

HOSPITALIZED INFANTS IN NICU: CORRELATES OF PARENTAL STRESS TO NICU ENVIRONMENT

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Abstract- This study examined correlates of the stress experienced by parents to the neonatal intensive care unit (NICU) environment where their infants are hospitalized. It was descriptive survey. The target population was 216 parents of At-risk infants in the NICU. Questionnaires on NICU Parental Stress Scale were administered to the respondents. A parent-infant demographic data sheet was also used to obtain information about the parent and infant characteristics. The research question was answered using mean score, standard deviation and Spearman Rank correlation coefficient (ρ) while the null hypotheses were tested using Mann-Whitney U test, Chi-Square and Wilcoxon W test statistics. The result indicated that infant gestational age and the fertility history of the parents significantly influenced parental stress to the NICU environment. However, the stress experienced by the parents over the behavior and appearance of the infants was not significantly determined by the number of children born by the parents.

Keywords: Hospitalized Infants, NICU Environment, Parental Stress.

I. INTRODUCTION

Medically fragile infants are born into families of all races, religions, nationalities and cultural backgrounds without regard for their social environment (Syder – Greenberg and Dokkin, 2000)[1]. As technology increases, smaller and more medically fragile infants are being treated and kept alive in highly technical neonatal intensive care (NICU) environments (Miles et al, 1993)[2].

From birth, the child has an ability to respond to the environment which influences the interaction between mother and child (Wigert et al, 2006)[3]. In typical circumstances, the parent-infant bonding process that occurs during the newborn period establishes the foundation for a lifelong relationship. However, this typical process does not necessarily occur when the infant is born at risk, and spends the first several weeks or months in the NICU (Case-Smith, 1993)[4]. If this attachment is interrupted, the child's emotional development is negatively influenced (Wigert et al, 2006)[3].

Neonatal Intensive Care Unit (NICU) environment has the potential to exacerbate stress for parents of infants admitted to the unit. NICU stressors, individually or in combination, may interfere with the parent-infant relationship and create extra difficulties for the couple and wider family (Carter et al, 2007)[5].

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

infants. According to Miles and Carter (1983)[6], 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 stay in the unit. Environmental factors that can influence parents' unique reaction to having an infant in the NICU might include difficulty in fulfilling their parental role, the medical equipment used for intervention, and the communication patterns and behaviour of the staff (Miles and Carter, 1983[6]; Hunter, 2001[7]). Miles and Carter (1983)[6] explained that as a result of the various factors that can influence the parents, 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, while others may use personal resources such as family, friends or financial assets. Hence, the response to the stress of having a child in the NICU can therefore be the result of a complicated interaction of various variables that can potentially be adaptive or maladaptive. Increased information about how parents of hospitalized high-risk infants perceive NICU, and also an understanding of the needs of such parents may enable NICU Staff to identify parents at risk and plan interventions to meet those needs and promote family functioning. This is particularly important given evidence that factors such as parental well-being, family cohesion and parent-child relationships make

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significant contributions to infant longer-term developmental outcomes (Carlson et al, 2003[8]; Elgar et al, 2004[9]; Martins and Gaffan, 2000[10]). This study was therefore intended to determine how the NICU environment influence the stress experienced by parents whose infants were hospitalized in the unit.

Research Question

- * How does gestational age of the infant in NICU relate to parental stress for the Sights and Sounds in the unit?

Hypotheses

- * Significant difference does not exist in the fertility history of parents with regard to the stress they experience for the Sights and Sounds in the NICU where their infants are hospitalized.
- * Number of children born by parents do not significantly relate to the stress experienced by the parents over the behaviour and appearance of their infants in the NICU.
- * Significant difference does not exist in the fertility history of parents with regard to the stress they experience over the behaviour and communication pattern of staff in the NICU where their infants are hospitalized.

MATERIALS AND METHODS.

Design and Sampling.

The study was a correlational research design. A convenient sample of 216 parents (mothers and fathers) of high-risk infants who were hospitalized in the NICU of two Teaching Hospitals in South-East Zone of Nigeria was used for the study.

Ethical approval was obtained for the study and informed consent was obtained from the parents. Inclusion criteria for the study were parents of the preterm babies and neonates with other illnesses (like asphyxia, birth injuries, congenital malformations, Jaundice, etc) that necessitated their admissions into the unit for special care. Parents who indicated not to participate were excluded from the study, and also their infants were not used. The parents were approached at various points within their infants' hospitalization. To obtain data on stress, the researchers approached the parents at a time when they were visiting but not holding their babies, and when not involved with other NICU personnel. Copies of the Questionnaires were administered at that time as well. For their information to be included in the study, their infants had to remain in the NICU for at least 24 hours. Confidentiality was ensured by not including names of the respondents in data collection. Rather code numbers were used instead of names.

INSTRUMENT

Parental Stressor Scale: Neonatal Intensive Unit (PSS-NICU) developed by Miles and Funk (1987)[11] and designed to measure the parents perception of stressors within the NICU was used by the researchers in this study. The scale consists of four sub-scales that measure stress related to sights and sounds (eg presence and noise of

monitors and equipment, other sick babies, alarm noises, large number of staff), appearance and behaviour of the infant (eg tubes and equipment on, in or near the infant, infant color, size, cry, movements, labored breathing), the impact on parents' role and their relationship with their baby (eg being separated from their infants, unable to feed and care for the infant, fear of touching or holding the baby, feeling helpless to help the infant), and the parents' relationship and communication with the staff (eg. Staff explaining things too fast, not enough information, staff looking worried about infant or not understanding).

Additional questionnaire items adopted from Abidin's (1995)[12] Parenting Stress Index (PSI) were added to the questionnaire sub-scales of infant behaviour and parental role alteration. For example, items like distractibility/hyperactivity, nil-adaptability, nil-reinforcement of parents, demandingness, mood and nil-acceptability were added to the questionnaire items of Infant Behaviour subscale, while items like incompetence, isolation and non-attachment were added to the subscale of parental role alteration. The responses to the PSS:NICU were scored on a 5-point Likert scale ranging from 1 point for "not at all stressful", 2 points for "mild stress", 3 points for "fairly moderate stress", 4 points for "very stressful" and 5 points for "extreme/ severe stress". Higher scores indicate more stress.

Another instrument (questionnaire) on Parental Self-report Scale on the coping measures parents adopt, alterations in mood (such as sad always, grief, anxiety, depression), concern about infants' outcome, involvement in decision-making as a measure to reduce stress and spouse presence in stress reduction was used for the study. The responses were rated on a 4-point scale ranging from 1 point for not at all, 2 points for fair, 3 points for much and 4 point for very much. Higher scores for this indicate more coping abilities for the parent.

A parent – Infant Demographic sheet was constructed for the study by the researchers to obtain information on the parent and infant characteristics that might contribute to, or be predictive of the different stress responses among 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 demography included their gestational age, birth weight, diagnosis and length of stay.

Internal consistency reliability coefficients were calculated using cronbach's alpha for the entire scales. 20 parents of hospitalized infants in the NICU of a teaching hospital in another zone in Nigeria were used. The internal consistencies for the entire scales were 0.76 and 0.65 respectively.

DATA ANALYSIS

Standard descriptive statistics like means, frequency, standard deviation were used to summarize the independent variables and the PSS: NICU total and four subscales. Mean score, standard deviation and spearman Rank coefficient were used to answer the research question. Mann-Whitney U, Wilcoxon and Chi square statistical tests were used to test the null hypotheses at 0.01 level of significance. SPSS version 21 was used in the data analysis.

RESULT

Table 1. Demographic Characteristics of the Study Population

Variable	Frequency	Percentage
Parental sex:		
Male	10	4.6
Female	206	95.4
Parental Marital Status (MS):		
Married	210	97.2
Single	6	2.8
Parental Ethnicity:		
Ibo	183	84.7
Hausa	7	3.2
Yoruba	10	4.6
Ijaw	4	1.9
Edo	6	2.8
Tiv	5	2.3
Langthang	1	0.5
Parental Educational Level:		
Illiterate	6	2.8
Primary	30	13.9
Secondary	121	56.0
Tertiary	59	27.3
Parental Occupation:		
Artisan	20	9.3
Business	146	67.6
Civil Servant	26	12.0
Professional	24	11.1
Number of Children:		
None alive	11	5.1
Some alive	44	20.4
All alive	161	74.5
Fertility History of the Parents:		
Infertile Prior to Child birth	23	10.6
Fertile Prior to Child Birth	193	89.4
Infant Sex:		
Male Child	132	61.1
Female Child	84	38.9
Infant Position:		
First Child	67	31.0
Second Child	60	27.8
Third Child	88	40.7
Above third Child	1	0.5
Infant Length of stay in Hospital:		
Few Days	101	46.8
Long Stay	115	53.2

Total Population N = 216

Demographic characteristics of the study population are shown in table 1. 4.6% of the respondents were males while 95.4% were females. The single parents constituted 2.8% while the married ones were 97.2% of the population. Majority of the respondents (84.7%) were Ibos, Hausas were 3.2%, Yoruba 4.6%, Ijaw 1.9%, Edo 2.8%, Tiv 2.3% and Langthang 0.5%. Majority of the respondents (56%) had secondary education while 2.8% were illiterates, 27.3% had tertiary education while 13.9% were of primary school level. 67.6% were business men and women, 12.0% were civil

servants, 11.1% were professionals and 9.3% were artisans. 74.5% had all their children alive, 20.4% had some of their children alive while 5.1% had none alive. With regard to the respondents' fertility history, 89.4% were fertile prior to childbirth while 10.6% had fertility treatment prior to childbirth. Among the NICU infants of the respondents, 61.1% were males while 38.9% were females; 31% constituted first child, 27.8% second child, 40.7% third child and 0.5% above third child. For the infants' length of stay in the hospital, 46.8% spent few days while 53.2% spent long period. The respondents' total population was 216.

Table 2. Descriptive Statistics of the Measured Variables

Variable	N	Mean	SD
Parental Age	216	29.9352	5.87509
Number of children born by Parents	216	2.6944	0.56170
Infant Gestational Age	216	35.2130	5.73370
Birth Weight of Infant	216	2.6160	0.97483
PSS for sights and sounds in NICU	216	2.5718	0.81058
PSS for NICU Infant behaviour and Appearance	216	2.9213	0.86783
PSS for NICU Staff Behaviour/ Communication	216	2.6139	1.06251
NICU Parental Role Alteration	216	3.0728	1.08000
NICU Parental Self-report coping Measures	216	3.2407	0.51870
Valid N (Listwise)	216		

Table 2 shows the descriptive statistics of the measured variables. Out of the 216 respondents, the mean age was 29.9352 with standard deviation (SD) of 5.87509, mean for number of children born by the respondents (the parents) was 2.6944 with SD of 0.56170, mean value of infant gestational age 35.2130 with SD of 5.73370; mean for the infants' birth weight 2.6160 with SD of 0.97483. Parental stress (PSS) for NICU sights and sounds had mean score of 2.5718 with SD of 0.81058, mean of PSS for infant behavior and

appearance was 2.9213 with SD of 0.86783, mean of PSS for NICU staff behaviour and communication 2.6139 with SD of 1.06251, mean of NICU parental role alteration 3.0728 with SD of 1.08000, while the mean of NICU parental self-report coping measures was 3.2407 with SD of 0.51870.

Table 3. Relationship between gestational age of infant and parental stress for the Sights and Sounds in NICU

Variables	N	X	SD	rho	Critical value	Level of significance
Infant Gestational Age	216	35.2130	5.73370	**	0.000	0.01
PSS for Sights and Sounds in NICU	216	2.5718	0.81058	0.249		

** Correlation is significant at 0.01 level (1 – tailed).

In table 3, the rho correlational value for the relationship between infant gestational age and parental stress for the

Sights and Sounds in NICU was 0.249. The critical value was 0.000. The correlation was significant at 0.01 level

Table 4. Mann-Whitney U test comparison of parental stress for Sights and Sounds in NICU across the fertility history of parents

Variable	Ranking Order	N	Mean Rank	Sum of Ranks	Z – Cal	Z – Crit	Probability
Fertility History - PSS for Sights and Sounds in NICU	Infertile prior to child birth	23	152.04	3497.00	3.553	0.000	P<0.01
	Fertile prior to child birth	193	103.31	19939.00			
	Total	216					

NB: Z-cal = standard score

Table 4 shows that at 0.01 level of significance, the calculated z-score of 3.553 was more than the z-crit of 0.000. The null hypothesis is rejected. Significant difference exists

across the fertility history of parents with regard to the stress they experience for the Sights and Sounds in the NICU where their infants are hospitalized

Table 5. Chi-Square test comparison of the number of children born by parents and parental stress for the behaviour and appearance of their infants in NICU.

No of Children	N	Mean Rank	df	X ² -Cal	X ² -Crit	Probability
None Alive	11	104.32	2	0.310	0.856	P>0.01
Some Alive	44	112.97				
All Alive	161	107.57				
Total	216					

In table 5. The calculated X² of 0.310 was less than the critical value of 0.856 at 0.01 level of significance. Therefore number of children born by parents is not significantly related

to parental stress for the behaviour and appearance of their infants in NICU. The null hypothesis is accepted .

Table 6. Wilcoxon W test comparison of parental stress for NICU staff behaviour and communication across the fertility history of parents.

Variable	Ranking Order	N	Mean Rank	Sum of Ranks	Z- Cal	Z-Crit	Probability
Fertility History- PSS for NICU staff Behaviour and Communication	Infertile prior to child birth	23	145.43	3345.00	3.005	0.003	P<0.01
	Fertile prior to child birth	193	104.10	20091.00			
	Total	216					

NB: Z – cal = standard score

In table 6 the calculated Z score of 3.005 was more than the Z-crit of 0.003 at 0.01 level of significance. There is significant difference in parental stress for NICU staff behaviour and communication across the fertility history of the parents. Therefore the null hypothesis is rejected.

DISCUSSION

Findings from the study indicate significant correlation (rho=0.249) between gestational age of the infant and parental stress for the Sights and Sounds in NICU (table 3). Valizadeh, Akbarbeglou and Asad (2009)[13] in their study on the effects of stress on mothers of premature infants in NICU noted that for parents NICU was a stress – provoking environment. According to the researchers, parents identify the noise from monitors, special devices and placing the infants in one isolate as very stressful. Order sources of stress for the parents include the medical accessories and devices surrounding and attached to infants, sudden skin color changes and the helplessness of tiny infants making facial grimaces indicating pains. Holditch – Davis and Miles (2012)[14], in their study on the sources of parental distress among mothers of preterm infants identified appearance in the NICU as one of the sources of stress to parents.

Findings from the study showed significant difference across fertility history of parents with regard to the parental stress for Sights and Sounds in the NICU (table 4). Pilliteri (1999)[15] has it that infertile couples not only express fears and anxiety over their inability to conceive, but may strongly desire a child and also feel the normal anxiety associated with

impending parenthood. For a previously infertile couple who eventually achieves desired pregnancy, finding themselves in the NICU environment after childbirth will give them serious psychological blow. The features of the NICU such as the medical accessories and devices and the unusual sound from the devices will instill fear in the parents. Such parents will develop feeling of hopelessness and impending death for the infant they were able to deliver after a protracted period of barrenness.

The study also showed absence of significant relationship between number of children born by parents and parental stress for the behaviour and appearance of their infants in NICU (table 5). The implication of this finding is that parents, irrespective of the number of children they have, develop stress over the state of ill-health of their infants in the NICU. Heidari, Hasanpour and Fooladi (2013)[16] reported that in the last month of pregnancy a close relationship is established between the mother and the unborn, and that this relationship is disturbed when the infant is transferred to NICU right after birth. This report shows that previous childbirths do not alter parental reactions to the illness of their newborns in NICU.

In addition, findings from the study indicate that significant difference exists in parental stress for NICU staff behaviour and communication across the fertility history of the parents (table 6). Learning theory of attachment has traditionally associated the formation of mother-infant attachment with the mother’s reduction of the baby’s hunger which is a primary drive; and because mother provides the infant with food which is a primary reinforcer, she herself becomes a secondary reinforcer (Hetherington and Parke, 1999)[17]. Presumably, this ability to satisfy the baby’s hunger drive forms the basis for infant attachment to the

mother or any other care giver linked to feeding (Hetherington and Park, 1999)[17]. Once the infant is in the NICU, the other care givers linked with infant feeding are the NICU staff members. Obviously, parents that went through treatment course for infertility prior to childbirth would desire to feed their newborns themselves so as to establish attachment with their infants instead of allowing the NICU staff to usurp their parental role and possibly take over the attachment. Street et al (2005)[18] observed that parents vary in their wishes and needs in relation to treatment decision-making. Some parents wish to be fully involved in all decisions while some prefer to leave the decisions to NICU staff because of their lack of knowledge and feeling of inability at a time of extreme stress (Abel-Boone, Dockett and Smith, 1989[19]; Pinch and Spielman, 1990[20]). These variations noted by some researchers support the findings in this study.

CONCLUSION

The study indicated that parental stress for NICU sights and sounds is significantly influenced by infant gestational age and parental fertility history. Significant difference was also observed across the fertility history of the parents with regard to parental stress for the NICU staff behavior and communication. However, there was absence of significant difference between the number of children born by parents and the stress parents experience over the behavior and appearance of their infants.

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