Section: Paediatrics

Original Research Article

A PROSPECTIVE OBSERVATIONAL STUDY TO EVALUATE PARENTAL STRESS LEVEL IN NEONATAL INTENSIVE CARE UNIT IN TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Stress is a natural human response that helps to address challenges and threats. Neonatal Intensive Care Units and this critical environment has been identified as an important stressor for the parents. The aim of the study is to assess the stress level among parents of newborn admitted in Neonatal intensive care unit at a tertiary institute.

Materials and Methods: A Prospective observational study was conducted in Neonatal intensive care unit, Department of Pediatrics; PSG IMS&R. The study was done among the Parents of neonates admitted in neonatal intensive care unit. Based on inclusion and exclusion criteria the final sample size obtained was 164. Demographic details were filled by the parents following which they were provided with the self administered questionnaire. PSS Neonatal care intensive unit questionnaire was used to assess the stress. The collected data was entered in MS excel and statistics was performed using SPSS 16. P value <0.05 was found to be statistically significant.

Results: In our study 117(71.3%) of parents are in the age range of 20-30. In our study, 57.3 % of the neonate were born as pre term. 95.2% of the parents did not have previous Neonatal Intensive Care Unit exposure. The level of stress in mother is more than father, stress was found more in less than 20years of age and is statistically significant p<0.0001. The parents whose neonate is admitted in Level 3 NICU were more stressed but there is no statistically significant difference. Gender and occupation alone had a significant difference in the stress levels in all levels of subscales.

Conclusion: Our study concluded that that mothers were more stressed than fathers. It reflects in all subscales. Parents of preterm neonate were more stressed than term neonate which is in accordance with previous studies. Other demographic parameters like gravida, number of neonates, mode of delivery, previous Neonatal Intensive Care Unit exposure and socioeconomic status do not have significant association with level of stress.

Keywords: Stress, Neonatal Intensive care unit, Neonates, gravida.

INTRODUCTION

Any internal or external factor that triggers a biological response is referred to as stress.[1] In the modern world all of us experience stress at least once in our lifetime. Stress can be defined as a state of mental tension or worry caused by a difficult situation. It is a natural human response that helps to address challenges and threats. Stress can have profound negative impacts on individuals, relationships, and society as a whole. One challenging scenario involves neonates receiving care in an intensive care unit. With advancements in technology, even the smallest and most critically ill neonates are being treated and saved in sophisticated Neonatal Intensive Care Units and this critical environment has been identified as an important stressor for the parents.[2,3]

Especially for mothers, who themselves are recovering from their postpartum period, this adds an additional physical and mental stress. Studies have found both the mothers and fathers of newborn admitted in the Neonatal Intensive Care Unit, have increased propensity for stress.[4,5]

Intensive care is warranted for approximately ten percent of newborn. The reasons for hospitalization varies from infection, respiratory distress, and perinatal hypoxic insult.[6] The factors contributing to stress in Newborn unit can be many including the Neonatal Intensive Care Unit environment, neonate behavior, parental role alteration and staff communication.[7]

A vicious cycle is set and the interpersonal relationship between parents and medical professionals become sour. Moreover, parents are often also distressed about the future health and development of their neonate, developmental disabilities, and their neonate's future.[8] According to WHO preterm birth is a worldwide challenge. It is estimated that 11.1.% neonate born prematurely worldwide and prematurity is a leading cause of death in a neonate.[9] The death rate in neonatal period is 18 per 1000 live birth globally and it is 20 per 1000 live birth according to 2020 sample registration system data in India.

Complex medical language and technology used by the Neonatal Intensive Care Unit neonatologists, nurses, and staff can also be confusing and hard to understand, causing frustration and stress in parents.[8,10]

The separation of neonate, the difficulties the neonate is undergoing and the uncertainty of survival of the neonate altogether causes lot of stress in parents. The intensive care unit is a bustling and daunting environment filled with seriously ill newborn sophisticated medical equipment, glaring light and loud monitors. At first parents feel extremely worked up, often edging towards shock, but tends to decrease over following days. Admission of their newborn can bring out strong response in parents, blending concern and anxiety thoughts of helplessness, hopelessness. When their newborn is very sick, parents may also experience profound shock, as they are not the primary caregivers.[11]

Miles and Carter (1983) et al. propose that parents responses are influenced by the interplay of multiple variables in a situation, characteristics of an individual, and stressors in environment.[12]

Elements associated with the sick neonate such as sudden hospitalization, severity of disease, and uncertainty of outcome can be described as situational stressors. They start to contemplate past events to the current disease which increases their stress. Such factors may include family stressors, such as perceived parental role upheaval, literacy, other stressful life events.

When we break them down to physical, psychosocial stressors they include constant beeping monitors, seeing their newborn amongst an atmosphere of tension and perception of efficiency of healthcare team is but a few environmental stressors.

Disruption of the parental role causes intense distress according to Ryan- Wengeret al.[13] In neutral situations, parents create an exclusive space for their neowborn that involves feeding, holding and caring for the newborn. Parents are unable to perform this pivotal role.

Parents are susceptible to post traumatic stress disorder after their newborn gets hospitalized according to Baluffi et al.[14,15] According to Colville and Gracey et al., nearly fifty three percent of parents were found to have adverse mental health impact even eight months post homecoming of their newborn.[16] The adverse mental health impact affects the entire household.

This study intends to assess the degree of stress in parents of neonates who are hospitalized and determine its causal factors. The findings will enable to deploy instruments, support systems for decreasing parental stress and negative impact it can have on them and newborn.

Different scales have been developed for the evaluation of parental stress among them Parental Stressor Scale: Neonatal Intensive Care Unit is comprehensive, validated and the most common instrument to evaluate NICU stress.[17,18] Often the different subset of stressors may have different impact.[19]

The Parental Stressor Scale: Neonatal Intensive Care Unit includes four dimensions: neonate behavior and appearance (IBA), parental role alteration (PRA), sights and sounds (SS), and staff behavior and communication (SBC).19This study aims to identify parents stress using PSS: NICU As per the meta analysis done by Camilla Caporali et al., it was found that in terms of PSS: Neonatal Intensive Care Unit scores, the mothers reported significantly higher scores for the Global PSS: Neonatal Intensive Care Unit score.[20] In a study done by Manish Dwivedi involving sixty one participants were recruited and evaluated the effect of communication on the stress level.[21] They found effective counseling reduced PSS Neonatal Intensive Care Unit score.

AIM: To assess the stress level among parents of newborn admitted in Neonatal intensive care unit at a tertiary institute.

MATERIALS AND METHODS

Type of study: Prospective observational study

Place of study: Neonatal intensive care unit, Department of Pediatrics; PSG IMS&R

Study Population: Parents of neonates admitted in neonatal intensive care unit

Inclusion Criteria

- Parents who had completed 48 hours after the first visit to the Neonatal Intensive Care Unit
- Parents who are willing to participate.
- Participants must have a minimum age of eighteen years or older and able to read, speak,

and understand English in order to sign the consent form and for filling the self administered questionnaire

Exclusion Criteria

- Participants with past or ongoing mental health challenges
- Participants who are not physically present in the Neonatal Intensive Care Unit during the entire stay of the newborn
- Those who have not completed 48 hours after their first visit. Candidates whose neonate died after taking consent.

Study Period: January to June 2024

Sample size: 164 parents

In a study done in Gujarat by Varma JR et al., it was found that 12% of mothers had moderate to severe anxiety symptoms.22In a study done in Portland by Helen Cyr- Alves et al., it was found that 12% of fathers had high stress level at the time of admission.23. Computing this the sample size was calculated in Open Epi and found to be 164 individuals Sample size calculated using the formula N=Z x 2PQ/d2 Where N is the required sample size

P= Reported prevalence Q=1-P

Z = the value of Z at 95% confidence interval d= allowable level of error(5%)

N= (1.96)2 x0.12x0.88 0.05x0.05

N=164

Sampling Method: Convenient sampling method was used for selecting samples. IEC: The research proposal was submitted to Institutional Ethical Committee of PSGIMSR, study was initiated only after IEC approval.

Data Collection: Study participants were the parents of the newborn admitted in NICU and who stayed there for two days after their first visit. Parents were approached and the study was explained to them. Informed written consent was obtained if the parents were willing to participate A copy of the consent form was given to parents, and demographic information sheet. The demographic information of the parents was collected including age, sex, literacy, prior pregnancy, vocation, past mental health issues, labor natural or caesarean section for mothers and newborn details such as prematurity was also asked.

PSS: NICU self administered data collection tool was employed, which has forty six questions17, divided into four subdivisions which quantify stress with relevance to Sights and Sounds, looks and behaviour Parental Role and Relationship staff behaviors and communication. The responses were recorded using an ordinal scale of measure with not applicable being the least with score zero and extremely stressful being assigned score of five.[18,19]

Recruited parents willing to participate was given a quiet, private and confidential space in the NICU counselling premises. Demographic details was filled by the parents following which they were provided with the self administered questionnaire. Participants were informed they can opt out of the research at any point of time if they choose to do so. Identity of the participants was kept confidential throughout.

In a study done by Nitish Chourasia et al., PSS: Neonatal Intensive Care Unit questionnaire was asked among 100 Neonatal Intensive Care Unit mothers and maternal stress was quantified using a Likert scale as low (1–2.9), medium (3–3.9) and high (4– 5).[24] The same criteria were used to classify parental stress.

Statistics: Data analysis was done using SPSS 22. Descriptive Statistics was expressed in Proportions, mean, median and standard deviation. Student t test or Anova test was used for test of significance for Parametric variables. Chi square were used for non parametric variables. A p-value less than 0.05 was considered as statistically significant.

RESULTS

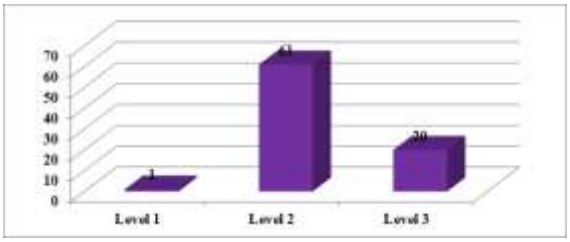

Figure 1: Admissions in Various NICU Levels

74.41% of them were in the level II NICU care.

Table 1: Gender distribution of the neonate

Sex of the neonate	Number (N)	Percentage (%)
Male	59	71.95
Female	23	28.05

Male neonates contributes 71.95%.

Table 2: Demographic profile of the parents

	Number	Percentage
Age of parents		
<20	2	1.2
20-30	117	71.3
31-40	43	26.2
>40	2	1.2
Education		
School Education	35	21.5
Bachelor Degree	88	53.4
Post Graduate Degree	39	23.9
Doctorate	2	1.2
Occupation		

Professional	70	42.3
Skilled	25	15.3
Unskilled	5	3.1
Unemployed	64	39.3
Family Income		
Upto 10,000/ month	24	14.7
Upto 50,000/ month	60	36.2
Upto 1,00,000/ month	55	33.8
More than 1,00,000/ month	25	15.3
Socioeconomic Class		
1(Upper)	84	51.2
2(Upper Middle)	32	20.4
3(Lower Middle)	28	16.1
4(Upper lower)	14	8.6
5(Lower)	6	3.7

In our study 117(71.3%) of parents are in the age range of 20-30 and 1.2% were more than 40 years. 78.5% of parents were degree holders. In our study, professionals accounted for 42.3%. Majority of the study population 69.9% were earning between 10,000 to 1lakh per month. 51.2% of the study population were in Class 1 followed by 20.4% Class II.

95.2% of the parents did not have previous Neonatal Intensive Care Unit exposure.

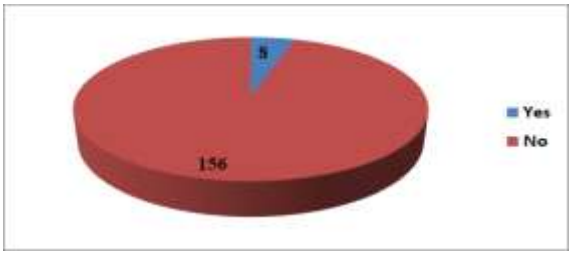

Figure 2: Previous Neonatal Intensive Care Unit exposure.

Table 3: Obstetric details

	Number (N)	Percentage (%)
Gravida		
Primi	62	75.6
Multi	20	24.4
Mode of Delivery		
Normal	36	43.9
LSCS	46	56.1
Gestational Age		
Pre term	47	57.3
Term	35	42.7

75.6% of the mothers were primigravida in our study. 56.1% of the study population underwent LSCS. In our study, 57.3 % of the neonate were born as pre term.

Table 4: General stress perception

	Mean	Standard deviation	P value
Gender			
Father	3.16	0.808	<0.001
Mother	4.78	0.675	
Age of parents			
<20	5	0	<0.0001
20-30	4.12	1.05	
31-40	3.49	1.49	
>40	3	0	
NICU LEVEL			
Level 1	4	1	0.79
Level 2	3.9	1.11	
Level 3	4.09	1.03	

The level of stress in mother is more than father and is statistically significant p<0.0001. Similarly the general stress was found more in less than 20years of age followed by 20-30 years of age parents and it is significant. Parents with their neonates in level 3 had more stress followed by level 2 but the difference is not statistically significant.

Table 5: Stress Level in Subscales in Gender and Gestational

	Sight and sound	Looks and appearance	Relationship	Staff Behaviour	Stress as perceived by the parent
Gender					
Father (82)	2.15±0.73	0.97±0.53	1.07±0.47	0.34±0.27	
Mother (82)	2.99±0.87	1.50±0.59	2.33±0.57	0.63±0.34	
p value	<0.001	<0.001	<0.001	<0.001	

Gestational age					
Preterm (94)	2.60±0.93	1.34±0.66	1.77±0.86	0.51±0.35	4±1.07
Term (70)	2.52±0.87	1.08±0.53	1.59±0.75	0.46±0.88	3.89±1.14
p value	0.572	0.008*	0.156	0.343	0.510
Gravida					
Primi(124)	2.58±0.90	1.22±0.59	1.70±0.83	0.50±0.33	3.98±1.08
Multi (40)	2.51±0.90	1.28±0.70	1.66±0.77	0.43±0.37	3.88±1.16
p value	0.636	0.587	0.799	0.272	0.614
Education					
School education	2.72±0.78	1.33±0.55	1.74±0.92	0.54±0.43	4.06±1.14
Bachelor degree	2.50±0.96	1.14±0.64	1.63±0.74	0.47±0.32	3.93±1.08
Post graduate	2.55±0.86	1.35±0.60	1.81±0.86	0.46±0.32	3.90±1.12
Doctorate	2.1±0.5	0.52±0.02	1.45±0.75	0.14±0.14	4±1.05
p value	0.490	0.100	0.508	0.440	0.801
Occupation					
Professional	2.25±0.78	1.04±0.61	1.34±0.76	0.40±0.29	3.37±0.96
Skilled	2.31±0.92	1.13±0.56	1.19±0.49	0.33±0.27	3.4±1.08
Unskilled	2.36±0.54	0.97±0.31	1.18±0.92	0.36±0.36	3.2±1.10
Unemployed	2.99±0.86	1.47±0.59	2.33±0.48	0.64±0.35	4.86±0.43
p value	<.0001*	0.000636*	<.00001	<.000049	<.00001
Monthly income					
Upto 10,000	2.79±0.76	1.36±0.58	1.77±0.97	0.60±0.43	4±1.14
Upto 50000	2.32±0.91	1.06±0.55	1.56±0.66	0.42±0.32	3.97±1.06
Upto 100,000	2.69±0.93	1.22±0.64	1.72±0.79	0.53±0.31	3.95±1.08
>1,00,000	2.59±0.84	1.47±0.67	1.94±0.97	0.43±0.32	3.88±1.24
p value	0.0739	0.03*	0.424	0.070	0.983

Gender and occupation alone had a significant difference in the stress levels in all levels of subscales.

DISCUSSION

In our study, it was observed that male neonates were 71.95% and female neonates were 28.05% There is more number of male neonates. In a study done by Mahmoud Al- Momani6 et al., 56.4% were male neonates and 43.6% were female neonates. There was also a higher proportion of male neonates. The admission of neonates is highest in Level 2 Neonatal Intensive Care Unit (74.39%) but we have 24.39% admitted in Level 3.

There are only a few studies which analyzed stress levels in fathers and the number of fathers included was also small. In a study by Dudek Shriber's study et al., (2004) 130 mothers and 32 fathers were included.[19] In Franck, Cox, Allen and Winter et al., (2005) a total of 184 mothers and 74 fathers were participants.25Upper class constituted 51.2% in our study, 20.4% of the study participants belonged to upper middle class and lower middle class participants were 16.1% and 8.6% of them from the upper lower class. Only 3.7% is from the lower class. In the study done by Ganguly.R et.al., nearly 41% of the parents were from the upper class of SES.[26]

The Mode of delivery of the study population was the caesarean section in 56.1% of the study population and normal vaginal delivery contributed to 43.9% of the study population. In a study done by Chaurasia et al., 75 % of the births were normal vaginal while 25 % were caesarean,[24] Comparing to that in our study more caesarean sections were observed. `In the other study by Miles MS, Carlson J (1996) did not show a significant association of parental stress with labor natural or cesarean section, previous children and prior exposure to NICU.[27] In our study also we had a similar association with stress levels and the mode of delivery, parity and previous Neonatal Intensive Care Unit exposure. In our study, 47(57.3 %) of the neonate were born as pre-term (28-37 weeks) and 35(42.7%) of them were born as term neonates. In a study done at Pondicherry sixty-five (65 %) were premature births (28–37 weeks) and thirty-five (35%) were term births.[24] The percentages are on par with previous studies.

In both mother and father Sights and Sounds was the most stressful event. The least stressful event was Staff Behaviour. The difference in Stress score is highest in Relationship and parental role. Mothers feel highly stressed compared to fathers in this aspect. In a study done by Dudek-Shriber et al., the highest mean among subscales is Relationship and parental role with the score of 3.2. They administered the questionnaire after 7 days of Neonatal Intensive Care Unit admission. They have interviewed 162 parents with only 32 fathers.[19]

In other studies done by Franck,et.al and Miles, et.al.,(1993) also parental role had highest mean with 2.58 and 3.10 respectively.[17,28] In Franks study fathers had equal score for parental relationship and looks and behaviour at 2.4028. In this study it was also noted that maternal stress perception was higher in each subdivision when compared to paternal stress which was statistically significant with p value of <0.001 with ninety five percent CI. Overall In general stress of having their newborn at NICU was moderately to highly stressful in maternal component with a mean of 3.8±0.736 and low to moderately stressful for paternal component with a mean of 2.9±0.700.[29]

In our study though the mean is more for sights and sounds it can be noted that for Relationship and Parental role14 mothers expressed moderate stress.

Age of the parents and stress level

In our study the age range of fathers is 25-43 (mean 31) and mothers is19-38 (mean 27). In Ruma Agrawal's study average maternal age was 27.3 years

and average paternal age was 29.6 years.74.Using a Pearson's correlation it was found that age of parents had a negative correlation with all the domains as the p value was less than 0.001. As age increases the stress level decreases which signifies as negative correlation. But r value for all domains are <-0.3 the correlation is weak.In the study by Chaurasia et.al., it was observed that increasing maternal age increases stress.[24]

Stress level and gestational age

The stress level is more in parents of a preterm neonate than term neonate in all 4 subscales but only in the looks score domain it was found to be statistically significant with a mean difference of 0.26 and with a p value of less than 0.001 found using an independent 't' test. In a study done by Chaurasia et.al., it was found that the stress level of mothers of a preterm neonate was found to be significantly higher than mothers of term neonates in all the three domains.[24]

In a study done by Dutta et al, it was concluded that that fathers of VLBW neonates are stressed due to financial burden of NICU, alteration of parental role and concern about home affairs. There was a decline in stress due to staff behavior and alteration of parental role over time, and a trend toward increasing stress due to home affairs and finances.[30]

Stress level and gravida

The stress level was found to be not statistically significant in all the four domains. In a study by Chourasia N, Surianarayanan P et al., it was concluded that maternal characteristics like parity, literacy, vocation did not contribute much to the maternal stress levels.[24]

SEC: SEC was not a significant contributor. In a previous study it participants with less financial means had increased stress when compared to participants who were financially sound. In a reasearch by Hendy A, El-sayed S, et.al. financial constraints contributed to almost 1.4 times to stress31. In our study as the lower class participants were 3.7% the observed distinction was not statistically significant. When investigating between the literacy and stress there is no significant distinction in stress. Niruba Umasankar et al., study in Srilanka also there was no correlation between education and stress level.[32]

But when the stress level was analyzed with the occupation there is a significant difference in the stress level. The unemployed had more stress in all the four domains. It may be noted that the mothers contributed to the entire unemployed group. So that can be the reason for this difference in our group. Already it has been noted that mothers have more stress than fathers.

When monthly income was analyzed for correlation there is no significant correlation between income and stress level. As per the study done by Reetha et al., it was found that there was no association between monthly income and stress level.[33] But it was found that upper income group has high stress score levels for looks and appearance which is statistically significant.

Level of Neonatal Intensive Care Unit

All the four domains were not statistically significant with the level of Neonatal Intensive Care Unit. In many previous studies including Chaurasia et al., it was stated that the length of stay increases the stress level.[24] As in this study the questionnaire was asked 48 hours after first visit and no further follow-up repeat questionnaire administration duration of stay was not evaluated.

Overall stress level as perceived by the parents

The gender wise stress level as perceived by the parent of having the neonate in Neonatal Intensive Care Unit was more among females than males as the mean stress score was 4.78 in females and 3.16 among males. When the frequency of stress level was analyzed 95% of mothers had severe stress and only 2.4% each had experienced moderate and mild stress. Among fathers 71% experienced moderate stress, 16% experienced severe stress and 13% experienced mild stress. It implies that the overall level of stress perceived by the parents is more than the stress due to the micro environment of Neonatal Intensive Care Unit like sights and sounds.

Table 6: Frequency of stress level as Perceived by parents

Stress level	Father	Mother
Low	11(13.4%)	2(2.4%)
Medium	58(70.7%)	2(2.4%)
High	13(15.8%)	78(95%)
Not at all stressful	0	0

The difference in stress level amongst parents, the stress level in the mother is more than the father and is statistically significant p<0.0001 by using independent t test. In majority of the previous studies like Franck et.al., and Agrawal R.et.al., it was observed that mothers have more stress level compared to fathers.[28,29] like our study.

Case-Smith et al., investigated and found out that parental distress must be addressed right from the beginning for better outcome of the newborns development and care.[34]

Maternal and paternal stress has to be taken into cognizance during the management of their sick newborn, in-order to employ effective instruments and support system for both fathers and mothers. The overall survival of extreme premature newborn has become better. The neonatal healthcare team must take the onus to provide parent friendly, inclusive system. Inclusive system has always been beneficial for the newborns development.

The limitations of our study was that the PSS: NICU tool was employed forty eight hours after parents first

visit to NICU. Hence identification of stress caused by the length of hospitalization cannot be done. The majority of patients are in upper socioeconomic status and so furthermore analysis is needed for the applicability to the people belonging to lower socioeconomic status.

CONCLUSION

Our study concluded that that mothers were more stressed than fathers. It reflects in all subscales. Sights and sounds is the most stressful domain followed by parental role alteration. The least affected domain was Staff behavior and communication. Parents of preterm neonate were more stressed than term neonate which is in accordance with previous studies. Age of the parent have negative correlation with stress level. Other demographic parameters like gravida, number of neonates, mode of delivery, previous Neonatal Intensive Care Unit exposure and socioeconomic status do not have significant association with level of stress.

The two kinds of stress perception, one due to NICU microenvironment and the overall stress perception owing to the NICU admission. It was observed that stress perception in both categories was higher among mothers when compared to fathers, and overall stress perception was the category which caused more stress amongst parents when compared to NICU microenvironment stress. Also in the future more studies enlightening the non NICU microenvironment stressors for parents should be done. These results may help in understanding parent's fear and reasons for their stress and addressing to their psychological support. This in turn will help in the better outcome of the neonates present ailment and also future development.

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