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Factors Associated with Developmental Concern and Intent to Access Therapy Following NICU Discharge

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Abstract

Purpose—To determine factors associated with mother’s concern about infant development and intent to access therapy services following neonatal intensive care unit (NICU) discharge.

Methods—Infant medical factors, MRI results, neurobehavior at term, maternal factors, and maternal perceptions about developmental concern and intent to access therapy at NICU discharge were prospectively collected in 84 infants born premature (<30 weeks gestation). Regression was used to determine factors associated with developmental concern and intent to access therapy at NICU discharge.

Results—Decreased developmental concern was reported by mothers with more children ($P=.007$). Infant stress signs ($P=.038$), higher maternal education ($P=.047$), reading books ($P=.030$) and maternal depression ($P=.018$) had associations with increased developmental concern. More maternal education was associated with more intent to access services ($P=.040$).

Conclusion—Maternal factors, rather than infant factors, had important associations with caregiver concern. In contrast, abnormal term neurobehavior and/or the presence of cerebral injury were not associated with caregiver concern about development.

Keywords

adult; anxiety; child; disabled children/rehabilitation; early intervention; educational status; female; health services accessibility; infant; humans; income; male; neonatal intensive care; parents/psychology; premature infant; questionnaires; severity of illness; socioeconomic factors

Introduction

Recent advances in medical care have improved the survival rates for infants born preterm, but long-term functional impairment and disability remain common.¹ In addition to an increased incidence of cerebral palsy, cognitive disability, and visual impairment, infants born premature have a heightened risk of subtle problems; such as, impaired attention and executive function, decreased scholastic performance, and increased behavioral problems.^{1,2} Due to concerns about subsequent developmental delay and behavioral problems, early therapeutic intervention is often recommended for infants born preterm. The effect of early intervention on later outcomes has been mixed due to disparate populations and

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interventions but has been demonstrated in some settings to improve cognition, diminish maladaptive behaviors, and increase family bonding and maternal confidence.³⁻⁶ Some evidence suggests that starting therapy earlier, prior to 9 months of age, yields greater developmental progress.⁷

With the growing numbers of infants born preterm with developmental delay and behavioral problems in early childhood,⁸ as well as the improved ability to detect early alterations in function,⁹ early therapy services are often recommended at discharge from the neonatal intensive care unit (NICU). Early therapy services can be accessed through a physician referral, or services can be accessed through an early intervention program. Early intervention is a federally enacted, state-coordinated program funded through Part C of the Individuals with Disabilities Education Act (IDEA) in which services are provided to children less than 3 years of age with specific developmental risks or disabilities.¹⁰ Each state differs in the type, frequency, amount and structure of early intervention services.^{11,13,14} Referral to early intervention programs can be made by parents, teachers, pediatricians or liaisons from the NICU. Systems have been set up nationwide to aid parents in activating therapeutic services.

Although many infants are referred for early therapy services, a gap is apparent between the developmental needs, as well as the recommendation of services, and the utilization of services for high risk infants.^{15,16} In a large study involving over 2,000 parents of children with special health care needs, only 72% of children with an identified need for services actually received rehabilitation services, and a family's level of financial hardship was associated with decreased access to therapy.¹⁷ A recent study of early intervention services in Florida found that delays in early intervention service implementation were associated with younger age at time of referral as well as referrals for behavior issues.¹⁸ Other factors identified in the literature that impede access to health care include insurance coverage, racial/ethnic disparities, severity of the condition, health literacy, maternal education, and family attitudes and beliefs.¹⁷⁻²⁰

According to the Health Belief Model,²¹ there are 4 factors associated with health behaviors: perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers. Perceived seriousness deals with how one feels about the seriousness or severity of the problem. Parental understanding about the severity of their infant's neurological impairment (perceived seriousness) is one possible barrier to accessing follow-up services among NICU graduates. The parents' initial developmental concern and intent to access therapy can influence whether early therapy services are initiated and continued. Many infants born preterm demonstrate poor developmental outcome and fail to receive adequate therapeutic services,^{1,15} therefore, a better understanding of early parental perceptions is an important area to research.

One service offered by many NICUs is a scheduled outpatient developmental follow-up visit. Maternal factors, such as being a young mother as well as drug use during pregnancy have been associated with hindered compliance with developmental follow-up.²² Although poor behavioral performance as well as identified brain injury could be assumed to increase compliance with developmental follow-up, no studies to date have investigated the association between maternal and medical factors, including identified brain injury and early function, on mother's early perceptions about the need for developmental follow-up services. The purpose of this study was to investigate the relationship of infant medical factors, infant behavior at term, and maternal factors on maternal perceptions of concern about development and intent to access therapy services at NICU discharge.

Methods

This prospective cohort study explored factors related to maternal perceptions of developmental concern and intent to access therapy at discharge from the NICU. This study was contained within an overarching study investigating the longitudinal development of the infant born preterm, was approved by the Institutional Human Ethics Committee, and was supported by the National Institute of Health.

Participants

The study recruited infants from a level III NICU who were part of a continuous inborn sample spanning a 3 year period from March 2007 through July 2010. Infants born at less than 30 weeks estimated gestational age (EGA) were recruited within the first 3 days of life. Exclusion criteria eliminated from the sample those infants who had a known congenital anomaly or were moribund with severe sepsis or respiratory failure.

Study Site

The study took place in a 75-bed level III NICU. At the study site, standing orders for physical, occupational and speech therapy services for all infants born less than 30 weeks gestation are standard of care. While in the NICU, therapeutic interventions can include services for positioning, problems with the infant's state regulation, motor functioning as well as feeding. Parent education is an important component of the in-house therapy program, and parents are instructed in techniques to diminish environmental stress as well as instructed in therapeutic activities that can optimize functional outcome. The need for therapeutic services is communicated to parents by therapy staff as discharge approaches. In addition, the physician meets with parents on a regular basis to update them on the infant's medical course and to provide the results of diagnostic testing. When brain injury is detected, these results are shared with the family in a private meeting, and the expected effect on functional outcome is discussed. Finally, a discharge coordinator ensures the family has had adequate instruction in all areas of infant care prior to discharge and makes the referral to the state's early intervention program and/or provides the family with a written referral for therapeutic services at discharge from the NICU. In the state where this study took place, all infants born less than 28 weeks gestation automatically qualify for early intervention, whereas others could qualify based on length of intubation, presence of brain injury, or other medical risk factors.¹³

Procedures

Infants whose parents gave informed consent underwent neurobehavioral and feeding assessment, magnetic resonance imaging (MRI), and routine cranial ultrasounds (CUS) throughout the NICU hospitalization. Infant and mother medical and environmental factors were collected from the medical record. Lastly, each infant's primary caregiver completed the *Questionnaire for the Mother or Primary Caregiver Right before Departure Date from NICU* (now referred to as the questionnaire).

The questionnaire was developed by researchers in the Victorian Infant Brain Study research group, by pulling questions from standardized assessments in addition to adding a variety of other questions aimed at identifying family traits and perceptions. It has been used in longitudinal studies of infants born premature since the year 2000. The questionnaire consists of nine independent sections over 12 pages, and in the current study parents completed a paper copy of the questionnaire immediately before or after NICU discharge.

The questionnaire provides information about family details, lifestyle, the child, caregiving experiences, coping strategies, recent events in the family, family issues, social support and

professional support. Examples of questions included on the questionnaire include: “How often does your family cook at home (very rarely, once or twice a month, once per week, or more than twice a week)” and “which of the following child minding options will you use (child care, nanny, grandparents, other relatives, friends, other)”. For this study, the questionnaire provided information on maternal stress, anxiety, depression, whether the mother recently read books about pregnancy or infant/child care, maternal education, developmental concern and intent to access therapy services at discharge.

Independent Variables

Maternal factors—Maternal education and whether the mother recently read books about pregnancy or infant/child care were collected from the questionnaire by the following questions: *Maternal education*: “Which of the following best describes your highest level of education?”, The choices included Junior High, High School, College, Graduate School and Post Graduate School. This variable was dichotomized into less than a college education or a college education. *Whether the mother recently read books about pregnancy or infant/child care*: “Have you read, or are you currently reading, books regarding the following topics: pregnancy, infant sleeping and feeding, child development, mother’s health, or parenting?” Recent reading of books about pregnancy or infant/child care was defined as report of reading any of these materials.

Additional maternal factors examined through the questionnaire included: race, age, marital status, number of previous children, as well as whether or not the mother had a previous infant born premature.

Maternal anxiety, depression, coping, and stress were measured with the following self-report measures, which were imbedded in the questionnaire: State Trait Anxiety Inventory (STAI),²³ Edinburgh Post Natal Depression Scale (EPDS),²⁴ Coping Inventory for Stressful Situations (CISS),²⁵ and the life stress subscale of the Parenting Stress Index (PSI).²⁶ The STAI is the most widely used self-report assessment of anxiety in adults.²⁷ It consists of two 20-item scales that differentiates between adult anxiety as a personality trait and the temporary condition of state anxiety.²³ The CISS is a 21-item self-report scale of preferred coping style, which relates back to general personality. Task-oriented, emotion-oriented and avoidance-oriented coping are determined by the CISS. The EPDS is a 10-question self-report measure, for which cut-offs for the diagnosis of clinical depression have been established.²⁴ The PSI is used to screen for stress in the parent-child relationship and consists of 101 items. For this study, however, the optional 19 items of the life stress scale were used in the questionnaire.²⁸ The life stress subscale provides a measure of stress that the mother is experiencing outside of the parent-child relationship, a measure of situational stress. A psychiatrist, blinded to the study objectives, supervised the scoring of the STAI, the CISS, the EPDS, and the life stress scale of the PSI. The total scores for the STAI, CISS, and PSI were used. The EPDS score was dichotomized into depressed or not depressed. All standardized tools that were used to define maternal health are widely used, valid assessment tools.^{23–26,28,29}

Socioeconomic status (SES) was captured from documentation in the medical record by identifying the type of insurance coverage. Low SES was defined by public insurance, while high SES was defined as having private insurance.

Infant factors—Infant factors, collected from the medical record, included whether the infant was part of a multiple birth, the sex of the infant, the Critical Risk Index for Babies (CRIB) score and EGA at birth. The CRIB score is a measure of initial perinatal medical severity,³⁰ documented by the attending physician in the first 12 hours of life. Higher CRIB scores, which reflect lower gestational age and birth weight and more escalation of care,

reflect increased medical need in the first days of life of the vulnerable infant born premature. The EGA at birth was defined as the number of completed weeks of gestation determined from the mother's last menstruation or from the most recent fetal ultrasound. Additional infant factors were obtained from imaging studies and neurobehavioral testing at term equivalent age.

Infant cerebral injury—Cerebral injury was determined through routine CUS and MRI. CUS was done at the bedside as part of routine clinical surveillance. MRI was conducted at term equivalent age without sedation in an MRI suite with a neonatal nurse present. Cerebral injury at term equivalent was determined by a single trained neuroradiologist using images from CUS and MRI. Cerebral injury was dichotomized as either none to mild injury, or moderate to severe injury. Moderate to severe cerebral injury was defined as an infant with 1 or more of the following: any cerebellar lesion, grades 3–4 intraventricular hemorrhage (IVH), and/or cystic periventricular leukomalacia (PVL). All findings from CUS and MRI, in addition to the expected effects on outcome, were communicated to the family prior to NICU discharge.

Infant behavior and function—Neurobehavioral outcome was determined between 37 and 41 weeks postmenstrual age (PMA) in the NICU using the NICU Network Neurobehavioral Scale (NNNS) and the Dubowitz Optimality Score. In addition, feeding performance was assessed using the Neonatal Oral Motor Assessment Scale (NOMAS). Findings were communicated to parents prior to discharge.

The NNNS is a tool developed for infants at high risk, and it has recently gained acceptance for use with infants born premature.^{31,32} This examination is used to provide an assessment of motor and sensory responses, neurological integrity, behavioral functioning including orientation, and responses to stress.^{9,32} From the 115 items of the NNNS, 13 summary scores are generated (habituation, tolerance of handling, quality of movement, self-regulation skills, non-optimal reflexes, infant stress signs, arousal, hypertonia, hypotonia, asymmetry, excitability, lethargy, and orientation). Summary score values for a sample of infants born full term and healthy are available for comparison within the NNNS manual.³³ For this study, the 13 numerical summary scores were used in the analysis.

Developmental function was also assessed using the Dubowitz Neurological Examination (DNE).³⁴ The DNE is a 34-item test that examines tone (10 items), tone patterns (5 items), reflexes (6 items), spontaneous movements (3 items), abnormal signs (3 items), and behavior (7 items). Each item is scored either as 1 (full credit), 0.5 (partial credit) or 0 (no credit). Raw scores can then be converted into optimality scores for each of the 6 subscales. A total neurologic optimality score is obtained by summing all 6 subscale optimality scores.³⁵ Although referenced on infants born full term, a total score below 31 (out of a possible 34 points) is considered suboptimal. For this study, the total DNE score was used in the analysis.

The Neonatal Oral Motor Assessment Scale (NOMAS) is a feeding evaluation tool that assesses jaw and tongue movements during the first 2 minutes of an oral feeding.³⁶ Oral-motor behaviors are categorized as either: normal, disorganized, or dysfunctional. NOMAS categorization was used as an independent variable in this study.

Preliminary analyses from the study sample had demonstrated a relationship between neurobehavioral outcome and brain injury, neurobehavioral outcome and gestational age, and neurobehavioral outcome and medical severity at birth.

Outcome Variables

In the *Questionnaire for the Mother or Primary Caregiver Right before Departure Date from NICU*, 2 questions from the child and professional support sections were used:

Developmental Concern—Caregivers were asked, “Overall, how concerned are you about your child’s development?”. Choices included: not concerned, slightly concerned, moderately concerned, and very concerned. To isolate concerned and not concerned, these responses were dichotomized into not concerned (including answers of not concerned or slightly concerned) and concerned (including answers of moderately concerned or very concerned).

Intent to Use Therapy Services at Discharge—Caregivers were asked, “What developmental therapies do you plan to use?”. Options include: early intervention (EI), physical therapy (PT), occupational therapy (OT), speech therapy (ST), developmental therapy, visual support and parents or teachers play group. If the parent indicated an intention to use EI, developmental therapy, PT, OT, or ST, they were coded as having intent to access therapeutic services at discharge. Otherwise, they were coded as having no intention of accessing therapy services.

The responses to the aforementioned questions defined the level of caregiver concern regarding development as well as the intent to access therapy services at discharge.

Statistical Analysis

A biostatistician was consulted for the data analysis in this study. Exploratory analyses using simple logistic regressions with an $\alpha = .05$ were conducted to investigate the association between infant and maternal factors and reported developmental concern and intent to access therapy services. Variables that reached significance were then further evaluated together in a multivariate regression model to determine which variables are most influential on developmental concern and intent to access services, using an $\alpha = .05$.

Results

One hundred and twenty infants were recruited for this study. Of those, 16 infants expired prior to NICU discharge, 6 withdrew, 1 was transferred to another NICU prior to term, 1 was later determined to have a congenital anomaly, and 4 were missing both outcome variables. No significant differences were found in caregiver anxiety, stress or depression as well as infant brain injury, estimated gestational age, or neurobehavioral outcome among caregivers who did and did not answer the questions. Eight additional infants were excluded, due to being part of a multiple birth. In the case of multiples, 1 infant was randomly selected from the pair or triplet to be included in the study. Eighty-four mother-infant dyads were included in this study. See Table 1 for infant and mother characteristics of the sample.

Intent to Access Therapy

Eighty-one percent ($n=68$) of primary caregivers indicated an intent to access therapy after NICU discharge, 14% ($n=12$) did not report an intent to access therapy, and 5% ($n=4$) failed to answer the question. There were trends toward recent reading of books ($P=.092$), higher socioeconomic status ($P=.093$) and lower CRIB score ($P=.088$) being associated with intent to access services at discharge. Higher levels of maternal education were associated with increased intent to access services ($P=.040$). No other significant associations between infant or maternal factors were detected.

Caregiver Concern

Sixty-one percent (n=49) of mothers were categorized as being concerned about their infant's development, whereas 38% (n=31) did not report concern, and 5% (n=4) did not answer the question.

See Table 2 for factors associated with maternal concern. Infant factors, such as multiple birth, EGA at birth, CRIB score, cerebral injury, and many of the neurobehavioral scores were not significantly associated with developmental concern. More infant stress signs ($P=.038$) were associated with an increased likelihood of reported developmental concern by the mother.

Increased report of caregiver concern about development was also associated with the presence of increased maternal depression ($P=.018$), recent reading of books ($P=.030$), maternal college education ($P=.047$), and fewer siblings ($P=.007$). Maternal stress, anxiety, coping, marital status, age, ethnicity, socioeconomic status, and previous premature birth were not significantly associated with developmental concern. After multivariate analysis, fewer siblings ($P=.035$) and maternal depression ($P=.026$) continued to be significant factors associated with developmental concern. There was no association between developmental concern and intent to access therapy services ($P=.865$).

Discussion

The key findings of this study were that major factors associated with concern about development and intent to access therapy at NICU discharge were maternal, while associations with infant factors, aside from infant stress signs, were not detected. Medical severity, neonatal brain injury and many of the infant behavior measures were not associated with caregiver report of concern about development or intent to access therapy services. In contrast, maternal factors including fewer siblings and more maternal depression were associated with increased reports of concern about development. Many of the measures used in this study are documented in the medical record during routine clinical care in the NICU. Others, such as the self-report measures of maternal health as well as factors obtained from the questionnaire, can be easily implemented as part of NICU care prior to discharge. Measures of neurobehavior and feeding performance can also be obtained as part of occupational therapy, physical therapy and speech therapy in the NICU and can help inform early intervention services at discharge.

Parental literacy has been reported as positively correlated with better health outcomes in children.²⁰ Our findings provide further evidence that both a college education as well as mothers who read books about pregnancy or infants and their health are more likely to be concerned about development and intend to access therapy at discharge. By sharing concern about development and activating services, educated parents may be more likely to optimize functional outcome through therapeutic interventions at discharge for their children. However, other maternal factors, including the number of children and maternal depression, also had important associations with perceptions about developmental concern.

Research has demonstrated that as family size increases, parents naturally have less time and energy to devote to each child.³⁷ Accordingly, parents of infants with more children were less likely to demonstrate concern about development. However, it is also possible that parents with other children may have more confidence in their parenting abilities.³⁸ Decreasing parental concern with increasing number of children remained one of the most influential factors on multivariate analysis.

Maternal depression was associated with an increased report of developmental concern. This supports the findings of other researchers that found that children of mothers with depressive symptoms are 3 times more likely to participate in early intervention programs than children of mothers without depressive symptoms.³⁹ It appears somewhat paradoxical that mothers with symptoms of depression are more likely to seek out therapy services for their children, as it is often thought that maternal depression can disable the capacity of the caregiver. Depressed mothers, however, have been shown to have a negative cognitive bias and, therefore, could be more likely to focus on the high risk of disability and potentially ignore the positive prognosis or establish hope and optimism for the future of the child. As infants of depressed mothers have been shown to have more developmental problems later in life,⁴⁰ follow up services can potentially best optimize developmental outcome with a family approach. Maternal depression remained one of the most influential factors associated with developmental concern after multivariate analysis.

Lack of associations between parent reports of developmental concern with CRIB scores in the current study corresponds with other research that identified that the severity of the patient's condition in the NICU did not affect compliance with developmental follow up.²² However, the lack of associations between caregiver concern and intent to access therapy and infant medical severity and cerebral injury was also surprising. Forty-four percent of infants in this study had moderate to severe cerebral injury on MRI or CUS, and future developmental outcomes are highly correlated with brain structure alterations and injury.¹ When significant cerebral injury was detected, mothers of these infants received details about the test results and were counseled on the future outlook for their child. Despite providing details about the infant's neurological status, presence of moderate to severe cerebral injury was not associated with developmental concern or intent to access therapy post discharge. The complex coping mechanisms of mothers of NICU infants may not have been able to be fully appreciated in this study.

Although increased infant stress signs were associated with developmental concern, we hypothesized that impaired behavior of the infant would have had stronger associations with concern about development. The infant with increased stress scores demonstrates physiological and motor stress signs, which could highlight the fragility and vulnerability of the infant born preterm and subsequently lead parents to be more perceptive in identifying risk and reporting concern about development. However, parental perceptions about development did not correspond with other types of developmental alterations at term, including tonal abnormality, asymmetry, quality of movement, ability to self regulate and the presence of early developmental skills and reflexes.

Previous researchers have shown that older mothers are more likely to comply with follow-up appointments,²² that financial hardship is a key barrier for accessing services,^{17,22} and that African Americans demonstrate more difficulty accessing health services.¹⁹ The current study did not detect associations between developmental concern or intent to access therapy and maternal age, socioeconomic status, or ethnic group. It is possible that there are healthcare system issues, such as lack of insurance coverage or perceived inability to pay, which can make it challenging to access services, rather than the desire to access developmental follow-up. Barriers to access is an important area for future research.

Lack of associations between parent perceptions of developmental concern and intent to access therapy could indicate a bias in the question about intent to access services. As parents were educated in the NICU about the recommendation for therapy services at discharge, they may have answered this question based on how they thought they should answer. However, the question about developmental concern is more benign and inquires about a perception, rather than a call to action, which could have been perceived as less

imposing and may reflect more of the parent's perceptions and intent. Given the possible bias in the intent to access therapy question, it makes sense that more mothers indicated an intent to access therapy than indicated a developmental concern. Infants born premature from the sample continue to return for developmental follow up at 2 and 4 years of age. Patterns of early intervention and therapy services can then be determined and compared to their early perceptions. When this cohort of infants return for developmental testing at age 2 years an additional questionnaire will be administered to determine therapy implementation after discharge. It will be interesting to further investigate the implementation of services, to see if a lack of compliance is related to developmental concern, as this could explain some of the differences in risk versus activation of services. This could also help explain some of the gaps in services that exist and provide support for systems of care that activate without parent advocacy. Universal therapy services for neonates at high-risk can ensure that these infants receive early therapy services to maximize functional outcome.

Limitations in the current study included a small sample size, variability between subjects, and possible bias with parent report measures. Infants born preterm demonstrate significant variability in neurobehavioral performance and brain development, which can make it difficult for parents and health professionals alike to make comparisons or predict functional outcome. This study also relied on parent's report of concern and intent to access therapy. The nature of self-report questionnaires makes it possible that parents reported an intention to access services because they thought that was how they were supposed to answer, rather than their actual intention. Due to the high number of mothers who reported intent to access therapy, it is also difficult to draw conclusions.

Although all associations involved unique factors, the exploration of factors associated with caregiver concern and intent to access therapy relied on multiple comparisons of infant and mother characteristics to determine which factors were associated with parental perceptions. Multiple comparisons increase the risk of finding associations when they do not exist. However, a biostatistician confirmed that a Bonferroni correction was not warranted for this study, as it was an exploratory study and all factors investigated were unique. In addition, these findings may not generalize to all infants born premature, as there is significant variability in early intervention criteria and eligibility across settings and geographical locations as well as differences in education at NICU discharge across settings.

Last, this study is limited by examining reported perceptions of developmental concern and intent to access therapy rather than actual behaviors. These perceptions are also collected at NICU discharge, a time when development may not be foremost in the mind of the caregiver. Immediate concerns may relate more to transition to home, management of residual medical problems, and transition to full parenthood.

Conclusion

In conclusion, major factors associated with concern about development and intent to access therapy at NICU discharge are primarily maternal. Maternal factors including fewer children, maternal depression and reading books are associated with increased reports of concern about development. Higher levels of maternal education are associated with increased intent to access services. Understanding factors associated with accessing therapeutic services following NICU discharge is an important first step toward improving compliance rates for developmental follow-up.

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Table 1

Sample Characteristics.

Continuous Variables (n=84)	Mean± SD	Categorical Variables (n=84)	(%)
Infant Factors		Infant Factors	
Gestational Age (weeks)	26.92±1.6	Multiple Birth	(18%)
CRIB score	4.16 ±3.5	Cerebral Injury	(44%)
Maternal Factors:		Abnormal Infant Behavior:	
Maternal Age (years)	27 ±2.7	* Lethargy	(33%)
		* Low Arousal	(40%)
		* Excitability	(47%)
		* Poor Self Regulation	(33%)
Number of Other Children	1.2±1.2	* Poor Quality of Movement	(9%)
		* Sub Optimal Reflexes	(98%)
		* Asymmetry	(31%)
Caregiver Stress-PSI	3.14±1.9	* Poor Habituation	(50%)
		* Poor Orientation	(85%)
Anxiety (trait)-STAI	33.5±9.0	* Hypertonicity	(76%)
		* Hypotonicity	(60%)
Anxiety (state)-STAI	45.91±18.3	* Stress	(89%)
		* Poor Tolerance of Handling	(93%)
CISS		Dysfunctional Feeder (NOMAS)	(39%)
Task Oriented Coping	55.5±13.5	Sub-optimal Dubowitz	(100%)
Emotion Oriented Coping	29.8±11.6	Maternal Factors:	
Avoidance Oriented Coping	40.8±15.4	Depression	(18%)
		Unmarried	(57%)
		History of Premature Birth	(43%)
		African American	(46%)
		Reading Books on Pregnancy/Children	(88%)
		College Educated	(52%)
		Private Insurance	(27%)

* Abnormal neurobehavior on the NNNS defined as scoring < the 25th percentile, according to published norms on full term infants.

Table 2

Associations with Developmental Concern

	β	B Confidence Interval (lower bound)	B Confidence Interval (upper bound)	R ²	P Value Univariate/Multivariate
Number of Children	-.128	-.220	-.036	.084	.007/.035*
Infant Stress Signs	1.052	.059	2.045	.070	.038/.371
Maternal Depression	.347	.061	.633	.064	.018/.026*
Reading of Books	.357	.035	.679	.047	.030/.100
College Educated	.221	.003	.439	.038	.047/.110

* Remained significant after multivariate analysis ($P < .05$)