
Parent Stress in the Neonatal Intensive Care Unit and the Influence of Parent and Infant Characteristics

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OBJECTIVE. This study investigated the stress experienced by parents in the neonatal intensive care unit (NICU), the infant and parent characteristics that resulted in different stress responses, and the characteristics that were predictive of stress.

METHOD. The Parental Stress Scale: Neonatal Intensive Care Unit was used to measure the stress of 162 parents. A Parent/Infant Demographic sheet provided information for determining which characteristics resulted in different responses and which variables were stress predictors.

RESULTS. The highest levels of stress experienced were in the relationship with baby–parental role area, and regarding how the baby looked and behaved. The infant characteristic of gestational age resulted in significantly different scores concerning the baby's appearance and behavior. Consistent predictors of stress were length of stay, extreme prematurity, and a cardiovascular diagnosis.

CONCLUSION. Identifying the stressors parents experience can assist NICU therapists in intervention planning. Family-centered care that addresses stressors concerning their roles and their understanding of their infant should be emphasized.

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Medically fragile infants are born into families of all races, religions, nationalities, and cultural backgrounds without regard for their social environment (Sydor-Greenberg & Dokkin, 2000). As technology increases, smaller and more medically fragile infants are being treated and kept alive in highly technical neonatal intensive care (NICU) environments (Miles, Funk, & Carlson, 1993). Although the amount of stress experienced by parents as a result depends on many factors (Vergara, 1993), a common experience families of these infants share is that the birth, diagnosis, and hospitalization of their baby causes stress that is characterized by uncertainty and fear (Brunssen & Shandor Miles, 1996).

In typical circumstances, the parent–infant bonding process that occurs during the newborn period establishes the foundation for a lifelong relationship. This typical process does not necessarily occur, however, when the infant is born prematurely or at risk, and spends the first several weeks or months in the NICU (Case-Smith, 1993). The complexity of the neonatal intensive care environment, the medical care, individual circumstances, and the appearance of the infant can all be factors that influence and perhaps lessen the families' role with their baby (Hunter, 2001). In addition, neonatal environmental stress can be a major factor contributing to the parents' distress, and may influence their parenting behaviors (Miles, Funk, & Carlson, 1993). Problems that result from stress may include upsetting parents' adjustment to the NICU to affecting the long-term relationship with their children and their ability to care for them (Affleck, Tennen, & Rowe, 1991).

Research suggests that failing to address the individual needs of families who have infants in the NICU can have a negative impact on outcomes (Sydor-

Greenberg, & Dokkin, 2002). Although it is generally understood that interventions be combined with the needs of the family, unintentional discrepancies between the philosophy and practice of professionals can occur. Some authors have argued that in order for families to implement suggested interventions, they must first receive assistance in managing their stress (Dunst, Leet, & Trivette, 1988; McDowell, Saylor, Taylor, Boyce, & Stokes, 1995).

In occupational therapy, family-centered care requires the therapist to recognize the infant as part of a family system. The philosophy of occupational therapy in early intervention is based on family-centered care principals that emphasize parent-professional collaboration in an effort to help family members develop positive relationships with their newborn, gain confidence in their ability to care for their infant, and gain skills in relating to and working with the professionals involved in their infants' care (Case-Smith, 1993). Different factors, however, can impact on determining the most appropriate intervention for infants and their families. The unique characteristics of the infants, the parents, and the stress they experience can all influence the therapist's decisions regarding the treatment approach to be used. The planning of such interventions may be enhanced if the contributions of various factors that increase parental stress are identified (Shields-Poe & Pinelli, 1997). In addition, identifying aspects of the infants, the parents, and the environment that can cause stress for the family may be useful in assisting occupational therapists in understanding their relative importance and in improving the quality of care.

The purpose of this study therefore was (a) to determine the occurrence of stress, the overall stress level, and the frequency of stress experienced by parents of infants in the NICU as measured by the subscale and total scores of the *Parental Stress Scale: Neonatal Intensive Care Unit* (PSS:NICU), (b) to determine which infant and parent characteristics result in significantly different stress scores on the PSS:NICU, and (c) to determine the influence of both infant and parent characteristics in predicting stress for parents who have an infant in neonatal intensive care.

Background

Parental Stress Intensive Care Unit Model and Occupational Therapy

The Parental Stress Intensive Care Unit Model (Miles & Carter, 1983), which was developed and used by the nursing profession, provides a comprehensive approach for understanding, describing, and assessing sources of potential parental stress in the intensive care unit. The framework is based on Magnusson's (1982) stress theory, which defines

stress as an individual's reaction to demands that approach or exceed the limits of coping resources. Stressors are defined as the physical and psychosocial elements of a situation that impose demands on individuals that can lead to stress reactions. To describe the stress that parents experience, the model focuses initially on the interaction between personal or family background factors, situational conditions, and environmental stimuli that can influence the parents' responses to stress.

When parents have an infant in neonatal intensive care, they bring with them their own unique characteristics and set of circumstances. While in the NICU, parents are also influenced by the specific situational conditions of their infant. These conditions can include the severity of their infant's diagnosis, the infant's appearance and level of functioning, and the duration of their infant's length of stay. Environmental factors that can influence the parents' unique reaction to having an infant in the NICU might include difficulty fulfilling their parental role, the medical equipment used for intervention, and the communication patterns and behaviors of the staff (Miles & Carter, 1983). All of these factors result in the parents having a unique perception of their infant's situation, status, and condition.

As a result of the various factors that can influence them, each parent develops his or her own way of cognitively appraising, or making judgments, about the NICU experience. For example, some parents may view their situation as positive, since their infant is getting the care he or she needs. Others may see it as negative when the infant or staff is unable to correspond to their expectations or needs. Some parents may cope by using the environmental resources available to them such as the support of the NICU staff. Others may use personal resources such as family, friends, or financial assets (Miles & Carter, 1983). The response to the stress of having a child in the NICU can therefore be the result of a complicated interaction of variables that can potentially be adaptive or maladaptive. It is important that occupational therapists in the NICU understand not only the disease and disability of the infant, but also the stress and personal background factors of the family. Examining parent stress and some of the variables that influence it may provide therapists with a better understanding of how, and to what degree, the stress they experience can affect their occupational role with their child.

NICU Parental Stress Studies

Studies have reported the numerous stressors that parents experience in the NICU environment and particular factors that may influence stress. There were no studies, however, that examined the combination of factors that can influence stress, as addressed by this study.

Using the PSS:NICU, Miles, Funk, and Kasper (1991) identified the most stressful aspect of the NICU for 122 parents to be an alteration in the parent–infant relationship, and the infants' appearance. The sights and sounds of the NICU caused lesser stress, and few parents reported stress in the area of staff communication and relationships.

In a study of 212 parents using the PSS:NICU, Shields-Poe and Pinelli (1997) determined that the parents' greatest stress was due to their infants' appearance and behavior. These results were related to how sick they perceived their infant to be.

Holditch-Davis and Shandor Miles (2000) identified six major factors as causing stress for parents who had an infant in the NICU. They included (a) preexisting and concurrent family factors; (b) prenatal and perinatal experiences; (c) the infants' illness, appearance, and treatment; (d) concerns about outcomes; (e) loss of parental role; and (f) interactions with health providers.

Some studies have examined the specific factor of the parent's gender for its effect on stress in the NICU. Pehudoff (1990) examined the degree of stress perceived by 31 mother–father couples using the PSS:NICU and found mothers more stressed than fathers in relationship to the NICU experience as a whole, and more specifically regarding their parental role. Stress levels did not differ between mothers and fathers, however, regarding the sights and sounds of the unit, or regarding how their baby looked and behaved. In a study of 23 couples using the PSS:NICU, Miles et al. (1992) found that although both parents experienced the greatest stress in regards to their parental role, mothers experienced a greater degree of stress than fathers. Shields-Poe and Pinelli (1997) also found in using the PSS:NICU that mothers were significantly more stressed than fathers in regard to their parental role, and determined that mothers were more stressed by the sights and sounds of the unit than fathers. A difference in the mothers' and fathers' response was also demonstrated in a study by Doering, Moser, and Dracup (2000) who determined that mothers demonstrated higher anxiety and poorer adjustment than fathers to the overall experience of having a child in the NICU.

A study that specifically examined the effect of age on stress indicated that older mothers reported higher levels of stress on the PSS:NICU than younger mothers in regards to their interactions with their infants. This same study also determined that marital status could also be a factor influencing stress since single mothers demonstrated higher levels of stress than married mothers regarding how their baby looked and behaved (Shields-Poe & Pinelli, 1997). Although the authors did not indicate that the single mothers' stress was directly related to the amount of social sup-

port they received, they did determine through this study that parents considered their spouse to be the most helpful person to them during their infants' NICU stay.

Other studies examining stress in the NICU have taken the approach of looking at a particular infant characteristic for its effect on the parents. Meyer et al. (1995) found in using the PSS:NICU that 142 mothers of preterm infants were three times more likely to experience stress than the normative population of mothers. It was suggested that these findings were consistent with stress theory since the essentially healthy women in this study had their coping resources overwhelmed by the stress inherent in the premature birth, and subsequent intensive care hospitalization of their baby. Singer et al. (1999) reported that mothers of high-risk infants with very low birth weight experienced higher stress levels than mothers of low-risk infants of very low birth weight, and infants who were typical. The length of stay of the infant also seems to have an effect on stress in that the longer the baby is hospitalized, the higher the level of stress for fathers regarding their communication with the staff (Shields-Poe & Pinelli, 1997).

Each of these studies suggests that the NICU experience of parents is stressful and complex, and that levels may differ based on gender and social support. This study, which was performed to determine (a) the occurrence, level, and frequency of stress experienced by parents of infants in the NICU as measured by the PSS:NICU, (b) the infant and parent characteristics that result in different stress scores, and (c) the influence of infant and parent characteristics in predicting stress, may assist NICU therapists in having a better understanding of how they might have more positive influence on the parents' adjustment to the environment. Understanding the parents' stress may help therapists and other health care practitioners in assisting the parents toward improving their ability to meet the needs of their infant, and to develop the skills they need for fulfilling their role.

Method

Participants

To determine the sample size for this study, two similar studies were consulted (Meyer et al. 1995; Shields-Poe & Pinelli, 1997). In these studies, a sample size of 20 was needed to achieve a power of .91 at .05 with an effect size between 31 and 32. However, to compare males and females, a larger sample size was necessary. Therefore, in order to achieve a power of .80 at .05 with an effect size of .68, a sample size of 56 was needed. Based on these results, a minimum of 60 parents was required for the current study.

A convenience sample of 181 parents of infants in a large urban hospital was recruited for the current study. To obtain data on stress, the researcher (who had no previous contact) approached the parents at a time when they were visiting but not holding their baby, and when not involved with other NICU personnel. Ten parents of the 191 who were approached indicated that they did not wish to participate, resulting in the sample of 181. From the 181 parents who participated, information from 162 parents was complete and usable. The parents were approached at various points within their infants' hospitalization. For their information to be included in the study however, their infant had to remain in the NICU for at least 7 days.

Instruments

The PSS:NICU, developed by Miles (1987), is a 46-item self-report instrument that was used in this study to measure the parents' perceptions of stress within the NICU. The scale consists of four subscales that measure stress related to (a) the sights and sounds of the unit (five items), (b) the appearance and behaviors of the infant (19 items), (c) the impact on the parents' role and their relationship with their baby (10 items), and (d) the parents' relationship and communication with the staff (11 items). There is also a general stress-level question that summarizes the parents' overall feeling of stress related to having an infant in the NICU. The responses to the PSS:NICU are scored on a 5-point Likert scale on which the parents can rate the level of stress for each item from 1 (not at all stressful) to 5 (extremely stressful). There is also a not applicable (N/A) option, which is scored 0 when using one of the scale's scoring methods.

The four subscales of the PSS:NICU and the entire scale can be scored in three different ways to obtain different types of information. Mean scores are obtained for each. The *stress occurrence* score (Metric 1) is a measurement of the stress related to the parents' particular situation. In this case, only those parents who report having had the experience receive a score on the item. Those who report the item as being not applicable receive a score of 0. The second scoring method provides an *overall stress* score (Metric 2). This score is a measure of the level of stress that the parent has experienced. In this case, a parent who did not report experiencing stress by a particular item is scored 1, indicating that no stress was evident. The number of items experienced by the parent on each of the subscales and the total scale provides for the third scoring method, which are the *frequency* scores. These scores indicate the total number of stressful items the parent has experienced while having an infant in the NICU. All three methods of scoring are considered important, since they provide different types of

insight concerning the parents' stress in the NICU (Miles, Funk, & Carlson, 1993).

For the psychometric evaluation of the PSS:NICU, 190 parents (115 mothers and 75 fathers) in the Midwestern and southeastern United States and Canada were used (Miles, Funk, & Carlson, 1993). Internal consistency reliability coefficients were calculated using Cronbach's alpha for three of the subscales and for the total scale. The analyses completed were done with both the *stress occurrence* (Metric 1) and *overall stress* (Metric 2) scores. The internal consistencies for the entire scale were .94 and .89, respectively. Cronbach's alpha coefficients for the *Sights and Sounds* subscale were .80 and .73; for the *Baby Looks and Behaves* subscale .92 and .83; and for the *Relationship With Baby/Parental Role* subscale .90 and .83. The internal consistency of the *Staff Behaviors and Communication* subscale was not examined since a large number of parents in this particular study did not report stress in this area (Miles et al., 1993).

Interscale correlations were also calculated between the scales for the *stress occurrence* and *overall stress* metrics. The results indicated that the subscale scores were highly correlated ($r = .88$ to $.96$), which suggests that they share a great deal of variance in common. However, since approximately one fourth of the variance was unshared between the *Baby Looks and Behaves* subscale, and the *Relationship With Baby/Parental Role* subscale, it was concluded that each of these scores offered a different view of the parents' stress related to the NICU (Miles et al., 1993).

To test the construct validity of the scale, it was anticipated that the perceived level of stress in the NICU would be correlated positively with the parents' anxiety. As a result, each of the parents' scores on the PSS:NICU subscales were compared with the scores on a 40-item self-report scale, the *State-Trait Anxiety Inventory* (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). Pearson correlation coefficients indicated that all of the correlations were significant at $p < .05$ (Miles et al., 1993).

A *Parent-Infant Demographic Sheet* was constructed for this study by the researcher to obtain information on the parent and infant characteristics that might contribute to, or be predictive of, different stress responses in the parents. These data were obtained confidentially from the medical files and included information on the parents' gender, age, marital status, ethnicity, education, and occupation. Data collected on the infants included their gestational age, birth weight, diagnosis, and length of stay.

Procedures

Approval was obtained from the appropriate institutional review boards prior to initiating the study. To collect the

data, parents of infants in Level II and Level III nurseries were approached by the researcher who introduced herself, explained the purpose of the study, and answered any questions the parents had. If the parents chose to participate, they were provided with an informed consent form and the PSS:NICU to complete. Following their completion, the mean scores for the four subscales and the entire scale were calculated for each parent using the stress occurrence and overall stress scoring metrics. Frequency scores were also calculated for each parent's subscale and PSS:NICU. On the same day, the researcher collected demographic information from the medical file using the *Parent-Infant Demographic Sheet*. To maintain confidentiality, code numbers were used instead of names.

Data Analysis

To answer the first research question regarding the occurrence of stress, overall stress, and frequency of stress experienced by the sample of parents, means and standard deviations were calculated for each of the subscales, the general stress score, and the total stress scores of the PSS:NICU. To determine the answer for the second research question regarding the infant and parent characteristics that resulted in significantly different stress levels, independent *t* tests when comparing two groups, and one-way analysis of variance (ANOVA) for more than two groups were used, with Scheffé's post hoc comparison applied. In order to determine which infant and parent characteristics predicted stress levels, multiple regression analysis using a hierarchical method with three blocks was used on the subscale, general, and total scores. Within each block, stepwise methods were applied to determine the extent to which each infant and parent variable contributed to stress. Since the infants' variables were known to have a stronger impact on parental stress levels than the parents' variables, they were entered into the block first. The first block included the infants' (a) gestational age, (b) birth weight, and (c) diagnosis. The infants' length of stay was entered into the second block. Although length of stay was not an infant or parent characteristic, it was entered into the second block because it had a stronger association with the dependent variable than the parents' characteristics. The last block of variables entered was the parents' characteristics. This block included their (a) gender, (b) age, (c) ethnicity, (d) education, and (e) occupation, which were also entered using the stepwise method. Since there were several statistical analyses involved in this study, it was necessary to set the alpha level at .01 to adequately control for a Type 1 error. Therefore, only those results significant at .01 are reported. All data analyses were conducted using the Statistical Package for Social Sciences, Version 10.

Results

Parent and Infant Characteristics

The majority of the 162 parents who participated and had complete and usable data were females (80%). Ages ranged from 14 to 51 years. Most of the parents were White (80.9%) and married (61%). Various educational levels were represented. Eighty different occupations were reported, so for the purposes of data analysis, they were categorized into the three groups: homemakers or unemployed, professionals, and nonprofessionals (see Table 1).

The infants in this study represented different gestational ages, birth weights, and diagnoses. Sixty-eight distinct medical diagnoses were included in the sample, which were categorized into five areas that represented similar areas of complication. The infants' length of stay at the time of data collection ranged from 1–155 days, with a mean length of stay of 15 days (see Table 2). Although the data were collected at these various points in time, if the infant did not remain in the NICU for 7 days, that infant's data were not included in the study.

Table 1. Parent Demographics

Characteristics	<i>n</i>	%
Gender		
Female	130	80.0
Male	32	20.0
Age		
14–21 years	26	16.0
22–32 years	75	46.3
33–51 years	61	37.7
Marital Status		
Single	53	32.7
Married	99	61.1
Separated	6	3.7
Divorced	1	.6
Cohabitate	3	1.9
Ethnicity		
White	131	80.9
Hispanic	4	2.5
African-American	25	15.4
Asian	1	.6
Other	1	.6
Education		
Less Than High School	25	15.4
High School	59	36.4
Associate's Degree	20	12.3
Bachelor's Degree	39	24.1
Master's Degree	15	9.3
Doctorate Degree	4	2.5
Occupation		
Homemaker or Unemployed	55	34.0
Professional	50	30.9
Nonprofessional	57	35.2

N = 162

Table 2. Infant Demographics

Characteristics	<i>n</i>	%
Gestational Age		
Extremely Premature (< 28 wks.)	33	20.4
Premature (28–36 wks.)	99	61.1
Full-Term (37–42 wks.)	30	18.5
Birth Weight		
Average (above 2,500 grams)	46	28.4
Low (1,500–2,500 grams)	32	19.8
Very Low (1,000– < 1,500 grams)	44	27.2
Extremely Low (< 1,000 grams)	40	24.7
Medical Complication		
Prematurity With Respiratory Disorders	66	40.7
Respiratory With Hemolytic, Infectious, and/or Metabolic Disorder	39	24.1
Cardiovascular Disorders	19	11.7
Gastrointestinal and/or Nephrolytic Disorders	12	7.4
Congenital, Neurological, and Visual Disorders		
With Complications	26	16.0

Note. Infants' length of stay at time of data collection: range: 1–155 days, ($M = 14.9$, $SD = 20.5$).
 $N = 162$

Parent Stress Levels

The stress that the parents experienced according to their PSS:NICU scores is illustrated in Table 3. In general, their stress ranged from moderately high to negligible depending on which dimension was being measured.

A feeling of *general stress* was highest for parents. The subscale in which they reported their greatest stress (although moderate) was in the *Relationship With Baby/Parental Role* area. Parents experienced “a little” to a moderate degree of stress regarding how their *Baby Looks and Behaves*. The *Sights and Sounds* of the unit caused only “a little” stress, and the area of *Staff Behaviors and Communication* was not particularly stressful at all.

When examining the mean scores for the entire scale, the stress occurrence score that indicates whether something was stressful or not was in the “a little” stressful range ($M = 2.71$, $SD = .73$). The overall stress score that indicates the degree of stress parents experienced was also within this same range ($M = 2.36$, $SD = .66$). In regard to the frequency of stress, the results indicated that approximately 32 of the 47 items on the scale were stress-provoking factors.

The Influence of Characteristics on Stress Scores

The infant characteristic of gestational age was significant in relation to the stress occurrence score on the *Baby Looks and Behaves* subscale ($F = 6.263$, $p = .002$). Parents of infants less than 28 weeks gestational age obtained significantly higher *stress occurrence* scores ($M = 3.70$, $SD = 1.75$) than parents whose infants who were in the 28–36-week range ($M = 2.91$, $SD = .96$). Parents of infants less than 28 weeks gestation also experienced a significantly higher *overall stress* score on this subscale ($M = 3.27$, $SD = 2.96$) than parents of infants in the 28–36-week age range ($M = 2.36$, $SD = .86$). It should be noted that for the overall stress score on this subscale, the F value was not significant ($F = 4.480$, $p = .013$) at .01, however post hoc analysis showed that parents of infants less than 28 weeks and parents of infants 28–36 weeks were significantly different at .01 (see Table 4).

There were four parent variables that were significant for the *frequency* of stress scores on the *Sights and Sounds* subscale. These included gender ($t = 3.518$, $p = .001$), marital status ($F = 5.043$, $p = .008$), education ($F = 3.399$, $p = .006$), and occupation ($F = 5.716$, $p = .004$). The post hoc analyses revealed that males ($M = 5.00$, $SD = .00$) were more stressed than females ($M = 4.75$, $SD = .80$), and married and cohabitating parents ($M = 4.92$, $SD = .34$) were more stressed than single parents ($M = 4.55$, $SD = 1.13$). Parents with a high school education ($M = 4.86$, $SD = .54$) and those with a bachelor's degree ($M = 4.92$, $SD = .35$) had higher stress frequency levels than those who did not complete high school ($M = 4.28$, $SD = 1.46$). In regard to occupation, parents who were working nonprofessionals obtained a significantly higher frequency score ($M = 4.96$, $SD = .19$) than parents who were homemakers–unemployed ($M = 4.55$, $SD = 1.12$) (see Table 5).

On the *Baby Looks and Behaves* subscale, marital status was significant for the *overall stress* score ($F = 7.499$, $p = .001$). Here, separated or divorced parents scored significantly higher ($M = 4.60$, $SD = 6.40$) than single parents ($M = 2.67$, $SD = .97$), and married or cohabitating parents ($M = 2.34$, $SD = .79$). On the *Relationship With Baby/Parental Role* subscale,

Table 3. Parent Stress Scale: NICU Subscale and Total Mean Scores Using Three Scoring Metrics

Subscale	Metric #1 Stress Occurrence		Metric #2 Overall Stress		Metric #3 Frequency	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Sights and Sounds (5 items)	2.37	1.1	2.28	.84	4.80	.72
Baby Looks and Behaves (19 items)	3.15	1.2	2.55	1.6	12.7	3.7
Relationship and Parental Role (10 items)	3.60	.91	3.22	.91	8.3	1.6
Staff Behaviors and Communication (11 items)	1.92	1.4	1.57	.89	5.6	4.0
Total Mean Score	2.71	.73	2.36	.66	31.98	7.4

Note. General stress score: $M = 3.73$, $SD = 1.33$.

Table 4. Analysis of Variance for Baby Looks & Behaves Subscale Scores According to Infant Characteristics

Subscale & Characteristic	Mean (SD)	$F(p)$	Post Hoc Analysis
Baby Looks & Behaves			
Stress Occurrence			
Gestational Age		$F = 6.263 (.002)$	
< 28 wks.	3.70 (1.75)		< 28 wks. vs. 28–36 wks.
28–36 wks.	2.91 (.96)		
37–42 wks.	3.37 (.94)		
Baby Looks & Behaves			
Overall Stress			
Gestational Age		$F = 4.480 (.013)^*$	
< 28 wks.	3.27 (2.96)		< 28 wks. vs. 28–36 wks.
28–36 wks.	2.36 (.86)		
37–42 wks.	2.42 (.79)		

Note. * F value was not significant at .01. However, post hoc analysis showed that < 28 wks. and 28–36 wks. were significantly different at .01 level.

Table 5. Differences in Sights and Sounds Subscale Frequency of Stress Scores According to Parent Characteristics

Characteristic	Mean (SD)	$t(p)$ or $F(p)$	Post Hoc Analysis
Gender			
Female	4.75 (.80)	$t = 3.518 (.001)$	
Male	5.00 (.00)		
Marital Status			
Single	4.55 (1.13)	$F = 5.043 (.008)$	Single vs. Married/Cohabitate
Married/Cohabitate	4.92 (.34)		
Separated/Divorced	5.00 (.00)		
Education			
<H.S.	4.28 (1.46)	$F = 3.399 (.006)$	< H.S. vs. H.S.
H.S.	4.86 (.54)		
Assoc.	4.90 (.31)		
BA/BS	4.92 (.35)		BA/BS vs. < H.S.
MA/MS	4.93 (.25)		
Doctorate	5.00 (.00)		
Occupation			
Homemaker/Unemployed	4.55 (.12)	$F = 5.716 (.004)$	Homemaker/Unemployed vs. Nonprofessional
Professional	4.90 (.42)		
Nonprofessional	4.96 (.19)		

gender was significant ($t = 2.688, p = .008$), with mothers having a higher *overall stress* score ($M = 3.31, SD = .90$) than fathers ($M = 2.84, SD = .87$) (see Table 6).

Predictors of Stress

The combination of infant and parent characteristics was examined for their influence in predicting stress on the subscale, general, and total scores of the PSS:NICU (see Table 7).

Sights and Sounds Subscale. Two characteristics contributed significantly to the prediction of the *frequency* of stress experienced. These included the parents' ethnicity and their education. Parents who were White and parents with a higher education had a greater frequency of stress than parents who were minorities, and had less education. None of the infant characteristics contributed significantly to the prediction of scores for this subscale.

Baby Looks and Behaves Subscale. For the *stress occurrence* metric, two infant variables predicted significantly.

These included the infants' length of stay at the time of data collection and the infants' diagnosis. If the infants' length of stay was longer, and they had a cardiovascular complication, the parents' stress occurrence score was higher. For *overall stress*, the strongest predictor was also the infants' length of stay. In addition, the parents' ethnic background was a predictor, with minorities having greater overall stress than parents who were White. For the *frequency* of stress, the most important predictor was the infants' gestational age, with extreme prematurity having the most impact. The infants' length of stay at the time of data collection was also a contributing predictor, with a longer length of stay resulting in greater stress frequency. For parents, marital status was a predictor, with those who were not married having a higher frequency of stress regarding how their baby looked and behaved than those who were married.

Relationship With Baby and Parental Role Subscale. For *stress occurrence*, the parents' age had the strongest impact, with the youngest group of parents experiencing the greatest

Table 6. Differences in Baby Looks & Behaves and Relationship/Parental Role Subscale Scores According to Parent Characteristics

Subscale & Characteristic	Mean (SD)	$F(p)$ or $t(p)$	Post hoc Analysis
Baby Looks & Behaves			
Overall Stress			
Marital Status		$F = 7.499 (.001)$	
Single	2.67 (.97)		Single vs. Separated/Divorced
Married/Cohabitate	2.34 (.79)		Married/Cohabitate vs. Separated/Divorced
Separated/Divorced	4.60 (6.40)		
Relationship & Parental Role			
Overall Stress			
Gender		$t = 2.688 (.008)$	
Female	3.31 (.90)		
Male	2.84 (.87)		

stress occurrence regarding their relationship and role. The second most important predictor was the infants' diagnosis of a cardiovascular disorder. Gender was the strongest predictor of *overall stress*, with women experiencing greater overall stress than men regarding their relationship with their baby and their role. In addition, the infants' diagnosis of a cardiovascular disorder was a contributing predictor in this area.

Staff Behaviors and Communication Subscale. For *overall stress*, the only contributing predictor was the infant diagnosis of a cardiovascular disorder. The infants' length of stay at the time of data collection was predictive of the *frequency* of stress, with a longer the length of stay resulting in greater frequency. Having a baby with a cardiovascular disorder was the second most important predictor for frequency of stress in this area.

Table 7. Final Regression Model for the Subscale and Total PSS:NICU Scores

Scoring Metric	Constant α	1st Variable b (B)	2nd Variable b (B)	3rd Variable b (B)	R_2	Adj. R_2	SEE
Sights and Sounds							
Frequency	5.126	Ethnicity -.469 (-.260)	Education .084 (.156)		0.110	0.099	0.684
Baby Looks & Behaves							
Stress Occurrence	2.895	Length of Stay .013 (.217)	Infant Cardiovascular Diagnosis .650 (.175)		0.073	0.062	1.628
Overall Stress	1.464	Length of Stay .020 (.269)	Ethnicity .660 (.169)		0.118	0.107	1.476
Frequency	18.807	Gestational Age -1.42 (-.189)	Length of Stay .033 (.180)	Marital Status -1.268 (-.166)	0.143	0.127	3.482
Relationship/Parental Role							
Stress Occurrence	4.284	Parent Age -.025 (-.196)	Infant Cardiovascular Diagnosis .524 (.185)		0.077	0.066	0.8848
Overall Stress	3.782	Gender -.520 (-.228)	Infant Cardiovascular Diagnosis .517 (.183)		0.076	0.064	0.883
Staff Behavior & Communication							
Overall Stress	1.506	Infant Cardiovascular Diagnosis .573 (.209)			0.043	0.038	0.8696
Frequency	3.782	Length of Stay .058 (.297)	Infant Cardiovascular Diagnosis 2.32 (.187)		0.117	0.106	3.974
General Stress	3.813	Infant Prematurity/ Respiratory -.561 (-.207)	Length of stay .011 (.166)		0.061	0.050	1.300
Total Means							
Stress Occurrence	2.660	Infant Cardiovascular Diagnosis .504 (.222)	Gender -.337 (-1.83)		0.074	0.063	0.7093
Overall Stress	2.712	Infant Cardiovascular Diagnosis .413 (.202)	Gender -.326 (-.197)		0.071	0.059	0.6404
Frequency	34.10	Infant Prematurity/ Respiratory .086 (.241)	Infant Cardiovascular Diagnosis 3.93 (.172)	Gestational Age -.122 (-.081)	0.103	0.086	7.075

General Stress Score. The most important predictor of *general stress* was having an infant with a diagnosis of prematurity with a respiratory disorder. The second most important predictor was a longer length of stay.

Parental Stress Scale: NICU Total Mean Scores. For both *overall stress* and *stress occurrence*, the most important predictor was the infant diagnosis of a cardiovascular disorder. Parents who had an infant with this diagnosis had higher overall stress and stress occurrence than parents with infants with other diagnostic complications. Parent gender was also an important predictor of overall stress, with mothers having higher overall stress than fathers. The most important predictors for the total *frequency* of stress scores were the infants' length of stay, followed by the infants' gestational age. The longer the infants' stay, and the younger the gestational age (< 28 weeks), the greater the frequency of stress. Finally, having an infant with a cardiovascular disorder resulted in greater frequency than the other diagnoses. Therefore, having a baby that was extremely premature and had a cardiovascular disorder resulted in the highest stress frequency.

Discussion

The results of this research indicate that scores measuring a feeling of general stress were highest on the PSS:NICU, suggesting that the stress experienced by parents may often be diffuse. This was especially true for parents of a premature baby with a respiratory disorder and a longer length of stay. Case-Smith (2001) has said that the process of intervention begins with the identification of family concerns. The finding of high general stress suggests that it is important for occupational therapists and other health care practitioners to determine more precisely what those specific stressors are so that their intervention protocols can better address the parents' needs, reduce their stress, and enhance their ability to understand and cope with their infant.

Specifically, in regard to the different areas of stress measured by the PSS:NICU, the results of this study are consistent with others (Miles et al., 1991, 1992), which indicate that the most stressful aspect of having an infant in the NICU is an altered parent role and relationship with their baby. This alteration is particularly stressful for mothers, younger parents, and parents of infants with a cardiovascular diagnosis. Each of these findings is important to occupational therapists since it is the philosophy of the profession to provide the support needed to facilitate a positive parent–infant relationship (Case-Smith, 2001). If occupational therapists are practicing this philosophy, this particular area of stress for parents should already be receiving the attention it deserves. If it is not, this study substantiates that

intervention that focuses on the parents' role with their infant should be a priority.

Greater stress for mothers regarding their role has been demonstrated by this study, and in studies by Miles, Funk, and Kasper (1991), Perhudoff (1990), and Shields-Poe and Pinelli (1997), who have suggested that mothers and fathers may have different expectations of their role with their infant. Case-Smith (2001) has indicated that mothers and fathers react differently to a child with a disability. Therefore, therapists and other health care practitioners need to work with parents in identifying roles that each of them can fulfill in the NICU, and provide support for caregiving procedures that are appropriate for the parent, and the infant's level of tolerance. Also, although it seems that less experience in the parental role might cause greater stress for younger parents (ages 14–21 years) as demonstrated by this study, the results of a study by Shields-Poe and Pinelli were directly the opposite. It can therefore only be speculated that for the younger parents in the current study, perhaps being a parent for the first time, or not knowing what to do and what to expect, provoked greater stress. For these parents, learning how to recognize their infants' cues and how to touch and handle their babies, which has traditionally been a role of the occupational therapist, should be emphasized for their effects on reducing stress and facilitating positive parent–child interactions. Finally, having an infant with a cardiovascular diagnosis may have resulted in greater role stress due to the fact that these infants often need to undergo surgery, or a series of surgeries that evoke anxiety regarding the infants' long-term care. These parents may need additional emphasis in assisting them to develop a comfort level with their infants that promotes their confidence and competence in assuming their role and developing a relationship, despite the medical uncertainties faced.

The second specific area that caused stress for parents in this study was how the baby looked and behaved. These findings were consistent with studies by Miles (1989) and Miles et al. (1991), but inconsistent with Shields-Poe and Pinelli (1997) who found this area to cause the greatest stress. In the current study, having a baby who was extremely premature resulted in significantly higher stress scores, and was predictive of stress, along with a longer length of stay and a cardiovascular diagnosis. These findings seem sensible since extremely premature babies are physiologically unstable, demonstrate many aspects in their physical appearance that are different, and are less responsive to social interaction than infants who are born later in a pregnancy. In addition, their extreme prematurity often results in the need for medical equipment and a longer length of stay to facilitate and allow time for their development. Infants with a cardiovascular disorder may also be in similar

circumstances due to the severity of their medical condition. Each of these findings seem to reinforce the occupational therapist's role in helping parents observe, interpret, and respond to their infants' unique behaviors and appearance. In the case of extremely premature babies, facilitating an understanding of the infant's gestational age and its implications on how the baby looks and reacts is important. In addition, being able to recognize changes in their infants' arousal states throughout their hospital stay should also assist in the parents' awareness that the infants' responses have a physiological basis that often affects their ability to respond and interact with them.

Other predictors of stress regarding the infants' appearance and behaviors were related to the parents' characteristics, including being a minority, and separated or divorced. As indicated by Magnusson (1982), subcultural factors can make different groups of individuals sensitive to different stressors. Parents who are members of minority groups are faced with the double task of socializing their children to their own culture and helping them to interact with the dominant culture (Humphry & Case-Smith, 2001). Perhaps how the baby looks and behaves is more stressful to minority parents because of their concerns about their infants' acceptance. As a result, these parents also need to understand and recognize their infants' arousal states for their impact on interaction, and should be familiar with ways in which proper positioning might improve their infants' appearance and behaviors. In regards to the parents' marital status, other studies (Miles, Funk, & Kasper, 1992; Shields-Poe & Pinelli, 1997) have also demonstrated that separated or divorced parents have increased concerns in this area. Since the birth of a baby with special needs is a trying experience for the most capable of families (Rosenberg & Robinson, 1988), separated and divorced parents may experience greater stress about their infants' appearance and behavior due to their difficulty with or inability to share their concerns with the other parent. In these cases, occupational therapists need to acknowledge their stress, show a caring and supportive attitude, and consistently encourage the parents to ask about alterations in their infants' appearance and condition. In addition, interventions that help parents to provide information to others about their infant may enhance the ability of other family members or friends to understand the infant better, allowing them to offer their support and acceptance.

An area that caused only "a little stress" for the parents in this and other studies (Alfonso, Hurst, Mayberry, Yost, & Lynch, 1992; Miles, Carter, Riddle, Hennessey, & Eberly, 1989; Miles et al., 1992; Riddle, Hennessey, Eberly, Carter, & Miles, 1989; and Shields-Poe & Pinelli, 1997) was the NICU sights and sounds. Explanations offered for these

lower stress levels are that the environment is perceived to be helping to keep the baby alive (Alfonso et al., 1992), there is increased familiarity with intensive care units due to frequent media exposure (Miles et al., 1989; Riddle et al., 1989), and that parents may have had other personal or work experiences that have prepared them for the environment (Shields-Poe & Pinelli). The higher frequency of stress scores for fathers versus mothers, which was found in this study however, might suggest that fathers pay more attention to equipment in the nursery than mothers. For more highly educated parents who also had a greater frequency of stress, a possible explanation may be that they have a better understanding that the equipment and technology are representative of the criticality of their infants' condition. When combining all of the factors that might impact on stress regarding the sights and sounds however, it was the parents' ethnicity (White), and level of education that were significant. Although the reasons for these differences in levels and impact can only be theorized, for those who do experience a greater stress frequency regarding the sights and sounds, or for whom greater stress is anticipated, it becomes important that the issue be addressed. Providing clear explanations regarding the equipment and technology, which might reduce the stress caused by the intensity of the environment, may be effective for accomplishing this goal.

The least stressful area for parents in this study and other studies (Alfonso et al., 1992; Miles et al., 1989; Shields-Poe & Pinelli, 1997) was regarding the staff's behavior and communication. Various authors have offered explanations for this finding. They range from it being difficult for parents to honestly appraise staff behaviors and communication at a time when their infant is seriously ill and under the care of the staff (Alfonso et al., 1992), to adequate communication actually occurring thereby attesting to the high quality of intervention being provided in the NICU (Miles et al., 1989). Whereas each of these explanations seem possible, it is likely that most parents would at least be cognizant of the fact that the staff is working to help their infants' condition to improve or in many cases to stay alive. The results of this study have also indicated that the length of stay and a cardiovascular disorder were predictive of stress in the area of communication with staff. This finding was somewhat consistent with that of Shields-Poe and Pinelli who found that for fathers, the longer the baby had been in the unit and the sicker the baby, the higher the stress scores in this area. For occupational therapists and other health care professionals, this suggests that parents who have been in the NICU longer, and whose infants have a serious medical complication, such as a cardiovascular disorder, need open and regular communication throughout the length of their NICU stay in order to receive the

support and assurances necessary regarding their infants' status and condition.

Finally, when examining the total PSS:NICU mean stress occurrence, overall stress, and frequency scores, one parent and three infant variables showed a significant association. Being a mother predicted greater stress occurrence and overall stress in the NICU, again emphasizing the need to address these levels of stress by enhancing mothers' opportunities for positive interaction with their infants. The infants' length of stay, diagnosis of a cardiovascular disorder, and extreme prematurity contributed to a greater frequency of stress, suggesting that parents of younger and sicker infants need to develop and maintain an understanding of their infants' sensory, motor, and medical needs throughout their stay in the NICU. Support and opportunities to care for their infant should therefore occur as often as possible. It was perceived as a positive finding that the mean stress occurrence and overall stress scores were somewhat lower than expected. As a result, it may be possible, as suggested by the literature, that parents actually are satisfied with the care their infant receives, easing the degree of stress they experience as a result of the environment and their infant's special needs.

Limitations and Directions for Future Research

Generalization of this study's findings is limited by the non-random convenience sample that was restricted to one hospital and geographic location. Therefore, recommendations for future research would include using a larger, randomly selected sample of parents in NICUs that are representative of different geographic locations in the United States. This would help to determine the consistency of the results and whether there are differences in responses based on location. Another limitation is that although complete confidentiality was assured to the parents for their participation, it may have been difficult for them to accurately rate their stress because their infant was receiving care in the NICU. To minimize the possibility of parents not wishing to report anything negative, future researchers may consider collecting data after the infant is no longer in the NICU or is discharged. It needs to be recognized, however, that this would most likely change the dynamics of the study and impact its results because it would require a retrospective response to the NICU stress experienced. In addition, only those parents available at the time of data collection and those who did not appear overly distressed were approached for their participation in this study. This ultimately may have had an effect on the outcomes. Future research therefore, should attempt to collect data at different points in time during the

NICU stay in order to obtain a more comprehensive perspective on the experience.

Finally, in applying this research to practice, each of these limitations suggests that the findings of this study require careful interpretation, because the environment of each NICU has its own unique set of circumstances that can potentially contribute to the stress that parents experience.

Conclusion

Considering the areas in which parents experience the greatest stress, and understanding the factors that can influence that stress, may be useful to NICU occupational therapists and other health care professionals in developing interventions that are more supportive and responsive to the parents' needs. The results of this study substantiate that occupational therapists and other health care professionals need to offer guidance that will help parents strengthen their role and develop a relationship with their infant that will improve the quality of their interactions and perhaps result in better outcomes. This need is especially true for mothers, for whom greater role stress can be anticipated. Parents also need the therapist's and others' assistance in understanding the appearance and behaviors of their infant. This study suggests that this need is especially true for parents of babies who are extremely premature, have a cardiovascular disorder, and who remain in the NICU for a longer length of time. As a result helping parents to understand their infant's gestational age, arousal states, and benefits of proper positioning may all be beneficial towards reducing this stress and increasing the parent's comfort level with their infant.

Parent-defined occupations are an essential component of neonatal intensive care (Holloway, 1998). Since the results of this study suggest that the areas of greatest stress for parents are regarding their occupational role and interactions with their infant, it also seems to indirectly confirm the importance of the unique contributions of occupational therapists within this environment. Designing interventions that correspond with the parents' needs and support the occupational roles of the parents may have the added benefit of reducing their stress, thereby facilitating their opportunities for active participation in the care and nurturing of their child.▲

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