Parental perceived stress among mothers of neonates admitted in Neonatal Intensive Care Unit at a teaching hospital of Gandaki Province

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ABSTRACT

Introduction: Neonatal Intensive Care Unit admission may be traumatic for mothers, causing psychological distress and altered parenting roles. This study aimed to assess the perceived parental stress (PPS) level and experience of mothers of neonates admitted to the NICU at a tertiary hospital in Gandaki Province. **Methods:** A mixed-method approach was used. For the quantitative study, 68 mothers of neonates admitted to the NICU were selected through total enumeration. A face-to-face interview using a structured questionnaire was conducted. PSS was measured using the PSS: NICU tool. For the qualitative study, ten mothers were selected purposively, and in-depth interviews were conducted using an interview guideline. The study was conducted at Gandaki Medical College Teaching Hospital and Research Center from May to June, 2024. **Results:** Of the total of 68 mothers, 52(76.5%) had a low level of PPS. The highest mean stress score was in the "Baby's Appearance and Behavior" subscale (31.97±16.96) out of a maximum 95 score, followed by "Relationship with Baby and Parental Role" (23.14±8.79) out of a maximum 50. Qualitative findings revealed deeper emotional struggles, including anxiety, helplessness, sleep disturbances, and fear of medical procedures. **Conclusions:** Despite low reported PPS levels, qualitative insights revealed emotional struggles and psychological burdens among mothers. Comprehensive support systems and emotionally responsive care are essential in NICUs to address these hidden stressors and enhance maternal coping.

Keywords: Maternal stress, neonatal intensive care unit, neonates, parental stress scale.

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INTRODUCTION

Transitioning from childbirth to parenting is more stressful if a newborn fails and is admitted to the Neonatal Intensive Care Unit (NICU). The limitation of parents' access to their babies and NICU admission gives stress, emotional turmoil, and strains on relationships. Mothers suffer significantly high levels of stress, and if left unaddressed, they may precipitate stress. The area of greatest stress to parents is the parental role and relationship, and the looks and behavior of the infant.[1,2] The NICU environment can be stressful for parents for various reasons.[3] Parents experienced high levels of stress. The highest and lowest sources of stress were infant behavior and appearance, and sights and sounds.[4] Most of the mothers whose neonates were admitted to the NICU experienced moderate and severe stress.[5] Stress disturbs the newborn's parents' relationship, which leads to severe stress. Assessment of stress among parents and including them in the infant's care may help to plan accordingly to resolve stress. In the above reference, there is severe stress experienced by parents, affecting their mental health and relationships. While numerous studies have assessed parental stress in NICU settings in developed countries, there is limited research exploring this issue in the context of Nepal, specifically

within Gandaki Province, and none using a mixed methods design to comprehensively assess both the quantitative level and qualitative experiences of stress among mothers. Thus, this study aimed to assess parental stress levels, the experience of mothers of neonates admitted to NICU.

METHODS

A mixed-method approach was adopted. The study was conducted at Gandaki Medical College Teaching and Research Center, Pokhara, Nepal from May to June, 2024. For the quantitative study, the descriptive cross-sectional research design was used. A total of 68 mothers of neonates admitted to the NICU were selected through total enumeration from May to June 2024. A standard scale, Parental Stress Scale: Neonatal Intensive Care Unit (PSS: NICU),[1] was used for the measurement of PPS. Data were collected through face-to-face interviews using a standard questionnaire. The researcher marked the response on the questionnaire.

For the qualitative study, a total of ten mothers of neonates admitted to the NICU were interviewed using an in-depth interview guideline. Interviews were tape-recorded after obtaining consent. The PSS: NICU includes two parts, the first is maternal and neonatal characteristics, which are not part of the PSS: NICU tool, and the second part has 46 descriptions of NICU-related stressors and 1 item for overall stress of parents. The 46 descriptions were measured on a 5-point Likert scale ranging from 1 (not stressful) to 5 (extremely stressful). More score, more stress, ranging from a minimum 0 to 230. There is an extra answer possibility for parents to indicate that they did not experience the stressor (not applicable), which is assigned a score of 0 (not stressful). The 45 descriptions of the PSS: NICU are divided into four subscales measuring parental stress on: the infant's appearance, parent role alterations, sights and sounds, staff behaviors, and communication. The possible range of total scores that were calculated after summing up the score were: Sights and Sounds (0-25); Infant Appearance (0-95); Parent-Infant Relationship (0-50); Staff (0- 55); General Stress [overall stress] (0-5); and the total scale ranges from Zero to 230 (0-230).

Collected data was edited, coded, entered, and analyzed in Statistical Package for the Social Sciences (SPSS) version 20.0. Descriptive statistics were computed for quantitative data, and thematic analysis was done for qualitative data. The process involves careful reading and re-reading of the data, identifying significant statements, formulating meaning, clustering meaning into themes, developing an exhaustive description, producing a fundamental structure, and validating findings.

The respondents received all explanations of the study objectives, and autonomy and confidentiality were guaranteed. Ethical approval (Ref. No. 25/080/81) was obtained from the Gandaki Medical College Ethical Review Committee. The respondents provided written informed consent.

RESULTS

Quantitative results

Table 1 shows the characteristics of the mothers. Out of total 68 mothers, 40(58.8%) were aged ≤29 years, 54(79.4%) had more than NRs. 111000 income per month, among them, 52(76.5%) had full-term (≥37weeks) gestational age and 46(67.6%) did not have previous NICU exposure.

Table 1: Frequency distribution of mothers (N=68)

Characteristics		Frequency	Percent (%)
Mothers age mean±SD= 28.38±3.75 Min=22 Max=37	≤ 29	40	58.8
	>29	28	41.2
Monthly income (NRs)	10000-36000	22	32.4
	36000-111000	32	47.1
	More than 111000	54	79.4
	No response	14	20.6
Gestational age	Preterm (<37 weeks)	16	23.5
	Term (≥37 weeks)	52	76.5
Previous NICU exposure	Yes	22	32.4
	No	46	67.6

Table 2 shows the frequency distribution of infants' characteristics. Of the total, 58(85.3%), 40(58.8%), 36(52.9%), 24(35.3%), and 46(67.6%) were ≤8 days of neonates, females, second neonate, having jaundice, and hospital stay ≤5 days in the NICU.

Table 2: Frequency distribution neonates' characteristics (N=68)

Characteristics		Frequency (n)	Percentage (%)
Age (in days) mean±SD= 7.11±7.45 Min=1 Max=26	≤8	58	85.3
	>8	10	14.7
Sex	Female	40	58.8
	Male	28	41.2
Position	First	24	35.3
	Second	36	52.9
	Third and above	8	11.7
Clinical diagnosis	Jaundice	24	35.3
	Fetal distress	12	17.6
	Preterm	6	8.8
	Others*	26	38.3
Hospital stays in days (NICU) mean±SD= 4.3±2.46 Min=1 Max=8	≤5	46	67.6
	>5	22	32.4

*Post-term macrosomia, poor cry, wear cry, delayed cry, asphyxia, aspiration sepsis, fever, and post term

Table 3 shows the parental perceived stress level of mothers in three categories, 52(76.5%) had a low level of PPS.

Table 3: Level of parental perceived stress among mothers in NICU (N=68)

Parental perceived stress level	Number (n)	Percentage (%)
Low stress	52	76.5
Moderate stress	4	5.9
Not applicable (no stress)	12	17.6

**There is no high level of parental perceived stress, and those not applicable were excluded

Table 4 shows the parental perceived stress levels of mothers according to the subscale of PSS: NICU Scale and the mean±SD scores. Total of 68 mothers, 26(38.2%) were not at all stressful due to sight and sound of NICU and 7.76±4.69, 26(38.2%) a little stressful regarding baby's look and behave while 31.97±16.96, 40(58.8%) were moderately/very/extremely stressful regarding relationship with baby and parental role and 23.14±8.79, 26(38.2%) were moderately/very/extremely stressful regarding staff behaviors and communication.

Table 4: Parental perceived stress level according to subscales of PSS: NICU scale (N=68)

Subscales	Total possible scores	Not at all stressful n(%)	A little Stressful n(%)	Moderately/ Very/ Extremely Stressful n(%)	Mean±SD
Sight and sound NICU	0-25	26(38.2%)	18(26.5%)	24(35.3%)	7.76±4.69
Baby look and behave	0-95	18(26.5%)	26(38.2%)	24(35.3%)	31.97±16.96
Relationship with baby and parental role	0-50	4(5.9%)	24(35.3%)	40(58.8%)	23.14±8.79
Staff behaviours' and communication	0-55	18(26.5%)	18(26.5%)	26(38.2%)	16.61±12.31
Total score	0-230				79.5±32.45

Qualitative results

Theme 1: Emotional turmoil triggered by NICU exposure

Subthemes 1.1: Emotional response to NICU environment

Mothers faced intense emotional distress upon first encountering the unfamiliar and restricted NICU environment, which was heightened by their baby's critical health issues and worsened by witnessing invasive procedures that triggered feelings of helplessness, fear, and deep emotional pain.

A 23-year-old mother of neonate of four days: It was a scary moment when I saw a glimpse of the NICU for the first time.

A 28-year-old mother of neonate of five days: Yes, I feel stressed because nurses allowed me to visit the NICU one time only once, and it is my first exposure.

A 25-year-old mother of a neonate of six days: I have no experience with the NICU environment but when I see from outside to inside the NICU, I feel very anxious so I do not want to see.

Subtheme 1.2: Stress related to baby's condition

A 23-year-old mother of neonate of three days: I was very anxious because the baby had difficulty breathing. Recovery time was slow, and I felt very anxious about the baby. But this morning, Baby was good, but now she looks tired and inactive.

A 27-year-old mother of neonate of three days: Stressed from delivery, and when I heard that the baby had to be kept in NICU, I thought maybe there was a problem with my baby, my husband was about to cry. M6 (I did not sleep the whole night).

Subtheme 1.3: Fear related to medical intervention

A 23-year-old mother of neonate of four days: It would be better if they do not do cannulation.

A 25-year-old mother of a neonate of six days: Mother was crying, mentioning that when I felt so much pain while injecting and cannulation, then how much my baby was suffering from pain [Mother was crying deeply while interviewing]. Another mother said I feel like crying (runa man laagi halcha ni, bacha lai dukhyo hola bhanera).

Theme 2: Physical and psychological strain of NICU hospitalization

Subthemes 2.1: Physical and emotional burden

Mothers experienced substantial physical and emotional strain from high-risk deliveries and premature births requiring immediate NICU admission, with separation from their newborns deepening their distress and triggering feelings of helplessness, sadness, and maternal role conflict, especially among those recovering from cesarean sections or struggling to bond with their infants

A 28-year-old mother of neonate of five days: I am very stressed because I conceived a baby after nine years of married life, and that baby must also be admitted to the NICU immediately after delivery.

A 37-year-old mother of neonate of five days: I am stressed because my baby is preterm for gestational age and is having breathing difficulty.

A 23-year-old mother of neonate of four days: Due to jaundice, my baby was admitted to the NICU. If this had not happened, we would have gone to our home, but we had to stay outside, which is stressful.

Subthemes 2.2: Separation from baby and maternal role conflict

A 23-year-old mother of neonate of four days: After being referred to GMC, the baby was immediately kept in NICU, so I could not hold them for a long time. Baby cries constantly in the NICU, but in my arms, the baby sleeps peacefully.

A 24-year-old mother of neonate of three days: I love my baby and feel so attached. Baby recognizes me and looks towards me.

A 28-year-old mother of neonate of five days: I feel extremely stressed because I have gone through a Cesarian section to deliver my baby. When I see another mother's baby feeding normally, I feel so sad because I cannot keep up with me. When I see other mothers holding their babies, I always wish my baby would get well.

Theme 3: Role of communication and support from healthcare providers

Subthemes 3.1: Communication and trust in staff

Most mothers found the polite and supportive behavior of healthcare providers reassuring, which helped alleviate stress, but some highlighted the need for clearer and more consistent communication about their baby's condition to foster trust and reduce anxiety.

A 23-year-old mother of neonate of four days: They told me all the information regarding the health condition and treatment of the baby.

A 25-year-old mother of neonate of six days: Doctors and nurses speak politely while providing information.

A 23-year-old mother of neonate of three days: No stress, but no proper communication from staff. If they would explain more about my baby's up-to-date health condition, then it would be better for me. I am satisfied with GMC.

Table 5 presents the themes, six subthemes, and 16 codes on the mother's parental perceived stress experience. Theme 1 reflects Emotional turmoil triggered by NICU experience, theme 2 pertains to the Physical and psychological strain of NICU hospitalization, and theme 3 concerns Clear communication and health workers' support work for relieving.

Table 5: Themes, subthemes, and codes (n=10)

Themes	Subthemes	Codes
Theme 1: Emotional turmoil triggered by NICU exposure	Subtheme 1.1: Emotional response to NICU environment	1.1.1: Anxiety from seeing NICU from outside
		1.1.2: Initial shock and fear of NICU
		1.1.3: Stress from first-time NICU exposure
	Subtheme 1.2: Stress related to baby's condition	1.2.1: Anxiety due to baby's breathing difficulty and recovery
		1.2.2: Stress and insomnia after hearing NICU admission
	Subtheme 1.3: Fear related to medical interventions	1.3.1 Fear and concern about cannulation
		1.3.2: Empathic distress due to the baby's pain during cannulation
		1.3.3: Emotional pain seeing baby cry from IV insertion
Theme 2: Physical and psychological strain of NICU hospitalization	Subtheme 2.1: Physical and emotional burden	2.1.1: Stress from delayed conception and NICU admission
		2.1.2: Stress due to the baby's prematurity and breathing issues
		2.1.3: Stress from delayed discharge due to jaundice
	Subtheme 2.2: Separation from baby and maternal role conflict	2.2.1: Distress from limited physical contact
		2.2.2: Soothing role contrast (crying in NICU, sleeping in arms)
		2.2.3: Emotional pain from comparing with other mothers
Theme 3: Clear communication and health workers' support work for relieving	Subtheme 3.1: Communication and trust in staff	3.1.1: Adequate and polite communication reduces stress
		3.1.2: Satisfaction with care but need for clearer updates

DISCUSSION

PPS among mothers

The study findings assessed the PPS level of mothers of neonates admitted to the NICU. The findings of the study revealed that about three-fourths of mothers had low. Similarly, Subhashini et al.[6] revealed that 76.6% and 23.3% of parents reported moderate stress and mild stress, respectively, and no mothers had severe stress. In contrast, Kogila et al.[7] revealed, 70%, 27%, and 3% had moderate levels, a high level, and a low level of stress. Mulla et al.[8] indicate no mild level of stress, 14% and 86% had moderate levels, and the majority had severe levels of stress, respectively.

The present findings revealed that approximately two-fifths of the mothers did not find the NICU's sights and sounds stressful. Likewise, about two-fifths found their baby's appearance and behavior to be only a little stressful. Regarding the relationship with their baby and parental role, around two-fifths experienced moderate stress, while nearly one-third reported moderate stress related to staff behavior and communication. The present finding of mean and standard deviation score revealed that babies' looks and behavior had the highest level of PPS, 31.97±16.96, followed

by relationship with the baby and parental role, 23.14±8.79, staff behavior and communication, 16.61±12.31and least in sight and sound, 7.76±4.69. Similarly, Ansari et al.[9] reported that mothers' greatest subscale score occurred on the Parental Role and Relationship, followed by looks and behavior, and the lowest score for the Sights and Sounds subscale.

In contrast, Ganguly et al.[10] reported that the highest stress level is for sight and sound, followed by a relationship with the baby and parental role, staff behavior, and communication, and the least stress is caused by infant behavior and appearance.

Many other studies [11] also found that most parents were experiencing stress in parental role alteration. The findings of this study support the previous studies that suggested that the admission of a neonate to a NICU is stressful to parents.[12,13-16] Regarding the different areas of stress measured by PSS: NICU, the results of this study were consistent with other studies,[12,13-16] which indicate that the most stressful aspect of having an infant in NICU is an altered parental role and relationship with their baby.

Stress experienced by mothers

Researchers found that most of the mothers were stressed, worried, and fearful due to the NICU environment and first-time exposure. Also, anxious, stressed, concerned, and distressed due to the baby's condition, diagnosis, and medical intervention. Stress due to NICU hospitalization and delayed discharge, separation from the baby, and maternal role conflict, distress.

Their stress is exacerbated by barriers to accessing neonates at times. Similarly, Byiringiro et al.[17] show that having restrictive access to their newborns was one of the stressful experiences for mothers.

Another finding, mothers showed a high level of trust in healthcare providers, the hospital, and specifically in nurses, and good interaction. In a similar study, Abuidhail et al.[18] show that good support from the healthcare team in the NICU and nurses. In this study, almost all mothers showed no stress and trust in healthcare providers. The mothers in this study shared similar experiences as reported in other previous studies by Byiringiro et al.[17] In general, when their newborns were hospitalized, mothers were understandably stressed and worried about their newborn's condition.

Triangulation of the quantitative and qualitative data

The quantitative findings revealed that most of the mothers had low levels of PPS. Among the four subscales, the highest mean stress scores were related to the baby's look and behavior, followed by stress associated with the baby and parental role.

The highest mean stress score was observed in the baby's appearance and behavior domain. This was strongly supported by qualitative findings, where mothers expressed overwhelming anxiety regarding their baby's breathing difficulties, preterm status, jaundice, and inconsistent recovery. These findings demonstrate a strong convergence between quantitative and qualitative strands regarding infant illness as a primary stressor.

Stress related to disrupted maternal roles was also a consistent theme across both data types. The "Relationship with baby and parental role" subscale showed moderate stress levels, while qualitative narratives illustrated deep sadness stemming from separation, inability to breastfeed, or lack of physical contact with their babies.

The relatively low mean score in the "Staff behavior and communication" subscale reflected positive perceptions of staff among most participants. This was corroborated by qualitative findings where mothers appreciated respectful, transparent communication by nurses and doctors. However, occasional dissatisfaction was reported.

In contrast, the Sight and Sound subscale registered the lowest mean score, suggesting minimal environmental stress. However, qualitative data revealed a disconnect, as many mothers described the NICU environment as "scary" and unfamiliar, especially during their initial exposure.

Another notable contrast emerged in the area of medicine. Although the PSS: NICU does not include a specific subscale on stress related to invasive interventions, qualitative interviews highlighted this as a major emotional burden. The intensity of stress varied, with some mothers reporting it as very stressful and a few describing it as extremely stressful. The study was restricted to the only one hospital. A few mothers did not participate as they were uncomfortable sharing their feelings and did not analyze other factors that may influence mothers' stress levels. As the study was limited to a single institution with a small qualitative sample, further research in diverse settings is recommended to develop comprehensive stress-reduction interventions for NICU mothers.

CONCLUSIONS

Quantitative results using the PSS: NICU scale suggested that most mothers experienced low to moderate PPS levels. However, qualitative findings uncovered profound emotional distress related to their infant's condition,

separation, and the unfamiliarity of the NICU environment. The triangulation of findings highlighted congruence in areas such as stress associated with the baby's appearance and behavior, and the disruption of maternal roles. Contrasts emerged between both datasets, where qualitative analysis indicated emotional impact of the NICU environment and intense fear associated with invasive procedure, but did not indicate quantitative analysis. The findings call for a more comprehensive, family-centered approach in NICU settings, psychosocial support, improved maternal involvement, and enhanced communication in the NICU to reduce maternal stress.

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AUTHORS' CONTRIBUTION

NKS designed the research, did data collection, performed statistical analysis, and prepared the first draft of manuscript. RG designed research, data collection, and analysis, explained and interpreted the data, and contributed to preparing the draft of the manuscript. All authors read and approved the manuscript.

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