

Burden and Determinants of Depression among Parents of Newborns Admitted To Neonatal Intensive Care Unit

Depression
among Parents of
Newborns
Admitted To ICU

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ABSTRACT

Objective: To assess the burden and determinants of depression among parents of newborns admitted to the neonatal intensive care unit (NICU).

Study Design: A cross-sectional study.

Place and Duration of Study: This study was conducted at the NICU of Indus Hospital, Muzaffar Garh, Pakistan, from March 2023 to August 2023.

Methods: A total of 131 parents of newborns admitted to the NICU for more than 24 hours were analyzed. Demographic information about patients (neonates) was recorded while the parents were screened for depression using the Parental Stressor Scale (PSS). PSS score greater than 75 was labeled as depression.

Results: In a total of 131 newborns, there were 79 (60.3%) were girls. The mean gestational age was 33.82±4.21 weeks (ranging between 24-41 weeks). The mean age of the respondent was 29.89±6.68 years (ranging between 18-45 years). Mode of delivery was cesarean section in 112 (85.5%) cases. The mean PSS score was 78.94±15.92 whereas depression was noted in 93 (71.0%) respondents. Being literate increased the odds to depression to 3.22 (1.22-8.47) while the comparison between literacy status turned out to be significant. Gestational age was found to have significant association with depression ($p=0.013$). Bivariate correlation analysis revealed that relatively weak but significant inverse correlation was identified between gestational age and PSS scores ($r=-0.197$, $p=0.04$).

Conclusion: A substantial portion, 71.0% of respondents whose newborns were admitted to NICU, reported depression as indicated by the PSS score. Educational status and gestational age were found to have significant association with parental depression.

Key Words: Cesarean section, depression, gestational age, neonatal intensive care unit, Parental Stressor Scale.

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INTRODUCTION

It is likely that new parents experience psychological distress (anxiety and depression). The parent and infant may distort their routine relationship with each other if the level of distress is high. It may also impede the development of attachment between them, consequently impacting the intellect and behavior of the infant's progress, educational achievement, and mental health in negative way.

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Therefore, it is quite understandable that those parents who have their infants admitted to the Neonatal Intensive Care Unit (NICU) might experience distress more than others.¹

A high level of psychological distress has been observed in 40-50% of parents when their infants are admitted to the NICUs, or after the discharge for few weeks.² Factors like parental age, social support, and coping methods are linked to psychological discomfort among parents of infants admitted to the NICU.^{2,3} The NICU environment, which includes the sights of equipment, bright lights, and strange noises, the infant's outward appearance, and the disruption to the regular parental role, may also cause stress in parents. There has also been evidence linking high levels of stress related to the NICU environment to higher levels of parental psychological discomfort.⁴ In the past, studies on the mental health of NICU parents have looked at signs of anxiety and depression separately, treating each disease as though it had its own unique set of symptoms.⁵ Because the symptoms of depression and anxiety disorders were separated, this method of analyzing unpleasant emotional states will be referred

to as a diagnostic categorization technique for the purposes of present viewpoints. However, reliance on this conceptual framework of diagnostic classification is problematic because a substantial body of evidence supports a common-factor model of adverse emotional states.⁶ In this context, symptoms of trauma, panic attacks, generalized anxiety, and depression are not seen as wholly separate categories but rather as representations of a person's propensity for unpleasant feelings.^{7,8} Salah M et al shared that 38.5% of mothers of newborns admitted to NICU reported depression.⁹ The available literature has revealed that no such study has been done in Pakistan on this topic; therefore, we planned this study with the objective of assessing the burden and determinants of depression among parents of newborns admitted to the neonatal intensive care unit. The findings of the study would be helpful to ascertain the burden of depression among the targeted population and will enable us to formulate guidelines for these parents for early diagnosis of depression followed by its management to improve their well-being.

METHODS

This cross-sectional (descriptive) study was performed at the Department of Neonatology, Indus Hospital, Muzaffar Garh, Pakistan, from March 2023 to August 2023. A sample size of 131 was calculated using the formula $n = z^2 p(1-p)/e^2$ considering the anticipated frequency of depression as 32.17%¹⁰, the margin of error as 8%, and the confidence level as 95%. A non-probability consecutive sampling technique was used for sample selection.

The inclusion criteria were the parents of newborns admitted to the NICU for more than 24 hours. The exclusion criteria were the parents who had a previous history of any kind of mental illness. Before the study was started, approval from the institutional ethical committee was obtained. The objectives of the study and aspects related to safety profile of the child were briefly described to the parents/caregivers of the study participants to obtain informed and written consent from them. Approval from the Institutional Ethical Committee was also acquired (IHHN_IRB_2022_12_025).

Demographic information about patients (neonates) was recorded by the researchers themselves. The parents were screened for depression using "Parental Stressor Scale: NICU (PSS: NICU)". The scale measured NICU-specific stress as per 46-item scale that has 4 subscales (NICU sights and sounds, infant appearance/behavior, parental role alterations, and parent relationships with staff). Parents rated each of the 46 items on a Likert scale from 1 (not at all stressful) to 5 (extremely stressful). Scores were deemed invalid if >10% of their components were missing. If ≤10% of answers were missing, the

applicable subscale mean score was calculated for that particular subscale question (n=5), and score greater than 75 defined depression. All of the data was collected and noted on a specially designed proforma.

For statistical analysis of the collected information, "Statistical Package for Social Science (SPSS)" version 26.0 was employed. The qualitative variables, which included gender, gestational age group, mode of delivery, gender of the respondent, gender of the child, depression, educational status, residential status, and socioeconomic status were represented in the form of frequency and percentage. The socioeconomic status was categorized as per the World Bank classification.¹¹ Low; Up to Rs. 11605; Lower Middle; 11606-45395 Rs; Upper Middle; 45395-140161 Rs; and High; >140161 Rs. The quantitative variables like gestational age and age of the respondent were presented by calculating the mean and standard deviation (SD).

The effect modifiers, for instance, gestational age, age of respondent, gender of respondent, gender of child, mode of delivery, residential status, and gender, were controlled by making stratified tables. Bivariate correlation was determined applying Spearman's correlation test. Post-stratification, chi-square test was applied taking $p \leq 0.05$ as significant.

RESULTS

In a total of 131 newborns, there were 79 (60.3%) were girls. The mean gestational age was 33.82 ± 4.21 weeks (ranging between 24-41 weeks). The mean age of the respondent was 29.89 ± 6.68 years (ranging between 18-45 years). Mode of delivery was cesarean section in 112 (85.5%) cases. Table-1 is showing details about the baseline socio-demographic characteristics of the children and their respondents.

Table No. 1: Characteristics of Study Participants

Characteristics		Number (%)
Child's gender	Boy	52 (39.7%)
	Girl	79 (60.3%)
Gestational age (weeks)	24-28	15 (11.5%)
	29-32	34 (26.0%)
	33-36	41 (31.3%)
	37-41	41 (31.3%)
Mode of delivery	Vaginal	19 (14.5%)
	Cesarean section	112 (85.5%)
Respondent's gender	Male	57 (43.5%)
	Female	74 (56.4%)
Respondent's age (years)	18-30	73 (55.7%)
	31-45	58 (44.3%)
Residence	Rural	62 (47.3%)
	Urban	69 (52.7%)
Literacy	Literate	90 (68.7%)
	Illiterate	41 (31.3%)
Socio-economic status	Low	17 (13.0%)
	Medium	106 (80.9%)
	High	8 (6.1%)

The mean PSS score was 78.94±15.92 whereas depression was noted in 93 (71.0%) respondents. Being literate increased the odds to depression to 3.22 (1.22-8.47) while the comparison between literacy status turned out to be significant. Gestational age was found

to have significant association with depression (p=0.013). Bivariate correlation analysis revealed that relatively weak but significant inverse correlation was identified between gestational age and PSS scores as shown in figure-1 (r=-0.197, p=0.04).

Table No. 2: Association of Socio-demographic characteristics of newborns and parents with depression.

Characteristics		Depression		Odds Ratio with 95% CI	P-value
		Yes (n=93)	No (n=38)		
Child's gender	Male	40 (43.0%)	12 (31.6%)	0.61 (0.28-1.36)	0.225
	Female	53 (57.0%)	26 (68.4%)	Reference	
Gestational age (weeks)	24-28	15 (16.1%)	-	-	0.013
	29-32	25 (26.9%)	9 (23.7%)	0.46 (0.17-1.23)	
	33-36	30 (32.3%)	11 (28.9%)	0.47 (0.19-1.18)	
	37-41	23 (24.7%)	18 (47.4%)	Reference	
Mode of delivery	Vaginal	12 (12.9%)	7 (18.4%)	Reference	0.416
	Cesarean section	81 (87.1%)	31 (81.6%)	0.66 (0.24-1.82)	
Respondent's gender	Male	38 (40.9%)	19 (50.0%)	1.45 (0.68-3.09)	0.338
	Female	55 (59.1%)	19 (50.0%)	Reference	
Respondent's age (years)	18-30	55 (59.1%)	18 (47.4%)	0.62 (0.29-1.33)	0.218
	31-45	38 (40.9%)	20 (52.6%)	Reference	
Residence	Rural	46 (49.5%)	16 (42.1%)	Reference	0.444
	Urban	47 (50.5%)	22 (57.9%)	1.35 (0.63-2.88)	
Literacy	Literate	58 (62.4%)	22 (84.2%)	3.22 (1.22-8.47)	0.014
	Illiterate	35 (37.6%)	6 (15.8%)	Reference	
Socio-economic status	Low	14 (15.1%)	3 (7.9%)	Reference	0.249
	Medium	75 (80.6%)	31 (81.6%)	4.67 (0.72-30.1)	
	High	4 (4.3%)	4 (10.5%)	1.93 (0.52-7.79)	

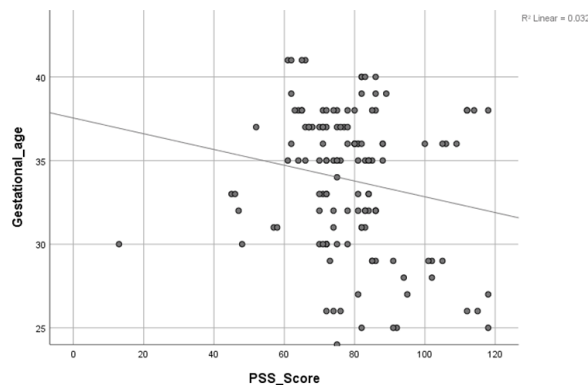


Figure No. 1: Scatter Plot showing relationship of Gestational age and PSS score.

DISCUSSION

In this study, the mean PSS score was 78.94±15.92 while depression was noted in 71.0% parents. Our findings highlight that nearly 3 out of 4 respondents of newborns admitted to NICU were having depression. The high prevalence of depression among parents of the newborns in the NICU is a significant finding. It suggests that the experience of having a child in the NICU is associated with a substantial psychological burden. The level of depression, as indicated by the PSS score, aligns with the known stressors in NICU

settings, such as the uncertainty of the infant's condition and the need for constant monitoring and medical interventions.^{12,13} Our findings in terms of the burden of depression are somewhat aligned with what Miles et al who discovered that 63% of mothers experienced higher depressive symptoms during the hospitalization of their child in the NICU.¹⁴ Rogers et al described the proportion of mothers with depression and anxiety symptoms to be 43% whose newborns were admitted to NICU.¹⁵ Deshwali et al from India in a recent study analyzing prevalence of mental health issues in mothers of preterm newborns admitted to NICU revealed that anxiety, and depression were reported by 66.2%, and 45.4% mothers respectively.¹⁶ Alkozei et al revealed 52% of mothers to have higher levels of stress while 38% were having severe symptoms of depression.¹⁷ Our findings, along with what has been laid down in the literature, emphasize that the proportion of depression is significant among parents who have their newborn children admitted to the NICU. Soghier LM et al reported 45% of parents to have depressive symptoms while 43% were having higher rates of perceived stress when their children were discharged from NICU. Moreover, they found that older gestational age (p=0.02), female neonate (p=0.02), and longer duration of NICU stay (p=0.045) were linked with increased odds of depression.¹⁸ Varma

et al in their investigation shared that maternal stress was increased with the increase in the level of maternal literacy (median score for illiterate 1.36 ± 0.32 ; less than high schools 1.56 ± 0.44 ; high school 1.96 ± 0.48 ; graduate 1.65 ± 0.44).¹⁹ Other researchers have shown that poor educational status, low socio-economic status is linked with higher rates of depression.^{20,21} The present study showed that being literate increased the odds to depression to 3.22 (1.22-8.47), $p=0.014$. Gestational age was found to have significant association with depression ($p=0.013$). Bivariate correlation analysis revealed that relatively weak but significant inverse correlation was identified between gestational age and PSS scores ($r=-0.197$, $p=0.04$). The association between gestational age and depression suggests that parents of preterm infants may be at a higher risk of depression. Preterm birth often leads to longer NICU stays and more medical complications, increasing parental stress and anxiety. The inverse correlation between gestational age and PSS scores further supports this idea, indicating that as gestational age decreases, parental stress tends to increase.

The outcomes of this study hold significant implications for clinical practice. Specifically, the implementation of a systematic screening process to identify signs of depression in parents with infants admitted to NICUs can serve as a crucial starting point for intervention. By proactively recognizing and addressing parental depression, healthcare providers and support teams have the potential to achieve multifaceted benefits. Firstly, this approach can substantially improve the mental and emotional well-being of parents, helping them better cope with the unique challenges associated with having an infant in the NICU. Secondly, it offers the opportunity to strengthen the parental-child attachment, fostering a more nurturing and supportive bond during a critical phase of infant development. Moreover, addressing parental depression in this context may contribute to enhanced developmental outcomes for infants, encompassing cognitive, emotional, and social dimensions. It's important to underscore that such interventions should be holistic, involving not only mothers but also the broader family support system, including fathers and caregivers. In the long term, this proactive approach has the potential to reduce healthcare costs associated with developmental delays and improve the overall quality of care and well-being for families facing the stressors of the NICU environment.

Relatively small sample size may limit the generalizability of this research to a broader population. As the sample was not selected randomly, there could be a selection bias. This could affect the representativeness of the sample and the generalizability of the results. This study was conducted at a single NICU, the results may not be applicable to

NICUs in different geographic locations or with different patient populations. Multi-center studies can provide a more diverse perspective. The use of self-reported data for variables like depression and literacy may introduce response bias. Participants might underreport or over report their experiences or characteristics. While the study identified associations between certain variables and depression, it may not have accounted for all potential confounding variables that could influence the results. Unmeasured factors could affect the observed relationships.

CONCLUSION

A substantial portion, 71.0% of respondents whose newborns were admitted to NICU, reported depression as indicated by the PSS score. Educational status and gestational age were found to have significant association with parental depression. Our findings warrant further investigation and consideration of potential confounding factors.

Author's Contribution:

Concept & Design of Study: Kamran Hayat
Drafting: Athar Razzaq, Sidra Saleem
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Revisiting Critically: Kamran Hayat, Athar Razzaq
Final Approval of version: Kamran Hayat

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