (e.g., child is lifted onto the bed or child’s port is uncovered); *during port start* refers to the time between the initiation of immediate preparation for the port start and the completion of port start (e.g., child’s clothing is placed so that it covers the child’s port); *post-port start phase* means the time between the end of the procedure phase and the end of video. Video segments (or “thin slices”) such as 30 seconds or 5 minutes, rather than the whole videos, can be used to study communications during painful medical procedures (Chorney et al., 2013; Henry & Eggly, 2013). The “thin slice” method has been reported to increase data coding efficiency with reliability in communication studies (Ambady, Bernieri, & Richeson, 2000; Henry & Eggly, 2013). In this study, three 3- to 5-minute slices, one for each phase as defined earlier, were coded in each video, including (1) the first 5 minutes immediately before the port start; (2) a 3- to 5-minute slice during port start (when the child was distressed or not distressed); and (3) an additional up to 5-minute slice after completing the

port start. The first author prepared the slices of each video before data coding, and then 104 videos were randomly assigned to both coders for coding. Each coder viewed the video in full once and coded parent communication behaviors (by P-CaReSS) and child distress (by K-CCD) in multiple passes. Both coders coded the video data independently. Questions regarding the data coding were discussed and resolved on a weekly basis in group meetings.

Statistical Analysis

Statistical analysis was conducted using SAS Version 9.4 (SAS Institute Inc., Cary, NC). Descriptive statistics were performed to portray sample demographic characteristics and parent and child behavioral variables. Means (standard deviation [SD]) were reported for the data with normal distributions, otherwise medians (interquartile range [IQR]) were reported. Number (percentage) was used to report categorical data. Because of the non-normal distribution of parent behavioral and child distress variables, mixed modeling with generalized estimating equations (GEEs) was chosen to analyze the percentage changes (%during-%pre) in parent with communication behaviors (coded as 'presence' or 'absence') from T1 to T3. Pairwise comparisons were conducted among T1, T2, and T3. Because of the low incidence of many parent behaviors in the phases of pre-and post-port start procedures, we combined the three phases of port start procedure for each video. The Friedman test was conducted to explore the median differences in parent communication behaviors (frequency of parent behaviors) from T1 to T3.

RESULTS

Demographic and Cancer-Related Information

Table 1 shows participants' demographic and cancer treatment-related information. More than 90% of the children had received a mixture of local anesthetics (prilocaine and lidocaine) applied to the skin over their port at least 30 minutes before the port start procedures. The reasons for these children not receiving the mixture of local anesthetics included rejections by children, forgetting to use it by parents, and never used it before. Mean durations of the port starts were 6.08 minutes (SD = 2.21), 6.54 minutes (SD = 2.74), and 6.55 minutes (SD = 2.88) at T1, T2, and T3, respectively.

Parent Behaviors Over the Three Phases of a Port Start Procedure Over Time

Table 2 shows the frequency (%) of parent communication behaviors over three phases of port start at T1, T2, and T3. Through the port starts, more than 50% of parents displayed verbal comforting, informing and explaining behaviors, close proximity to their child, and nonverbal supporting/allowing behaviors. Regarding parent noncaring behaviors, parents displayed more behaviors of less availability (e.g., playing with their phone, ignoring the child's talk, and leaving the child alone) but fewer criticizing and apologizing behaviors.

Figure 1 depicts the trend of parent communication behaviors pre-, during, and post-port start at T1, T2, and T3. A greater percentage of parents used verbal caring behaviors in phase 2 (during port start) compared with in phase 1 (pre-port start) or phase 3 (post-port start) (Fig. 1A); the percentage of parents exhibiting nonverbal caring behaviors decreased over the three phases (Fig. 1B); more parents displayed verbal noncaring behaviors, such as

criticizing and apologizing, in phase 2 compared with phases 1 or 3, and fewer parents used nonverbal noncaring behaviors in phase 2 compared with in phases 1 or 3 (Fig. 1C). More parents displayed positive (i.e., caring) emotions in phase 2 compared with phases 1 or 3 (Fig. 1D). The percentage of parents exhibiting negative emotions remained stable over the three phases of port start.

Longitudinal Change of Parent Behaviors Over the Three Phases of a Port Start Procedure Over Time

Based on the mixed modeling with GEE, no significant difference was found with respect to most parent verbal communication behaviors controlling for preprocedure behaviors over time (Table 3). Significant differences were found between T1 and T3 in the following parent behaviors: eye contact ($\beta = -1.05$, $p = .02$), distance close enough to touch ($\beta = -0.81$, $p = .03$), nonverbal comforting ($\beta = -1.34$, $p = .04$), and less availability ($\beta = -0.92$, $p = .036$), indicating that more parents displayed nonverbal behaviors from T1 to T3. In addition, more parents displayed burdens/intrusive questions ($\beta = -1.11$, $p = .03$) and nonverbal comforting behaviors ($\beta = -1.52$, $p = .047$) from T2 to T3.

Longitudinal Change of Parent Behaviors and Child Distress in a Port Start Procedure Over Time

Parents displayed increases in the following verbal caring behaviors over time: sharing feelings, believing in/esteem; parents displayed decreased informing/explaining, avoiding assumption, and comforting behaviors over time. Parent nonverbal caring behaviors increased over time, including comforting, supporting/allowing, and believing in/esteem; and parent noncaring behaviors decreased over time, including apologizing, burdens/intrusive questions, and less availability. Child's verbal and behavioral distress had a decreasing trend from T1 to T3, suggesting that children had less distress as they received more painful procedures. When Friedman test was used to examine differences between the median scores, parent communication behaviors were not found to have changed significantly from T1 to T3.

DISCUSSION

This study investigated the change of parent communication behaviors over the course of repeated port start procedures. We found that parents displayed more nonverbal communication behaviors from T1 to T3, suggesting that parents gradually adjusted themselves to use more nonverbal behaviors as their child experienced more port start procedures. Although studies have reported the changes of parent communication behaviors and child distress before, during, and after a procedure (Chorney et al., 2013; Taylor et al., 2011), the longitudinal changes of parent and child communication behaviors are rarely studied over time during painful medical procedures such as port start.

More parents attempted to use verbal (caring and noncaring) communication behaviors during port starts compared with pre-and post-port start procedures. This pattern of parent communication behaviors remains consistent with the pattern of child verbal and behavioral distress. Not surprisingly, a caring parent should use more verbal communication behaviors

to help their child go through painful medical procedures as child expresses an increase of pain and distress during these procedures (Blount et al., 1989; Cline et al., 2006). Also, parents may have a higher level of distress during cancer procedures compared with pre- and postprocedure, suggesting that an increase of parent verbal communication behaviors could be a way for parents to discharge their own empathic distress (Noddings, 1984; Penner et al., 2008).

In contrast to parent verbal behaviors, parent nonverbal behaviors either did not change or decreased during port start procedures compared with pre-and post-port start procedures. Further analysis by mixed modeling with GEE indicated that more and more parents displayed nonverbal caring behaviors during port starts over the course of repeated port starts (i.e., from T1 to T3). Possible explanations of these findings include the following: (1) Fear is a result of skill deficits (Bandura, 1977); therefore, parents might lack of belief to manage medical painful procedures that can bring fear and distress to parents at the beginning. As children receive more procedures, parents gradually became familiar with the procedures and thus use more nonverbal caring behaviors; and (2) as a result of the changes in research and clinical practice in medical procedures, more educational and advising resources are available to facilitate parents to help their child go through these procedures (Czarnecki et al., 2011; Lee, Yamada, Kyololo, Shorkey, & Stevens, 2014). Therefore, parent self-efficacy, beliefs, knowledge, and behaviors of caring for their child are adapting throughout the trajectory of cancer treatments and relevant procedures. This study adds new knowledge to current literature by providing specific levels of change in parent verbal, nonverbal, and even emotional behaviors not only during different phases of a port start procedure but also different times for the repeated port start procedures. This study also provides an explicit solution to design intervention programs based on the adapting course of parent communication behaviors over time.

This study added to previous studies in several ways. First, this study addressed parent communication behaviors from a caring perspective. Based on Swanson's theory of caring, findings of this study have expanded the use of caring theory in the parent-child communication studies and have validated the application of this theory in observational studies. Also, this study investigated parent nonverbal behaviors that have rarely been investigated in previous studies (Blount et al., 2008; Peterson et al., 2007), such as eye contact and distance close to touch. Studying parent nonverbal behaviors can broaden our understanding of parent-child communication phenomena and provide new means to design communication interventions during medical painful procedures. Finally, this study answered an important question regarding the trajectory change of parent communication behaviors over time, suggesting that parents display more nonverbal caring behaviors as children receive more painful procedures. These findings can be used to guide the clinical practice and education so that health care providers help parents recognize and adjust their behaviors in ways that would benefit their children's experience during cancer procedures.

Limitations

This study has several limitations. First, this study did not examine how demographic variables (e.g., parent gender and child gender) and parent dispositional attributes (e.g.,

parent positive and negative affections) moderate the parent communication behaviors and child distress. For example, parent communication behaviors might be different between parents with higher positive affections and those with lower positive affections. Future studies should explore the predictors of parent communication behaviors during painful medical procedures. Also, we only coded parent distress behaviors without considering children's resilience behaviors after parent communication behaviors in this study. Previous studies have reported that parent nonprocedural talk and verbal distraction were more likely to stimulate child's coping strategies (Chorney et al., 2013). Future work should examine the impact of parent caring behaviors on the child's resilience behaviors along with child distress behaviors during painful medical procedures. Additionally, this study specifically focused on longitudinal change of parent communications behaviors and did not investigate how parent communication behaviors interact with child distress behaviors. More work is needed to answer how parent communication behaviors influence children's verbal and nonverbal distress using the newer methods such as time-window sequential analysis.

Implications for Practice

Understanding the longitudinal changes of parental communication behaviors can significantly contribute to nursing clinical practice. Parental adjustments to use more nonverbal behaviors as their children experienced more port start procedures provide a critical solution for nurses to help parents cope with their children's painful procedures. Nurses can use these findings to enhance parental caring behaviors (e.g., eye contact and comforting behaviors) and reduce parental noncaring behaviors (e.g., intrusive and burdensome questions [e.g., Why do you cry? Are you distressed or nervous?]). Improving parental caring behaviors will not only decrease parental anxiety and distress but also heighten child coping behaviors toward cancer port start procedures.

CONCLUSION

This study investigated the longitudinal change of parent verbal and nonverbal communication behaviors during repeated port start procedures. We found that parents adapted to use more nonverbal caring behaviors as their children experience additional port start procedures. Findings of this study provide a new solution to design evidence-based interventions to improve children's and parents' well-being during cancer-related painful procedures. Experimental studies should be designed to help parents use caring behaviors to better support their child during painful and distressing cancer procedures.

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FIGURE 1.

■ Trends in parent communication behaviors during the three port start phases from T1 to T3. (A) Verbal caring behaviors; (B) nonverbal caring behaviors; (C) noncaring behaviors; (D) emotional behaviors.

TABLE 1.

Participant Demographic and Cancer Treatment-Related Information

Variable	Mean (SD)	Range	n (%)
Child			
Age, year	6.4 (3.0)	3–12	
Gender			
Girl			17 (39.5)
Boy			26 (60.5)
Race			
White			31 (72.1)
Black/African American			8 (18.6)
Other			4 (9.3)
Diagnosis			
Acute lymphocytic leukemia			28 (65.1)
Wilms' tumor			6 (14.0)
Lymphoma			3 (7.0)
Sarcoma (unspecified)			2 (4.7)
Other cancer			4 (9.2)
Cancer therapy			
Surgery alone			4 (9.3)
Chemotherapy alone			17 (39.5)
Chemotherapy and surgery			11 (25.6)
Chemotherapy, surgery, and radiotherapy			2 (4.7)
Chemotherapy, surgery, radiotherapy, and other			2 (4.7)
Others			1 (2.3)
Number of LPs in past 2 months	3 (3)	0–10	
Number of BMAs in past 2 months	1 (1)	0–6	
Number of port starts in past 2 months	10 (8)	0–30	
Parent			
Age, year	34.4 (7.1)	20–54	
Gender			

Variable	Mean (SD)	Range	n (%)
Female			34 (79.1)
Male			9 (20.9)
Relationship to child			
Mother			33 (76.7)
Father			9 (20.9)
Grandmother			1 (2.3)
Race			
White			32 (74.4)
Black/African American			7 (16.3)
Other			4 (9.3)
Marital Status			
Married or domestic partnered			28 (65.1)
Separated, divorced, or widowed			10 (23.2)
Never married			5 (11.6)
Parent in room during port starts			
Primary caregiver			26 (60.5)
Both caregivers			17 (39.5)

SD = standard deviation; LPs = lumbar punctures; BMAs = bone marrow aspirations.

TABLE 2.

Parent Communication Behaviors During the Three Phases of the Port Start Procedures over Time, n (%)

Parent Communication Behavior	T1 (n = 37)				T2 (n = 37)				T3 (n = 30)			
	Pre	During	Post*	Pre	During	Post	Pre	During	Pre	During	Post [†]	Post [‡]
Verbal												
Knowing												
Avoiding assumption	14 (37.8)	18 (48.6)	15 (38.9)	14 (37.8)	16 (43.2)	6 (16.2)	10 (33.3)	17 (43.3)	10 (34.5)			
Being with												
Sharing feelings	1 (2.7)	1 (2.7)	0	0	1 (2.7)	2 (5.4)	0	2 (6.7)	2 (6.9)			
Doing for												
Protecting	1 (2.7)	3 (8.1)	1 (2.8)	3 (8.1)	6 (16.2)	0	0	2 (6.7)	0			
Comforting	17 (45.9)	22 (59.5)	17 (47.2)	22 (59.5)	24 (64.9)	14 (37.8)	15 (50.0)	20 (66.7)	11 (37.9)			
Maintaining belief												
Believing in/esteem	1 (2.7)	9 (24.3)	3 (8.3)	4 (10.8)	13 (35.1)	3 (8.1)	2 (6.7)	12 (40.0)	8 (27.6)			
Enabling												
Informing/explaining	13 (35.1)	22 (59.5)	9 (25)	19 (51.4)	25 (67.6)	7 (18.9)	13 (43.3)	21 (70.0)	8 (27.6)			
Validating	5 (13.5)	15 (40.5)	5 (13.9)	7 (10.9)	18 (48.6)	7 (18.9)	4 (13.3)	11 (36.7)	7 (24.1)			
Supporting/allowing	2 (5.4)	8 (21.6)	0	0	14 (37.8)	0	2 (6.7)	7 (33.3)	0			
Noncaring												
Criticizing	3 (8.1)	4 (10.8)	1 (2.8)	3 (8.1)	4 (10.8)	1 (2.7)	5 (16.7)	4 (13.3)	0			
Apologizing	1 (2.7)	1 (2.7)	2 (5.6)	2 (5.4)	3 (8.1)	1 (2.7)	0	1 (3.3)	0			
Burdens/intrusive questions	4 (10.8)	7 (18.9)	3 (8.3)	6 (26.2)	5 (13.5)	3 (8.1)	1 (3.3)	6 (20.0)	0			
Nonverbal												
Being with												
Eye contact	11 (29.7)	5 (13.5)	5 (13.9)	6 (16.2)	4 (10.8)	3 (8.1)	9 (30.0)	8 (26.7)	3 (10.3)			
Distance close enough to touch	29 (78.4)	25 (67.6)	29 (80.6)	30 (81.1)	30 (81.1)	28 (75.7)	21 (70.0)	22 (73.3)	26 (89.7)			
Doing for												
Nonverbal comforting	10 (27)	2 (5.4)	3 (8.3)	11 (29.7)	2 (5.4)	3 (8.1)	6 (20.0)	4 (13.3)	4 (13.8)			
Enabling												

Parent Communication Behavior	T1 (n = 37)			T2 (n = 37)			T3 (n = 30)		
	Pre	During	Post*	Pre	During	Post	Pre	During	Post [†]
Nonverbal supporting/allowing	19 (51.4)	24 (64.9)	23 (63.9)	19 (51.4)	28 (75.7)	23 (62.2)	18 (60.0)	21 (70.0)	22 (75.9)
Maintaining belief									
Nonverbal believing in/esteem	0	0	0	1 (2.7)	0	0	0	1 (3.3)	3 (10.3)
Noncaring									
Less availability	34 (91.9)	20 (54.1)	23 (63.9)	27 (73)	22 (59.5)	24 (64.9)	24 (80.0)	19 (63.3)	22 (75.9)
Emotional Behavior									
Caring (positive)	17 (46.0)	24 (64.9)	21 (58.3)	19 (51.4)	27 (73.0)	21 (56.8)	20 (66.7)	23 (73.7)	20 (69.0)
Neutral	16 (43.2)	10 (27.0)	13 (36.1)	15 (40.5)	8 (21.6)	13 (35.1)	7 (23.3)	5 (16.7)	7 (24.1)
Noncaring (negative)	4 (10.8)	3 (8.1)	2 (5.6)	3 (8.1)	2 (5.4)	3 (8.1)	3 (10.0)	2 (6.6)	2 (6.9)

* n = 36.

[†] n = 29.

TABLE 3.
Pairwise Comparisons of Parent Communication Behaviors from T1 to T3 Controlling for Preprocedure Behaviors

Parent Communication Behavior	LS Means (%during-%pre)			T1 vs. T2		T1 vs. T3		T2 vs. T3	
	T1	T2	T3	Estimate [*]	p	Estimate [*]	p	Estimate [*]	p
Verbal									
Knowing									
Avoiding assumption	0.29	0.08	0.41	0.21	.63	-0.13	.78	-0.33	.42
Being with									
Sharing feelings	-2.83	-2.04	-1.2	-0.79	.6	-1.63	.26	-0.84	.38
Doing for									
Protecting	-1.45	-1.08	-1.14	-0.37	.67	-0.31	.6	0.05	.94
Comforting	0.77	0.84	1.23	-0.7	.85	-0.46	.34	-0.39	.36
Maintaining belief									
Believing in/esteem	-0.35	-0.09	0.31	-0.26	.54	-0.66	.17	-0.4	.43
Enabling									
Informing/explaining	0.98	1.07	1.48	-0.09	.85	-0.5	.37	-0.41	.51
Validating	0.22	0.47	0.23	-0.25	.46	-0.01	.98	0.24	.5
Supporting/allowing	NA	NA	NA	NA	NA	NA	NA	NA	NA
Noncaring									
Criticizing	-1.32	-1.32	-1.16	-0.01	.99	-0.16	.83	-0.15	.78
Apologizing	-2.38	-1.8	-1.52	-0.58	.63	-0.85	.22	-0.27	.74
Burdens/intrusive questions	-0.87	-1.45	-0.34	0.58	.41	-0.53	.32	-1.11	.03[†]
Nonverbal									
Being with									
Eye contact	-1.4	-1.2	-0.35	-0.2	.73	-1.05	.02[†]	-0.84	.16
Distance close enough to touch	1.01	1.78	1.82	-0.77	.07	-0.81	.03[†]	-0.04	.93
Doing for									
Nonverbal comforting	-2.32	-2.49	-0.97	0.17	.81	-1.34	.04[†]	-1.52	.047[†]
Enabling									

Parent Communication Behavior	LS Means (%during-%pre)			T1 vs. T2		T1 vs. T3		T2 vs. T3	
	T1	T2	T3	Estimate [*]	p	Estimate [*]	p	Estimate [*]	p
Nonverbal supporting/allowing	1.05	1.57	1.41	-0.52	.14	-0.36	.47	0.16	.75
Maintaining belief									
Nonverbal believing in/esteem	NA	NA	NA	NA	NA	NA	NA	NA	NA
Noncaring									
Less availability	0.22	0.89	1.15	-0.67	.097	-0.92	.036[†]	-0.26	.54

NA = not applicable. The bold values are exact *p*-values.

^{*} Estimate of differences of time least squares means.

[†] *p* < .05.