

Impact of maternal and neonatal parameters on the type of anxiety among parents of neonates admitted in Neonatal Intensive Care Unit

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Abstract:

Background: Various factors operating in the child, mother and the environment in the NICU cause considerable anxiety in the mothers leading to further stress and other parenting issues. Hence it is important to understand the level and type of anxiety in these mothers which would affect the mother. Thus, it becomes important to understand the levels of anxiety experienced by the parents and its association between various sociodemographic factors in mother and infant characteristics. **Methodology:** This cross-sectional study was conceived to assess the anxiety levels and 100 mothers were recruited after getting appropriate approvals and consent from them. Data was collected using a preset questionnaire and State and Trait Anxiety inventory scale. **Results:** When both parents were interviewed, 91% of mothers and 43% of fathers were found to be anxious. A significant difference was found in the values of 2 types of anxiety (State anxiety and Trait anxiety levels). Though State anxiety levels were significantly different between mothers and fathers of NICU babies with mothers experiencing more anxiety levels when compared with fathers, trait levels were the same.

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Except for supporting family members, none of the factors like age, educational status, occupation, or income level had any significance between the state or trait anxiety levels. When mothers were allowed to handle babies gently, there was a significant reduction in State anxiety levels, while Trait anxiety levels remained unchanged. None of the other baby factors including low birth weight had a significant effect on anxiety in the long run. **Conclusion:** This study brings out the importance of addressing anxiety in mothers with NICU babies; to assess the type of anxiety separately and deal with the factors that increase it separately. It also brings out the fact that the general nature of the parent which brings out the trait was not influenced considerably by NICU admissions.

Keywords: Anxiety, neonate, sociodemographic, maternal factors, infant factors

Introduction:

Many common problems during the newborn period like prematurity, maternal health issues, difficulties during labor and birth, respiratory distress syndrome, and hemolytic anemia of newborns may require NICU admission. This can be traumatic and stressful to the parents, mainly the mother which in turn leads to affecting the mother-baby relationship and development of the baby. Stress is further aggravated when they find to their shock that the mother/father wouldn't be able to take care of the baby themselves, and the presence or absence of economic support or social support adds to it. Mothers of neonates admitted to the NICU exhibit high levels of anxiety during the period of hospitalization. Early identification of anxiety levels has implications for the support of mothers during the hospitalization of their newborns. NICU mothers experience multiple stressors related to preterm birth, the medical condition of the infant, the complexity of the NICU environment, and the perceived vulnerability of the infant^[1]. These can put mothers at risk of experiencing psychological distress, such as anxiety. In addition, parents of NICU infants may be predisposed to poor emotional functioning, anxiety, and mood disorders^[2]. It is important for mothers of NICU babies to seek support from family, friends, and healthcare professionals. Family support is negatively correlated with maternal state anxiety and maternal trait anxiety^[3]. In addition, there are several support groups and resources available.

This study was conducted on parents of neonates admitted to NICU, with the following objectives:

1. To determine the levels of anxiety experienced by parents of babies admitted to NICU

2. To find out the association between anxiety level and sociodemographic and clinical variables of mothers and their newborns.

Materials and methods:

Study design:

This was a cross-sectional study done in Saveetha Medical College, Thandalam, a sub-urban area of Chennai, TN, India over 12 months from September 2022 to August 2023. Parents of Neonates admitted to the NICU were the study population. All parents whose neonates were admitted to the NICU for more than 24 hours and gave their valid consent for participation were included in the study. Those parents who did not wish to take part in the study or did not give consent after expressing willingness were excluded. All the participants were explained about the study, in their mother tongue and a valid consent was taken. All willing parents were selected by convenient sampling and the questionnaire was administered by face-to-face interview method. The sample size was set to be 100. Power analyses were used to determine the sample size; A power analysis based on a previous study by Yurdakul et al., got a sample size of 95 with 85% power^[13]. Hence, 86% power was attained with the first 100 mothers who agreed to participate in the study.

Data was collected using a pre-determined Proforma and Spielberg's State and Trait Anxiety Inventory scale which consists of questions regarding anxiety. This Likert-type scale psychological inventory developed by Spielberger et al measures two types of anxiety: the temporary condition of "state anxiety", or anxiety about an event, and the more general and long-standing quality of "trait anxiety", or anxiety level as a personal characteristic. It has 40 items: 20 items for state anxiety (S anxiety)

and 20 items for trait anxiety (T anxiety). Scores range from 20 to 80, the higher the scores greater the anxiety. Total scores obtained from each scale were evaluated separately. To this value a predetermined and unchanged number was added; for state anxiety, it was 50 and for trait anxiety, it was 35. The subsequent result was the individual's anxiety score.

The descriptive questionnaire form was created which contained the socio-demographic details of mothers, certain details of the newborns, opinions of mothers regarding the NICU, and the status of their baby in the NICU. It also had a rough grading of perceived anxiety of the parents as mild, moderate, or severe.

Data was collected ensuring strict privacy and confidentiality were maintained throughout the study. Performa had sociodemographic details of the parents and a rough classification of perceived anxiety as mild, moderate, or severe by the parent.

Statistical analysis: The collected data were numerically coded and entered in Microsoft Excel 2010, and then analyzed using SPSS-Version 23.0., (SPSS Inc, Chicago, USA). Data was analyzed by calculating Percentages and Proportions. Statistical test like Odds ratio and Chi-Square was used to assess the factors associated with the study variables. Descriptive statistics (mean, SD), Student's t-test (in two-group comparisons in which parameters exhibited normal distribution), and the Mann-Whitney U test (for 2-group comparisons in which parameters

are not in normal distribution) were used. Values where $p < 0.05$ were considered as significant.

Results:

Most of the parents reported tension and anxiety in the days their child was in the NICU. When asked about the level of tension they felt when their child was taken to NICU, eighty-nine percent of parents reported tensed; of which, 40 % reported 'Often', 24% said 'tensed the whole day', 28% said 'somewhat tensed' and 8% felt 'tensed only some times'. Almost 70% of the parents said they felt strained and were worrying about possible misfortune and more than 70% of parents said the stress and anxiety made them indecisive during their stay in NICU. Only a small percentage, i.e., 10 % of parents said they felt calm or at ease and self-confident during the NICU stay.

When both parents were interviewed, 91% of mothers and 43% of fathers experienced feelings of anxiety. The sex of babies did not have any impact on the number of parents who perceived anxiety. The number of anxious mothers was more in the primary or below group ($n=19/100$), followed by ($n=44$) 44% of them being degree and above.

However, when analyzing the anxiety among mothers alone using STAI, a significant difference was found in the values of variables between the 2 types of anxiety. The mean age of mothers in years was 25.69 ± 4.28 SD. The socio-demographic parameters are as in Table 1.

Table 1: Demographic factors:

Demographic characteristics	Mothers with new-borns in a NICU	
Age	25.69±4.28(Mean+/-SD) years	
	n	%
<i>Educational status</i>		
Primary school	19	19
High school	37	37
Degree and above	44	44
<i>Occupational Status</i>		
Working	29	29.0
not working	71	71.0
<i>Income level</i>		
low	24	24.0
Middle	56	56.0
High	20	20.0
<i>Supporting family members</i>		
Present	81	81.0
Not present	19	19.0

State anxiety levels were significantly different between mothers and fathers of NICU babies with mothers experiencing more anxiety levels when compared with fathers($p<0.001$). However, trait anxiety levels were not significantly different between both parents(Table:2).

Table 2: State –Trait Anxiety Levels of Mothers Vs Fathers

	Mothers with new-borns in a NICU	Fathers with new-borns in a NICU	Statistical Analysis
	Mean±SD	Mean±SD	Values(t; p)
State Anxiety Levels	49.20±5.65	43.41±6.61	t=4.718, p<0.001*
Trait Anxiety Levels	41.02±5.29	39.68±5.99	t= 1.1877, p=0.238

Independent samples t-test; * $p<0.05$

When the difference in the two types of anxiety were analyzed against maternal parameters, none of the factors like age, educational status, occupation, or income level had any significance between the state or trait anxiety levels. The only significant parameter was the presence of supporting family members($p=0.003$) (Table 3)

Table3: “State-Trait Anxiety Levels” vs maternal Parameters.

Characteristics		Mothers with new-borns in a NICU	
		STAI -T	
STAI -S			
Age	r	0.103	-0.112
	p	0.314	0.277
		MEAN±SD	MEAN±SD
Educational Status			
Primary School		49.40±6.49	41.03±6.18
High School		46.37±7.24	39.03±5.52
Degree and above		51.28±5.49	40.52±7.24
		F=1.049,p= 0.365	F=0.761,p=0.487
Occupational Status			
Working		47.79±6.59	38.92±4.94
Nonworking		47.86±6.52	41.32±5.25
		t=0.264,p=0.815	t=1.455, p=0.164
Income levels			
Poor		46.64±7.81	41.37±2.92
Middle		47.09±6.73	39.62±5.82
High		46.43±4.03	41.67±4.54
		F=2.620,p=0.081	F=1.285,p=0.259
Presence of Supporting family members			
Yes		46.60±6.12	41.03±4.46
No		49.60±6.61	38.94±3.54
		t=3.027,p=0.003*	U=831.00,p=0.474
Previous NICU experience			
Yes		45.40±5.15	40.93±4.25
No		50.2±5.51	38.72±3.35
		t=3.135,p=0.002*	U=822.00,p=0.465

When the difference in the types of anxiety was assessed with selected infant characteristics like birth weight, sex of baby, and updating daily status there was no significant difference between the two. However, allowing for touch therapy or in the baby care activities quite early during NICU stay produced a significant effect in state levels than trait levels. (p=0.048) (Table 4)

Table 4: “State-Trait Anxiety Levels” according to infant Parameters.

Birth Weight			
	≤2500 gram (n=32)	>2500 gram (n=68)	Significance
	Mean ± SD	Mean ± SD	
STAI -S	47.95±5.70	47.31±7.36	U=1084.00, p=0.729
STAI -T	40.13±4.78	38.31±5.85	U=1004.00, p=0.350
Gender of the Baby			
	Female (Mean ± SD)	Male (Mean ± SD)	
STAI S	48.12±7.13	47.98±6.32	U=1062.50, p=0.349
STAI-T	39.72±6.45	41.02±4.71	t= -.956, p=0.350

Effect of daily counselling on babies status				
	Yes	Partially	No	
	Mean ± SD	Mean ± SD	Mean ± SD	
STAI -S	47.64±6.64	48.44±7.00	52.37±5.37	KW=6.367, p=0.041*
STAI-T	39.55±3.41	40.21±6.01	40.81±5.39	KW=.246, p=0.884

Involving in early interaction with baby like allowing to touch, change diaper				
	Yes	Partially	No	
	Mean ±SD	Mean ± SD	Mean ± SD	
STAI-S	45.47±6.42	46.44±6.14	50.35±7.79	F=3.136, p=0.048*
STAI -T	40.42±5.53	40.50±5.77	39.09±5.13	F=.500, p=0.608

*p<0.05

Discussion:

This study was conducted in a tertiary care center where recommended protocols for parent care, counseling, and NICU care were in place; hence, the analysis should be seen contextually. When both parents were interviewed about feelings of anxiety, 91% were mothers and 43% were fathers reported feeling anxious. The same trend was found in many other studies also, where more number of mothers were experiencing anxiety and stress. The sex of babies did not have any impact on the number of parents who perceived anxiety. The number of anxious mothers was more in the primary education or below group (n=19), followed by 44% in the degree and above

educational status group. Similar reporting of experiencing stress was also noted by others.^{[4],[6]} Reporting of anxiety was the same in parents of both male and female babies which is in contrast to the study by Gurpreet Singh⁽⁵⁾ and similar to the study by Miles Ms and Masubrema,⁽⁴⁾⁽⁷⁾ The anxiety seems to be higher in mothers than the fathers with 91% of mothers developing anxiety compared with only 43 % of fathers who had anxiety. This was similar to many studies^{[5],[6],[7],[8],[9],[10]} and was in contrast to studies by Miles MS et al.^[4]

The anxiety levels in lesser educated people were higher than in higher educated people, 88% (n=16/19) in lesser educated parents as

compared to 70%(n=29/37) in higher educated parents which is similar to Ganguly and Carter JD^[4,6]and in contrast to Gurpreet.^{[5], [10]} However, this trend is found to reverse in those who are degree and above, where we have the maximum level of mean anxiety level. This could partly be due to increased knowledge levels about conditions and more medical/Internet exposure this population might have gotten. The higher anxiety levels of parents with previous NICU admission don't show any significant alteration from the parents with no previous NICU admission of their children, which is in contrast to a study by Binu et al^[3] This means that state anxiety remains the same despite previous NICU exposure. This points to the need for mandatory counseling for the parents, especially the mothers, irrespective of the previous NICU exposure, each time counseling from the caregivers is needed.

The anxiety levels in parents with previous neonatal deaths were seen to be increased with 86 % of parents with previous exposure to neonatal deaths in contrast to 77% of parents with no neonatal deaths. This study was also in contrast to a study by Gurpreet^[5] which showed that previous NICU experience, irrespective of the outcome (recovery/death of the neonate), and was found to be associated with significantly lower anxiety levels, which showed higher stress in mothers who have no previous NICU admission.^{[9],[12]}

The State anxiety levels were significantly different between mothers and fathers in the present study. However, the Trait anxiety level remains insignificant between the parents. This is a significant finding of the present study which points to the fact that state anxiety manifesting like fear, nervousness, discomfort, etc is higher in mothers than fathers of NICU babies. This is the temporary anxiety referred to as how a person is feeling at the time of a perceived threat. The

trait stress levels-the feelings of stress, worry, discomfort, etc that one experiences on a day-to-day basis, are the same in both parents. This indicates that the sex of parents does not affect usually how people feel across typical situations that everyone experiences daily in the context of NICU admissions.

When the difference in stress and Trait type anxiety were analyzed against maternal parameters, none of the factors like age, educational status, occupation, or income level had any significance between the state or trait anxiety levels. Only the presence of supporting family members was found to be significant(p=0.003). This indicates the need for effective support systems to alleviate the anxiety of mothers in difficult situations in the NICU and the need for anticipatory advice to them. However, in the present study, allowing the mother to handle the baby early allows a reduction of state-level anxiety and does not affect trait-level anxiety. A recent study noted that maternal or infant characteristics do not correlate with maternal anxiety. However, they found that the stress experienced by mothers had a significant correlation with anxiety and was found to be associated with state and trait anxiety levels.^[14] Another study also identified that state anxiety levels among mothers of NICU babies were higher than those not in NICU.^[15] It is reported that such mothers have higher levels of depression and anxiety levels than those with healthy-term babies.^[16]

This study gives insight into the modifiable factors among child and mother parameters that can directly affect the quality of life and mental health of parents in the immediate postpartum period. Further research into the effect of the different types of postpartum anxiety on childcare, needs to be evaluated based on the parenting behavior. This may give further insight

into how such anxiety may affect parenting and its effect on child development.

Conclusion:

This study has shown that almost all parents who have their children admitted to the NICU have anxiety regarding their child's health. Among the maternal parameters, the only significant parameter was the presence of supporting family

members and no other factor including age, educational status, occupation, or income level had any significance between the state or trait anxiety levels. Even in the context of previous exposure of parents to NICU care, since parents across socioeconomic and educational backgrounds feel anxious, early exposure to newborn care and effective counseling to impart knowledge of the babies' condition should be given.

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