A descriptive study to assess parental anxiety among parents of neonates admitted to the neonatal intensive care unit of GGSMCH, faridkot, Punjab

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Abstract:
Background: The admission of a critically ill or premature neonate to a Neonatal Intensive Care Unit (NICU) represents an acute developmental and situational crisis for parents. The alien high-technology environment, coupled with the disruption of the parental caregiving role and uncertainty surrounding neonatal survival, triggers profound parental psychological distress.
Objectives: To assess the levels of parental anxiety among parents of neonates admitted to the NICU of Guru Gobind Singh Medical College and Hospital (GGSMCH), Faridkot, Punjab. To determine domain-specific parental stressors using the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU). To identify the socio-demographic and clinical correlates associated with parental anxiety. **Methodology:** A quantitative, non-experimental descriptive cross-sectional design was conducted among 200 parents (116 mothers, 84 fathers) of neonates hospitalized in the level-III Faridkot, Punjab. Participants were selected using consecutive non-probability sampling. Data collection utilized a structured socio-demographic and neonatal clinical profile sheet, the standardized State-Trait Anxiety Inventory (STAI-Form Y), and the PSS:NICU. Descriptive and inferential statistics (frequencies, percentages, mean $\pm$ standard deviation, independent samples t-test, one-way ANOVA, and Chi-square test) were computed with significance set at $p < 0.05$. **Results:** The mean state anxiety score was 52.48 ± 8.64, and the mean trait anxiety score was 47.32 ± 7.82. Overall, 68.0% ($n = 136$) of parents exhibited severe state anxiety, 26.5% ($n = 53$) moderate anxiety, and 5.5% ($n = 11$) mild anxiety. Mothers reported significantly higher mean state anxiety scores than fathers (55.12 ± 7.91 vs. 48.83 ± 8.24, $t = 5.43, p < 0.001$). Under the PSS:NICU subscales, "Parental Role Alteration" induced the highest stress (4.18 ± 0.62), followed by "Infant Appearance and Behavior" (3.74 ± 0.71) and "Sights and Sounds of the Unit" (2.86 ± 0.84). Maternal primiparity, mechanical ventilation, prolonged NICU stay (> 7 days), rural domicile, and lower socioeconomic status demonstrated statistically significant associations with severe parental state anxiety ($p < 0.05$). **Conclusion:** Parental anxiety is ubiquitous and pronounced among parents in tertiary NICU settings in rural Malwa, Punjab. Family-Centered Care (FCC) models, structured bedside orientation protocols, early kangaroo mother care (KMC), and dedicated psycho-educational counseling delivered by neonatal nurses must be integrated into standard neonatal intensive care protocols.

Keywords:
Parental Anxiety, Neonatal Intensive Care Unit (NICU), State-Trait Anxiety Inventory (STAI), Parental Stressor Scale (PSS: NICU), GGSMCH Faridkot, Family-Centered Care.

1. Introduction and Background:

Childbirth is universally anticipated as a celebratory, fulfilling milestone in family life. However, when a neonate requires urgent admission to a Neonatal Intensive Care Unit (NICU) due to prematurity, respiratory distress syndrome (RDS), and low birth weight (LBW), hypoxic-ischemic encephalopathy (HIE), congenital anomalies, or neonatal sepsis, the normative transition to parenthood is shattered (Miles et al., 1993; Franck et al., 2005). The sudden transfer of a vulnerable infant into a high-dependency clinical environment introduces

profound psychological, emotional, and social strain upon parents (Dudek-Shriber et al., 2004).

In the modern NICU, survival rates of extremely low birth weight (ELBW) and critically ill neonates have improved markedly due to advancements in mechanical ventilation, surfactant replacement therapy, advanced hemodynamic monitoring, and parenteral nutrition (Bua et al., 2024). Nonetheless, this technological sophistication creates an intimidating physical environment characterized by high-frequency auditory alarms, bright phototherapy arrays, multiple infusion lines, endotracheal tubes, and active clinical resuscitations (Carter et al., 1989; Agrawal et al., 2016). Parents find themselves confronted not only with the imminent threat of their infant's mortality or neurological morbidity, but also with an acute deprivation of their expected parental role (Kaur et al., 2025; Singh et al., 2026).

Anxiety in this context operates along two distinct psychometric vectors: state anxiety (an acute, transient emotional condition characterized by subjective feelings of apprehension, tension, and autonomic hyperactivity) and trait anxiety (a relatively stable individual propensity to perceive situations as threatening) (Spielberger et al., 1983). Parents of hospitalized newborns consistently report elevated state anxiety levels that exceed community and general postpartum baselines (Bua et al., 2024). Unresolved parental anxiety impairs postpartum parent-infant bonding, lowers rates of successful exclusive breastfeeding, disrupts maternal milk ejection reflexes through neuroendocrine blunting of oxytocin and prolactin, and precipitates maternal postpartum depression and long-term parental post-traumatic stress disorder (PTSD) (Tzeli et al., 2025).

In India, neonatal morbidity and mortality remain major public health challenges. The National Family Health Survey (NFHS-5) highlights a substantial burden of neonatal mortality, with significant regional variations across states. In Punjab, tertiary referral centers such as Guru Gobind Singh Medical College and Hospital (GGSMCH), Faridkot—a major tertiary academic and healthcare center managed by Baba Farid University of Health Sciences (BFUHS)—cater to a diverse socio-demographic cohort encompassing rural, agrarian, and semi-urban populations of the Malwa belt. The parental cohort presenting to GGSMCH frequently navigates unique challenges: multi-generational joint family dynamics, limited baseline health literacy regarding specialized neonatal procedures, financial stress associated with tertiary care hospitalization, and geographic displacements from surrounding rural pockets (Kaur et al., 2025).

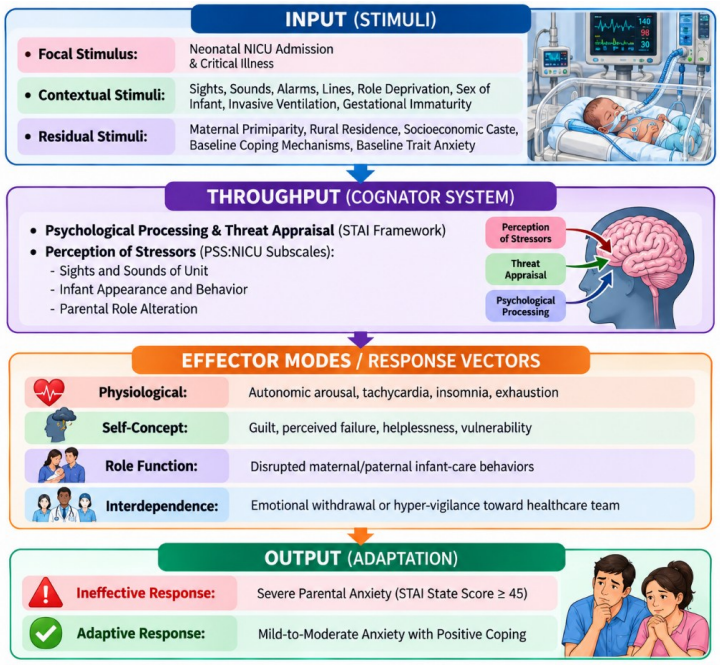
Despite the proliferation of specialized newborn care units (SNCUs) and NICUs across Punjab, empirical investigations evaluating parental mental health, psychological morbidity, and specific environmental stressors remain scarce in this geographical quadrant. Understanding parental anxiety and its contextual determinants in tertiary health systems is essential for developing evidence-based Family-Centered Care (FCC) pathways.

2. Need for the study:

1. **High Psychological Burden:** Recent clinical reports indicate that upwards of 70% to 90% of parents with neonates admitted to critical care experience clinically meaningful psychological distress and anxiety (Singh et al., 2026).
2. **Impact on Neonatal Neurodevelopment:** Prolonged parental anxiety impairs parents' ability to engage in responsive caregiving, attuned holding, and sensitive vocal interaction, all of which are critical for the neurobehavioral maturation of high-risk infants (Miles et al., 1993; Franck et al., 2005).
3. **Role Alteration vs. Physical Environment:** Empirical literature reveals that parental distress is driven more heavily by "role alteration"—the inability to hold, feed, or protect one's baby—than by the technical sights and sounds of the intensive care ward (Miles et al., 1993; Agrawal et al., 2016). Quantifying this relationship in an Indian public teaching hospital enables targeted nursing counseling.
4. **Institutional Context of Malwa, Punjab:** GGSMCH serves as the apex tertiary care referral institution for south-western Punjab. While clinical protocols for neonatal stabilization, surfactant therapy, and exchange transfusion are standardized, baseline psychological screening for admitted parents is not routinely operationalized. This descriptive empirical baseline provides administrative and clinical nursing evidence to establish structured psycho-educational orientation and family support desks.

3. Theoretical and conceptual framework:

The conceptual foundation of this study is grounded in **Callista Roy's Adaptation Model (RAM)**, synthesized with **Spielberger's State-Trait Anxiety Model** and the **Environmental Stress Theory** of Miles and Carter (Spielberger et al., 1983; Roy, 1984; Carter et al., 1989).



Within this model:

- **Focal Stimulus:** The acute, unexpected hospitalization of the neonate in the NICU.
- **Contextual Stimuli:** The physical and communicative environment (monitors, alarms, ventilators, tubes), the physical appearance of the baby (small size, color, breathing patterns), and the disruption of normal parenting behaviors.
- **Residual Stimuli:** Individual socio-demographic variables including age, parity, educational attainment, socioeconomic status, and preexisting baseline trait anxiety.
- **Cognator Mechanism:** Internal cognitive and emotional processes mediating the parent's appraisal of the threat.
- **Output:** The level of state anxiety manifest in the parent, categorized as mild, moderate, or severe.

4. Objectives of the study:

1. To assess the level of state and trait anxiety among parents of neonates admitted to the NICU of GGSMCH, Faridkot, Punjab.
2. To assess the domain-specific sources of parental stress using the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS:NICU).
3. To determine the differences in anxiety levels between mothers and fathers of hospitalized neonates.
4. To evaluate the association between the levels of parental state anxiety and selected socio-demographic variables (parental age, gender, education, family type, parity, socioeconomic status, domicile).
5. To evaluate the association between the levels of parental state anxiety and selected neonatal clinical variables (gestational age, birth weight, diagnosis, requirement for mechanical ventilation, length of NICU stay).

5. Hypotheses:

All hypotheses were formulated at the $\alpha = 0.05$ significance level:

- **H_1:** There is a statistically significant difference in the mean state anxiety scores between mothers and fathers of admitted neonates.
- **H_2:** There is a statistically significant association between the level of parental state anxiety and selected socio-demographic variables of the parents.
- **H_3:** There is a statistically significant association between the level of parental state anxiety and selected clinical characteristics of the neonate.

6. Operational definitions:

- **Parent:** The biological mother or biological father of the neonate currently hospitalized in the NICU of GGSMCH, Faridkot, who is available and directly involved in the baby's care.
- **Neonate:** A newborn infant from birth up to 28 days of chronological postnatal age admitted to the NICU of GGSMCH.

- **Parental Anxiety:** A state of emotional apprehension, subjective tension, worry, and physiological arousal experienced by the parent in response to their newborn's critical illness and hospitalization, operationally measured using the standardized Spielberger State-Trait Anxiety Inventory (STAI-Form Y).
  - *Mild Anxiety:* STAI State score between 20 and 37.
  - *Moderate Anxiety:* STAI State score between 38 and 44.
  - *Severe Anxiety:* STAI State score of 45 and above.
- **Parental Stressors:** Specific physical, observational, and behavioral triggers within the neonatal unit environment evaluated across three core subscales (Sights and Sounds, Infant Appearance, and Parental Role Alteration) via the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS:NICU) developed by Miles et al. (1993).
- **NICU of GGSMCH, Faridkot:** The 30-bed, level-III tertiary neonatal intensive care unit situated at Guru Gobind Singh Medical College and Hospital, Faridkot, Punjab.

7. Review of literature:

The review of literature is organized under four thematic headers:

1. Epidemiology and prevalence of parental anxiety and distress in the NICU.
2. Sources and domains of environmental and psychological stressors in the NICU.
3. Gender differentials: maternal versus paternal psychological responses.
4. Predictors and socio-demographic/clinical correlates of parental anxiety in Indian and global contexts.

7.1. Epidemiology and Prevalence of Parental Anxiety in the NICU:

Parental psychological morbidity following an infant's NICU admission is documented as an acute mental health challenge globally. Franck et al. (2005) investigated parental stress across diverse intensive care settings in the United Kingdom, establishing that over 65% of parents demonstrated clinical thresholds for severe emotional strain during the first week of infant admission. In a multicenter European cohort, Bua et al. (2024) observed that parental distress in intensive units far exceeds normative community controls, with 76.0% of mothers and 45.3% of fathers suffering from clinically significant anxiety or depressive symptoms simultaneously.

Within India, hospital-based studies illustrate similarly high burdens. Singh et al. (2026), in a comparative investigation conducted in a tertiary center in Punjab, reported that mothers of neonates admitted to the NICU demonstrated an anxiety prevalence of 92.5% using the Perinatal Anxiety Screening Scale (PASS), compared to 70.6% among mothers of healthy term newborns ($p < 0.001$). Similarly, Kaur et al. (2025) identified marked psychological distress in parents across North Indian intensive nurseries, identifying emotional, economic, and procedural anxieties as primary drivers of parental instability.

7.2. Domains of Stressors: The PSS:NICU Paradigm:

Miles et al. (1993) developed and validated the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS:NICU), isolating three principal dimensions: "Sights and Sounds," "Infant Appearance and Behavior," and "Parental Role Alteration." Subsequent validation across international cultures (Dudek-Shriber et al., 2004; Tzeli et al., 2025) confirmed that while the physical machinery, flashing monitors, and alarms (Sights and Sounds) provoke baseline apprehension, "Parental Role Alteration" consistently generates the highest subjective stress scores. Parents perceive the inability to protect, soothe, hold, and care for their fragile child as a severe failure of their core parental identity (Carter et al., 1989; Agrawal et al., 2016).

Agrawal et al. (2016), evaluating parental stressors in an Indian teaching hospital, confirmed that "Relationship with the baby and parental role" scored the highest mean stress score (4.22 ± 0.64), followed by infant appearance (3.89 ± 0.72), whereas sights and sounds yielded the lowest relative distress (2.65 ± 0.81).

7.3. Maternal Versus Paternal Experiences:

The manifestation of psychological distress often diverges along gender lines within the neonatal nursery. Bua et al. (2024) reported that mothers scored significantly higher on median stress (2.9 vs. $2.2, p < 0.001$) and trait anxiety (37 vs. $32, p = 0.004$) compared to fathers. High stress was identified in 45.5% of mothers compared to 24.1% of fathers ($p = 0.004$).

Mothers often internalize grief, helplessness, and somatic fatigue related to physiological postpartum recovery, whereas fathers frequently bear a dual burden: providing psychological stability for their spouse while managing the financial liabilities, pharmacy procurement, and family communications outside the unit perimeter (Carter et al., 1989; Kaur et al., 2025). This externalization frequently leads to under-recognized

paternal anxiety, which remains largely unaddressed by conventional clinical nursing workflows (Franck et al., 2005).

7.4. Correlates and Clinical Predictors of Parental Anxiety:

A spectrum of parental and neonatal variables correlates with the magnitude of experienced anxiety. In their case-control analysis, Singh et al. (2026) demonstrated that young maternal age (< 25 years), cesarean delivery, and having a female neonate were statistically significant determinants of heightened maternal anxiety in Punjab ($p < 0.05$). Studies by Dudek-Shriber et al. (2004) and Bua et al. (2024) identified infant prematurity, extremely low birth weight, invasive mechanical ventilation, and total duration of intensive care hospitalization as significant amplifiers of parental anxiety.

In an exploratory study from a tertiary facility in Jalandhar, Punjab, investigators demonstrated that lower gestational age, prolonged NICU stay, parental illiteracy, living in nuclear families, and requirement for endotracheal intubation served as statistically significant stressors for admitted parents (Agrawal et al., 2016; Singh et al., 2026). The absence of extended familial support systems was identified as a critical predisposing factor for psychological decompensation among mothers in North India.

8. Methodology:

8.1. Research Approach and Design:

A quantitative, non-experimental descriptive cross-sectional survey design was selected to quantify the levels of parental anxiety, detail domain-specific stressors, and explore relationships with demographic and clinical variables without introducing experimental manipulation.

8.2. Research Setting:

The investigation was conducted at the Neonatal Intensive Care Unit Faridkot, Punjab. The level-III NICU comprises a 30-bed capacity equipped with advanced radiant warmers, conventional and high-frequency ventilators, multiparameter physiological monitors, bubble CPAP devices, double-surface phototherapy units, and an adjacent Step-Down/Kangaroo Mother Care (KMC) ward.

8.3. Population, Sample, and Sampling Technique:

- **Target Population:** All biological parents (mothers and fathers) of neonates admitted to tertiary care NICUs in Punjab.
- **Accessible Population:** Parents of neonates admitted to the NICU of GGSMCH, Faridkot during the active data collection window.
- **Sample Size:** 200 parents (116 mothers and 84 fathers). Sample size was calculated using the single proportion formula:

$$n = \frac{Z_{1-\alpha/2}^2 \cdot p \cdot (1-p)}{d^2}$$

Assuming an anticipated prevalence (p) of parental anxiety in the NICU of 80% (0.80) based on regional literature (Singh et al., 2026), a 95% confidence level ($Z = 1.96$), and an absolute precision margin (d) of 5.5% (0.055):

$$n = \frac{(1.96)^2 \cdot 0.80 \cdot 0.20}{(0.055)^2} \approx 203$$

Accounting for incomplete surveys, a final sample of 200 enrolled participants was secured.

- **Sampling Technique:** Consecutive non-probability sampling. Every eligible parent visiting or attending to their neonate in the unit who fulfilled the selection criteria was recruited until the target quota was met.

8.4. Criteria for Selection:

Inclusion Criteria:

1. Biological mother or father of a neonate admitted to the NICU of GGSMCH for a minimum of 48 hours.
2. Parents aged 18 years and above.
3. Parents able to comprehend and converse in Punjabi, Hindi, or English.
4. Parents providing written informed consent.

Exclusion Criteria:

1. Parents with pre-existing, documented psychiatric disorders or those receiving ongoing psychopharmacological therapy prior to this delivery.
2. Parents whose neonates were in an active, unstable peri-arrest or immediate moribund clinical state.
3. Parents suffering from acute postpartum physical complications requiring intensive maternal medical care.

8.5. Data Collection Instruments:

Data collection used a three-part structured questionnaire battery translated into Punjabi and Hindi through forward-backward translation protocols:

1. **Part I: Socio-Demographic and Clinical Data Sheet:**
   - *Parental Socio-demographics:* Age, gender, educational status, occupation, monthly family income (classified as per the modified Kuppuswamy socio-economic scale), family structure (nuclear vs. joint), residential domicile (rural vs. urban), and parity.
   - *Neonatal Clinical Profile:* Gestational maturity (preterm < 37 weeks vs. term ≥ 37 weeks), birth weight (< 1500 g, 1500--2499 g, ≥ 2500 g), primary admission diagnosis, requirement for invasive mechanical ventilation, and total duration of NICU stay at assessment.
2. **Part II: Spielberger State-Trait Anxiety Inventory (STAI - Form Y):**
   - A globally validated 40-item self-report scale divided into two 20-item subscales:
     - *State Anxiety (S-Anxiety):* Evaluates how the parent feels right now at this moment (e.g., tension, apprehension, nervousness).
     - *Trait Anxiety (T-Anxiety):* Evaluates how the parent generally feels across typical baseline scenarios.
   - Each item is scored on a 4-point Likert scale (1 = Not at all, to 4 = Very much so for S-Anxiety; 1 = Almost never, to 4 = Almost always for T-Anxiety). Reverse scoring applies to positive items. Scores range from 20 to 80 per subscale.
   - Standard categorization: Mild (20–37), Moderate (38–44), Severe (≥ 45).
3. **Part III: Parental Stressor Scale: Neonatal Intensive Care Unit (PSS:NICU):**
   - Adapted from Miles et al. (1993), comprising 34 items divided across 3 subscales:
     - *Subscale 1: Sights and Sounds* (5 items; e.g., monitor beeps, alarms, sudden noises).
     - *Subscale 2: Infant Appearance and Behavior* (17 items; e.g., small size, skin color, tubes, IV lines, crying, lethargy).
     - *Subscale 3: Parental Role Alteration* (12 items; e.g., separation, not holding the baby, unable to feed, feeling helpless).
   - Items are scored on a 5-point Likert scale from 1 ("Not at all stressful") to 5 ("Extremely stressful"). A Metric Stress Score is derived by dividing total scores by the number of applicable items.

8.6. Validity and Reliability:

- **Content Validity:** Evaluated by a panel of seven experts comprising two senior neonatologists, three pediatric nursing professors, one clinical psychologist, and one biostatistician. Suggestions regarding language clarity in Punjabi and regional phrasing were incorporated.
- **Reliability:** Pre-tested during a pilot study among 20 parents admitted to the same clinical area (data excluded from main analysis). Internal consistency was computed using Cronbach's alpha (α):
  - STAI State Anxiety: $\alpha = 0.89$
  - STAI Trait Anxiety: $\alpha = 0.84$
  - PSS:NICU Overall Scale: $\alpha = 0.92$

These coefficients indicate strong psychometric reliability.

8.7. Ethical Considerations:

Ethical clearance was obtained from the Institutional Ethics Committee (IEC) of Guru Gobind Singh Medical College and Hospital, Faridkot. Administrative permission was secured from the Medical Superintendent and the Head of the Department of Pediatrics/Neonatology. Informed written consent was acquired from each parent prior to enrollment, following a comprehensive verbal explanation in their native dialect regarding the study's scope, voluntary participation, and freedom to withdraw at any juncture without impacting their infant's medical management. Strict confidentiality and data anonymity were maintained throughout via unique participant coding.

8.8. Data Collection Procedure:

Data were collected over a four-month period. Eligible parents were approached during designated visiting hours or while attending routine KMC/expressed breast milk (EBM) feeding sessions in the mother-infant counseling room adjacent to the NICU. Questionnaires were administered in a private, quiet room. Parents with limited literacy received uniform, non-directive reading of items by the principal investigator. Each session lasted approximately 25 to 35 minutes.

8.9. Plan for Statistical Analysis:

Data were entered into Microsoft Excel and analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY).

- Descriptive statistics (frequency, percentage, mean, standard deviation) summarized demographic attributes, clinical parameters, and stress scores.
- An independent samples t-test evaluated mean anxiety differences between mothers and fathers.
- Pearson's correlation coefficient assessed relationships between PSS:NICU stress domains and STAI state anxiety scores.
- Chi-square (χ^2) tests and Fisher's exact tests evaluated associations between categorical parental anxiety tiers and socio-demographic/clinical parameters. A p-value < 0.05 was considered statistically significant.

9. Results and data analysis:

9.1. Socio-Demographic Profile of Participants:

The study cohort comprised 200 parents (116 mothers, 58.0%; 84 fathers, 42.0%).

Table. 1: Distribution of Parents by Socio-Demographic Characteristics (N = 200)

Demographic Variable	Categories	Frequency (n)	Percentage (%)
Parental Age (Years)	18–24	62	31.0
	25–30	94	47.0
	>30	44	22.0
Gender of Parent	Mother	116	58.0
	Father	84	42.0
Educational Attainment	Illiterate	28	14.0
	Primary / Middle	54	27.0
	Matric / Sr. Sec.	82	41.0
	Graduate & Above	36	18.0
Occupational Status	Homemaker	104	52.0
	Daily Wage/Labor	42	21.0
	Agriculture/Farmer	32	16.0
	Salaried / Business	22	11.0
Residential Domicile	Rural	138	69.0
	Urban	62	31.0
Family Structure	Nuclear	78	39.0
	Joint	122	61.0
Parity (Maternal)	Primiparous	96	48.0
	Multiparous	104	52.0
Socioeconomic Status (Kupp)	Upper & Upper Middle	24	12.0
	Lower Middle	72	36.0
	Upper Lower/Lower	104	52.0

9.2. Clinical Profile of Admitted Neonates:

Clinical characteristics of the neonates representing the 200 enrolled parents were analyzed across essential diagnostic and physiological categories.

Table 2: Clinical Characteristics of Admitted Neonates (N = 200)

Clinical Characteristic	Categories	Frequency (n)	Percentage (%)

Gestational Age	Preterm (<37 weeks)	128	64.0
	Term (≥37 weeks)	72	36.0
Birth Weight	<1500 g (VLBW)	46	23.0
	1500–2499 g	98	49.0
	≥2500 g	56	28.0
Primary Clinical Diagnosis	Preterm + RDS	74	37.0
	Neonatal Sepsis	42	21.0
	Birth Asphyxia/HIE	36	18.0
	Neonatal Jaundice	28	14.0
	Congenital/Other	20	10.0
Respiratory Support	Yes (Invasive Mechanical Ventilation)	58	29.0
	Non-invasive/CPAP	64	32.0
	Low-flow Oxygen	78	39.0
Duration of NICU Stay	≤3 days	48	24.0
	4–7 days	86	43.0
	>7 days	66	33.0

9.3 Overall Levels of Parental Anxiety (STAI):
Data assessed via the State-Trait Anxiety Inventory revealed marked elevations in parental anxiety scores.

Table. 3: Mean Scores and Distribution of Parental Anxiety Levels (N = 200)

Anxiety Dimension	Classification	Frequency (n)	Percentage (%)	Mean ± SD (Range)
State Anxiety (S-Anxiety)	Mild (20–37)	11	5.5	
	Moderate (38–44)	53	26.5	52.48 ± 8.64
	Severe (≥45)	136	68.0	(24–74)
Trait Anxiety (T-Anxiety)	Mild (20–37)	26	13.0	
	Moderate (38–44)	82	41.0	47.32 ± 7.82
	Severe (≥45)	92	46.0	(22–68)

As detailed in Table 3, more than two-thirds of all enrolled parents (68.0%, $n = 136$) met the clinical criterion for severe state anxiety (S-Anxiety score ≥ 45), with an overall mean of 52.48 ± 8.64.

Table. 4: Comparison of State and Trait Anxiety Scores Between Mothers and Fathers

Scale Component	Mothers (n = 116) Mean ± SD	Fathers (n = 84) Mean ± SD	t-statistic	p-value
State Anxiety	55.12 ± 7.91	48.83 ± 8.24	5.43	<0.001*
Trait Anxiety	48.65 ± 7.54	45.48 ± 7.88	2.87	0.004*

*Statistically significant at $p < 0.05$
Table 4 confirms that mothers experienced significantly higher levels of acute state anxiety (55.12 ± 7.91) compared to fathers (48.83 ± 8.24, $t = 5.43, p < 0.001$). Baseline trait anxiety was also significantly higher among mothers ($t = 2.87, p = 0.004$).

9.4. Assessment of Environmental Stressors (PSS:NICU):
Environmental stressors triggering parental anxiety were examined across the three operational subscales of the PSS:NICU.

Table. 5: Ranking and Mean Metric Scores of PSS:NICU Subscales (N = 200)

Rank	Stressor Domain Subscale	Score Range	Mean ± SD	Level
1	Parental Role Alteration	1.0–5.0	4.18 ± 0.62	High
2	Infant Appearance and Behavior	1.0–5.0	3.74 ± 0.71	High
3	Sights and Sounds of the Unit	1.0–5.0	2.86 ± 0.84	Moderate
	Overall PSS:NICU Stress Index	1.0–5.0	3.68 ± 0.66	High

Analysis revealed that **Parental Role Alteration** generated the highest subjective stress (4.18 ± 0.62). Within this domain, specific items with the highest mean scores included:

- "Feeling helpless about how to help my infant during crying or distress" (4.62 ± 0.58)
- "Being separated from my baby after delivery" (4.56 ± 0.64)
- "Not being able to feed my baby myself" (4.42 ± 0.72)

The **Infant Appearance and Behavior** subscale ranked second (3.74 ± 0.71), driven by:

- "Seeing tubes, cannulas, and needles in my baby" (4.38 ± 0.66)
- "The small size and thin skin of the baby" (4.12 ± 0.78)
- "Jerking or bruised skin" (3.84 ± 0.82)

The **Sights and Sounds** subscale was rated the lowest (2.86 ± 0.84), with sudden monitors beeping and flashing alarms scoring 3.24 ± 0.88.

A Pearson correlation analysis showed a strong, statistically significant positive correlation between the overall PSS:NICU stress score and parental state anxiety ($r = 0.684, p < 0.001$).

9.5. Association Between Parental State Anxiety and Selected Socio-Demographic Variables:

Table. 6: Association Between Parental State Anxiety Levels and Socio-Demographic Variables

Demographic Variable	Total (N)	Mild–Moderate (n = 64)	Severe (n = 136)	Chi-Square (χ^2)	p-value
Age Group (Years)					
18–24	62	12 (19.4%)	50 (80.6%)	6.94	0.031*
25–30	94	34 (36.2%)	60 (63.8%)		
>30	44	18 (40.9%)	26 (59.1%)		
Gender of Parent					
Mother	116	24 (20.7%)	92 (79.3%)	15.68	<0.001*
Father	84	40 (47.6%)	44 (52.4%)		
Residential Domicile					
Rural	138	36 (26.1%)	102 (73.9%)	5.21	0.022*
Urban	62	28 (45.2%)	34 (54.8%)		
Parity (Mothers Only)					
Primiparous	58	6 (10.3%)	52 (89.7%)	**9.82**	**0.002***
Multiparous	58	18 (31.0%)	40 (69.0%)		
Socioeconomic Status					
Upper & Upper Middle	24	14 (58.3%)	10 (41.7%)	**10.32**	**0.006***
Lower Middle	72	24 (33.3%)	48 (66.7%)		
Upper Lower & Lower	104	26 (25.0%)	78 (75.0%)		

*Significant at $p < 0.05$

As demonstrated in Table 6:

- Younger parents (18–24 years) displayed significantly higher rates of severe state anxiety (80.6%) compared to parents over 30 (59.1%, $\chi^2 = 6.94, p = 0.031$).
- Mothers were significantly more likely to manifest severe anxiety than fathers (79.3% vs. 52.4%, $\chi^2 = 15.68, p < 0.001$).
- Rural domicile ($\chi^2 = 5.21, p = 0.022$) and lower socioeconomic class ($\chi^2 = 10.32, p = 0.006$) were significantly associated with severe state anxiety.
- Primiparous mothers experienced a significantly higher incidence of severe anxiety (89.7%) compared to multiparous mothers (69.0%, $\chi^2 = 9.82, p = 0.002$).

9.6. Association Between Parental State Anxiety and Clinical Characteristics of the Neonate:

Table. 7: Association Between Parental State Anxiety Levels and Neonatal Clinical Parameters

Clinical Parameter	Total	Mild–Moderate (n =	Severe (n =	Chi-Square	p-

	(N)	64)	136)	(χ^2)	value
Gestational Maturity					
Preterm (<37 weeks)	128	32 (25.0%)	96 (75.0%)	7.12	0.008*
Term (≥37 weeks)	72	32 (44.4%)	40 (55.6%)		
Birth Weight					
<1500 g (VLBW)	46	6 (13.0%)	40 (87.0%)	10.84	0.004*
1500–2499 g	98	34 (34.7%)	64 (65.3%)		
≥2500 g	56	24 (42.9%)	32 (57.1%)		
Mechanical Ventilation					
Invasive Endotracheal	58	8 (13.8%)	50 (86.2%)	12.44	0.002*
Non-invasive / CPAP	64	20 (31.2%)	44 (68.8%)		
Low-Flow Oxygen/None	78	36 (46.2%)	42 (53.8%)		
Duration of Stay					
≤3 days	48	22 (45.8%)	26 (54.2%)	7.86	0.020*
4–7 days	86	28 (32.6%)	58 (67.4%)		
>7 days	66	14 (21.2%)	52 (78.8%)		

*Significant at $p < 0.05$

The clinical condition of the neonate significantly influenced parental anxiety. Parents of preterm infants (< 37 weeks) demonstrated significantly higher rates of severe anxiety (75.0%) compared to parents of term infants (55.6%, $p = 0.008$). Similarly, very low birth weight (< 1500 g) infants (87.0% severe anxiety, $p = 0.004$), invasive mechanical ventilation (86.2% severe anxiety, $p = 0.002$), and hospitalization extending beyond 7 days (78.8% severe anxiety, $p = 0.020$) were significant predictors of elevated parental state anxiety.

10. Discussion:

This study evaluated parental anxiety among 200 parents of neonates hospitalized in the level-III NICU of GGSMCH, Faridkot, and Punjab.

10.1. Prevalence and Severity of Anxiety:

The finding that 68.0% of parents exhibited severe state anxiety (S-Anxiety ≥ 45) aligns with national and global literature. Singh et al. (2026), in their tertiary hospital study in Punjab, documented perinatal anxiety rates exceeding 90% among mothers of sick neonates. In Italy, Bua et al. (2024) observed that 76% of mothers in the NICU experienced severe psychiatric distress, including anxiety and postpartum depressive symptoms. Carter et al. (1989) and Franck et al. (2005) corroborated that the admission of an infant to an intensive care environment universally generates acute adaptive crisis and autonomic emotional strain.

10.2. Maternal Versus Paternal Variations:

Mothers demonstrated significantly higher mean state anxiety scores (55.12 ± 7.91) than fathers (48.83 ± 8.24, $p < 0.001$). This difference can be understood through both biological and cultural frameworks. Biologically, postpartum mothers undergo rapid endocrine shifts, physical exhaustion, pain from episiotomy or cesarean incisions, and early lactation establishment, all of which compound emotional vulnerability (Singh et al., 2026). Culturally, in rural Punjab, mothers assume primary caregiving and nurturing responsibilities, rendering the separation from their infant disruptive to their self-identity (Kaur et al., 2025).

Fathers, while exhibiting lower overall state scores, nonetheless demonstrated substantial distress (52.4% classified as severe anxiety). This aligns with Bua et al. (2024), who emphasized that paternal anxiety often goes undetected because men frequently suppress subjective distress to project emotional resilience and manage logistics outside the clinical ward.

10.3. Hierarchy of Stressor Domains: PSS: NICU:

Analysis of the PSS:NICU identified **Parental Role Alteration** (4.18 ± 0.62) as the most distressing domain, followed by **Infant Appearance and Behavior** (3.74 ± 0.71), whereas **Sights and Sounds** (2.86 ± 0.84) induced the least stress. These findings are consistent with Miles et al. (1993), who established that mechanical

equipment is secondary to the grief and helplessness parents feel when they cannot hold, soothe, or feed their infant.

Agrawal et al. (2016) similarly found in an Indian cohort that parental role deprivation scored the highest metric stress (4.22 ± 0.64). When parents enter the NICU, alarms and monitors are initially jarring, but over time, it is the inability to enact normative parenting rituals—such as breastfeeding, holding, and caretaking—that sustains psychological morbidity (Dudek-Shriber et al., 2004; Tzeli et al., 2025).

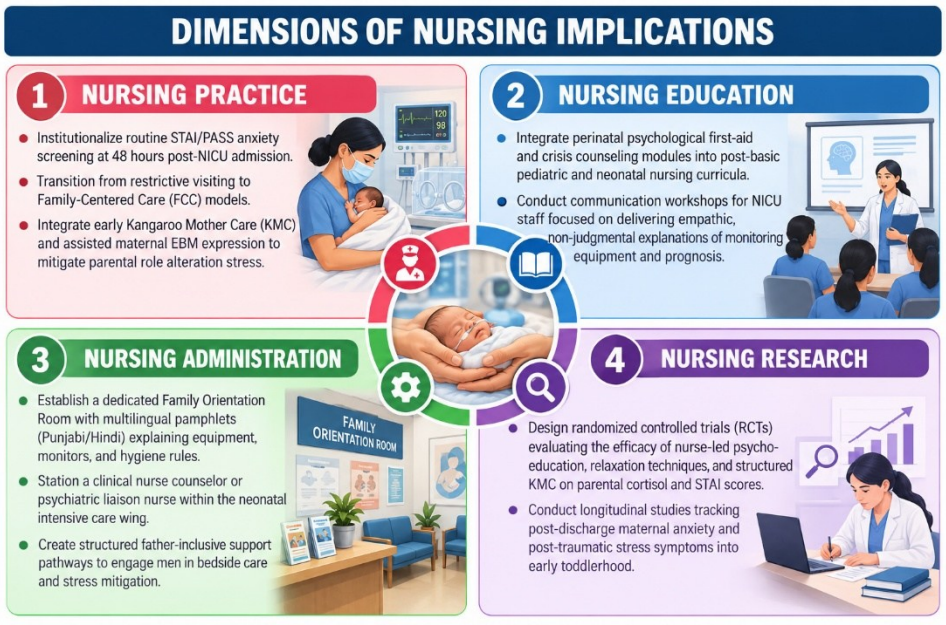
10.4. Socio-demographic and clinical determinants:

Younger age (18--24 years) and primiparity were significantly associated with higher state anxiety ($p < 0.05$). Primiparous mothers, lacking prior caregiving experience, interpret technological interventions and alarms with heightened catastrophic appraisal (Singh et al., 2026). Rural residence and lower socioeconomic status also correlated significantly with severe anxiety, mirroring findings from other Indian public hospitals (Agrawal et al., 2016; Kaur et al., 2025). Families from rural farming or daily-wage backgrounds encounter financial stress, transport barriers, and lower baseline health literacy, compounding feelings of helplessness in a tertiary medical center.

Clinical indices of infant morbidity—including prematurity (< 37 weeks), very low birth weight (< 1500 g), invasive mechanical ventilation, and prolonged hospital stay (> 7 days)—were strong predictors of severe anxiety ($p < 0.01$). Ventilator alarms, endotracheal tape, chest retractions, and prolonged separation signal imminent mortality to parents, elevating autonomic arousal and anxiety states (Franck et al., 2005; Bua et al., 2024).

11. Nursing implications:

The empirical findings from GGSMCH, Faridkot carry actionable implications across four key domains of nursing:



12. Strengths, limitations, and recommendations:

Strengths:

- Uses globally validated, psychometrically sound instruments (STAI-Form Y and PSS:NICU) translated and validated in local languages.
- Simultaneous recruitment of mothers and fathers provides a balanced perspective on paternal mental health in an Indian public hospital.
- Evaluates both parental socio-demographics and objective neonatal clinical illness variables.

Limitations:

- Cross-sectional design captures anxiety at a single cross-section, precluding assessment of trajectory over the hospital stay.
- Conducted at a single tertiary center in Faridkot, Punjab, limiting generalizability to private or non-academic community clinics.
- Relies on self-report questionnaires without concurrent physiological biomarkers (e.g., salivary cortisol

or heart rate variability).

Recommendations:

1. Replicate the study using a multicenter, prospective longitudinal design across various districts of Punjab.
2. Formulate and clinically evaluate structured, nurse-delivered Family-Centered Care (FCC) bundles in SNCUs and tertiary NICUs throughout Punjab.
3. Establish dedicated peer-support groups connecting experienced graduate-NICU parents with newly admitted families.

13. Conclusion:

This study demonstrates a high prevalence of severe state anxiety (68.0%) among parents of neonates admitted to the NICU of GGSMCH, Faridkot, and Punjab. Disruption of the parental caregiving role constitutes the primary driver of parental psychological distress, outranking the physical sights and sounds of medical equipment. Mothers, primiparous parents, rural residents, and parents of premature, mechanically ventilated neonates face heightened risk for severe anxiety states.

Mitigating this psychological burden requires structural evolution in neonatal nursing care—shifting from an exclusive focus on infant physiology toward holistic, Family-Centered Care that integrates early bedside parental involvement, Kangaroo Mother Care, structured orientation, and proactive psychological support.

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