

A Descriptive Study on Stress Levels in Mothers of admitted Neonates in NICU in a Tertiary Care Centre, JaipurNikita Pal¹, Kaushal Singh Baghel², Trapta Goyal³, Abhishek Kumar Sharma⁴, Rajveer Singh Yadav⁵, Gunjan Agarwal⁶¹Assistant Professor, Department of Paediatrics, Mahatma Gandhi University of Medical Sciences and Technology, Jaipur, Rajasthan, India²Assistant Professor, Department of Anaesthesia, Mahatma Gandhi University of Medical Sciences and Technology, Jaipur, Rajasthan, India.³Assistant Professor, Department of Paediatrics, Mahatma Gandhi University of Medical Sciences and Technology, Jaipur, Rajasthan, India⁴Associate Professor, Department of Paediatrics, Mahatma Gandhi University of Medical Sciences and Technology, Jaipur, Rajasthan, India.⁵Associate Professor, Department of Paediatrics, Mahatma Gandhi University of Medical Sciences and Technology, Jaipur, Rajasthan, India.⁶Senior Resident, Department of Paediatrics, Mahatma Gandhi University of Medical Sciences and Technology, Jaipur, Rajasthan, India

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Conflict of interest: Nil

Abstract**Background:** Hospitalization of a neonate is quite stressful for parents specially mothers.**Aims & Objectives:** To assess the stress levels in mothers of admitted newborn in NICU and to identify demographical and obstetric profile of mother and clinical profile of newborn that affects the stress level.**Methodology:** This cross-sectional study was carried out between September 2022 and August 2023 in a tertiary care hospital. A validated scale, The Parental Stressor Scale (PSS): NICU questionnaire was used to measure the stress among 125 mothers of admitted newborns. The stress scores were quantified using Likert scale.**Results:** The mean stress scores for the subscales sight and sounds of unit, looks and behaviour, parental role alteration and staff behaviour and communication were 1.98±0.766, 2.99±0.577, 2.94±1.011, 1.40±0.562 respectively. Stress was significantly higher in mothers who were younger, illiterate, primigravida, had LSCS, with previous NICU exposure and those with pregnancy complications. Mothers of newborn admitted within 24 hours of birth, with lower gestational ages, female gender, lesser birth weights, those requiring oxygen and ventilator support have higher stress scores.**Conclusions:** NICU mothers are under moderate stress and an appropriate interventional programme targeted towards specific stressors is required to alleviate their stress.**Keywords:** Stress, Newborn, Neonatal intensive Care Unit, PSS: NICU, Stressors.This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

Neonatal Intensive Care Unit (NICU) environment has the potential to exacerbate stress for parents specially mothers of newborn admitted to the unit, making it imperative for health care providers to identify and act on the sources of their stress. The Parent-Infant bonding process that occurs during the newborn period set up the basis for a long-life relationship. This typical process does not occur when the infant spends the first few days or weeks in the NICU [1, 2]. The admission of a neonate in the NICU is usually stressful for them and all the other family members.[3,4,5,6,7] They experience multiple stressors related to preterm

birth, medical condition of baby, prolonged hospitalization, alteration in parenting, exposure to a technical environment, and the appearance of their small fragile infant, in addition to stressors associated with the normal transition process to parent-hood.[1,3,4,5,8] Neonatal units are often loaded with loud sounds, unpleasant sight and procedures, and multitude of health care professionals.[9] Environmental aspects that can influence the parent's distinctive response to having an infant in the NICU might include issues fulfilling their parental role, the medical equipment used for intervention, and the communication

patterns and conduct of the staff. All these factors result in the parents having a unique perception of their infant's situation, status and condition. [1,4,5] The stressful nature of the NICU environment is well reported in west ward literature. However, there are not many studies appraising the stress level in mothers of babies admitted in NICU in Tertiary care in resource poor milieu including India.[1,4,5,8] Recognizing aspects of the babies, mothers and the environment that can lead to stress may be beneficial in assisting health personnel in understanding their importance and in improvising their ability to meet the necessity of their babies and to develop the skills required for fulfilling their role. There is a long felt need to change from the current approach to provide better educational and emotional support to NICU mothers. Hence this study was planned to assess the stress levels in mothers using Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU) and to recognize various stressors related to NICU, maternal and neonatal conditions. [10]

Aims and Objectives

Aims: A study on Stress levels in mothers of admitted neonates in NICU.

Objectives:

1. To assess the stress levels in mothers of admitted neonates in NICU using Parental stressor scale: Neonatal intensive care unit (PSS: NICU).
2. To find the association between maternal stress scores with the maternal demographic and obstetric profile.
3. To find the association of maternal stress scores with demographic and clinical profile of neonates.

Materials and Methods

This hospital based cross- sectional study was conducted in a tertiary care centre in Jaipur, India from 1st September 2022 to august 2023 after receiving approval from Institute of Ethical Committee. All mothers who gave written and informed consent were recruited for the study. Only those mothers whose newborns were admitted for >72 hours in NICU during the study period were included irrespective of the birth weight and gestational age. Babies who died or discharged within 72 hours of admission and those with lethal congenital anomalies were excluded. Mothers who were not available in hospital or those with psychiatric or neurological problems were also

excluded. The sample size was 125, calculated as 10% of the total annual admission in NICU (based on the last year's annual statistics of the department). After recruitment, demographic details of mothers like age, education, occupation etc and maternal history, hospitalization details of babies like gestation, age, date of birth, order, sex etc and anthropometric measurements like birth weight, length and head circumference were taken and entered in proforma. We assessed stress levels of mothers at the time of recruitment using PSS: NICU scale. The PSS: NICU questionnaire had validated for measuring parental perception of the stresses they face in the NICU. The scale consists of 4 subscales that assess the stress in relation to the following- (a) the sights and sounds of the unit, (b) the baby's appearance and behaviour, (c) the effect on parent's role and relationship with the baby, and (d) parent's interaction and communication with the staff. The responses of PSS:NICU were scored on a 5-point Likert scale from 0 to 5 where 0 represents "no experience at all with the scenario or phenomena", 1 representing "not at all stressful", 2 for "mild stress", 3 indicates "fairly moderate stress", 4 means "very stressful", 5 for "extreme/ severe stress". Higher scores indicate more stress. Stress level was classified according to points on Likert scale as Low (1-1.9), Moderate (2-3.9), and High (4-5).¹¹

Statistical Analysis: - The data was compiled using Microsoft Excel and analysed using IBM SPSS software version 20. Categorical data were expressed as Proportions, whereas Numerical data were expressed as Mean and Standard deviation.

Result

A total 125 mothers enrolled for study. The profile of 125 mothers: mean age was 23.66±2.86 and 53.6% were 21-25 years. About 62.4% mothers were rural area and 64.8% were house wife. A total 16.8% were illiterate and 55.2% primigravida. 62.4% delivered by normal delivery, 61.6% reported pregnancy complications and only 24.8% had previous NICU experience. The profile of 125 neonates was 58.4% were males, 41.6% were female and 65.6% were less than 24 hours. Only 2.4% neonates were less than 1 kg, 52.8% neonate weight were 1.5-2.49kg and 42.4% neonates were 32-34 weeks of gestational age. Indications of admission in NICU, 40% neonates were prematurity and respiratory distress followed by birth asphyxia and NNJ 19.2% of each.

Table 1: Maternal stress levels using PSS: NICU

PSS:NICU	Stress score (N=125)	
	Mean	SD
Sight And Sounds	1.98	0.766
Looks And Behavior	2.99	0.577
Parenteral Role Alteration	2.94	1.01
Staff Behavior and Communication	1.40	0.562

Table 1 showed that stress scores, mean of sight, sound was 1.98 ± 0.766 , looks, and behaviour was 2.99 ± 0.577 . Parent's role alteration mean was 2.94 ± 1.01 , Staff behaviour and communication mean was 1.40 ± 0.562 . The highest mean stress scores were found in Looks and behaviour of baby, followed by parental role alteration and least mean stress score noted in staff behaviour and communication.

Table 2: Association of maternal stress score with demographic profile

Maternal demography		Stress score		P value
		Mean	SD	
Age(years)	18-20	2.34	0.99	<0.001
	21-25	2.3	0.76	
	26-30	2.25	0.97	
	>30	2.1	0.91	
Residence	Rural	2.29	0.73	0.005
	Urban	2.33	0.81	
Education	Illiterate	2.4	0.77	<0.001
	Primary	2.27	0.77	
	High	2.43	0.82	
	Graduate	2.07	0.76	
Occupation	Housewife	2.33	0.82	0.004
	Working	2.3	0.66	

Table 2 showed that mean stress score 2.34 ± 0.99 , higher among 18-20 age group of mothers, stress level slightly higher in urban 2.33 ± 0.81 compare to rural 2.29 ± 0.73 . In house wife stress level was 2.33 ± 0.82 and more stress score found in illiterate 2.4 ± 0.77 and high class educated mothers 2.43 ± 0.82 . There was significant p value (<0.05) in all demographic profile.

Table 3: Association of maternal stress score with obstetric profile of mothers

Maternal factors		stress score		P Value
		Mean	SD	
Type of delivery	Vaginal	2.25	0.60	<0.05
	LSCS	2.36	0.71	
Gravida	Primi	2.38	0.86	<0.05
	Multi	2.26	0.70	
Previous NICU experience	Yes	2.62	1.03	<0.05
	No	2.42	0.99	
Pregnancy complications	Yes	2.48	0.98	<0.05
	No	2.32	0.99	

Table 3 showed that mean stress score was higher in LSCS mothers (2.36 ± 0.71) as compare to normal delivery mothers. In primigravida, mothers mean stress score was (2.38 ± 0.86). Stress score was also higher in previous NICU Experience mothers 2.62 ± 1.03 and pregnancy complications mothers 2.48 ± 0.98 . There was significant p value (<0.05) in all demographic profile.

Table 4: Association of maternal stress score with neonatal demography

Neonatal demography		Mean	SD
Age	<24 hrs	2.34	1.19
	25-72 hrs	2.18	1.11
	>72 hrs	2.25	1.14
Gender	Male	2.19	1.33
	Female	2.29	1.48
Birth weight	<1	2.46	1.25
	1-1.5	1.44	1.16

	1.5-2.5	1.20	1.1
	>2.5	2.04	1.12
Gestational age	<32	2.48	1.15
	33-36	2.29	1.11
	≥37	2.09	1.13
Oxygen support	Yes	2.27	1.12
	No	2.12	1.17
Ventilator support	Yes	2.47	1.15
	No	2.15	1.12

Table 4 showed that various neonatal factors affecting stress score in mother. Mean stress score was higher in mothers of newborn admitted within 24 hours of birth (2.34 ± 1.19) and birth weight $<1\text{kg}$ (2.46 ± 1.25). Similarly, mean stress score was higher in mother of neonates with gestational age <32 weeks (2.48 ± 1.15) and those on Oxygen support (2.27 ± 1.12) and ventilator support (2.47 ± 1.15).

Discussion

Parents, especially mother of neonates admitted to the NICU undergo a great deal of stress and are influenced by several conditions including the baby's appearance and level of functioning, severity of their baby's diagnosis and duration of length of stay in NICU. Environmental factors that can affect the mother's unique reaction to having a neonate in the NICU might include difficulty fulfilling their parental role, the medical equipment used for intervention and the communication patterns and behaviours of the staff. Variable factors of mothers are such as maternal age, education, occupation, pregnancy complications. Various factors of neonates related to birth weight, gestational age of neonates, gender, and technical support are also affecting stress levels in mothers. It is very crucial for doctors and NICU staff to identify specific stressor among NICU mothers and develop appropriate intervention protocols that can reduce their stress levels. Therefore, the present study was conducted to assess the maternal stress levels and identify various stressors.

PSS: NICU scale was used to assess the stress levels among mothers. This study showed that, mean stress scores of sight and sound was 1.98 ± 0.766 , looks and behaviour was 2.99 ± 0.577 , parental role alteration mean was 2.94 ± 1.01 , Staff behaviour and communication mean was 1.40 ± 0.562 . Thus, highest mean stress score was found in Looks and behaviour. A similar study conducted by Varma R et al (2019)⁶ also found similar results, mean of sights and sounds was 1.98 ± 0.83 , mean of looks and behaviour was 1.45 ± 0.45 , mean of parental role alteration was 1.76 ± 0.54 , mean of staff behaviour and communication was 1.03 ± 0.12 . Another study was conducted by Ashwani N et al (2017)⁸ showed that mean of sights and sounds was 1.75 ± 0.317 , mean of looks and behaviour was 2.11 ± 0.146 , mean of parental role alteration was 2.48 ± 0.486 , mean of staff behaviour and communication was 1.47 ± 0.72 .

Agrawal R et al (2016)¹ also conducted a study, in which mean of sights and sounds was 2.04 ± 0.438 , mean of looks and behaviour was 3.23 ± 0.555 , mean of parental role alteration was 3.74 ± 0.637 , mean of staff behaviour and communication was 1.92 ± 0.281 . A similar study was conducted by Chourasia et al (2013)⁴, showed that mean of sights and sounds was 2.55 ± 0.631 , mean of looks and behaviour was 4.10 ± 0.583 , mean of parental role alteration was 4.12 ± 0.626 . All the above studies had similar results of higher stress scores in the subscales parental role alteration and looks & behaviour and lowest in staff behaviour & communication.

Maternal factors affecting stress level: - In our study of 125 mothers, mean stress score was highest among age group 18-20 [2.34 ± 0.99] and stress level slightly higher in urban 2.33 ± 0.81 compare to rural mothers and house wives. Stress level was significantly higher among illiterate and high educated mothers 2.43 ± 0.83 . Stress score was also higher in LSCS 2.36 ± 0.71 and primigravida mother 2.38 ± 0.86 . There was significant p value (<0.05) in all demographic profile. A similar study was conducted by Varma et al (2019)⁶, showed that mean of stress levels was among age group >26 years 1.65 ± 0.49 , high educated mothers 1.96 ± 0.48 , primigravida mother 1.63 ± 0.48 , LSCS delivered mothers 1.69 ± 0.53 and in which pregnancy complications (1.73 ± 0.63). Ashwani et al (2017)⁸ reported that illiterate mothers and <25 years age had higher stress levels. A study was conducted by E Palma I et al (2017)⁷, also reported that higher stress was noted among mother who delivered by LSCS.

Neonatal factors affecting maternal stress level: - Various neonatal factors also affect stress level in mother. Mean stress score was higher in mothers of neonates admitted within age 24 hours of life (2.34 ± 1.19) and birth weight $<1\text{kg}$ (2.46 ± 1.25). Similarly mean stress score was higher in mother of neonates gestational age <32 weeks (2.48 ± 1.15).

Mean stress score higher in mother of neonates on Oxygen support 2.27 ± 1.12 and ventilator support 2.47 ± 1.15 . A similar study conducted by Varma et al (2019)⁶, mean stress score was higher in mother of female gender 1.69 ± 0.44 , premature neonates 1.63 ± 0.47 , weight $< 1\text{kg}$ 1.60 ± 0.50 of newborn and on ventilator support 2.17 ± 0.51 neonates. Vargese M et al (2014),¹⁵ reported that factors such birth weight and gestation age influenced the stress levels to a significant degree and other factors also affect like gender of neonate, presence of birth asphyxia, ventilation status.

Strength and Limitations: The strength of this study was that the neonates sampled were representative of diverse range admitted to NICU. Mothers were not excluded by way of their neonate's gestational age, birth weight or type of medical conditions. The limitation of study was that the sample was a convenience sample and might not be representatives of the population and variation in the time of administration of the PSS: NICU.

Conclusions

Mothers of all the neonates admitted in NICU are under moderate degree of stress. After identifying various stressors causing stress, appropriate intervention programmes including counselling sessions for mothers should be made to alleviate their anxiety and reduce stress. Efforts should be made to improve mother- infant bond even when the baby is inside NICU.

Recommendations:

1. Assess the level of stress among mothers of neonates admitted in NICU.
2. Counselling mothers regarding nature of neonatal disease and explaining prognosis can reduce their stress significantly.
3. Appropriate counselling guidelines for mothers should be made by the institute.
4. Providing a professional group of facilitator and focussing support on elements of the parental role and relationship with baby.

Ethical Approval: Ethical Committee of Mahatma Gandhi Medical College, Jaipur, and Rajasthan, India approved this study.

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