

INPLASY

INPLASY2025110019

doi: 10.37766/inplasy2025.11.0019

Received: 7 November 2025

Published: 7 November 2025

Corresponding author:

Ilana Shiff

ishiff@yorku.ca

Author Affiliation:

York University.

Parental Stress in the Context of Preterm Infant Intensive Care: Associations with Parent–Child Interactions

Shiff, I; Garvey, N; Bhupal, D; De Araujo, L; Lebovic, A; Premji, S; Pillai Riddell, R.

ADMINISTRATIVE INFORMATION**Support** - Canadian Institutes of Health Research (CIHR) Doctoral Scholarship.**Review Stage at time of this submission** - Formal screening of search results against eligibility criteria.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY2025110019**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 7 November 2025 and was last updated on 7 November 2025.**INTRODUCTION**

Review question / Objective This systematic review will synthesize the empirical literature surrounding the relationship between parental stress during neonatal intensive care unit and how this relates to concurrent and future parent–child relational outcomes, such as interaction quality, attachment, and caregiving quality. The overarching research question guiding this review is: Among parents of preterm infants who were cared for in a neonatal intensive care unit, how is parental stress (measured at any point over the infant's first year of life) associated with parent–child dyadic outcomes (measured either concurrently or longitudinally).

This will be a narrative review of published empirical studies (cross-sectional, longitudinal, cohort, or intervention-based). Studies without observational assessment, literature reviews, and case reports will be excluded.

The primary objective is to determine the strength and consistency of associations between parental stress and parent–child interactive outcomes in the context of preterm birth and intensive care. A secondary objective is to identify potential moderators—such as child gestational age, time of stress or dyadic assessment, ethnocultural identity, or type of stress measure—that may influence these associations.

By integrating evidence across diverse study designs and measurement approaches, this review aims to clarify whether and how early parental stress within or following the NICU shapes the development of parent–child relational functioning, a critical period for attachment formation and child development.

Condition being studied Preterm birth, defined as delivery before 37 weeks of gestation, remains a major global health concern, affecting roughly one in ten live births worldwide. Although advances in neonatal intensive care have markedly improved

survival rates, the medical complexity, prolonged hospitalization, and early separation that accompany neonatal intensive care unit (NICU) stays create a uniquely stressful and isolating context for parents and families, both during hospitalization as well as subsequent to discharge.

Initial scoping of the literature suggests that parental stress in this context is multifaceted, encompassing general stress, social support-related stress, parenting stress, and NICU-specific stress. Parents often report feelings of helplessness, uncertainty, and loss of control during and after their child's hospitalization, reflecting both situational pressures and broader psychosocial strain.

These experiences occur during a sensitive developmental window for both the infant and the emerging parent-child relationship. Elevated stress may compromise parents' ability to respond sensitively to their child's cues, leading to less synchronous, more intrusive, or withdrawn interactions. Such disruptions have been linked to difficulties in attachment formation as well as emotional and physiological co-regulation.

Given the variability in how parental stress is conceptualized and measured, synthesizing this literature is essential to clarify how these factors relate to parent-child interaction quality, attachment, and caregiving behaviors in families of preterm children following intensive care.

METHODS

Participant or population This review will include studies involving parents or primary caregivers of preterm infants (born before 37 weeks' gestation) who are receiving or have received care in a neonatal intensive care unit (NICU). Eligible study participants will include mothers, fathers, birthing parents, or other primary caregivers who have a central caregiving role post-NICU.

Infants may vary in gestational age (e.g., extremely, very, or moderate-to-late preterm) and medical condition, provided they meet criteria for preterm birth and intensive care hospitalization. Studies with comparison groups of full-term infants or parents of full-term infants will be included if they enable examination associations between parental stress or parent-child interaction in the preterm group. Studies that include samples with some non-preterm NICU infants may be included.

Intervention This review is primarily observational and aims to synthesize evidence on the

association between parental stress and parent-child interactive outcomes in the context of preterm infant intensive care. The review will include both observational studies and intervention studies if they provide relevant data on these associations. Interventions may include programs designed to reduce parental stress or enhance parent-infant interaction (e.g., developmental care programs, video feedback, or parental support interventions). However, the review will not focus on evaluating intervention efficacy..

Comparator No specific comparator is required for inclusion.

Study designs to be included This review will include empirical studies that examine associations between parental stress and parent-child interactive outcomes among parents of preterm infants. Eligible designs include observational (cross-sectional, longitudinal, or cohort) and intervention studies that report relevant correlational or predictive data. Case reports, reviews, and commentaries will be excluded.

Eligibility criteria The review will focus on studies involving parents or primary caregivers of children born before 37 weeks gestation who required neonatal intensive care. To be eligible, studies must also:

- Include a measure of parental stress (e.g., general stress, social support-related stress, parenting stress, or NICU-specific stress) assessed during the hospitalization period or within the first year of the child's life (corrected age)
- Include at least one parent-child interaction outcome, such as observed interaction quality (e.g., reciprocity, synchrony), attachment outcomes (e.g., attachment classifications, security), or caregiving quality (e.g., responsive caregiving, scaffolding).
- Include statistical associations between parental stress and parent-child interaction outcomes
- Both concurrent and longitudinal associations between parental stress and dyadic outcomes will be eligible for inclusion.

Studies will be included if they:

- Involve parents or primary caregivers of preterm infants (born <37 weeks' gestation) who are receiving or have received NICU care;
- Assess parental stress using a validated or clearly described measure, measured either during NICU hospitalization or within the first year of infant life; and

- Examine at parent-child interactive outcome, such as caregiving quality, attachment, or dyadic/relational coordination.

Exclusion criteria include:

- Studies focusing on non-preterm or non-NICU populations;
- Animal studies.

Information sources Electronic database searches were conducted in MEDLINE (via Ovid), Embase (via Ovid), PsycINFO (via ProQuest), and CINAHL (via EBSCOhost) from database inception to the date of search execution.

Search strategies were combine controlled vocabulary (e.g., MeSH, Thesaurus terms) and keywords related to preterm or premature infants, neonatal intensive care, parental stress, and parent-child interaction or dyadic outcomes.

Only peer-reviewed empirical studies were included. Dissertations, conference abstracts, and other forms of grey literature were not included, as the review focuses on fully published data with sufficient methodological detail for extraction.

Main outcome(s) The primary outcome of this review will be the association between parental stress and parent-child interactive outcomes among parents of preterm infants who received neonatal intensive care.

Parental stress may be measured using validated instruments assessing general stress, parenting stress, NICU-specific stress, or perceived social support (e.g., Parental Stressor Scale: NICU, Parenting Stress Index, Perceived Stress Scale, Multidimensional Scale of Perceived Social Support). Timing of assessment may occur during NICU hospitalization or post-discharge (up to infant one year).

Parent-child interactive outcomes will include observational assessments of interaction quality (e.g., reciprocity, synchrony), attachment outcomes (e.g., attachment classifications, security), or caregiving quality (e.g., responsive caregiving, scaffolding). Timing of assessments may occur during NICU hospitalization or post-discharge (up to infancy or early childhood).

Outcomes may be reported as correlation coefficients, mean differences, regression estimates, or other effect measures reflecting concurrent or longitudinal associations.

Quality assessment / Risk of bias analysis The methodological quality and risk of bias of included

studies will be independently evaluated using a customized risk of bias tool adapted from the NIH National Heart, Lung, and Blood Institute Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies, the Cochrane Risk of Bias 2.0 tool for randomized and quasi-experimental designs, and established guidelines for best practices in the measurement of psychological and behavioural outcomes.

Each study will be rated as having low, high, unclear, or not applicable risk of bias across five domains:

1. Validity and reliability of parental stress and parent-child interactive outcome measures, including the clarity of construct definitions, psychometric evidence, and appropriateness of scoring or data handling.
2. Consideration of confounding variables relevant to stress and parent-child interaction research (e.g., infant gestational age or medical status, parental demographics, timing of assessment, and contextual factors).
3. Observer- or coder-related bias, including use of validated coding systems, inter-rater reliability, and blinding of assessors when applicable.
4. Influence of missing data, including attrition rates, handling of incomplete cases, and transparency of reporting.
5. Consistency and clarity of inclusion/exclusion criteria and representativeness of the study sample.

Up to four reviewers will complete assessments independently, resolving disagreements by discussion or third-party consultation. Risk of bias ratings will not be used to exclude studies, but will inform the interpretation of evidence.

Strategy of data synthesis A narrative synthesis approach will be used to summarize findings across studies, following guidance from the Cochrane Handbook and best-practice recommendations for developmental and psychological research. Data will first be grouped according to key conceptual categories, including (a) type of parental stress measured (e.g., general stress, parenting stress, NICU-specific stress, perceived social support), (b) type of parent-child interactive outcome (e.g., caregiving quality, attachment, dyadic / relational coordination), and (c) study design (cross-sectional/longitudinal, observational/intervention).

Descriptive information (sample characteristics, measurement tools, effect sizes, and statistical associations) will be extracted. When available,

standardized effect sizes will be documented or calculated from reported data. Patterns of association will be summarized by direction and strength of effect, and differences will be examined according to study quality, sample characteristics, and timing of assessment (e.g., during vs. after NICU stay).

Given the expected heterogeneity in study designs and outcomes, meta-analysis will not be conducted; instead, findings will be synthesized descriptively. Narrative summaries will highlight consistent and divergent evidence linking parental stress with parent-child interactions and identify methodological or contextual factors contributing to variability across studies.

Subgroup analysis If sufficient data are available, subgroup analyses will be conducted narratively to explore potential sources of variability in the association between parental stress and parent-child interactive outcomes. Subgroups will be defined a priori based on key study or sample characteristics expected to influence these associations, including:

- Timing of parental stress assessment – during NICU hospitalization versus post-discharge
- Type of parental stress – general, parenting, NICU-specific, perceived social support
- Timing of dyadic outcome assessment – during NICU hospitalization versus post-discharge (within 1 year) versus early childhood
- Type of dyadic outcome – caregiving quality, attachment, dyadic / relational coordination
- Infant gestational age category – extremely, very, or moderate-to-late preterm.
- Study design – observational versus intervention studies.
- Parent gender – maternal versus paternal samples (where separately reported).
- Ethnocultural group membership (where available)

Where possible, differences in the direction or magnitude of associations will be described across these subgroups. Given the expected methodological heterogeneity across studies, subgroup patterns will be interpreted qualitatively rather than statistically.

Sensitivity analysis No sensitivity analyses will be conducted, as this will be a narrative synthesis.

Country(ies) involved Canada.

Keywords preterm infants; parental stress; neonatal intensive care unit; NICU; parent–infant

interaction; dyadic outcomes; sensitivity; attachment; synchrony; responsiveness; developmental psychology.

Contributions of each author

Author 1 - Ilana Shiff.

Email: ishiff@yorku.ca

Author 2 - Nichaela Garvey.

Email: kaylagar@yorku.ca

Author 3 - Divya Bhupal.

Email: divyahb@my.yorku.ca

Author 4 - Lucas De Araujo.

Email: lucasd03@my.yorku.ca

Author 5 - Andrea Lebovic.

Email: andrealebovic@gmail.com

Author 6 - Shahirose Premji.

Email: shahirose.premji@queensu.ca

Author 7 - Rebecca Pillai Riddell.

Email: rpr@yorku.ca