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# Assessment of stress among parents of neonates admitted in the neonatal intensive care unit of a tertiary care hospital in Eastern India

Ria Ganguly, Lipilekha Patnaik, Jagdish Sahoo<sup>1</sup>, Sumitra Pattanaik, Trilochan Sahu

## Abstract:

**BACKGROUND:** An infant admitted to the neonatal intensive care unit (NICU) is a potentially stressful event for parents. Severe stress is experienced by parents, affecting their mental health and relationship, and infants' development. The current study aims to assess the stress levels among parents of neonates admitted to NICU and to identify the factors influencing their stress levels.

**MATERIALS AND METHODS:** A cross-sectional study was conducted in a tertiary care hospital of Eastern India over 2 months. Stress levels were assessed using Parental Stressor Scale: NICU questionnaire among 100 NICU parents (mother or father) with more than 24 h of admission. Stress was quantified using the Likert scale. The statistical analysis was performed using the SPSS software.

**RESULTS:** In this study, 60.8% parents experienced severe and extreme stress level for overall stress. The mean for overall stress experienced was  $3.71 \pm 0.70$ . There was no significant difference in overall stress between father and mother ( $P = 0.65$ ). The highest levels of stress experienced were in sight and sound subscale ( $3.23 \pm 0.41$ ) followed by relationship with the baby and parental role, i.e., 2.46 30. There was no significant association in overall stress score with maternal age, parity, education level, previous baby being admitted to the NICU ( $P > 0.05$ ). Stress in sight and sound domain was statistically significantly higher ( $P = 0.009$ ) among parents of babies with stay of  $\leq 7$  days.

**CONCLUSION:** These results support wider use in research and clinical practice to identify parental stress. Interventions can be developed to ameliorate its negative effects on individual, interpersonal, and societal levels. The stress score was not significantly different between fathers and mothers of neonates admitted to NICU and the length of stay was significantly associated with sight and sound domain. Appropriate counseling should be targeted toward both parents. Future intervention studies should be planned to decrease the stress level among parents.

## Keywords:

Neonatal intensive care unit, new-born, parental stress, parental stressor scale

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## Introduction

The most vulnerable time for a child's survival is the first 28 days of life or the neonatal period. Children face the highest risk of dying in their 1<sup>st</sup> month of life at an average global rate of 18 deaths per 1000 live births in 2017. "Globally, 2.5 million children died in the 1<sup>st</sup> month of life in 2017 alone – approximately 7000 neonatal deaths

every day – most of which occurred in the 1<sup>st</sup> week, with about 1 million dying on the 1<sup>st</sup> day and close to 1 million dying within the next 6 days."<sup>[1]</sup> Most of these deaths are entirely preventable. Prematurity, complications during labor and birth, and infections such as sepsis, pneumonia, tetanus, and diarrhea are among the leading causes – all of which can be treated or prevented with simple, affordable solutions. However, these children are also

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dying because of the environment they were born into and their parents' financial constraints – whether it be an impoverished family, a marginalized community. Children in the poorest households are nearly twice as likely to die before the age of five than those from the richest. It is completely possible to prevent new-born and child deaths with a concerted, coordinated effort among policy-makers, businesses, health-care workers, communities, and families. We can work together to provide affordable, quality healthcare for every mother and child.<sup>[2]</sup> The birth of a child that needs admission in the Neonatal Intensive Care Unit (NICU) can be very stressful for the parents. Severe stress is experienced by a significant number of parents and can affect mother–baby relationship and thus affect infant development subsequently. The expectation of having a healthy child is interrupted by the shock of being separated from him/her and not being able to take care of their baby as imagined. The presence or absence of social support and economic challenges and other factors impacts stress for parents and non-parents alike, but for parents there are added stressors such as child characteristics and parenting responsibilities that influence well-being in general, and parents' mental health in particular. Beyond individual characteristics such as age, gender, and physical health, there are factors such as geographical location, socio-economic status, race, and ethnicity that impact the level of stress and threaten the physical and mental health of parents. Other sources of stress for parents of NICU infants have been found to be alterations in the parental role and relationship with the baby, outcome of the infants' health, and ineffective patterns of communication among health-care providers and parents.<sup>[3]</sup> This study was conducted on parents of neonates admitted in NICU with the following objectives:

1. To determine the levels of stress experienced by parents of babies admitted in NICU
2. To find out the association between stress level and sociodemographic and clinical variables of mothers and their newborn.

## Materials and Methods

This was a cross-sectional study conducted on parents of neonates admitted in NICU of SUM Hospital, Bhubaneswar, India, during a period of 3 months from September to November 2018. Ethical clearance was obtained from the Institutional Ethical Committee. Written informed consent was obtained from the participants. Parents of neonates who were admitted in NICU for more than 24 h were included in the study (60 mothers and 40 fathers). A semi-structured validated interview-based questionnaire consisting of Parental Stressor Scale: NICU (PSS: NICU) comprising four subscales, and questions related to maternal and neonatal characteristics were used.

## Parental stressor scale: Neonatal intensive care unit

In the Parental NICU Stress model,<sup>[4]</sup> NICU environment stressors directly influence parents' stress response. Four major NICU environment stressors were identified and described in detail by Miles, *et al.* (1993). This scale has been widely used in the neonatal literature and has been shown to have high validity and reliability.

The PSS: NICU contains 46 items, corresponding to four subscales and a general stress item. The four subscales and their numbers of items are as follows: Sights and Sounds, 5 items; Infant Appearance, 19 items; Parent-infant Relationship, 10 items; and Staff, 11 items.

Another was a question on general or overall stress level.

Participants were asked to rate each item, according to how stressful the situation described in each item was for them:

1 = not at all stressful, 2 = a little stressful, 3 = moderately stressful, 4 = very stressful, and 5 = extremely stressful. Stress was defined as feeling anxious, upset or tense. If participants had not experienced a particular situation, they were asked to indicate this by answering "not applicable." If a participant had multiple infants in the unit, questions on the scale relating to a single infant were requested to be answered with regard to the most applicable infant.

## Statistical analysis

Data from interviewing parents were collected using semi-structured questionnaire, compiled using MS Excel, and statistical analysis was performed using the SPSS software version 20.0 v (IBM Corp., Armonk, NY, USA). Statistical measures such as mean and proportion were used. For the comparison of discrete variables, the Chi-square test was used; for the continuous variables, the Student's *t*-test was used.

## Results

Of the 100 parents enrolled, the mean age of the mothers ( $n = 100$ ) was 27 years with a range of 22–35 years. Only 20% of the mothers had education up to secondary level and 40% were homemakers. The mean age of father was 30 years, 55% of the fathers got secondary level of education, and 68% of the fathers were nonprofessionals by occupation. Nearly 41% of the parents were from the upper class of SES. Sociodemographic characteristics of the parents are tabulated in Table 1, and clinical data of the mothers' pregnancy and delivery is shown in Table 2.

Among the distribution of infant characteristics, 28% were born by normal vaginal delivery, 76% were male babies, and 46% were of birth order 1 [Table 2].

**Table 1: Sociodemographic characteristics of the parents (n=100)**

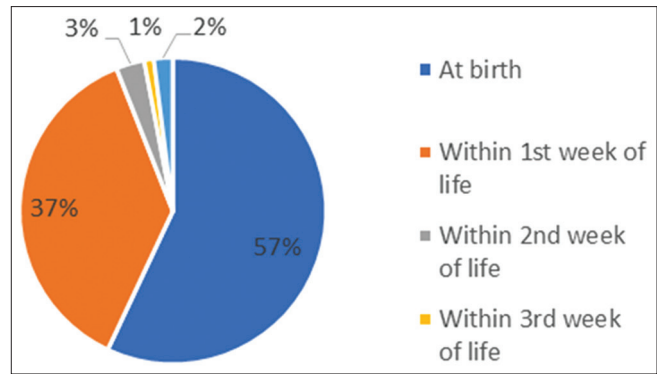
Sociodemographic variables	Percentage
Religion	
Hindu	96
Muslim	4
Caste	
General	78
SC/ST/SEBC	22
Residence	
Urban	80
Rural	20
Type of family	
Joint	35
Nuclear	65
Education of father	
Primary	14
Secondary and above	86
Education of mother	
Illiterate/primary	76
Secondary and above	24
Socioeconomic status	
Upper class	41
Middle class	59

**Table 2: Maternal characteristics of the study population (n=100)**

Characteristics	Percentage
Mode of delivery	
Elective LSCS	68
Emergency LSCS	4
Vaginal delivery	26
Instrumental vaginal delivery	2
Place of birth	
IMS and SUM	89
Transferred from other facility	11
Parity	
Primiparous	46
Multiparous	54
Previous baby needed NICU admission	
Yes	12
No	88
Previous neonatal death	
Yes	8
No	92

LSCS=Lower segment cesarean section, NICU=Neonatal intensive care unit

Most of the babies (57%) were admitted at birth [Figure 1]. Mean gestational age was 35.71 ± 4.4 weeks. The most common reason for admission was perinatal asphyxia (27%), followed by prematurity (26%), neonatal sepsis (14%), jaundice (10%), neonatal hyperbilirubinemia (10%), respiratory distress (9%), metabolic disorder (9%), and 5% others [Figure 2]. Mean length of their stay in the NICU was 6.8 days with the range of 2–15 days. A total of 46% were in normal birth weight range and 30% were in the low-birth-weight



**Figure 1: Age at admission in neonatal intensive care unit**

group, 22% were very low-birth weight, and 2% were extremely low-birth weight [Figure 3].

Figure 4 demonstrates the mean stress score in each stress subscale for mother and father. There was no significant difference in stress score between father and mother in each subscale. Furthermore, there was no significant difference in overall stress between father and mother ( $P = 0.65$ ). There was no significant association in the overall stress score with maternal age, parity, education level, previous baby being admitted to the NICU, birth weight of the baby, and gestational age ( $P > 0.05$ ).

Table 3 shows the parental stress measured by PSS: NICU scale. The mean for overall stress experienced was 3.71 ± 0.70. Among the parents, 60.8% experienced severe and extreme stress level for overall stress. The highest levels of stress experienced were in the “Sight and Sound Subscale” (3.23 ± 0.41) followed by Relationship with the baby and parental role,” i. e., 2.46 ± 30.

The question with the highest score obtained on the whole scale was the item “Sudden noises” (3.37 ± 0.599) from the subscale “sight and sound,” followed by the item “tubes and equipment” (3.29 ± 0.701) and from the item “baby in pain” (3.16 ± 0.644).

In the “Relationship with baby and parental role” subscale, the highest stressor was “Not being able to care for baby myself” (2.76 ± 0.473). “Not being able to share my baby with relatives” and “feeling the staffs are closer to my baby” had very little stress scores.

In the “Staff behavior and communication” subscale “staffs explaining things too fast” had highest stress score (2.59 ± 0.72) and least stress score were for “staffs telling conflicting things” (0.59 ± 0.98).

Table 4 demonstrates parental stress levels in relation to gender and length of stay. There was no

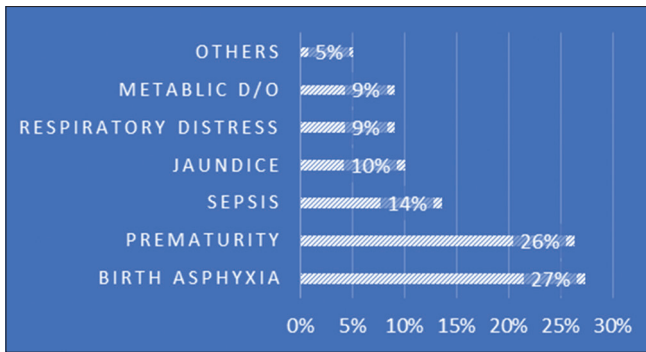


Figure 2: Reasons for admission in neonatal intensive care unit

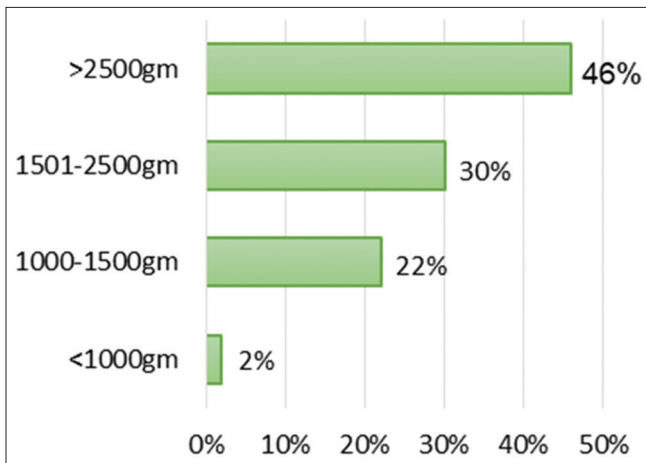


Figure 3: Birth weight of neonates

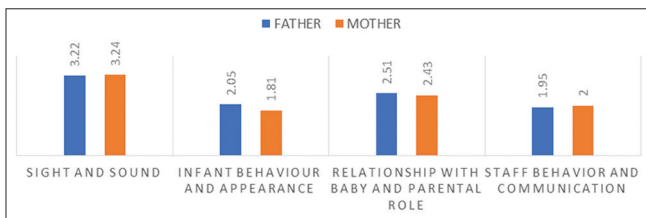


Figure 4: Mean stress scores for mothers and fathers

significant difference in stress experienced by father and mother in any of the subscales. Stress in sight and sound domain was statistically significantly higher ( $P = 0.009$ ) among parents of babies with stay of  $\leq 7$  days.

There is no significant difference in stress subscales between father and mother of admitted neonates. Interview having  $< 8$  years of education have higher stress in behavior and appearance subscale. Unemployed interview and previous neonatal death have higher stress in sight and sound subscale. No significant associations were observed between total parental stress and gender of neonate, birth weight, gestational age, mode of delivery and parity, previous neonate being hospitalized in NICU [Table 5].

Table 3: Parental stress measured by parental stressor scale: Neonatal intensive care unit ( $n=100$ )

Subscale stress level	Mean $\pm$ SD
Sight and sound	3.23 $\pm$ 0.41
Infant behavior and appearance	1.90 $\pm$ 0.66
Relationship with baby and parental role	2.46 $\pm$ 0.30
Staff behavior and communication	1.98 $\pm$ 0.43
Overall stress	3.71 $\pm$ 0.70

SD=Standard deviation

## Discussion

If the four subscales are considered, what most stresses the parents (without differences by gender) is the NICU sight and sound (e.g., alarms, monitors, other hospitalized NB and so on), followed by relationship with baby and parental role. This is consistent with other studies by Carter *et al.* and Musabirema P *et al.*<sup>[5,6]</sup> These studies state that sights, sounds, and the general environment of the NICU often cause stress and panic in the parents.

The second specific area that caused stress in this study was parents relationship with baby and parental role which happened to be the most stressful scale for the study done by Miles *et al.*<sup>[7]</sup> Few cohort studies have documented higher rates of neurodevelopment impairment, including motor, visual, and hearing disabilities; mental retardation; attention disorders; and learning disabilities at school age in these infants.<sup>[8]</sup>

The least stress was caused by “infant appearance” which may be because the type of interaction that occurs during visiting hours was not enough to create a bond or notice the behavior of the baby.

Several studies indicate that mothers present higher levels of stress than fathers.<sup>[9-13]</sup> However, in this study, differences in stress levels of father and mother are not statistically significant. Today, fathers have equal responsibility toward the child and he is the earning head of the family in most cases in India and thus help in maintaining family stability during the hospital admission. Thus, stress due to their child’s hospitalization won’t depend on the gender variable.

The personal characteristics of the parent, such as their past experiences and pregnancy history, may influence parental stress. In this study, the stress presented by parents does not seem to be related to other pregnancy variables such as parity, pregnancy planning, or having an older child hospitalized in a NICU. This differs from the studies by Carter *et al.*<sup>[5,9]</sup> and Dudek-Shriber,<sup>[14]</sup> in which higher stress scores in mothers are associated with having complicated pregnancies and not having previous experience of having a child hospitalized in a NICU.<sup>[6]</sup>

**Table 4: Parental stress levels in relation to gender and length of stay**

Characteristics	Group	Sight and Sound	Infant behavior and appearance	Relationship with baby and parental role	Staff behavior and communication
Parents gender	Father (40)	3.22±0.30	2.05±0.69	2.51±0.24	1.95±0.47
	Mother (60)	3.24±0.47	1.81±0.64	2.43±0.33	2.00±0.40
Length of stay (days)	≤7	3.33±0.42*	1.93±0.66	2.48±0.27	1.99±0.45
	>7	3.02±0.31	1.85±0.68	2.41±0.35	1.96±0.37

\*P=0.009 (P&lt;0.05 is significant)

**Table 5: Parental stress subscales and total parental stress in relation to sociodemographic and clinical characteristics**

Characteristics	Mean±SD				
	Parental role	Behavior and appearance	Sights and sounds	Staff behavior and communication	Total parental stress
Sex of neonate					
Male	2.43±.32	1.77±.65	3.22±0.41	2.05±.45	3.64±0.559
Female	2.49±.27	2.06±.66	3.24±0.42	1.90±.38	3.78±0.850
P	0.538	0.944	0.900	0.978	0.503
Birth weight					
≤1500 grams	2.53±.42	1.89±0.49	3.12±0.28	1.99±0.43	3.80±0.422
>1500 grams	2.45±0.26	1.91±0.70	3.26±0.43	1.98±0.43	3.68±0.756
P	0.584	0.935	0.220	0.972	0.517
Parent					
Father	2.51±0.24	2.05±0.69	3.22±0.30	1.95±0.47	3.65±0.813
Mother	2.43±0.33	1.81±0.64	3.24±0.47	2.00±0.40	3.74±0.631
P	0.332	0.211	0.819	0.717	0.670
Education of interviewee					
≤8 years	2.46±0.29	2.09±0.66	3.31±0.48	2.04±0.39	3.64±0.75
>8 years	2.46±0.31	1.72±0.62	3.16±0.32	1.93±0.46	3.77±0.65
P	0.976	0.045*	0.203	0.361	0.517
Employment of interviewee					
Employed	2.49±0.32	1.92±0.58	3.19±0.37	1.99±0.42	3.68±0.72
Unemployed	2.43±0.26	1.89±0.77	3.26±0.44	1.97±0.45	3.74±0.68
P	0.452	0.370	0.036*	0.812	0.761
Previous neonatal death					
Yes	2.67±0.26	1.42±0.82	3.25±0.42	1.88±0.41	3.00±0.81
No	2.44±0.29	1.95±0.64	3.05±0.10	1.99±0.43	3.77±0.66
P	0.184	0.292	0.022*	0.639	0.156
Gestational age					
Term	2.49±0.32	1.92±0.58	3.26±0.44	1.99±0.42	3.83±0.60
Preterm	2.43±0.26	1.89±0.77	3.19±0.37	1.97±0.45	3.55±0.80
P	0.464	0.869	0.502	0.904	0.175
Mode of delivery					
LSCS	2.41±0.38	1.76±0.74	3.20±0.51	1.79±0.44	3.79±0.80
Normal	2.48±0.26	1.96±0.63	3.24±0.37	2.06±0.40	3.68±0.66
P	0.524	0.374	0.751	0.062	0.653
Parity					
Primipara	2.51±0.25	1.77±0.67	3.24±0.49	2.02±0.43	3.65±0.74
Multipara	2.43±0.32	1.99±0.65	3.23±0.36	1.96±0.43	3.74±0.68
P	0.388	0.259	0.952	0.647	0.659

SD=Standard deviation, LSCS=Lower segment cesarean section

No significant differences were found between stress and birth weight of the new-born. This is in agreement with some studies that show that the level of stress is not necessarily associated with the severity of the new-born, but with other factors.<sup>[10,15,16]</sup>

Few authors opine that the psychological trauma of having a sick child is more related to the alteration in their parental role than to gestational age, birth weight, and even length of stay in the NICU.<sup>[10,17]</sup> However, in this study, stress in sight and sound domain was

significantly higher among parents of babies with stay of <7 days. Stress levels can therefore decrease with length of stay as parents gain a better understanding of the condition of their baby's health status and achieve a greater adjustment to the physical environment of NICU.

In this study, there was no association between total parental stress and gender of neonate, birth weight, gestational age, mode of delivery, parity, and previous neonate being hospitalized in NICU. A study by Chourasia *et al.* showed no statistical significance in three domains (infants' behavior, parental role alteration, sights, and sounds) in respect to education, but in the present study, education of the interview was influenced in behavior and appearance subscale.<sup>[18]</sup> Interview having <8 years of education have higher stress in behavior and appearance subscale. Lesser educated and uneducated parents' were found to have higher stress. This may be explained by the difficulty to understand the information provided to them and they were not oriented to the environment of the NICU. This emphasizes the need for specific NICU educational and counseling support. Provision of competent care in a calm and reassuring manner as well as clear communication and careful explanations may help in parental comprehension capability which may reduce parental anxiety. Interventions addressing NICU parent stress, depression, and anxiety not only improve parents' outcomes but infants' outcomes as well<sup>[19,20]</sup> Unemployed interview and previous neonatal death have higher stress in sight and sound subscale.

The results of the present study in terms of sight and sound subscale showed that "the sudden sound of the monitor buzzer and presence of monitors," respectively, were the most experienced stressor agents by parents with neonates in NICU. Among infant appearance and behavior, "tubes and equipment on my baby," "baby in pain" were stressors with maximum scores. Among infant appearance and behavior, "tubes and equipment on my baby," "baby in pain" were stressors with maximum scores. Thus, it is recommended that parents, particularly mothers with high-risk pregnancies be provided with some explanations before labor about the environment of the NICU. These explanations include the causes of devices alarms, rush of the staff, equipment and facilities of the unit, ventilators, intravenous tubes, and monitors. Previous studies shows that parental trauma in the NICU is less related to infant characteristics than it is to alterations in their parental role.<sup>[21]</sup> In the subscale relationship with baby and parental role, "not being able to care for baby myself," "being separated from baby" and "not feeding my baby" had maximum scores.

In the subscale staff behavior, "staff explaining things too fast" and "staffs looking worried" were the main stressors. This may be due to increased workload in the NICUs of tertiary care center in India the health personnel including doctors and nurses find less time to focus on parental stressors in the NICU environment and give appropriate counseling to alleviate their anxiety. On the other hand, the increased privacy of individual rooms might make mothers feel more comfortable when spending time with their infant and consequently reduce parental stress. Kangaroo mother care method is a cheap and convenient way to take better care of premature neonates.<sup>[22]</sup> Future research is necessary to establish that NICU design may influence parental stress levels.

### Limitation

It would be important to measure the level of stress at different times of the hospitalization to study eventual variations over time as well as to study the impact of the presence of different specific pathologies of the newborn baby on stress levels and the sample was a convenience sample and may not be representative of the population.

Another limitation of this study is that we did not analyze other factors that may influence parents' stress levels such as personality variables and social networks. These factors could be represented in the overall stress level score that is unrelated to the questions on the scale used.

### Conclusion

The overall stress score among parents was  $3.71 \pm 0.70$  which is moderately stressful and it is not significantly different in fathers and mothers. The length of stay was significantly associated with sight and sound domain. Thus, support and education to deal with stress of hospitalization as well as practices that promote bonding between parents and neonates should be delivered to all parents. Future intervention studies should be planned to decrease the stress level among parents. Identifying the aspects of the babies and the stressors for the parents may be useful in assisting health personnel in understanding their importance and in improving the quality of care.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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