



## Analysis Of Stress Level In Parents of Newborns Admitted In N.I.C.U

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### Abstract

**Introduction:** Bonding between mother and newborn is an important process that occurs during the neonatal period , which establishes the foundation for a lifelong relationship, Therefore, it becomes important to know & assess the factors leading to stress and anxiety in parents.

**Aim of the study:** To analyse the stress levels experienced by parents of newborn admitted in N.I.C.U.

**Material & methods** This study was a cross sectional observational study, conducted in parents of 256 neonates admitted in N.I.C.U .Stress levels in parents were assessed using Parental Stressor scale: N.I.C.U. This scale has 4 subscales with total 46 items. Parents were asked to rate these items on a 5- point Likert scale. Stress scores including highest and mean scores, in either of parents were calculated .Parents data were analysed using the SPSS-20 ,Independent t test ,M ANOVA test

**Result :** Maximum stress scores in either of the parents were affected by ,looking at the other sick babies in N.I.C.U. sudden noise of monitor alarms ,babies in pain , on ventilator breath, separated from mother, communication gaps with N.I.C.U. staff .Stress in mothers was significantly associated with gender , gestational age, education and mode of feeding, in newborn, however fathers belonging to Lower socio-economic class felt more stress ,other factors were not significant in them.

**Conclusion:** Stress levels is increased ,in parents of newborn ,who are admitted in N.I.C.U. Several factors such as behaviour and communication with staff ,equipment alarms ,sick babies contribute to this increased level of stress in parents.

**Keywords:** NEWBORN, STRESS, PSS:NICU (Parental stress scale Neonatal intensive care unit)

### Introduction

There may be multiple stress factors in parents of preterm and low birth babies, due to complexity of the NICU environment and condition of newborn. This Stress in the parents can be assessed using the ‘Parental NICU stress model’ which considers the following factors contributing to NICU environment stress factors, such as sounds and sights, appearance of newborn and behaviour, parental role alteration, staff behaviour , which have a direct influence on the parents’ stress response. Jeffcoate et al.<sup>1</sup> and Carter et al.<sup>2</sup> studied prematurity and postnatal depression in

parents. Leifer et al. <sup>3</sup>,found a higher rate of divorce in premature babies. Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU) is a common scale , for assessment of stress factors and has been utilized to measure the parental stress response and environmental stressors due to newborn admission in NICU. This study was therefore carried out to determine the stress level & factors associated with stress in parents of newborn admitted in N.I.C.U. of S.M.I.M.E.R. (Surat Municipal Institute of Medical Education & Research) Hospital, Surat ,

using Parental Stress Scale: Neonatal Intensive Care Unit.

**Material & Methods:** This is a hospital based cross sectional observational study . Ethical approval was obtained from Institutional Ethical Committee at S.M.I.M.E.R. Informed written consent was obtained from the parents of neonates ,who were delivered and remain admitted in NICU of SMIMER hospital, at least for seven days were included in the study . Parents of newborns not willing or giving consent and not understanding Hindi or Gujarati ,Orphans , medico-legal cases , newborn with congenital malformations were excluded from the study. Socio-economic status was determined by Modified Prasad classification for 2021<sup>4</sup>. Parental stresses were assessed using a questionnaire based on “Parental Stressor scale: Neonatal Intensive Care Unit”<sup>5</sup> originally in English language which, was translated and validated in Gujarati and Hindi languages, as majority of parents belong to these language groups. This questionnaire was used to measure parental stress on 8th day of admission. 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, 12 items. Participants were asked to rate each item, according to how stressful the situation described in each item was for them. The responses to the PSS:

NICU were scored on a 5- point Likert scale where 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”. Mean scores and standard deviation were obtained for each subscale and total scale separately for mothers and fathers and the overall stress scores was then calculated. Parental stress levels were classified according to the points on Likert scale as low (1-1.9), moderate (2-3.9) and high (4-5)

**Statistical Analysis :** Sample size was selected on basis of number of admissions in NICU according to annual statistics of department. The calculated sample size was a total of 256 neonates, which were included in the study. Data was collected, entered in MS-Excel database and subjected to statistical analysis ,using the SPSS-20 software. Descriptive statistics for intergroup comparison was used ,where qualitative data was depicted in percentage and quantitative data was depicted in MEAN and STANDARD DEVIATION. Independent t test was applied to observe significant difference between 2 independent groups of quantitative data. M ANOVA test was applied to find out association between demographic parameters and stress level of parents. p value of < 0.05 was considered significant. Confidence intervals was at 95% confidence limit.

**Parental Stressor scale: Neonatal Intensive Care Unit<sup>1</sup>**

Sr. No.	SIGHTS AND SOUNDS subscale
1.	The presence of monitors
2.	The constant noise of equipment
3.	The sudden noise of monitor alarms
4.	The other sick babies in the room
5.	The large number of people working in the unit
Sr. No.	Baby’s appearance and behaviour subscale

1.	Tubes and equipments on or near my baby
2.	Bruises and cuts on my baby
3.	Unusual colour of my baby
4.	Unusual breathing of my baby
5.	Seeing my baby suddenly change colour
6.	Seeing my baby stop breathing
7.	The small size of my baby
8.	The wrinkled appearance of my baby
9.	Having a ventilator breath for my baby
10.	Seeing needles and tubes put in my baby
11.	IV line in my baby
12.	When baby seemed to be in pain
13.	My baby crying for long periods
14.	When my baby looked afraid
15.	When baby looked sad
16.	Limp and weak appearance of my baby
17.	Jerky or restlessness movements of baby
18.	My baby not being able to cry like other babies
19.	Clapping on baby's chest for chest drainage
<b>Sr. No.</b>	<b>Parental role alterations subscale</b>
1.	Being separated from my baby
2.	Not feeding my baby myself
3.	Not being able to care for my baby myself
4.	Not being able to hold my baby when I want
5.	Sometimes forgetting what my baby looks like

6.	Not being able to share my baby with other family members
7.	Feeling helpless and unable to protect my baby from pain and painful procedures
8.	Being afraid of touching or holding my baby
9.	Feeling staff are closer to my baby than I am
10.	Feeling helpless about how to help my baby during this time
<b>Sr. No.</b>	<b>Staff behaviour and communication subscale</b>
1.	Staff explaining things too fast
2.	Staffs using words I don't understand
3.	Telling me different things about my baby's condition
4.	Not telling me enough about tests and treatments being done to my baby
5.	Not talking to me enough
6.	Too many different people talking to me
7.	Difficulty in getting information or help when I visit or telephone the unit
8.	Not feeling sure that I will be called about changes in my baby's condition
9.	Staff looking worried about my baby
10.	Staff acting as if they did not want parents around
11.	Staff acting as if they don't understand my baby's behavior or special needs
12.	How stressful has the experience of having your baby hospitalized been for you?

**Observations:** A total of 404 patients were enrolled for the study but 148 patients took Discharge against medical advice. Therefore analysis was carried out in 256 neonates. Out of these 256 parents, 91 were fathers and 165 mothers. Table -1 shows details of Age ,education good emotional support in family ,occupation of Mothers & Fathers.

**Table:1 Details of mother's age , education ,good emotional support and occupation**

Age Group (Years)	Mother (n=165)	Father ( n=91)

<19	11 (6.6%)	2 (2.1%)
20-29	139 (84.2%)	72(79.12%)
30-39	15 (9.09%)	17 (18.6%)
<b>Education</b>		
Primary school	20 (12.12 %)	04 (4.3 %)
High school	129 (78.18 %)	58 (63.7 %)
<b>Good Emotional Support in Family</b>		
Yes	138 (83.63 %)	85 (93.40 %)
No	27 (16.36 %)	6 (6.5%)
<b>Occupation</b>		
Unemployed	157 (95.15 %)	04 (4.3 %)
Unskilled worker	08 (4.8 %)	54 (59.34 %)
Skilled worker	00	33 (35.98 %)

Table-2. shows characteristics regarding newborn details such as Gender ,Mode of delivery, birth weight & gestational age.

**Table :2 Characteristics of Newborns**

Gender	Male	123 (48.05%)	N=256
	Female	133 (51.95%)	
Mode of delivery	Vaginal	156 (39.06%)	N = 256
	C – section	100 (60.94%)	
Birth weight	> 2.5kg	49 (19.14%)	N = 256
	1.5kg – 2.49 kg	80 (31.25%)	

	1kg – 1.49 kg	108 (42.19%)	
	< 1kg	19 (7.42%)	
Gestational age	Fullterm	77 (30.08%)	N = 256
	Preterm	179 (69.92%)	

**Table: 3 Most common Stress scores (Subscales) of Parent Stress scale in Mother & Father**

Sr. No.	<b>Stress Score of SIGHTS AND SOUNDS</b>			
	subscale of Parent Stress Scale – Neonatal Intensive Care Unit (PSS: NICU)			
	Item with Maximum Stress Score	Parent	Mean	S.D.
1	<b>The other Sick babies in the NICU</b>	Mother	<b>2.57</b>	0.60
2	<b>The sudden Noise of monitor alarms</b>	Father	<b>2.21</b>	1.43
	<b>Stress Score of Baby’s APPEARANCE and BEHAVIOURAL</b>			
	subscale of Parent Stress Scale – Neonatal Intensive Care Unit (PSS: NICU)			
	Item with Maximum Stress Score	Parent	Mean	S.D.
1	<b>When baby seemed to be in pain</b>	Mother	<b>3.30</b>	0.77
2	<b>Having a ventilator breath for my baby</b>	Father	<b>3.16</b>	1.50
	<b>Stress Score of PARENTAL ROLE ALTERATION</b>			
	subscale of Parent Stress Scale – Neonatal Intensive Care Unit (PSS: NICU)			
	Item with Maximum Stress Score	Parent	Mean	S.D.
1	<b>Being separated from my baby</b>	Mother	<b>4.81</b>	0.52
2	<b>Feeling helpless about how to help my baby during this time</b>	Father	<b>4.29</b>	1.00
	<b>Stress Score of staff BEHAVIOUR and COMMUNICATION</b>			
	subscale of Parent Stress Scale – Neonatal Intensive Care Unit (PSS: NICU)			
	Item with Maximum Stress Score	Parent	Mean	S.D.

1	Staff explaining things too fast	Mother	<b>1.96</b>	0.87
2	Difficulty in getting information or help when I visit the unit	Father	<b>1.82</b>	1.26

Table-3 shows maximum stress scores observed in mother and father in different subscales of Parent Stress Scale –Neonatal Intensive Care Unit ( PSS-NICU)

**Table:4 Comparison of overall stress score of fathers and Mothers across subscale and Total scale**

Subscale	Overall Stress Score (MS)±SD	
	Mother	Father
Sights and Sounds	2.16±0.76	1.94±1.24
Baby looks and Behave	3.02±0.8	2.35±1.4
Relationship with baby and parenteral role	<b>3.67±0.85</b>	<b>3.19±1.43</b>
Staff Behaviour and Communication	1.68±0.90	1.41±0.92
Total Scale	2.63±0.8	2.22±1.24

Highest stress scores in both mothers and fathers were found on item “ Relationship with baby and Parenteral role” Subscale ( Table-4)

**Table: 5 Maternal stress levels in relation to demographic parameters**

Characteristic	Groups	Mean subscale stress score (SD)				P value
		Sights and sounds	Looks and behaviour	Parental role	Staff behaviour	
Gender	Male	10.42(2.12)	56.69(7.05)	36.33(4.53)	16.41(3.49)	<b>0.002</b>
	Female	11.13(3.05)	58.09(9.35)	37.03(5.25)	20.33(7.65)	
Gestational age	Full term	10.53(1.93)	51.58(6.71)	34.53(5.98)	18.02(4.69)	<b>0.000</b>
	Preterm	10.88(2.88)	59.36(7.96)	37.41(4.31)	18.62(6.82)	
Parents age	<19 years	15.90(1.70)	74.18(10.84)	43.45(3.41)	31.81(13.24)	<b>0.00</b>
	20-29 years	10.16(2.09)	55.38(6.07)	35.76(4.15)	17.25(4.08)	
	30-39	12.93(3.05)	64.06(7.84)	40.40(6.81)	20.06(5.00)	

	years					
Education	Primary School	13.35(2.87)	63.25(13.63)	40.10(8.29)	28.55(10.72)	<b>0.000</b>
	High school	10.52(2.54)	56.61(6.94)	36.32(4.0)	17.24(3.91)	
	Above high school	9.81(1.42)	56.75(8.12)	35.50(4.81)	15.87(2.98)	
Socio economic class	lower (<1166)	14.05(3.63)	67.22(12.74)	41.66(5.33)	22.88(12.10)	0.15
	lower middle class (1166-2253)	10.65(2.15)	55.65(5.98)	36.02(4.64)	18.32(4.97)	
	middle class (2253-3808)	10.10(2.44)	57.20(5.05)	36.29(4.06)	17.85(5.64)	
	upper middle class (3808-7769)	10.00(1.54)	51.12(8.04)	33.87(4.33)	15.87(3.44)	
	upper class (7770 and above)	10.62(2.97)	66.00(9.91)	40.00(4.34)	19.00(4.34)	
Gravida	Primi	11.22(3.02)	57.62(6.07)	37.33(4.53)	20.44(3.49)	<b>0.001</b>
	Multi	10.72(2.19)	56.07(9.35)	36.03(5.25)	18.31(7.65)	
Mode of feeding	Direct BF	9.53(2.93)	59.58(7.51)	36.23(5.98)	19.04(4.69)	<b>0.004</b>
	Expressed breast milk (EBM)	11.48(1.88)	57.36(6.16)	35.88(4.31)	17.72(6.82)	



Language	Hindi	10.62(2.02)	54.22(7.17)	34.33(5.53)	19.34(4.49)	0.211
	Gujarati	11.52(3.19)	55.27(8.25)	35.03(4.23)	17.51(6.65)	

As depicted in Table -5, In mothers, gender of neonate ,increasing age of mother, preterm babies , level of education , parity of mother and expressed breast milk to newborn were significantly associated with higher stress levels .However , no significant association was found between socioeconomic class and level of stress of mothers.

**Table :6. Father stress level in relation to demographic parameters.**

Characteristic	Groups	Mean subscale stress score (SD)				P value
		Sights and sounds	Looks and behavior	Parental role	Staff behavior	
Gender	Male	8.25(4.09)	38.69(21.98)	29.53(12.08)	13.16(6.1)	0.140
	Female	11.08(6.03)	50.06(24.26)	34.16(12.55)	17.70(11.1)	
Gestational age	Full term	10.36(5.15)	49.13(24.75)	33.50(12.93)	15.45(8.18)	0.357
	Preterm	9.55(5.46)	43.2(23.46)	31.49(12.39)	15.59(9.76)	
Parents age	<19 years	14.50(7.73)	58.50(29.56)	35.16(16.14)	24.83(15.18)	0.231
	20-29 years	9.53(5.15)	44.56(23.24)	32.19(12.05)	15.12(8.87)	
	30-39 years	8.00(3.91)	34.28(22.35)	26.85(14.63)	12.42(3.35)	
Education	Primary	11.27(7.05)	44.18(27.45)	29.36(14.37)	18.81(12.79)	0.365
	High school	9.38(5.02)	44.09(22.86)	32.22(11.90)	14.84(8.71)	
	Above high school	10.77(6.03)	50.00(28.43)	33.22(15.61)	17.22(9.75)	
Socio-economic class	lower (< Rs.1166)	8.70(5.63)	33.80(21.22)	25.70(13.40)	12.90(4.01)	<b>0.04</b>
	lower middle class(Rs.1166-2253)	8.42(4.40)	40.16(21.89)	30.09(11.79)	13.40(6.62)	

	middle class (Rs.2253-3808)	11.92(6.03)	55.00(23.61)	37.0(11.28)	20.15(13.06)	
	upper middle class (Rs.3808-7769)	10.11(4.93)	48.33(27.25)	32.22(13.90)	13.88(4.10)	
	upper class(Rs.≥ 7770)	11.25(8.01)	44.25(28.08)	34.25(15.98)	18.75(14.84)	
Language	Hindi	8.11(4.59)	39.59(22.38)	28.43(11.07)	14.15(5.33)	0.22
	Gujarati	10.88(5.03)	51.26(23.46)	33.19(13.53)	16.71(12.21)	

As depicted in Table-6, lower socioeconomic status was associated with higher levels of stress as compared to upper socioeconomic class, whereas no significant correlation with stress was found in other parameters.

### Discussion:

Parenteral stress remains unmeasured and neglected area in N.I.C.U. It becomes very important for the staff and doctors in N.I.C.U. to identify and understand factors leading to stress in parents, so that appropriate interventional protocols may be developed to reduce or alleviate stress. In this study, most common reason for mother being in stress in the present study was, “being separated from her baby” out of all 10 items of subscale titled as “Relationship with baby and parental role alteration” (Table-4), whereas “feeling of helplessness when baby was admitted in N.I.C.U.” was most stressful for father. As mother and baby have more emotional bonding, “separation of baby” may be the major factor for stress in mothers. Father being head of the family may have attitude of protective responsibility towards family, hence, this may be a factor for stress in father. The second common cause of stress for parents in this study was under subscale “how the baby looked and behaved”.(Table-4) Mothers were most stressed “when baby seemed to be in pain” whereas fathers were most stressed about having “ventilators breathe for their baby”. Other items like “bruises and

cuts on the baby” were also scored high by both the parents. On Sights and sound subscale, the “sudden noises of monitor alarms” was reported as causing the highest level of stress for fathers (Table -4). This may be due to the common human tendency for a non health person, which may induce stress by looking at monitors and other instrumental alarms used in N.I.C.U environment, which may indicate gravity of the situation and that may be the reason for high level of stress in fathers under this subscale. In case of mother, the highest level of stress under subscale of “Sights and Sound” (Table-4) was “looking at other sick babies in N.I.C.U.” The least stressful area for both mothers and fathers was regarding “staff behaviour and communication” under this subscale(Table-4). Mothers experienced stress for item “staff explaining things too fast”. This may be due to communication gap between them and NICU staff. There may also be time constraints and other work burden of N.I.C.U. due to which the staff may have difficulty in giving instructions, explaining about condition of newborn to mother. In addition, mother education might also play some role. In this specified area, fathers faced difficulty in “getting information or help, when they visited NICU” for

their babies. The difficulties they faced may also be because of busy schedule, time constraints or interaction of fathers with junior inexperienced staff and at some times non availability of staff at that time. Overall, the stress levels of mothers were much higher than the stress level of fathers. Moreover, mothers had significantly higher stress scores for each subscale and the total scale compared to fathers ( $p=0.002$ ) (Table -5). In the present study, characteristics like gender, gestational age, education level of parent and parents age did not affect significantly on the stress levels in father. Whereas socioeconomic class to which father belonged had a significant impact on the stress level of father ( $p=0.04$ ) (Table-6), as most of the fathers were the sole earning members in family and working on daily wages. In mothers, socioeconomic class did not have significant impact on her stress levels as most of the mothers in the study were household working women. Characteristics like gender of baby especially male child had a significant impact on stress levels of mother. Since India is a developing country, where traditionally, still there is gender discrimination between male and female, males are given preference for love, care and support as compared to female, which is indicated by  $p=0.002$  (Table -5). Characteristics like gestational age (maturity of the neonate) and education level also played a significant role in contributing to the stress levels experienced by mothers. When mother was explained about prematurity, risks and complications ,it induced more stress as indicated by ( $p=0.000$ ), It was also seen that ,as the age of mother increases, the level of stress also increases.( $p=0.000$ ) Table-5. This may be due to maturity and responsibility, which comes with increasing age of mother. Primi gravida mothers experienced higher levels of stress, as compared to multi gravida mothers, apprehension and anxiety may be more in primi mothers as compared to multipara experienced mothers with several siblings. Mothers, who were directly breastfeeding ,experienced lesser stress as compared to those ,who gave expressed breast milk or through spoon or feeding tube. This suggests that direct breastfeeding is most beneficial in relieving stress in mothers. We could find few studies for comparison ,however all parameters and inclusion /criteria did not match exactly to our study. On comparing subscale of parental stress scale, factors such as “baby looks and

behavior, relationship with baby and parental role alteration , staff behavior and communication” played a significant role in stress level of either of the parents ( $p=0.000$ ,  $p=0.001$ ,  $p=0.024$  respectively) which is similar to finding of study of Agarwal R<sup>6</sup> ( $p<0.001$  for all factors) study. Gestational age, parents age and mode of feeding played a significant role as inducers of stress in mothers in our study and Chaurasia et al<sup>7</sup> study. Miles et al<sup>8</sup> ,who identified the most stressful aspect of the NICU for 122 parents to be an alteration in the parent infant relationship and the infant’s appearance. The sights and sounds of the NICU caused lesser stress, and few parents reported stress due to staff communication and behavior in their study. Overall, stress levels in mothers of N.I.C.U admitted babies were higher than stress levels of fathers, this was also the findings in studies of, Shields PD<sup>9</sup>, Miles et al<sup>10</sup> , Perehudoff B<sup>11</sup>, Jeffcoate, J<sup>1</sup>.

**Conclusion:** Those Newborns admitted in N.I.C.U. their parents experienced increased level of stress, due to sudden instrumental alarms, communication gape with staff ,separation of newborn from mother, newborn on ventilators and in pain. Proper counseling good communication ,providing precise and adequate information about the status of newborn babies to their parents , behavioral changes of N.I.C.U. staff may help in alleviation of stress levels in parents.

**Limitations :** Stress levels were assessed only at single point of time that is on the eighth day. Stress levels could not be assessed simultaneously, at the same time ,in both mother and father ,due to their personal issues and job work.

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